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A BLENDED SOCIO-CONSTRUCTIVIST COURSE WITH AN ACTIVITY-BASED, COLLABORATIVE LEARNING ENVIRONMENT INTENDED FOR TRAINERS OF CONFERENCE INTERPRETERS

THESE

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Summary

This dissertation concerns the transformation of a successful two-week face-to-face course for interpreter trainers into a one-year blended socio-constructivist course. This change entailed not only redesigning the course curriculum but also designing it for an online context and changing its status from a Certificate to a Master of Advanced Studies course. The research was carried out over two editions of the course and involved 55 learners, seven faculty members, one technical support person and one pedagogical advisor.

From a theoretical point of view, the design of the course is based on a model that lies somewhere between whole scale models like Merrill's (2002) "first principles of instruction" or Van Merriënboer's (2007) 4C/ID,[1] and agile design models such as Tripp & Bichelmeyer's (1990). Our approach could also be qualified as "constructional design" (Jonassen et al., 2007) since the design of activities is clearly based on constructivist strategies (Hannafin & Hill, 2007).

We have used a developmental research approach (Collins et al., 2004; Reeves, 2000). The pilot study conducted between 2000 and 2003 generated the initial Tutoring Support Structure (TSS) design framework, which was then used to design the interpreter trainers' course and which eventually evolved into a new model that we present as a practical outcome.

The study focuses on three goals: 1) to design, implement, and describe a blended socio-constructivist course, 2) to evaluate the course from the perspective of both the faculty and the learners, and 3) to formulate design rules for similar training contexts, i.e. adult, higher education, blended and activity-based courses. To meet the first goal, we have used conjecture maps and activity diagrams. To meet the second goal, we have appealed to both quantitative data – responses to a questionnaire administered to learners and data gathered from the learning environment - and qualitative data – interviews with teaching staff. Finally, to meet the third goal, we have derived design rules from conjectures that are grounded in both theory and empirical findings.

The findings indicate a clearly positive answer to the question of whether we did in fact implement a socio-constructivist learning design. They also confirm that learners did acquire skills. They show that the C3MS[2] portal is an effective socio-constructivist learning environment and that the tools supported pedagogical goals. The TSS framework helped to create an effective socio-constructivist learning design. On the whole, the teaching staff considered the change to teaching with a portal a positive experience and are in favour of expanding its use within the *unité*[3]. Finally, three learner profiles were identified by statistical analysis and suggest three different ways of approaching the learning enterprise. Learners from the "few" profile are definitely not sufficiently involved and allow themselves to be carried by the rest of the group. Learners from the "average" and "a lot" profile are active knowledge builders and know where to look for information and how to regulate their work. The difference between these latter two groups is that learners from the "average" profile practise reflection whereas learners from the "a lot" group do not.

Findings also led to the development of a new design framework, referred to as the "component model of activity-based training", which is more comprehensive than the former TSS framework. From a design perspective, this new framework is the result of both empirical findings and recent theories in educational technologies.

[1] Four-component instructional design system
[2] Community, Content and Collaboration Management System
[3] It is not a university department.

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Chapter 1. Introduction

Society, its beliefs, cultural attitudes, needs and developments have an impact on learning, pedagogy and instructional design. For example, instructional sequences for a given field of study can be taught very differently from one generation to another. From a pragmatic point of view, the introduction of constructivism corresponds to the transition from the Industrial Age to the Information Age. In terms of the skills expected of learners once they enter the workforce, the shift is also visible and expectations change. It may seem trivial to say that if education changes, workers' abilities change accordingly. If the needs of the workplace change, education tries to adapt in order to provide future workers with expected skills. Since instruction depends on the characteristics of the super-system, Reigeluth (1999) highlights the differences, from an organisational perspective, between the Industrial Age and the Information Age (Table 1). The super-system of instruction is to be considered as an organisation of the learning enterprise and the different characteristics identified in the table affect instruction.

Industrial Age	Information Age
Standardization	Customization
Bureaucratic organization	Team-based organization
Centralized control	Autonomy with accountability
Adversarial relationships	Cooperative relationships
Autocratic decision making	Shared decision making
Compliance	Initiative
Conformity	Diversity
One-way communications	Networking
Compartmentalization	Holism
Parts oriented	Process oriented
Planned obsolescence	Total quality
CEO or boss as "king"	Customer as "king"

Table 1: Key markers that distinguish industrial-age and information-age organizations (Reigeluth, 1999, p.17)

Nowadays, workers are increasingly expected to network, to identify and solve problems, and to act strategically. Tomorrow's workers are today's learners, even if standardised education will also remain. There is undoubtedly a need for soft skills – skills defined in terms of expected outcomes, such as communication or critical thinking skills – and complex problem-solving skills. It is thus understandable that instruction can no longer focus simply on standardised learning content if the goal is to prepare tomorrow's workers to be efficient in

the workplace. Education has to adapt to changing conditions and provide learners with adequate skills and intellectual tools.

The present research project is concerned with innovation in the training of conference interpreter trainers worldwide. The dissertation describes and analyses the design and implementation of this training in an activity-based learning environment. It targets three main objectives: 1) to design and implement a blended socio-constructivist course within an activity-based learning environment; 2) to evaluate the design and implementation of the entire course from the perspectives of both the learners and the faculty[4]; and finally, 3) to formulate a theory, in terms of design rules, for any adult training course set in an activity-based learning environment with a face-to-face component. To meet the first two objectives, seven leading research questions are addressed. Based on the findings for these research questions, we formulate conjectures that culminate in a set of design rules that address the third objective. The research questions are as follows: A) To what extent did we implement a socio-constructivist learning design? B) What are the effects of the design on skill acquisition and knowledge building? C) To what extent is the portal an effective learning environment and in what ways did tools support pedagogical goals? D) To what extent did the Tutoring Support Structure framework help to create an effective socio-constructivist learning design? E) How did faculty perceive the implementation of the blended format of the course? F) What do the individual differences among learners consist in? G) What are the relations among variables that we used to answer the previous questions?

Our research approach is called *design* or *development research*. It addresses a practical developmental goal, which is to respond to a specific problem encountered by practitioners. At the same time, it addresses a more theoretical goal, which is to formulate design rules at the end of the research process to guide future initiatives. It is not an "objective" research approach: the researcher is fully involved in the entire research process. From the perspective of activity theory, it can be seen as a never-ending cycle, starting with the identification of a problem, followed by the development of a solution, the evaluation of this solution, the production of design rules, and then moving on to the identification of a new problem, and so on. Sandoval's (2004) conjecture maps have been used *a posteriori* to schematise the relationship between the theory, embodied conjectures, processes and predicted outcomes of a particular instructional sequence. We appeal to both quantitative and qualitative data.

[4] Throughout the text, the term "faculty" or "teaching staff" will be used indifferently to designate teachers and tutors.

The present research consists in an exploratory study with a few learners – 55[5] for both case studies - and some seven faculty members. The context is very specific, namely the training of trainers. It addresses socio-constructivist learning and teaching issues in a blended format, in which the online portion of the course represents the most important part (in terms of the amount of time dedicated to learning). However, we believe that some of the insights gained in the process, in particular the design rules formulated at the end, contribute to a more general theory on blended flexible learning design in higher vocational adult training.

Interpreter training programs go back to 1941, when the first was created in Geneva at the *École d'interprètes*. In 1928, at the International Labor Conference, simultaneous interpreting was used, and the need to train simultaneous interpreters was recognised for the first time. Then, in the years following World War II, the need for simultaneous interpreters became all the more apparent with the Nuremberg Trials. In 1946, with the introduction of simultaneous interpretation at the United Nations, training did not last more than three months. Trainees had to become familiar with the equipment (booths, microphones, etc.) and with listening to and translating a given speech. It was only in 1953 that the "first purpose-built simultaneous interpretation room with ten booths was inaugurated (Williams 1981:7) and the teaching of simultaneous interpreting became an integral part of the curriculum of the *Ecole d'interprètes*" (Moser-Mercer, 2005, p. 212). "Exercises were encouraged and the interpretation was recorded and then discussed" (Kurz, 1996, cited by Moser-Mercer, 2005, p. 213). In 1952, Jean Herbert published *Le manuel de l'interprète*, which was the first attempt to publish advice on how to teach simultaneous interpretation. But it was not until 1989, with the publication of *Pédagogie raisonnée de l'interprétation* by Seleskovitch and Lederer "that the teaching of simultaneous interpreting was given a systematic and detailed treatment" (Moser-Mercer, 2005, p. 217).

> This theory presupposes that global cognitive operations dominate over local linguistic processing and that interpreters are forever reasoning on the basis of what they have already heard and processed as opposed to consulting the current input. The result is fluent and confident production. This approach has inspired the development of the various exercises that make up the bulk of this comprehensive compendium. […] Seleskovitch and Lederer were the first to point to different types of discourse and discourse parameters as a global framework for developing progression in the training of simultaneous interpreting. Their manual also is among the first to point to the importance of appropriate feedback at the formal and substantive level and to the necessity of allowing students to prepare the subject matter of a speech before entering the practice booth. (Moser-Mercer, 2005, p. 218)

[5] Case Study 1 involves 21 learners and Case Study 2 34.

In 1989, Van Dam introduced the notion of expertise, drawing a distinction between "interpreting as a process and interpreting as a skill to be taught" (Moser-Mercer, 2005, p. 219).

In recent years, the introduction of socio-constructivist pedagogy and activity-based virtual learning environments mark yet another turn. When pedagogy and instructional design change, professional development for trainers must either follow suit or take place beforehand. In the case of the *Unité d'Interprétation*, both have been conducted more or less in parallel since 2004-2005.

Innovation in the course for interpreter trainers was carried out with the help of the Tutoring Support Structure framework (Table 2).

Support level	Modules		
Institutional	Human Resources[6]	Training[7]	Tutor roles[8]
Material	Choice of learning environment[9]	Support tools for tutors[10]	Knowledge management[11]
Cognitive	Activity scaffolding tools[12]		

Table 2: Tutoring Support Structure (TSS) framework

Such a support structure can be best exploited when used with a constructivist learning environment which is distinguished by "(i) the centrality of the learner in defining meaning, (ii) the importance of situated, authentic contexts, (iii) the negotiation and interpretation of personal beliefs and multiple perspectives, (iv) the importance of prior learner experiences in meaning construction, and (v) the use of technology to scaffold higher mental processes" (Land & Hannafin, 2000, pp. 11-12).

In 2004, the first blended edition of the course for interpreter trainers was implemented (Case Study 1); in 2006, the second edition of the course was offered (Case Study 2); and in 2008-9, the systematic analysis of both case studies was undertaken and revealed the limitations of the TSS framework. The literature review may seem vast and unfocused, but all theoretical issues addressed do play a role in the design of an activity-based blended course. Both the theory and the empirical findings from this research have led to a new design framework. It is more comprehensive than the former TSS framework and is referred to as the component model of activity-based training.

[6] Goodlad & Hirst, 1989; Green, 2001; Tait et al., 2002
[7] Barker, 2 Tait et al., 2002 ; Barker, 2002; Annoot, 2001; Baudrit, 2000000 2 ; Green, 2001 ; Tait & al., 2002 ; Baudrit, 2000 ; Bennett & Marsh, 2002 ; Salmon, 2000
[8] Tait et al., 2002 ; Barker, 2002; Annoot, 2001; Baudrit, 2000
[9] Green, 2001; Barker, 2002
[10] Charlier, 1999
[11] Probst et al., 2000; Von Krogh, 1999
[12] Jonassen 1991; Jonassen, 2000; Land & Hannafin, 2000

We now provide an overview of the different chapters. Chapters 2 to 7 review the literature related to the different fields involved in the research. Chapter 8 presents the research approach and the research questions. Chapter 9 addresses methodology issues. Chapter 10 presents the case studies. Chapter 11 presents the findings to research questions, Chapter 12 presents the design rules and, finally, Chapter 13 concludes the dissertation.

Chapter 2 addresses learning issues. In a socio-constructivist context, learners are considered as active knowledge builders in constant interaction with their environment and with the world, transforming both – themselves and the environment - in the process (Fosnot & Perry, 2005; Jonassen *et al.*, 2007). They develop reflective capabilities and are in a constant process of cognitive development, structuring and reorganizing previously and newly acquired skills and knowledge (Woo & Reeves, 2007; Herrington *et al.*, 2003; Hutchins, 2000). Learners are members of a knowledge-building community that entails accountability and responsibility towards created knowledge (Scardamalia & Bereiter, 2006). Learners work collaboratively and interact meaningfully in a context of authentic activities. These provide learners with an opportunity to experience learning in a motivating, designed real-life context and produce something that is relevant for the community (Jermann, 2004). Higher-order learning and skills are required to train interpreter trainers and these refer to cognitive categories associated with analysing, evaluating and creating (Berge *et al.*, 2004).

Chapter 3 addresses pedagogical design issues. General cognitivist pedagogical models are concerned with how learners process information. In such models, all the steps of instruction are predetermined (Merrill, 2002; Van Merriënboer, 2007). Constructivist and socio-constructivist activities can be incorporated within these steps, but these models remain far from models like the rapid prototyping instructional method, which consider design and learning as interdependent and mutually reinforcing cyclical processes. Three major pedagogical strategies are reviewed in detail: cognitive apprenticeship, knowledge building and collaborative learning (Joyce *et al.*, 2004). These strategies provide an overall framework for implementing pedagogical models such as inductive thinking, concept acquisition, scientific inquiry or role play. The learning environment represents a determining parameter for the design of online activities. Activity-based learning environments are composed of a set of technological tools to support socio-pedagogical goals (Jonassen, 1999; Hannafin *et al.*, 1999). Communication, collaboration, social, and cognitive-scaffolding resources constitute core tools for facilitating activity-based learning. The teacher's role is transformed to that of a coach who scaffolds meaningful learning experiences for the students. Psycho-pedagogical

values underlying such learning environments are related to situated learning, metacognitive monitoring and progressively refined higher-order learning.

The pedagogical scenario – also called a script or storyboard – entails detailed descriptions of learning activities, a learning environment to support the development and enactment of these activities and, finally, specific learning materials (Dillenbourg & Tchounikine, 2007; Kobbe, 2005). Scenarios evolve in cycles, with, typically, the learner producing something, submitting it, other learners looking at the product and reacting to it, teaching staff providing feedback and the learner integrating this feedback and producing a new version, and so on. In such a setting, the teacher's role is threefold: manager, facilitator and orchestrator (Schneider *et al.*, 2003). The "IMS Global Learning Consortium - Learning Design" (IMS LD) specification is a formal language that refers to pedagogical scenarios as "plays" and implements the basic design model of actors adopting roles, performing activities within an environment, and interacting with other actors and the environment. Activity diagrams can be used to describe the general flow for all actors involved, be it formalised in IMS LD language or not. The design of a pedagogical scenario takes into account a process of scaffolding that is woven into the design or is made available more explicitly with the help of scaffolding tools (Mc Loughlin, 2002; Sharma & Hannafin, 2007; Jonassen *et al.*, 2005). Finally, the pedagogical scenario has to take into account the design of evaluation. The concept of sustainable assessment with notions of confidence, standards, self-monitoring, acute discernment, reflection, use of feedback, and care in the use of language is introduced (Boud & Falchikov, 2005).

Chapter 4 addresses issues related to design methods. Instructional design theories (IDT) and Instructional systems design (ISD) constitute concrete methods for designing instructional sequences. IDT is a combination of situations on the one hand and methods on the other. Situations refer to the contextual parameters, typically related to learners, teaching staff, content and learning environments. Methods refer to a potential description of the process and are probabilistic. ISD is the cognitivist design method *par excellence*. Based on information-processing theory, it focuses on how the learner learns. The ADDIE – analysis, design, development, implementation, and evaluation – cycle ensures the homogeneity and quality of the created instructional sequence. Methods centred on performance objectives, materials and evaluation ensure the design and implementation of instructional systems in accordance with systematic design processes (Gagné *et al.*, 1992; Reigeluth, 1999). The younger generation has created a new branch of instructional design: "the learning sciences" or "constructional design" which is clearly constructivist in orientation (Jonassen *et al.*, 2007; Hannafin & Hill,

2007). In reaction to heavy and standardised instructional sequences, rapid prototyping and agile designs in general are an attempt to design instructional sequences without the burden of heavy ISD methodologies (Tripp & Bichelmeyer, 1990). The steps typically consist in conducting a needs analysis and setting overall learning objectives, implementing the prototype, using it and refining it. Agile designs represent an opportunity to respond to learners' emerging needs while providing small teams or individual teachers with possibilities for innovation if they so desire.

Chapter 5 addresses issues related to tutoring. In the design of an instructional sequence, learner support is a key issue that has to be taken into account from the very beginning. The design of learner support mechanisms determines the entire design process and it may determine the entire learning sequence. It is all the more important in contexts of activity-based learning to ensure that the design supports learners and is capable of being adapted to their learning paths. To achieve this, the needs in terms of tutor type, pedagogical strategies and the tutor's role have to be clarified from the very beginning. The type of tutor can vary from a highly structured context with the tutor being in control to a more open, constructivist context with the tutor scaffolding the learning process adaptively (De Lièvre *et al.*, 2006). Similarly, pedagogical strategies vary along a continuum from highly controlled to autonomous and extremely autonomous (Baudrit, 2000). Depending on the learning context and activities, tutors' roles also vary considerably. The range of tutors' roles addresses cognitive, social, motivational, affective, administrative, technical, organisational, evaluation, advisory and quality control issues (Merrill *et al.*, 1995; Goodyear *et al.*, 2001; Packham *et al.*, 2006; Barker, 2002; Tait *et al.*, 2002). Additionally, tutors' interventions occur at key moments in the learning process and vary between proactivity and reactivity (Deschryver, 2002). Designers have to play with this non-exhaustive list of parameters when integrating learner support mechanisms into the design (Gordon *et al.*, 2007). Due to the highly situated nature of tutoring, each parameter has to be appraised in relation to the context. Finally, the effectiveness of tutoring is a difficult issue to tackle, but one thing we can be sure of is that it has to be approached from both the learners' and the tutors' perspectives.

Chapter 6 addresses technology-related issues. Technology can be considered an additional tool that instructional designers can appeal to when designing an instructional sequence (Dempsey & Van Eck, 2007). Within the constructivist design approach, technology is considered an opportunity to immerse learners in a practice field, offering them the support of a community of practice. A community of practice can be considered the meeting point of several intellectual traditions, combining interactions between theories of the individual and

community on the one hand, and interactions between theories focusing on social aspects and theories focusing on action on the other hand. Mediating a community of practice with technology entails interacting, publishing, producing, sharing and collecting artifacts relevant to the members' practice, and nurturing the community (Wenger, 1998). Specific tools are geared to these functions. Finally, a learning environment that favours the development of a community of practice for learning is one that cultivates collaborative learning in authentic contexts with active pedagogical strategies coupled with an effective coaching structure (Barab & Duffy, 2000). Also, the mixture of technology and face-to-face learning situations, when orchestrated from a constructivist perspective on learning, can enhance learning. Blended learning has different forms and modes: enabling, enhancing and transforming blends are the three categories identified (Graham, 2005). They represent a continuum from convenience of access to consistent pedagogical change through technology. Trends and predictions in blended learning have taken a socio-constructivist direction, with collaborative learning, case studies and problem-based learning as major pedagogical orientations (Bonk *et al.*, 2005). A potential learning environment that meets the aforementioned needs is the Community, Content and Collaboration Management System (C3MS). C3MS is a collaborative open-source portalware using simple web applications. Its modular architecture allows the learning environment to be tailored to a teacher's pedagogical needs and goals with a set of different categories of tools to support learning activities (Schneider *et al.*, 2003).

Chapter 7 addresses issues of transformation and innovation in a training setting. Transforming an organisation is an in-depth process involving major cultural changes. With the help of Bates' (2000) change management theory and Engeström's (2001) model of human activity systems and his theory of expansive learning, we analyse the changes involved in the transition from a pre-technology learning context to a technology-enabled learning context.

Chapter 8 addresses the research approach and research questions. We first clarify the concept of design or development research, which addresses the practical developmental goal of responding to a specific problem encountered by practitioners (Reeves, 2000); Collins *et al.*, 2004). We introduce conjecture maps (Sandoval, 2004) as a means of visually representing the relationship between theory, embodied design conjectures, observable processes and predicted outcomes of instructional designs at various levels of analysis. We then detail each research question in terms of more operational sub-questions. Our research questions draw on twelve principal theoretical conjectures and we show how they, in turn, are grounded in the literature.

Chapter 9 describes the research methodology. The research was conducted with three types of data: 1) data collected from a questionnaire distributed to learners at the end of the course, 2) data collected through semi-structured interviews with teaching staff at the end of the course, and 3) objective data retrieved from the portal. Three types of analyses were performed on the data. The first consists in statistical analysis: descriptive statistical analysis to address the issues associated with the research questions, and cluster analysis to identify different learner profiles. The second consists in the use of activity diagrams to describe and analyse enacted activities at both the group level (because activities were collaborative) and the individual level. The third consists in analysing the transcripts from the semi-structured interviews with teaching staff, which also helped to address the issues related to the research questions.

Chapter 10 presents the two case studies. The context for the first case study (Case Study 1) was the Certificate for interpreter trainers, which is a one-year continuing education course. It is a postgraduate course for professional interpreters seeking to become interpreter trainers. It employs both distance and face-to-face formats: one face-to-face week embedded, respectively, in five months of distance teaching and learning, and in seven months of distance learning devoted to writing the seminar paper. In 2004, the Certificate course enrolled 21 participants and was the first course at ETI - Ecole de Traduction et d'Interprétation - to be designed with a community portal. The context for the second case study (Case Study 2) was the Master of Advanced Studies (MAS) for interpreter trainers, which had basically the same characteristics as the first, since it was an upgrade of the former Certificate. The course became one component of the ETI Virtual Institute and welcomed 34 participants.

Chapter 11 addresses the research questions presented in Chapter 9. Based on the analyses of the data and the findings, we formulate design conjectures that are intended to guide future initiatives and particularly the fourth edition of the MAS.

Chapter 12 presents the new design framework, the component model of activity-based training, and a set of recommendations – in terms of design rules – for any adult training setting with an activity-based learning environment and a face-to-face component.

Chapter 13 concludes the dissertation, with a synthesis of the design experiment, report of findings to research questions, considerations regarding limitations of this research and finally an outlook on future directions.

The appendices include the questionnaire distributed to learners, the semi-guided interview used with faculty, the activity diagrams related to question F and the correlation table related to question G.

Chapter 2. Learning

Interpreter training is profession oriented. After three semesters of courses at the Master's level, students[13] enter the professional market. To earn their professional qualifications, the training focuses on production. Students are strongly encouraged to work individually and in groups and are regularly assisted during classes. Basically, they learn how to deliver and interpret speeches, and are provided with the necessary theoretical background by the expert teaching staff.

Interpreting as a profession is a team effort. It is common to hear about the "French booth", or the "German booth," which refers to a group of interpreters who collaborate and are ready to help the peer who is responsible for the interpretation. During a conference, interpreters interpret for some ten to twenty minutes and then a peer takes over, and so on. This collaborative culture is already encouraged during their studies: collaboration among students, particularly those sharing languages, is common. For instance, if one student interprets into English, s/he will provide speeches in English for other students interpreting from English. In return, students interpreting into Spanish provide speeches in Spanish for those interpreting from Spanish into English. Interaction among students on the one hand and individual and group productions on the other characterise interpretation studies at the Geneva school - *Ecole de Traduction et d'Interprétation*.

In such a learning culture, when the time came to choose the direction to adopt for the vocational education of interpreters, it became quite obvious that a socio-constructivist learning context constituted the best option.

Section 2.1. Constructivism, socio-constructivism

Learners can be considered resources and encouraged to create knowledge through meaningful interactions with peers in given communities, engaging in authentic activities and performing higher-order learning tasks. It is also known that learning addresses several processes other than mental ones. Emotions, and motivation in particular, are partly responsible for the learner's perception of the learning experience, for instance. Within this

[13] Throughout this dissertation, the term "student" is used to refer to any learner enrolled in a course other than the Certificate or the Master of Advanced Studies for interpreter trainers and who is not a subject in the present analysis. The term "learner" is reserved for those learners enrolled specifically in the Certificate or the MAS course, unless it is being used in the general sense adopted in the literature.

section, we will try to understand how these concepts are involved from a socio-constructivist perspective on learning.

What is a constructivist perspective on the world?

The essence of constructivism is that each learner constructs his/her own version of reality, thereby simultaneously transforming him/herself and reality; and there is thus no objective reality *per se* outside of individuals. Interacting with reality is important in the process of construction and in the transformation resulting from this interaction as well. "Constructivism is a poststructuralist psychological theory (Doll, 1993), one that construes learning as an interpretive, recursive, nonlinear building process by active learners interacting with their surround – the physical and social world" (Fosnot & Perry, 2005, p. 34).

Some constructivists emphasise the individual cognitive structuring process and others the broader sociocultural effects on learning. "Constructivism construes learning as an interpretive, recursive, building process by active learners interacting with the physical and social world. It is a psychological theory of learning that describes how structures and deeper conceptual understanding come about" (Fosnot, 1996, p. 30).

> Constructivists believe that reality is constructed by individuals and social groups based on their experiences with and interpretations of the world. The mind constructs its own conceptual ecology for interacting with, interpreting, and making meaning for that world. Rather than being independent from the knower, knowledge, according to constructivists, is embodied in human experience, perceptions, imaginations, and mental and social representations. (Jonassen *et al.*, 2007, p. 46)

What is a constructivist learning theory?

> Although there are many variants of constructivist learning theory (Fosnot, 1996), they share a perspective that learning is defined as meaning making. In other words, according to constructivists, learning requires the personal interpretation of phenomena such as the construction of a mental model representing complex phenomena. Therefore, when interactions in a learning environment are designed to enhance meaning making, then those interactions are meaningful within the principles of the constructivist learning theory and within the context of interactive learning environments that have been designed according to the theory of constructivism (Gergen, 1999). (Woo & Reeves, 2007, p. 17)

What are the concepts used by socio-constructivism to explain the foundational processes of learning?

> Social constructivism explains the foundational processes of learning using three concepts: 1) the 'Zone of Proximal Development (ZPD)', 2) 'Intersubjectivity,' and 3) 'Enculturation' (Fosnot, 1996; Fosnot & Perry, 2005; Jonassen,1999; Jonassen *et al.*, 1995; Lave & Wenger, 1991; Vrasidas, 2000; Vygotsky, 1978). The Zone of Proximal Development is where a child's (or novice's) spontaneous concepts meet the order and logic of adult (or expert) reasoning. Intersubjectivity refers to the mutual understanding that is achieved

between people through effective communication. Enculturation is the process whereby the currently established culture enables an individual to learn the accepted norms and values of the culture or society in which the individual lives. (Woo & Reeves, 2007, p. 19)

What are the characteristics and applications of socio-constructivism?

Considering learning to be a process of meaning making that occurs through intersubjectivity in the ZPD, Woo and Reeves (2007) have summarised its characteristics and applications (Table 3).

Characteristics	– Active construction of knowledge based on experience with and previous knowledge of the physical and social worlds – Emphasis on the need for the ZPD – Emphasis on the influence of human culture and the sociocultural context – Recognition of the social construction of knowledge through dialogue and negotiation – Emphasis on the intersubjective construction of knowledge – Multiple interpretations of knowledge
Applications	– Emphasis on the critical role of peers, in particular more skilled students – Enculturation of students into the community of the particular academic discipline or profession – Use of relevant and authentic tasks – Appreciation of multiple perspectives – Problem solving in real world situations – Collaboration in the learning process – Opportunity for students to publicly share their work, revise their work based on social critiques, and reflect on what they have learned with others

Table 3: The characteristics and applications of social constructivism (Jaworski, 1994; Ernest, 1995), from Woo and Reeves, 2007, p. 19

The content of Table 3 highlights the importance of concepts that make up the foundational process of learning. From the perspective of "constructivism being a theory about learning, not a description of teaching" (Fosnot & Perry, 2005, p. 33), some general principles of learning derived from constructivist strategies are listed below. They concern development, disequilibrium, reflection, and interaction within a given community, and can be very useful to bear in mind when designing learning activities.

- Learning is not the result of development; learning *is* development. It requires invention and self-organization on the part of the learner. Thus teachers need to allow learners to raise their own questions, generate their own hypotheses and models as possibilities, and test them for viability.
- Disequilibrium facilitates learning. "Errors" need to be perceived as a result of learners' conceptions and therefore not minimized or avoided. Challenging, open-ended investigations in realistic, meaningful contexts need to be offered, thus allowing learners to explore and generate many possibilities, both affirming and contradictory. Contradictions, in particular, need to be illuminated, explored, and discussed.

- Reflective abstraction is the driving force of learning. As meaning-makers, humans seek to organize and generalize across experiences in a representational form. Allowing reflection time through journal writing, representation in multisymbolic form, and/or discussion of connections across experiences or strategies may facilitate reflective abstraction.
- Dialogue within a community engenders further thinking. The classroom needs to be seen as a "community of discourse engaged in activity, reflection, and conversation (Fosnot, 1989). The learners (rather than the teacher) are responsible for defending, proving, justifying, and communicating their ideas to the classroom community. Ideas are accepted as truth only insofar as they make sense to the community and thus rise to the level of "taken-as-shared".

Learning is the result of activity and self-organization and proceeds toward the development of structures. As learners struggle to make meaning, progressive structural shifts in perspective are constructed – in a sense, "big ideas" (Shifter & Fosnot, 1993). These "big ideas" are learner-constructed, central organizing principles that can be generalized across experiences and that often require the undoing or reorganizing of earlier conceptions. This process continues throughout development (Fosnot & Perry, 2005, pp. 33-34).

In a socio-constructivist context, learners are considered active knowledge builders in continual interaction with their environment and with the world, transforming both – themselves and the environment - within this interaction. Learning occurs through the process of meaning making, in interaction with a given cultural environment and in the Zone of Proximal Development. Learners develop reflective capabilities and are in a constant process of cognitive development, structuring and reorganizing previously and newly acquired skills and knowledge.

Section 2.2. The knowledge-building community model

Meaning making and knowledge building are central to socio-constructivism. Scardamalia and Bereiter (2006) have developed a model of the knowledge-building community that is a combination of situated learning, writing-to-learn and community building. What is situated learning, from a learning theory perspective? It is defined in terms of four key points:

1) Learning is situated in the activity in which it takes place. Learning *is* doing. 2) Meaningful learning will only take place if it is embedded in the social and physical context within which it will be used (Brown et al 1989) according to Oliver (2000). 3) Knowledge is situated, being in part a product of the activity, context, and culture in which it is developed and used. [Therefore] learning methods that are embedded in authentic situations are not merely useful; they are essential (Brown et al 1989). 4) Situated learning occurs when students work on authentic tasks that take place in real-world setting (Winn, 1993). (Schneider, EduTechWiki http://edutechwiki.unige.ch/en/Situated_learning).

Situated learning is very close to the concept of distributed learning that we will describe later on. The concept of writing-to-learn is fundamental to knowledge building and achieved through the process of writing.

> Writing-to-learn - also known as the writing across the curriculum movement (WAC) - refers to a family of instructional design models that postulate positive effects of pedagogical scenarios that engage learners in writing activities. "Writing-to-learn" has a long research tradition that initially focused mostly on the effects of individual writing and related cognitive issues. Klein's (1999) detailed research review identifies four major research lines and associated main hypothesis:
>
> Klein's review of writing-to-learn hypothesis
>
> – The "point of utterance" hypothesis: writers spontaneously generate knowledge when they write (Galbraith, 1999).
> – The "forward hypothesis": writers externalize ideas in text, and then re-read them to generate new inferences.
> – The "genre hypothesis": writers use genre structures to organize relationships among elements of text, and thereby among elements of knowledge (Newell, 1984).
> – The "backward hypothesis": writers set rhetorical goals, and then solve content problems to achieve these goals (Flower & Hayes, 1994).
>
> These four hypotheses invoke different aspects of writing and are in principle compatible with regard to the learner's competence matrix. (Schneider, 2008, p. 152).

The third concept involved in the knowledge-building model is community building. We will discuss aspects of communities of practice more extensively in Section 6.2. To summarise, a community of practice is the meeting point of several intellectual traditions, combining interactions between theories of the individual and the community and interactions between theories focusing on social aspects and theories focusing on action.

What does this knowledge-building model entail?

Education has as its primary mission to enculturate learners in this knowledge-building society. Learners are considered real resources and encouraged to create knowledge. Learners are considered members of a knowledge-building community, which entails six parameters (Scardamalia & Bereiter, 2006, pp. 98-110):

1. *Knowledge advancement as a community* rather than individual achievement. This refers to "engaging students in the deliberate creation and improvement of knowledge that has an epistemic value for a community – a feed forward effect" (p. 101). "The use and creation of "epistemic artifacts" to serve in the further advancement of a knowledge" (p. 99).

2. *Knowledge advancement as idea improvement* rather than as progress toward true or warranted belief. This point highlights the never-ending cycle involved in the improvement of an idea.
3. Knowledge *of* in contrast of knowledge *about.* This perspective reconciles declarative and procedural knowledge, since *knowledge of* "consists of both procedural knowledge (i.e. knowing how to open a parachute and guide its descent) and declarative knowledge that would be drawn on when engaged in the activity of sky-diving (i.e. knowledge of equipment characteristics and maintenance requirements, rules of particular events). It entails not only knowledge that can be explicitly stated or demonstrated, but also implicit or intuitive knowledge that is not manifested directly but must be inferred. Knowledge *of* is activated when a need for it is encountered in action" (p. 105). "In knowledge building, students work with problems that result in deep structural knowledge of" (p. 107) to guarantee analogical transfer and deep understanding.
4. *Discourse as collaborative problem solving* rather than as argumentation. This point refers to using discourse to improve an idea and this necessitates three commitments: a commitment to progress, a commitment to seek common understanding rather than to merely agree, and a commitment to expand the base of accepted facts (p. 109).
5. *Constructive use of authoritative information*. Evaluating the quality of information and using it appropriately.
6. *Understanding as an emergent.* This consideration refers to "explaining conceptual development. It entails self-organization at the level of ideas – explaining how more complex ideas can emerge from interactions of simpler ideas and precepts" (p. 110).

Parallel to this consideration of the learner as a full member of a knowledge-building community, Scardamalia (2002) provides twelve knowledge-building principles for sharing "collective cognitive responsibility" in a propitious environment. These are formulated in terms of socio-cognitive determinants of knowledge building. The twelve principles are as follows:

- Real ideas, authentic problems: Knowledge problems arise from efforts to understand the world. Ideas produced or appropriated are as real as things touched and felt.
- Improvable ideas: Learners improve the quality, coherence and utility of ideas in a culture of psychological safety (revealing ignorance, voicing half-baked notions, etc.).
- Idea diversity: As biodiversity is essential to an ecosystem, to understand an idea is to understand the ideas that surround it, including those that stand in contrast to it.

- Rise above: This involves working toward more inclusive principles and higher-level formulations of problems. It means learning to work with diversity, complexity and messiness and achieving new syntheses out of that.
- Epistemic agency: Learners set forth their ideas and negotiate a fit between personal ideas and ideas of others, using contrast to spark and sustain knowledge advancement. Learners deal with problems of goals, motivation, evaluation and long-range planning.
- Community knowledge, collective responsibility: This involves producing ideas of value to others and sharing responsibility for the overall advancement of knowledge in the community.
- Democratizing knowledge: All participants are legitimate contributors to the shared goals of the community.
- Symmetric knowledge advancement: Expertise is distributed within and between communities. To give knowledge is to get knowledge
- Pervasive knowledge building: Knowledge building is not confined to particular occasions but pervades mental life at all times and everywhere.
- Constructive use of authoritative sources: To know a discipline is to be in touch with the present state and growing edge of knowledge in the field. This requires respect and understanding of authoritative sources, combined with a critical stance toward them.
- Knowledge building discourse: Knowledge itself is refined and transformed through the discursive practices of the community – practices that have the advancement of knowledge as their explicit goal.
- Embedded and transformative assessment: The community engages in its own internal assessment, which is both more fine-tuned and more rigorous than external assessment, and serves to ensure that the community's work will exceed the expectations of external assessors. (Adapted from Scardamalia, 2002, pp. 78-82)

Given these principles of knowledge building and considering each learner as a mature member of a community aiming to nourish it and able and responsible to do so, the community constitutes a body of experts, peer-learners, and resources that learners can interact with. Interactions take place at many levels, in particular at learner-learner, learner-content, learner-teacher and learner-technology levels (Varistas, 2000). The community will try to create meaning and knowledge in a particular learning context.

Knowledge building can be considered a strategy that is part of a constructivist learning theory. It is a combination of situated learning, writing-to-learn and community building. Learners are considered real resources and encouraged to create knowledge through writing and taking part in the community. Finally, a knowledge building community entails accountability and responsibility towards the knowledge that it creates.

Section 2.3. Meaningful interactions

Knowledge building is about interacting according to certain rules within a community. These interactions, however, do not necessarily lead to knowledge building. Researchers have tried to identify the types of interactions that result in the expected knowledge building. They have characterised them as meaningful interactions taking place in authentic learning activities. "Humans are social beings; we grow up through the social interaction in various communities" (Woo & Reeves, 2007, p. 18). To what extent, though, are all these interactions productive, learning-wise? Woo and Reeves (2007) tried to identify meaningful interactions in socio-constructivist environments (Figure 1).

> When interaction has a direct influence on a learner's intellectual growth, we can say the interaction is meaningful (Hirumi, 2002; Vrasidas & McIssac, 1999). In an online learning environment designed on the principles of social constructivism, meaningful interaction should include responding, negotiating internally and socially, arguing against points, adding to evolving ideas, and offering alternative perspectives with one another while solving some real tasks (Jonassen *et al.*, 1995; Lapadat, 2002; Lave & Wenger, 1991; Vrasidas, 2000; Vygotsky, 1978). While engaging in authentic learning tasks with various people including peers and experts, learners engage in defining the task, generating ideas, sharing resources and perspectives, negotiating, synthesizing individual thoughts with those of others, completing the tasks, and refining them on the basis of further sharing of insights and critiques. When learners are faced with confusion or conflict, they discuss the issues with one another at first and then they try to negotiate internally and socially to solve the problem. Finally, they arrive at some common understanding. Such a meaningful interaction process is required for meaning making and hence learning. (Woo & Reeves, 2007, p. 20)

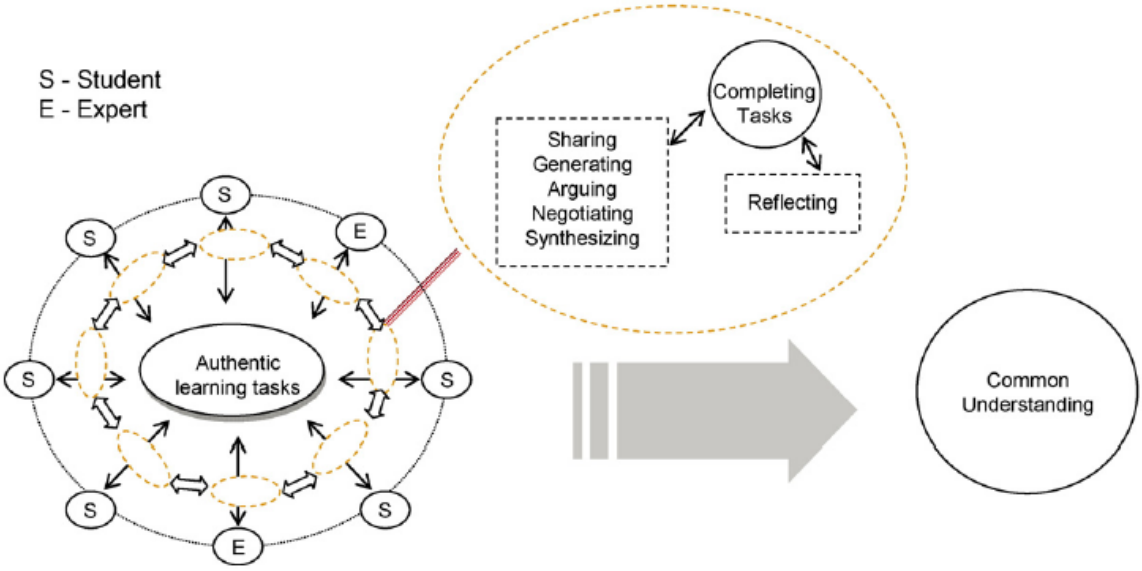


Figure 1: Meaningful interaction in social constructivism (Woo & Reeves, 2007, p. 19)

For interactions to be meaningful, scripting learners' activities beforehand is often necessary (the concept of script is developed in Section 3.4). Instructional designers design the broader pedagogical scenario and detail activities to foster interactions and in particular to "promote active learning, enable effective facilitation and enable the process of higher order knowledge and abilities" (Murihead & Juwah, 2004, cited by Woo & Reeves, 2007, p. 16). These meaningful interactions occur in authentic learning activities.

Meaningful interactions in a socio-constructivist learning environment consist in responding, negotiating internally and socially, arguing, building on ideas, offering alternative perspectives, sharing insights and critiques, etc., to create meaning out of a task and thus to learn. It is an interactive process with peers, experts, the learning environment and the socio-professional environment.

Section 2.4. Authentic activities and higher order learning

Authentic activities immerse the learner in a given setting to perform a real-life-based task. Herrington, Oliver and Reeves (2003) have identified ten features that characterise authentic activities:

- *Authentic activities have real world relevance.* Activities match as nearly as possible the real world tasks of professionals in practice rather than decontextualised or classroom based tasks.
- *Authentic activities are ill-defined, requiring students to define the tasks and sub-tasks needed to complete the activity.* Problems inherent in the activities are ill-defined and open to multiple interpretations rather than easily solved by the application of existing algorithms. Learners must identify their own unique tasks and sub-tasks in order to complete the major task.
- *Authentic activities comprise complex tasks to be investigated by students over a sustained period of time.* Activities are completed in days, weeks and months rather than minutes or hours. They require significant investment of time and intellectual resources.
- Authentic activities provide the opportunity for students to examine the task from different perspectives, using a variety of resources. The task affords learners the opportunity to examine the problem from a variety of theoretical and practical perspectives, rather than allowing a single perspective that learners must imitate to be successful. The use of a variety of resources rather than a limited number of preselected references requires students to detect relevant from irrelevant information.
- *Authentic activities provide the opportunity to collaborate.* Collaboration is integral to the task, both within the course and the real world, rather than achievable by an individual learner.
- *Authentic activities provide the opportunity to reflect.* Activities need to enable learners to make choices and reflect on their learning both individually and socially.

- *Authentic activities can be integrated and applied across different subject areas and lead beyond domain specific outcomes.* Activities encourage interdisciplinary perspectives and enable students to play diverse roles thus building robust expertise rather than knowledge limited to a single well-defined field or domain.
- *Authentic activities are seamlessly integrated with assessment.* Assessment of activities is seamlessly integrated with the major task in a manner that reflects real world assessment, rather than separate artificial assessment removed from the nature of the task.
- *Authentic activities create polished products valuable in their own right rather than as preparation for something else.* Activities culminate in the creation of a whole product rather than an exercise or sub-step in preparation for something else.
- *Authentic activities allow competing solutions and diversity of outcomes.* Activities allow a range and diversity of outcomes open to multiple solutions of an original nature, rather than a single correct response obtained by the application of rules and procedures (Herrington *et al.*, 2003, pp. 70-71).

Authentic activities provide learners with a chance to experience learning in a designed real-life context and produce something that is relevant for the community. They also help learners to shift from a culture of consuming to a culture of production. In other words, they help learners deal with the paradigm shift they have to undergo in their life as learners, in the transition from industrial education to knowledge building education.

> Teacher support and peer scaffolding are often suggested as strategies that may assist students who are reluctant to engage with student-centred and problem-based tasks to persevere beyond the initial weeks of frustration and uncertainty. Our research suggests that the use of authentic learning settings can also provide strong supports for such learners. Authentic settings have the capability to motivate and encourage learner participation by facilitating students' willing suspension of disbelief. In this way, students become immersed in the setting and such immersion can provide the motivation that is needed for the initial perseverance. Once students have persevered with what can initially be quite discomforting and unfamiliar settings, they are able to develop the forms of familiarity and the skill sets required so that the authentic setting no longer provides a distraction from the cognitive engagement that higher order learning requires (Herrington *et al.*, 2003, p.75).

Engaging in authentic activities is often very costly for learners not used to the culture of activity-based training. While designing meaningful and authentic activities, designers have to foresee a solid coaching structure to support learners in this cultural change (see Chapter 5 for details on coaching structures). As Herrington *et al.* (2003) mention, the expert or more advanced peer can play this decisive role in the learning process.

According to Bloom *et al*'s taxonomy, quoted by Huitt (2004), three intellectual behaviours have been identified in the process of learning: the cognitive, the affective and the psychomotor. While the affective domain refers to "the manner in which we deal with things emotionally, such as feelings, values, appreciation, enthusiasms, motivations, and attitudes"

and the psychomotor domain refers to "physical movement, coordination, and use of the motor-skill areas" (Clark, 2007), we will focus on the cognitive domain.

> The cognitive domain involves knowledge and the development of intellectual skills. This includes the recall or recognition of specific facts, procedural patterns, and concepts that serve in the development of intellectual abilities and skills. There are six major categories, starting from the simplest behavior to the most complex. The categories can be thought of as degrees of difficulties. That is, the first one must be mastered before the next one can take place. (Clark, 2007)

Overbaugh and Schultz (no date) describe a revisited form of the taxonomy, focusing on the shift from nouns to verbs to characterise the different categories. The categories entail: remembering (Can the student recall or remember the information?), understanding (Can the student explain ideas or concepts?), applying (Can the student use the information in a new way?), analysing (Can the student distinguish between the different parts?), evaluating (Can the student justify a stand or decision?) and creating (Can the student create a new product or point of view?) (Figure 2, Table 4).

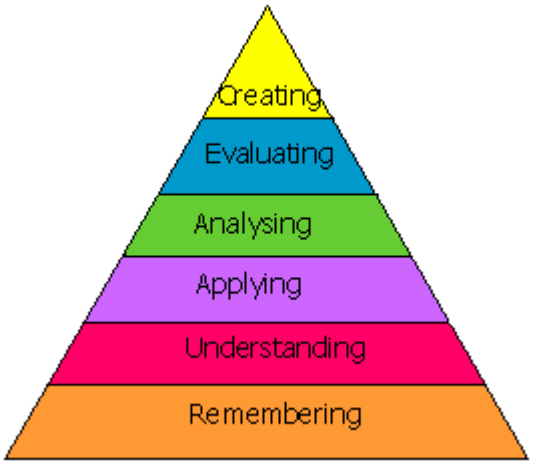


Figure 2: New version of Bloom's taxonomy concerning the cognitive domain (Overbaugh & Schultz, no date)

Category	Sub-category actions
Remembering	define, duplicate, list, memorize, recall, repeat, reproduce state
Understanding	classify, describe, discuss, explain, identify, locate, recognize, report, select, translate, paraphrase
Applying	choose, demonstrate, dramatize, employ, illustrate, interpret, operate, schedule, sketch, solve, use, write
Analysing	appraise, compare, contrast, criticize, differentiate, discriminate, distinguish, examine, experiment, question, test
Evaluating	appraise, argue, defend, judge, select, support, value, evaluate
Creating	assemble, construct, create, design, develop, formulate, write

Table 4: Categories and sub-categories of the cognitive domain (Overbaugh & Shultz, no date)

Higher-order learning and skills are to be found at the top of the pyramid.

Berge, Ramaekers and Pilot (2004) discuss higher-order learning, both from the design and the implied cognitive process points of view. They found that, regarding design issues, tasks engaging learners in higher-order learning had the following recurrent properties:

- Complex: The problem's complexity has to be reduced so that students can handle it.
- Ill-structured:[14] For well-structured problems, domain knowledge and justification skills are all that is required. For ill-structured problems, additional skills like scientific attitude and regulation of cognition prove to be necessary.
- Challenging: The task has to be grounded in student's experience; after task completion, students must be able to use the knowledge that they have gained within their community; the task must be open-ended in order to ensure students' autonomy and stimulate their curiosity; the task must be demanding, neither too simple, nor too difficult, that is, within their ZPD.
- Familiar: If students are familiar with the task type, they will be able to solve it with greater expertise.

Regarding the underlying cognitive process, they found that it unfolds in a threefold temporal sequence: finding, analysing and conceptualising the problem. After *recognizing the existence of a problem*, students construct a mental representation of it. To help them in the conceptualisation phase, different tactics are used: case-based reasoning (use of a previously studied case), use of concept maps (to support epistemological scaffolding), model progression (gradual introduction of the model), timing of information (provide information just in time as students progress). *Finding and testing solutions* is a five-step process: listing all possible solutions, evaluating them, "choosing the solution with the highest value," implementing an action plan, and evaluating the consequences of the chosen action. Finally, there are different ways of *regulating the problem-solving process*, which involve planning and defending one's choices (Adapted from Berge *et al.*, 2004, pp. 11-18).

Designing higher-order learning activities requires a subtle balancing of 1) structure – not too much, otherwise the task is not challenging enough, and not too little, otherwise it is too complex; 2) complexity – managing cognitive overload; and 3) authenticity – motivating learners with open-ended, realistic, demanding and meaningful problems. Learners confronted with such learning activities develop strategies for analysing, searching for and selecting appropriate information, constructing and testing possible solutions (Berge *et al.*, 2004).

[14] The term "ll-structured" is used here in conformity with the definition provided by Berge, Ramaekers and Pilot (2004) and Barab and Duffy (2000).

Authentic activities provide learners with a chance to experience learning in a designed real-life context and produce something that is relevant for the community. Engaging in authentic activities implies a cultural attitude that is real-life and production oriented.

Higher-order learning and skills refer to cognitive categories associated with analysing, evaluating and creating. Authentic activities provide an ideal context for higher-order learning, since they are inherently complex, ill-structured and challenging.

Section 2.5. Collaborative learning

From our perspective, collaborative learning is a strategy that encompasses the different concepts we have been discussing in this section. It entails a strong community dimension while engaging learners in authentic tasks and meaningful interactions with peers and teaching staff. It is very difficult to define, in the abstract, what collaborative learning is. According to Jermann (2004):

> The concept of collaborative learning covers a wide range of situations that differ with regard to the size of the group, the definition of learning, the modalities of interaction and the timing. First, the size of the group may vary from a dyad (2 subjects) to a small group (3-5 subjects), a class (20-30 subjects), and a community (a few hundred to a thousand people) or even to society (several thousands or millions of people). Second, 'learning' may refer among others to following a course, studying course material, or performing learning activities like solving a problem. Third, the modalities of joint learning may encompass face to face or distance interaction, simultaneous or deferred activity, joint activity or organization of activity through some division of labor. Finally, activities labeled as collaborative learning may last from a couple of hours up to one year or more. (p.7)

Researchers' analyses of communities and group collaboration are reported in Jermann (2004). They agree that in most cases collaboration actually takes place when the following seven conditions are met. 1) Members of the group must share a common goal and a common understanding of the situation – this is referred to as *grounding*. 2) They must agree on a "horizontal" (Dillenbourg, 1999) division of labour in terms of roles, and be flexible about it, that is, be willing to change roles. 3) They must be conscious of symmetries of action, knowledge and status, because these parameters help establish a healthy climate of mutual safety. 4) They must process information, giving a place to constructive socio-cognitive conflict while being conscious of their commitment to this knowledge-building enterprise. Individual and group accountability constitutes a fundamental input. Finally, beforehand, designers must 5) structure interactions (scripting), 6) solicit metacognitive capabilities and 7) regulate the process of learning throughout the learning enterprise.

In our perspective, collaborative learning represents a particular instantiation of socio-constructivism. It has a strong community-of-practice dimension, it engages learners in authentic higher-order activities, provoking meaningful interactions with meaning making and knowledge building as outcomes. Seven conditions have been found to contribute to collaborative learning: grounding, division of labour, symmetry (of action, knowledge and status), information processing, scripting of interactions, metacognitive scaffolding and learning process regulation.

Section 2.6. Distributed cognition

Collaborative learning is closely related to distributed cognition issues. Within a collaborative process, where does knowledge reside? in individuals? in the community? in tools? Is it possible to extend individual cognitive resources? How is it possible to achieve something a single individual would not be able to? On what kind of process are human cognitive achievements based? The concept of distributed cognition tries to outline answers to these kinds of questions. It refers to "a process in which cognitive resources are shared socially in order to extend individual cognitive resources or to accomplish something that an individual agent could not achieve alone" (Lehtinen, Hakkarainen, Lipponen, Rahikainen, & Muukkonen, (no date)). Human cognitive processes operate in several places: in humans as well as in machines and in cognitive agents. "Cognitive processes can be distributed between humans and machines (physically distributed cognition, Norman, 1993; Perkins, 1993) or between cognitive agents (socially distributed cognition)" (Lehtinen *et al.*, (no date)).

> The cognitive significance of distributed cognition is based on the fact that human beings have only limited cognitive resources such as time, memory, or computational power (Cherniak, 1986; Harman, 1986). Norman (1993, p. 43) argued that human cognitive resources are highly overestimated; without external aids humans have only a limited memory and reasoning capacity. Higher cognitive accomplishments presuppose that an agent uses the external world and his or her fellow inquirers as sources of knowledge, organisers of activity, and in general as extensions of his or her cognition. A critical condition for a successful process of inquiry is the adoption of socio-culturally developed cognitive tools or artifacts (Resnick, Säljö & Pontecorvo, 1997). By using cognitive tools, multiple forms of representation, and other artifacts, inquirers are able to reduce the cognitive processing load and take on more complicated problems to solve than would otherwise be possible (Pea, 1993; Salomon, Perkins, & Globerson, 1991). (Lehtinen *et al.*, (no date))

Distributed cognition is a branch of cognitive science. Its goal is to understand cognitive systems.

> What distinguishes distributed cognition from other approaches is the commitment to two related theoretical principles. The first concerns the boundaries of the unit of analysis for cognition. [...] The second principle

> concerns the range of mechanisms that may be assumed to participate in cognitive processes. (Hollan, Hutchins & Kirsh, 1999, p. 2)

Concerning the first principle, in distributed cognition, "one expects to find a system that can dynamically configure itself to bring sub-systems into coordination to accomplish various functions. A cognitive process is delimited by the functional relationships among the elements that participate in it" (Hollan *et al.*, 1999, p. 2).

Concerning the second principle, distributed cognition takes into account not only the manipulation of symbols inside one individual mind, but is concerned with a "broad class of cognitive events and does not expect all such events to be encompassed by the skin or skull of an individual" (Hollan *et al.*, 1999, p. 2).

To understand human cognitive accomplishments, distributed cognition and the cognitive framework of analysis it suggests, with its dual principles, are determining factors.

> When one applies these principles to the observation of human activity "in the wild", at least three interesting kinds of distribution of cognitive process become apparent:
>
> – Cognitive processes may be distributed across the members of a social group.
> – Cognitive processes may involve coordination between internal and external (material or environmental) structure.
> – Processes may be distributed through time is such a way that the products of earlier events can transform the nature of later events. (Hollan *et al.*, 1999, p. 3)

Concerning the first point, the social aspect of distributed cognition, "considering simultaneously 'the society of mind' and the 'mind in society', the distributed cognition approach provides a new place to look for the origins of complexity. Phenomena that are not predictable from the organization of any individual taken in isolation may arise in the interactions among individuals" (Hutchins, 2000, p. 7).

Concerning the second point, the interrelation between cognition and the material environment, "cognitive activity is sometimes situated in the material world in such a way that the environment is a computational medium" (Hutchins, 2000, p. 7). Do cognitive artifacts enhance cognition? They may, but what is important to remember is that "cognitive artifacts are involved in a process of organizing functional skills into cognitive functional systems. […] It is essential to distinguish the cognitive properties required to manipulate the artifact from the computation that is achieved via the manipulation of the artifact" (Hutchins, 2000, pp. 8-9).

Concerning the third point, distribution over time, Hutchins states that "the environments of human thinking are not "natural" environments. They are artificial through and through. They

develop over time. The crystallization of partial solutions to frequently encountered problems in artifacts is a ubiquitous strategy for the stabilization of knowledge and practice" (Hutchins, 2000, p. 9).

One major aspect of a distributed cognition perspective is that knowledge resides both in the individual and in the environment. In reality, there are different positions, one focused on the individual and the other focused on the social.

> Two perspectives are represented within distributed cognition with regard to this question. The person-plus perspective considers that cognition eventually resides in the individual, but gives the social and material context a large importance in describing and explaining cognitive processes. The social-only perspective radically rejects traditional information processing models and argues for the situatedness of all cognitive processes, cognition is a social phenomenon and can be described only at the system level. (Jermann, 2004, p. 33)

It is important to notice that Hutchins' studies are concerned with distributed cognition in the workplace, not in a learning environment. Jermann (2004) has addressed some aspects of distributed cognition theory from a collaborative learning perspective and comes to the conclusion that it can enhance learning because of its capacity to "delegate" management tasks.

> The distribution of the executive function is of particular interest in an educational context as is exemplified in work about metacognitive mediation and peer tutoring. Distribution of the executive function means that the monitoring and control of an individual's activity can be taken over by another individual, be it a peer of same level of competency or a more skilled peer or an adult. (Jermann, 2004, p. 32)

Within a distributed cognition perspective, the learning environment plays a fundamental role, not only in supporting pedagogical activities by providing appropriate tools, but also in constituting the very locus and media learners interact with to produce knowledge.

Distributed cognition's main preoccupation is to know where knowledge resides: in the individual? in the environment? in both? It is a framework concerned with processes that enable and extend human cognitive resources. From a learning point of view and particularly in a context of learning with a technology-enabled environment, the distribution of the executive function (Perkins, 1993, quoted by Jermann, 2004) is partially taken over by the design, offering learners the possibility of making choices rather than having the teacher choose for them.

Section 2.7. Reflection

The present section addresses a very important issue of socio-constructivism, reflection, which is complementary to the concepts of knowledge building and community building.

What is reflection? Authors report many uses of reflection and reflective practices. Reflection is sometimes used as a synonym for metacognition. Both terms refer to reflecting upon learning processes, experiences, actions and decisions involved during the learning experience. To examine and retrieve how one has functioned during a learning experience involves the learner in active exploration. The outcome is a new or enhanced understanding either of content, of process or both. Reflection and metacognition are "concerned with the process of monitoring, regulating and controlling an individual's thinking about thinking" (Daniels, 2002). According to Moon (2005), reflection has a role to play in "academic and non-academic learning, self development, critical review, considering our own processes of mental functioning, decision-making, emancipation and empowerment and so on" (p. 1).

Reflective learning is related to learning in action and expert learning processes (Daniels, 2002). "Reflection is an active process that takes into direct consideration what is being learned, how that information affects the learner's extrinsic and intrinsic perspectives and relationships to their environment" (Daniels, 2002). Metacognition relates to knowledge of cognition and regulation. It is an awareness about thinking that allows the individual to choose the most adequate strategies to solve a given learning task. "Learners develop "executive control" over learning strategies" (Joyce, Weil & Calhoun, 2004, p. 14). "Reflection and metacognition are internal feedback loops on thinking and steps towards higher learning, or critical thinking" (Daniels, 2002).

What about reflective writing?

Reflective writing assignments engage learners in reflective and critical thinking. "Reflective writing can include the use of readings, observation and experience related to the learning situation in question" (Schneider[15]). It varies between highly structured writing and unstructured writing, "as in stream-of-consciousness writing" (idem). Varner and Peck (2003) have classified the different types of reflective writing assignments (Figure 3).

[15] http://edutechwiki.unige.ch/en/Reflection

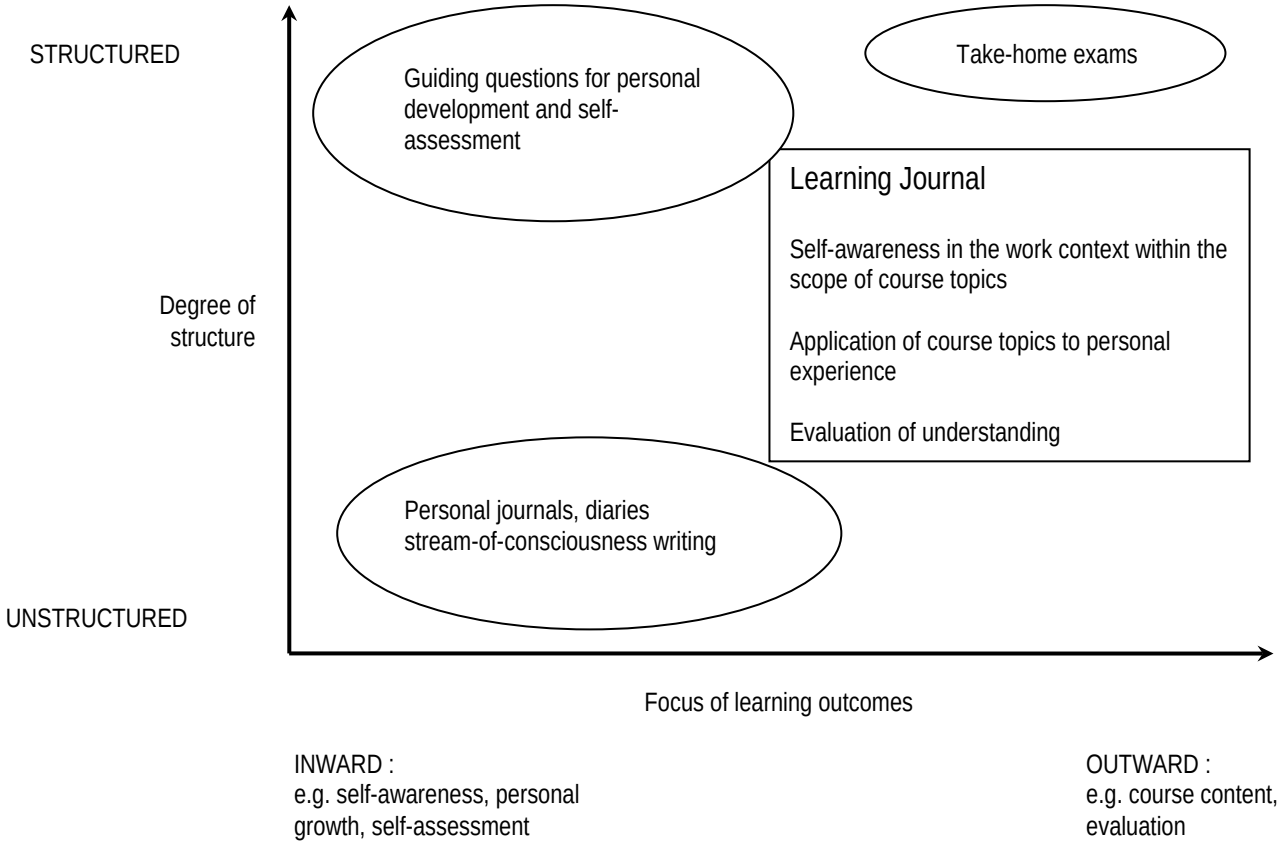


Figure 3: Types of reflective writing assignments (Varner & Peck, 2003, p. 4)

We will now focus on journal writing as a reflective tool. "Journal writing is an insightful and powerful instructional technology utilizing strategies that foster understanding and the application of concepts, enhance critical thinking, improve achievement and attitude, encourage student reflection and capture changes in students' perception" (Dunlap, 2006, p. 20).

Journal writing is an effective instructional technology because it:

- Encourages students to reflect on and articulate their thinking and problem solving strategies
- Supports effective acquisition and transferability of cognitive and metacognitive skills
- Encourages students to identify and analyze their difficulties, make suggestions for solving problems and ask and pursue questions on their own
- Makes conceptual and perceptual changes visible for assessment purposes. (Dunlap, 2006, p. 20)

Writing about content and process, pausing after having accomplished a task to think over how one has proceeded to achieve the goal is indeed a further step to additional learning. This metacognitive act has a self-regulatatory function that is beneficial not only for the task that has just been accomplished but also for tasks that are undertaken in the future. This pausing is

the occasion for a debriefing, taking into account what works well and what needs to be improved.

Boud (2001) also explored journal writing and confirms the metacognitive added-value it can bring to learning. He examined journal writing exclusively through the lens of learning, as a device learners can use to enhance their learning.

> This perspective views the varieties of journal writing as ways of making sense of the world and how we operate within it. It looks at journal writing as a form of reflective practice, that is, a device for working with events and experiences in order to extract meaning from them. (Boud, 2001, p. 9)

What does it mean to enhance learning through reflective practice? What exactly does reflection consist in? Boud answers these questions in very simple terms.

> The process of exploring how journals assist their writers learn is commonly described in terms of how they can enhance reflection and reflective practice. Reflection has been described as a process of turning experience into learning. That is, of exploring experience in order to learn new things from it. Reflection has been described as "those intellectual and affective activities in which individuals engage to explore their experiences in order to lead to new understandings and appreciations (Boud, Keogh and Walker, 1985, p. 19). (Boud, 2001, p. 10)

To encourage such reflective practice, some scripting and scaffolding may increase the chances of optimising results. Boud (2001, pp. 11-12) suggests three critical moments of reflection when journal writing can support learning: before, during and after an activity. While journals can be public, available only to a specific community, or private, Boud (2001, pp. 14-5) recommends keeping the journal private since a reader, depending on who s/he is, may inhibit and/or influence the writing.

1) Reflection in anticipation of events:

Firstly, a focus on the learner. Journals can be used to explore what we want from involvement in any activity. We write about what we bring to the situation, what we want out of it and what we need to be mindful of which may distract us from our intentions. Secondly, a focus on all aspects of the context. Journals can be used here to record what we know of the context and what is possible. Thirdly, a focus on learning skills and strategies. Journals allow us to practice imaginary scenarios, to ask "what if", to plan what we need to take to the event, to try out forms of record keeping that might be suitable and to trial conversations and interactions with key players we will meet.

2) Reflection in the midst of action:

While engaging in an activity and learning, be aware of three reflective acts: Firstly, noticing. Be aware of what is happening in (world of thoughts and feelings) and around us (external

world). Secondly, intervening. Take actions to change the situations we find ourselves in. Thirdly, reflection-in-action. In reference to Schön, this describes the process of working with, noticing and intervening to interpret events and the effects of one's interventions.

3) Reflection after events

Reflection following events is principally concerned with a process of thinking but it also entails feelings, emotions and decision-making.

> Firstly, the return to experience. The role of journal writing here is to give an account of what happened and retrieve as fully as possible the rich texture of events as they unfolded. The emphasis is on conjuring up the situation afresh and capturing it in a form that enables it to be revisited with ease. Secondly, attending to feelings. As part of returning to the experience, we need to focus on the feelings and emotions which were (or are) present. These feelings can inhibit or enhance possibilities for further reflection and learning. Feelings experienced as negative may need to be discharged or sublimated, otherwise they may continually distort all other perceptions and block understanding; those experienced as positive can be celebrated as it is these which will enhance the desire to pursue learning further. Thirdly, re-evaluation of experience. Re-acquaintance with the event and attending to and expressing the thoughts and feelings associated with it, can prepare the ground for freer evaluation of experience than is often possible at the time. The process of re-evaluation includes, relating new information to that which is already known; seeking relationships between new and old ideas; determining the authenticity for ourselves of the ideas and feelings which have resulted; and making the resulting knowledge one's own, a part of one's normal ways of operating. (Boud, 2001, pp. 14-5).

This reflective monitoring throughout an activity fosters self-regulation and leads to increased expert knowledge. The reflective process prior to the activity helps learners to keep the goal in mind; during the activity, it helps them to be fully aware and ready to intervene, and after the activity, it facilitates transfer.

Reflective practice is centred around the process of monitoring, regulating and controlling an individual's thinking about thinking and an individual's motivation with a view to enhancing understanding and creating expert knowledge. Reflection and metacognition are used in a similar way in the literature. Metacognition is more about creating an awareness of thinking about thinking. Reflective writing is one sort of reflection in action. It can vary from highly structured to unstructured as well as from inward-directed to outward-directed. Learning journals are situated at the mid-point on both dimensions: semi-structured and containing inward (self-oriented) and outward (course-oriented) dimensions. Journal writing can be done at three key moments: before the activity it helps learners to keep the goal in mind; during the activity it helps them to be fully aware and ready to intervene; and after the activity it facilitates transfer.

Section 2.8. Motivation

To close this chapter on learning issues, the concept of motivation will be addressed because learning is not only about mental performance. Motivation pertains to the more global category of emotions and emotions constitute an important variable in education and learning theories. Emotions play an important role in the process of knowledge construction. "The effects of emotions on learning are mediated by self regulation and motivation and both positive and negative emotions influence on learning" (Gorga & Schneider, 2009, p. 1). It is well recognized that emotions like anxiety, boredom, pride or enjoyment "affect achievement by influencing the student's involvement and attitude towards learning and learning environments" (Gorga & Schneider, 2009, p. 1). This is all the truer when learners work at a distance, interacting with a computer-based mediated learning environment. It is one thing to acknowledge the influence of emotions and motivation on learning, and it is another to build them into learning situations.

Keller is well known in the world of instructional design for having introduced, in the 1980s, the ARCS (Attention-Relevance-Confidence-Satisfaction) model from motivational design (Table 5).

Attention	
Perceptual Arousal	What can I do to capture their interest?
Inquiry Arousal	How can I stimulate an attitude of inquiry?
Variability	How can I use a variety of tactics to maintain their attention?
Relevance	
Goal Orientation	How can I best meet my learners' needs? (Do I know their needs?)
Motive Matching	How and when can I provide my learners with appropriate choices, responsibilities, and influences?
Familiarity	How can I tie the instruction to the learners' experiences?
Confidence	
Learning Requirements	How can I assist in building a positive expectation for success?
Success Opportunities	How will the learning experience support or enhance the students' beliefs in their competence?
Personal Control	How will the learners clearly know their success is based upon their efforts and abilities?
Satisfaction	
Intrinsic Reinforcement	How can I provide meaningful opportunities for learners to use their newly acquired knowledge/skill?
Extrinsic Rewards	What will provide reinforcement to the learners' successes?
Equity	How can I assist the students in anchoring a positive feeling about their accomplishments?

Table 5: ARCS model categories and subcategories (Keller, 2007, p. 88)

The four categories "represent a macro-level frame of reference, while the subcategories provide guidance for more specific subsets of motivational tactics" (Keller, 2007, p. 87). To each sub-category, a salient question is associated, helping a designer to understand how to deal with the category and sub-category.

Concerning the ARCS design process, it consists of ten successive steps: 1) obtain course information, 2) obtain audience information, 3) analyse audience, 4) analyse existing materials, 5) list objectives and assessments, 6) list potential motivational tactics, 7) select and design motivational tactics, 8) integrate motivational tactics with instruction, 9) select and develop materials, 10) evaluate and revise (Keller, 2007, p. 89). The design process consists in gathering information about the course and the audience and then weaving motivational tactics into the instructional design. Keller's approach is a problem-solving one: the initial analysis of audience motivation serves to guide the designer in choosing the most appropriate motivational tactics.

Learning is a complex process implying many processes in addition to mental processes. Emotions, for instance, have proved to be a determining factor in the learning process. In the last twenty years, instructional designers have woven motivational tactics into the design of instructional sequences.

Section 2.9. Summary

In a socio-constructivist context, learners are considered active knowledge builders in constant interaction with their environment and with the world, transforming both – themselves and the environment - in the process. They develop reflective capabilities and are in a constant process of cognitive development, structuring and reorganizing previously and newly acquired skills and knowledge. The knowledge-building model is based on a combination of situated learning, writing-to-learn and community-building approaches. Learners are considered real resources and encouraged to create knowledge through writing and taking part in the community. A knowledge building community entails accountability and responsibility towards created knowledge. The creation of knowledge happens within interactions, particularly meaningful ones. Meaningful interactions consist in responding, negotiating internally and socially, arguing, building on ideas, offering alternative perspectives, sharing insights and critiques, etc., to create meaning out of a task, construct knowledge, and thus to learn. It is an interactive process with peers, experts, the learning environment and the socio-professional environment. Authentic learning activities constitute a

fertile ground for these kinds of interactions to flourish. They provide learners with a chance to experience learning in a designed real-life context and produce something that is relevant for the community. Engaging in authentic activities implies a cultural attitude that is real-life and production oriented. Higher-order learning and skills, which refer to cognitive categories associated with analysing, evaluating and creating, are involved in training interpreter trainers. Authentic activities provide an ideal context for higher-order learning, since they are inherently complex, ill-structured and challenging. To achieve knowledge building through meaningful interactions in authentic learning activities, we have set up a collaborative learning strategy.

In our perspective, collaborative learning represents a particular instantiation of socio-constructivism. It has a strong community-of-practice dimension, it engages learners in authentic higher-order activities, provoking meaningful interactions with meaning making and knowledge building as outcomes. Seven conditions that contribute to collaborative learning have been identified: grounding, division of labour, symmetry (of action, knowledge and status), information processing, scripting of interactions, metacognitive scaffolding and learning-process regulation. Since collaboration involves participation in a learning environment, it is deeply grounded in distributed cognition. Distributed cognition seeks to know where knowledge resides: in the individual? in the environment? in both? It is a framework concerned with processes that enable and extend human cognitive resources.

We have summarised the context of learning in action and will review the processes encouraged in parallel. Reflection, particularly journaling, and motivation are the two components. Reflective practice is centred around the process of monitoring, regulating and controlling an individual's thinking about thinking and an individual's motivation with a view to enhancing understanding and creating expert knowledge. Reflective writing is one sort of reflection in action. It can be highly structured or unstructured as well as inward- or outward-directed. Journal writing can be undertaken at three key moments: before the activity it helps learners to keep the goal in mind; during the activity it helps them to be fully aware and ready to intervene, and after the activity it facilitates transfer. The other dimension addresses motivation. Emotions have proved to be a determining factor in the learning process. Learning is a complex process implying many processes in addition to mental processes. In the last twenty years, it has become common practice to weave motivational tactics into the design of instructional sequences.

Chapter 3. Pedagogical design

This chapter introduces pedagogical models and strategies that instructional designers rely on when they design learning activities. Concrete methods of designing instructional sequences such as instructional systems designs or agile designs are presented as two opposing methods. It also addresses issues of the learning environment. Pedagogical scenarios and scaffolding will be introduced as tools at the service of instructional designers. Finally, considerations on evaluation, that has also to be taken into account during the design, are mentioned.

Section 3.1. General full-scale ISD pedagogical models

General cognitivist pedagogical models focus on having learners process information. Knowledge is considered in terms of mental schemata and learning occurs when there is a change in learners' schemata. The "black box" of the mind needs to be opened and understood: information comes in, is processed, and results in certain outcomes. Merrill (2002) and Van Merriënboer (2007) provide objectivist instructional design pedagogical models and import constructivist perspectives on learning in the variety of activities they suggest.

Merrill's (2002) "first principles of instruction" consist in providing a problem-centred learning situation, activating existing knowledge, demonstrating content and process, planning the application of this newly acquired knowledge or skill and finally integrating it. The following presents a more detailed description of these five principles:

- Principle 1—Problem-centred (let me do the whole task): Learning is promoted when learners are engaged in solving real-world problems.
- Principle 2—Activation (where do I start): Learning is promoted when relevant previous experience is activated.
- Principle 3—Demonstration (show me): Learning is promoted when the instruction demonstrates what is to be learned rather than merely giving information about what is to be learned.
- Principle 4—Application (let me): Learning is promoted when learners are required to use their new knowledge or skill to solve problems.

- Principle 5—Integration (watch me): Learning is promoted when learners are encouraged to integrate (transfer) the new knowledge or skill into their everyday life. (Merrill, 2002, pp. 45-50)

These instructional principles should hold for any appropriate situation, independently of the specific learning activities involved.

Van Merriënboer's (2007) four-component instructional design system (4C/ID) is very close to Merrill's model. It consists in providing four interrelated blueprint components, based on learning processes central to complex learning. This is a holistic approach to learning, aimed at teaching the complex skills of higher-order learning.

The first component addresses the quality of learning tasks. To address complexity, he suggests working on whole tasks, augmenting their difficulty gradually, instead of fragmenting one complex task. Within the same task-class, an additional difficulty is introduced each time. In parallel, learners are provided with a certain amount of support, which gradually fades as they improve their mastery of the task.

The second component consists in providing supporting information, in other words, providing all the pieces of information learners need in order to solve a problem in a given domain. It gives indications about the process needed to solve a problem in a particular task-class. It also provides a bridge between existing knowledge and skills and the ones learners are expected to acquire.

The third component consists in procedural information: the kind of timely information learners need to solve the routine aspects of learning tasks. This information is typically found in guides and user manuals or can be provided by an expert in the domain. Once this procedural knowledge is acquired, support fades. The shift to a holistic approach to learning may call for additional practice for a set of tasks instructors would like learners to master with a high-level of automaticity (i.e. multiplication tables).

This additional practice constitutes the fourth component of the model. It must be firmly grounded in the cognitive context of the whole task if it is to be effective (Figure 4).

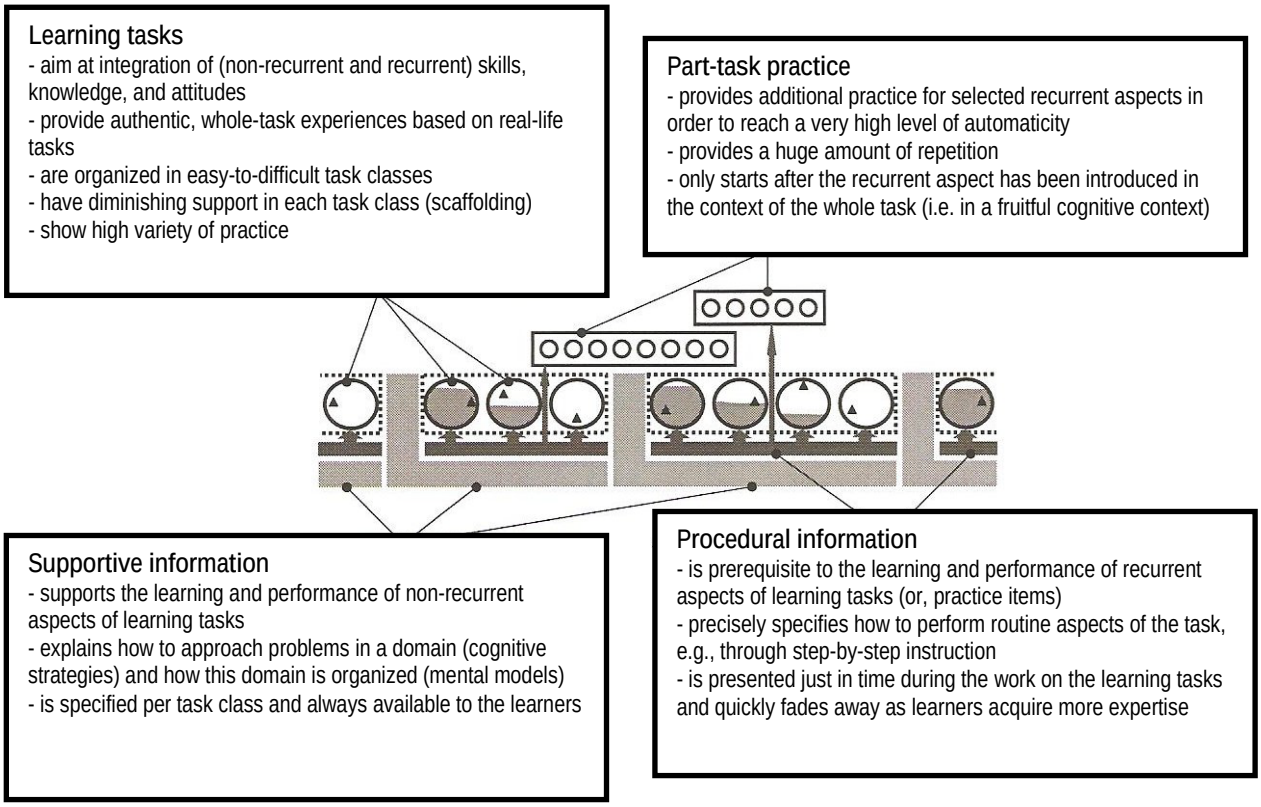


Figure 4: A schematic training blueprint for complex learning and the main features of each of the four components (Van Merriënboer & Kirschner, 2007, p. 14)

Recently, Van Merriënboer and Kirschner have developed a simpler model based on the 4C/ID one. It is labeled *Ten steps to complex learning*. The first component of the earlier model, *learning tasks*, corresponds to the first three steps of the simpler model: 1) design learning tasks, 2) sequence task classes, 3) set performance objectives. The second component, *supportive information*, corresponds to the three following steps: 4) design supportive information, 5) analyse cognitive strategies, 6) analyse mental models. The third component, *procedural information*, corresponds to 7) design procedural information, 8) analyse cognitive rules, 9) analyse prerequisite knowledge. And the last component remains the same in both methods: *part-task practice* (Van Merriënboer & Kirschner, 2007, p. 10).

This method, with the part-task practice, can be very effective for the learning of selected recurrent aspects of a complex skill. It is generally used with skills that enable the performance of many other skills and allows a high level of automaticity. The process used involves overlearning in association with time and speed. Sequencing techniques to break the task into smaller bits include *segmentation* – break the procedure down into distinct temporal or spatial parts; *simplification* – break the procedure down into parts that represent increasingly complex versions of the procedure; and *fractionation* – break the procedure down into different functional parts (Van Merriënboer & Kirschner, 2007, p. 197). The

outcome is a very well acquired skill for the long term, whereas this is not always the outcome in weak problem-based pedagogies, for example.

Both models, Merrill's and Van Merriënboer's, are very close, but label things differently: they seek to provide models that put learners at the centre, as active knowledge builders, in the process of acquiring higher-order learning skills in authentic contexts. Both methods are based on an objectivist methodology that predicts all the steps of instruction. Within these steps, they have built in constructivist and socio-constructivist activities. To summarise, their instructional design theory remains objectivist and they import constructivist perspectives on learning in the variety of activities they suggest. They are far, for instance, from a rapid prototyping instructional method that considers design and learning as interdependent and mutually reinforcing cyclical processes (see Section 4.2 for more details).

Section 3.2. Pedagogical strategies and models

The design of learning activities involves a certain amount of creativity, of course, but a great part of the design is based on pedagogical models and strategies that have been reported in the research and proved to be efficient and effective. We will mainly use Joyce, Weil and Calhoun's (2004) terminology in this section. Authors group the models into four families: information-processing, social, personal and behavioural systems. Only models used in the case studies will be reviewed.

Three main pedagogical strategies have been identified: cognitive apprenticeship, knowledge building and collaborative learning. Schneider defines cognitive apprenticeship as

> the pedagogic strategy at the core of situated learning. Similarly to craft apprenticeship, "Cognitive apprenticeship supports learning in a domain by enabling students to acquire, develop, and use cognitive tools in authentic domain activity" (Brown, Collins and Duguid, 1989). Furthermore, "cognitive apprenticeship methods try to enculturate students into authentic practices through activity and social interaction" (Brown *et al.*). Thus, it is important not only to solve problems in a learning environment that uses real-world contexts and immerses the learner in the culture of a particular practice, but also to allow learners to witness the practitioners of that culture solving problems and carrying out tasks[16]. (Schneider, EduTechWiki)

Knowledge building refers to "collecting information, supporting discourse and exchanges, encouraging a social and professional network of learners and experts and making the knowledge acquired collectively available for future use."[17] Collaborative learning, considered as a pedagogical strategy, entails a strong community-of-practice dimension, and

[16] http://edutechwiki.unige.ch/en/Cognitive_apprenticeship
[17] http://edutechwiki.unige.ch/en/Knowledge-building_community_model

engages learners in authentic higher-order activities, provoking meaningful interactions with meaning making and knowledge building as outcomes.

The three pedagogical strategies overlap, focusing respectively on modelling, knowledge and the community. While each strategy focuses on a single aspect, it also very often entails other aspects and strategies are often used in combination.

Coming back to Joyce *et al.*'s (2004) classification, the information-processing family is concerned with "enhancing the human being's innate drive to make sense of the world by acquiring and organizing data, sensing problems and generating solutions to them, and developing concepts and language to convey them" (p. 26). Models related to this family involve information gathering, concept learning, hypothesis formation and testing and creative thinking.

Inductive thinking addresses the following instructional issues: information retrieval, concept formation, skill development, and hypothesis formation and testing. It nurtures the spirit of inquiry and logical thinking and provides an awareness of the nature of knowledge. Its syntax depends on the specific task but can be summarised in the table below (Table 6).

Potential realisation (1)	Potential realisation (2)	Potential realisation (3)
Concept formation Enumeration and listing Grouping Labelling, categorizing	Interpretation of data Identifying critical relationships Exploring relationships Making inferences	Application of principles Predicting consequences, explaining unfamiliar phenomena, hypothesizing Explaining and/or supporting the predictions and hypotheses Verifying the prediction

Table 6: Inductive thinking model syntax (Joyce *et al.*, 2004, p. 58)

Concept acquisition or *concept attainment* is closely related to the inductive thinking model. It is based on the presentation of organized information at different stages of development and aims at teaching and learning concepts. Instructionally speaking, concept attainment addresses issues pertaining to the nature of concepts, conceptual systems and their application and concept-learning strategies. The model nurtures conceptual flexibility, inductive reasoning and a tolerance for ambiguity (Table 7).

Phase	Action
Phase 1	Presentation of data and identification of concept Presentation of labelled examples – compare attributes in examples Generate and test hypotheses State definition according to essential attributes

Phase	Action
Phase 2	Testing attainment of the concept Identify additional examples – confirm hypotheses, concept naming, restating definition
Phase 3	Analysis of thinking strategies Description of thoughts, role, type and number of hypotheses and attributes

Table 7: Concept attainment / acquisition model syntax (Joyce *et al.*, 2004, p. 72)

Scientific inquiry promotes strategies of inquiry and those values and attitudes that are necessary for an inquiring mind: process skills (observing, collecting, and organizing data; identifying and controlling variables; forming and testing hypotheses and explanations, inferring), active learning, persistence, logical thinking and an orientation that views all knowledge as tentative. On the instructional level, the scientific inquiry model emphasizes scientific processes and strategies for creative inquiry. On the nurturing level, it emphasizes a spirit of creativity, independence or autonomy in learning, tolerance of ambiguity, and the tentative nature of knowledge. Its syntax can be summarised in five phases (Table 8).

Phase	Action
Phase 1	Confrontation with the problem Explain inquiry procedures Present discrepant event State definition according to essential attributes
Phase 2	Data gathering – verification Verify the nature of objects and conditions Verify the occurrence of the problem situation
Phase 3	Data gathering – experimentation Isolate relevant variables Hypothesize (and test) causal relationships
Phase 4	Organizing, formulating an explanation Formulate rules or explanations
Phase 5	Analysis of the inquiry process Analyze inquiry strategy and develop more effective ones

Table 8: Scientific inquiry model syntax (Joyce *et al.*, 2004, p. 129)

Partners in learning focuses on the definition of problems, exploration of various perspectives on the problem, and studying together to master information, ideas and skills, while at the same time developing social competencies. The number of participants can vary from two to a whole group. Partners in learning addresses the following instructional issues: effective group processes and governance, the constructivist view of knowledge, and the discipline of collaborative inquiry. It nurtures independence as learners, respect for the dignity

of all, social inquiry as a way of life, and interpersonal affiliation. Typically, it unfolds in six phases (Table 9).

Phase	Action
Phase 1	Encounter puzzling situation (planned or unplanned)
Phase 2	Explore reactions to the situation
Phase 3	Formulate study task and organize for study (problem definition, role, assignments, etc.)
Phase 4	Independent and group study
Phase 5	Analyze progress and process
Phase 6	Recycle the phases with another confrontation or with a new problem resulting from a preceding investigation

Table 9: Partners in learning model syntax (Joyce *et al.*, 2004, p. 222)

Role play is another model in the social family. It engages learners in collecting and organizing information about social issues and then enacting the roles of others. On the instructional level, role play develops empathy and respect towards peers, promotes analysis of personal values and targets behaviour and strategies for solving interpersonal problems. It nurtures social integration and comfort in expressing opinions, and develops skills in negotiating. It unfolds in the following way (Table 10).

Phase	Action
Phase 1	Warm up the group (identify or introduce problem, make problem explicit, interpret problem story, explore issues, explain role play)
Phase 2	Select participants (analyze roles, select role players)
Phase 3	Set the stage (set line of action, restate roles, get inside problem situation)
Phase 4	Prepare the observers (decide what to look for, assign observation tasks)
Phase 5	Enact (begin role play, maintain role play, break role play)
Phase 6	Discuss and evaluate (review action of role play – events, positions, realism, discuss major focus, develop next enactment)
Phase 7	Reenact (play revised roles, suggest next steps or behavioural alternatives)
Phase 8	Discuss and evaluate (review action of role play – events, positions, realism, discuss major focus, develop next enactment)
Phase 9	Share experience and generalize (relate problem situation to real experience and current problems, explore general principles of behavior)

Table 10: Role play model syntax (Joyce *et al.*, 2004, p. 248)

Problem-based learning can be seen as a particular instantiation of the partners-in-learning model. As they engage in authentic activities, learners are confronted with ill-structured and complex problems that require them to adopt an active role as problem solvers. According to

Margetson (1997), “problem-based learning encourages open-minded, reflective, critical and active learning; it is morally defensible in that it pays due respect to both student and teacher as persons with knowledge, understanding, feelings and interests who come together in a shared educational process; and it reflects the nature of knowledge – that is, knowledge is complex and changes as a result of responses by communities of persons to problems they perceive in their worlds” (p. 39). It can unfold as shown below (Table 11).

Steps	Action
Step 1	Recognition of a problem with significant academic or operational applications
Step 2	Initial formulation of the problem
Step 3	Description of the problem situation
Step 4	Identification of key relationships within the problem situation
Step 5	Identification of solutions for analysis and testing
Step 6	Evaluation of solutions with respect to the problem

Table 11: Problem-based learning steps (Birch, 1986, pp 19-80)

The last model is called *direct instruction* in Joyce *et al.*’s (2004) terminology. It is part of the behavioural family and refers to a pattern of teaching “that consists of the teacher’s explaining a new concept or skill” (p. 314) to a group and then having them practise it (Table 12).

Phase	Action
Phase 1	Orientation (establish content of lesson, review previous learning, establish lesson objectives, establish lesson’s procedures)
Phase 2	Presentation (explain and / or demonstrate new concept or skill, provide visual representation of the task, check for understanding)
Phase 3	Structured practice (lead through practice examples in lock step, respond, provide corrective feedback and reinforce correct practice)
Phase 4	Guided practice (semi-independent practice under teacher’s monitoring, feedback through praise, prompt, and leave)
Phase 5	Independent practice, feedback delayed.

Table 12: Direct instruction model syntax (Joyce *et al.*, 2004, p. 314)

In this research, three major pedagogical strategies are addressed: cognitive apprenticeship, knowledge building and collaborative learning. These strategies provide an overall framework for implementing pedagogical models. The ones reviewed refer to information processing and social learning and comprise inductive thinking, concept acquisition or attainment, scientific inquiry, partners in learning and problem-based learning. The final model, pertaining to the behavioural family, is direct instruction.

Section 3.3. Activity-based learning environments

With the introduction of technology, the learning environment has taken a place in its own right in the design process. We will describe two examples of technology-enabled learning environments, CLEs (Constructivist Learning Environments) and OLEs (Open Learning Environments), in order to highlight the importance of the role of the learning environment in the overall design process.

Jonassen (1999) has developed the CLEs model to represent an environment in which the learner is a meaning maker, a knowledge builder.

> The model conceives of a problem, question, or project as the focus of the environment, with various interpretative and intellectual support systems surrounding it. The goal of the learner is to interpret and solve the problem or complete the project. Related cases and information resources support understanding of the problem and suggest possible solutions; cognitive tools help learners to interpret and manipulate aspects of the problem; conversation / collaboration tools enable communities of learners to negotiate and coconstruct meaning for the problem; and social/contextual support systems help users to implement the CLE (Jonassen, 1999, p. 217).

The set of technological tools support socio-pedagogical goals alongside content-based resources or artifacts provided to learners. Three types of tools support learners:

- Cognitive tools to scaffold required skills, for instance problem representation tools, knowledge modeling tools, performance support tools and information gathering tools;
- Conversation and collaboration tools to support the development of the community;
- Social and contextual tools to support all users whenever they have a question.

"In most CLEs, learners need to explore; articulate what they know and have learned; speculate (conjecture, hypothesize, test); manipulate the environment in order to construct and test their theories and models; and reflect on what they did, why it did or did not work, and what they have learned from the activities" (Jonassen, 1999, p. 230). Learning activities – exploration, articulation, reflection - are supported with adequate instructional activities. For instance, in the exploration phase, modelling is the easiest strategy, be it behavioural modelling with an expert showing how to enact the "overt performance", or cognitive modelling with the expert enacting the "covert cognitive processes" (Jonassen, 1999, p. 231). Learners improve their performances until they reach their own creative and original way of performing. The coach helps them in this learning curve, "motivating learners, analyzing their performances, providing feedback and advice on the performances and how to learn about

how to perform, and provoking reflection on and articulation of what was learned" (Jonassen, 1999, p. 232).

While modelling is expert-performance-centred and coaching learner-performance-centred, scaffolding completes both these instructional activities, providing an architecture to go "beyond the learner's capacities" (Jonassen, 1999, p. 235).

At about the same time, Hannafin, Land and Oliver (1999) developed the open learning environments (OLE) model. This model comprises four basic components: enabling contexts, resources, tools, and scaffolds.

The *enabling context* determines the perspectives taken in the environment, and consists in "induced or imposed perspectives that influence how needs are framed, approaches are planned, and resources are interpreted" (p. 123):

- An externally-imposed context specifies a specific problem for the learner.
- An externally-induced context presents the context, and the learner has to formulate the problem.
- An individually-generated context stimulates the learner to generate both the context and the problem.

Resources consist of "sources ranging from electronic, to print, to humans, that provide needed information" (p. 123), in other words, resources represent information relevant to a given context. They can be static or dynamic.

Tools consist "of means for engaging and manipulating both resources and ideas" (p.123) and are used as mediation. Several categories of tools are available:

- processing tools to support the learner's cognitive processing, such as:
  - seeking tools to identify relevant resources,
  - collecting tools to gather resources,
  - organizing tools to represent relationships among ideas,
  - integrating tools to link new with existing knowledge,
  - generating tools to create new artifacts to think with;
- manipulation tools to test the validity of, or to explore, beliefs and theories;
- communication tools to communicate among the community both synchronously and asynchronously.

Scaffolding consists of "processes that support individual learning efforts" (p.123) and can be grouped into four categories:

- conceptual scaffolding to guide learners on what to consider;

- metacognitive scaffolding to guide them on how to think about the problem under investigation;
- procedural scaffolding to guide them on how to use the environment to meet their learning goals;
- strategic scaffolding to guide them on approaches to solving the problem.

From a psycho-pedagogical point of view, it is important to notice which theories underlie such learning environments:

> OLEs share psychological and pedagogical values: situated thinking, prior knowledge and experience, metacognitive monitoring, and the progressive testing and refining of understanding. Associated methods emphasize authentic learning contexts, anchored problem-based approaches, construction, manipulation, and scaffolding. (Hannafin *et al.*, 1999, p. 121)

Hannafin *et al.*, have set up this model to support student-centredness. Individual goals and reasoning capabilities are promoted. "OLEs attempt to address these needs by inducing (or supporting) frames for study, making resources available, providing tools to support and encourage analysis and interpretations, and guiding learners in accomplishing their goals or addressing their needs" (Hannafin *et al.*, 1999, p. 139).

Activity-based learning environments are composed of a set of technological tools to support socio-pedagogical goals. Communication, collaboration, social, cognitive scaffolding tools and resources constitute core tools to enable activity-based learning. The teacher's role is transformed to that of a coach who scaffolds meaningful learning experiences for the students. Psycho-pedagogical values underlying such learning environments are related to situated learning, metacognitive monitoring and progressively refined higher-order learning.

Section 3.4. The pedagogical scenario

In the objectivist–constructivist confrontation, the scenario can be seen as a concrete attestation of the influences of each tradition on the other. If constructivists introduced the notion of scenario, it might be partly due to the failure of radical constructivist perspectives (Kirschner, Sweller & Clark, 2006) and the need to return to some sort of structure in the learning process. On their side, instructivists imported constructivist approaches to learning in their overall designs (Figure 5).

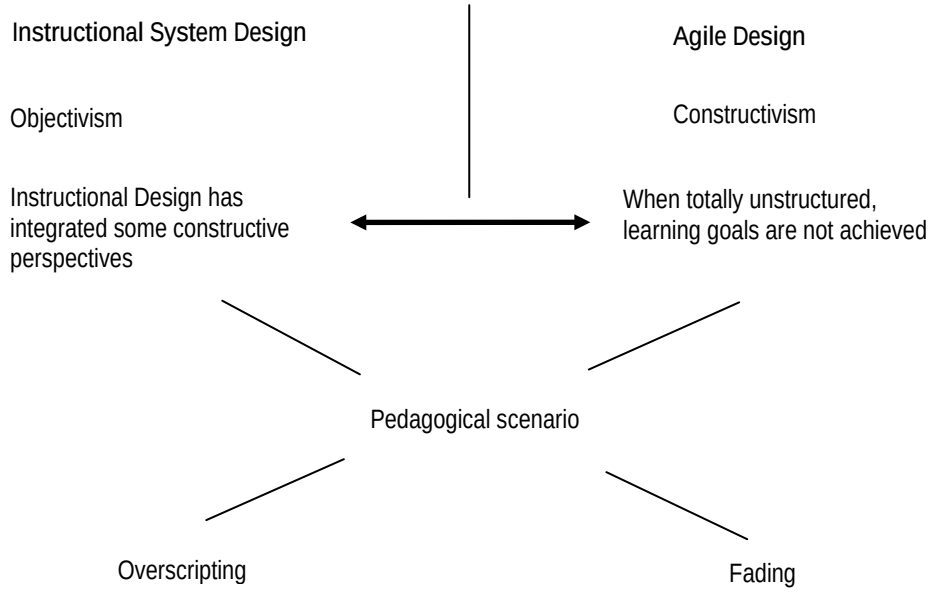


Figure 5: Interactions between ISD and Agile Design

We use the term *pedagogical scenario* but at least two other terms exist to describe the same concept. In Computer Supported Collaborative Learning (CSCL) for example, the commonly used term is *script*. "The term '*script*' has also been used for methods that structure face-to-face collaborative learning" (Dillenbourg & Tchounikine, 2007, p. 5). The other term is *storyboard*. "A storyboard is a sketch of how to organize a story and a list of its contents. It helps to: 1) define the parameters of a story within available resources and time, 2) organize and focus a story, and 3) to figure out what medium to use for each part of the story" (Stevens, 2007).

The common element in all three labels is the dual notion of dealing with a story and describing how this story unfolds. So what is a pedagogical scenario in an educational setting? In very simple words, it can be defined as a way of describing how different activities unfold, paying attention both to process, content and roles. "A pedagogical scenario is an instantiation of an instructional design model for a given subject and a given kind of situation."[18] Typically, a pedagogical scenario entails the following elements:

- learning activities with complete scenarios describing them (goals, content, resources, evaluation, support, etc.);
- a learning environment that will support the development of activities;
- specific learning materials with which learners may need to interact at some point.

In the literature, there is not much about pedagogical scenarios. Obviously, it is in CSCL that it is most widely used. Dillenbourg and Hong (2008) distinguish micro- from macro-scripts.

[18] Schneider, D. http://edutechwiki.unige.ch/en/Pedagogical_scenario

– Micro-scripts are dialogue models, mostly argumentation models, which are embedded in the environment and which students are expected to adopt and progressively internalize. For instance, a micro-script may prompt a student to respond to the argument of a fellow student with a counter-argument (Weinberger *et al.*, 2002).

– Macro-scripts are pedagogical models, i.e. they model a sequence of activities to be performed by groups. For instance, argumentation can be triggered by collecting students' opinions and pairing students with conflicting opinions. (Dillenbourg & Hong, p. 7)

Dillenbourg and Tchounikine address another issue of scripting: its flexibility. They try to identify which elements in the scenario should remain fixed and which ones should be flexible. To do so, they distinguish intrinsic constraints from extrinsic constraints. "Intrinsic constraints are bound to the core mechanisms of the scripts, i.e. to the script design rationale. […] Extrinsic constraints are induced by different issues such as technological choices, contextual factors or arbitrary decisions" (Dillenbourg & Tchounikine, 2007, p. 6). Intrinsic constraints are the ones that remain stable, whereas teachers or script designers must make decisions concerning extrinsic constraints. Why are CSCL researchers concerned about the question of a script's flexibility?

CSCL macro-scripts are at the junction of instructional design and sociocultural approaches. Designing and implementing such scripts requires addressing a pedagogical dilemma that is very classical but particularly salient in CSCL: if the scaffolding is too weak, it will not produce the expected interactions; if it is too strong, it will spoil the natural richness of free collaboration. The purpose of a script is to introduce constraints that will shape collaborative interactions while avoiding the risk of over-scripting collaboration (Dillenbourg 2002), i.e. constraining collaboration in a way that makes it sterile by inhibiting the 'natural' peer interaction mechanisms (Dillenbourg & Tchounikine, 2007, p. 6).

Dillenbourg and Hong (2008) situate the script in its pedagogical role independently of computers and collaboration. They discuss "integrated scripts", that is

scripts that integrate several activities distributed across multiple places and different social planes (individual, collaborative, collective) within a single workflow. This broadened script concept places the teacher back at the centre of activity, not for lecturing, but rather for "orchestrating" (Randolph and Evertson 1994; Dillenbourg and Fischer 2007) script activities. Hence, our script environment includes features that enable the teacher to follow student activities in real time and, if necessary, modify the script, for instance by changing groups or deadlines (Dillenbourg and Tchounikine 2007). (Dillenbourg & Hong, 2008, p. 10)

To summarize, the script can be defined as a pedagogical tool to help teaching staff and learners monitor the scenario enactment with a view to achieving learning goals.

Kobbe (2005) has developed a framework with the following components: "the individuals that participate in a script, the activities that they engage in, the roles they assume, the

resources that they make use of and the groups they form" (Kobbe, 2005, p. 9). In addition, he has defined the script mechanisms to "describe the distributed nature of scripts, i.e. how individual learners are distributed over groups, how components are distributed over participants and how both components and groups are distributed over time" (Kobbe, 2005, p. 11). With the interplay between components and mechanisms, a teacher should have enough information to understand how the scenario unfolds and how it can be enacted in a particular context.

Schneider's (2003) considerations about pedagogical scenarios are as follows: Scenarios evolve in cycles, with, typically, the learner producing something, depositing it, other learners looking at the product and reacting to it, teaching staff providing feedback and the learner integrating this feedback and depositing a new version of the product, and so on (Figure 6).

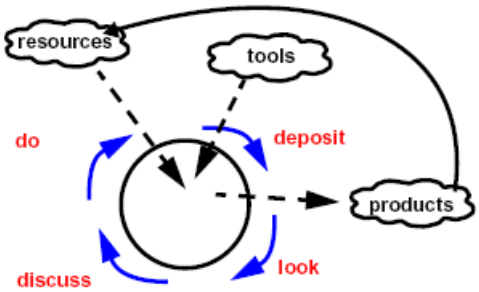


Figure 6: The basic do-deposit-look-discuss loop (Schneider *et al.*, 2003, p. 6)

In such a learning loop, teachers have to adopt several roles.

> The teacher's *manager* role is to make sure that such loops are productive, e.g. that the students produce something, that it is task related, that they engage themselves in metareflection (look critically at their own work) and that they discuss and share with others. The teacher's *facilitator* role is to help students with their tasks, e.g. help them to select resources and tools, explain difficult concepts and procedures, "debug" when they are stuck, etc. The teacher's *orchestrator* role is to implement (or most frequently also to create) the scenarios or scripts as they are also called. This means basically to define a scenario as a sequence of clearly identifiable phases in a way that learners focus on a smaller amount of tasks at the same time and that these tasks are not too difficult to be solved at some point. (Schneider *et al.*, 2003, p. 6)

To achieve learning goals while designing higher-order learning activities, it is important to design a very detailed pedagogical scenario beforehand, one that entails descriptions of activities, roles and tools.

Teaching staff may intervene pro-actively but they need to find the balance between two extremes, "over-scripting" and "fading". Fading refers to putting the script aside when a group performs "naturally" well and in accordance with learning goals. The script can either "fade in" when the "natural" group's dynamic is no longer satisfying or "fade out" in the

reverse situation (Kobbe, Weinberger, Dillenbourg, Harre, Hämäläinen, Häkkinen & Fischer, 2007). If teaching staff intervenes too much they run the risk of over-scripting the scenario with dramatic consequences for learners. They must continually evaluate the situation and intervene when necessary; they can also fade the scenario if they judge that learners are performing well within their own appropriated scenario.

> When designing and executing a pedagogical scenario the teacher has to respect a harmonic equilibrium between the freedom which is necessary for intellectual development and motivation on the one hand and certain guiding principles on the other. Engagement in a project and open confrontation of ideas must be guided by structured activities and a certain amount of monitoring, but the teacher should not overscript and overregulate since it will have negative effects on crucial factors like development of general problem-solving, metacognition capacities, motivation, etc. that we have defined above as major pedagogical goals. (Schneider *et al.*, 2003, p. 6)

A pedagogical scenario – also called script or storyboard – entails detailed scenarios of learning activities, a learning environment to support the development and enactment of these activities and, finally, specific learning materials. Scenarios evolve in cycles, with, typically, the learner producing something, depositing it, other learners looking at the product and reacting to it, teaching staff providing feedback and the learner integrating this feedback and depositing a new version of the product, and so on. In such a setting, the teacher's role is threefold: manager, facilitator and orchestrator. This perspective of the pedagogical scenario can be assimilated to the macro-script definition in CSCL. On the level of micro-scripts and activity scaffolding, the question of script flexibility is addressed to ensure equilibrium between intervention and non-intervention in the collaborative learning process.

The concept of integrated scripts considers the distribution of learning activities in a single workflow and places the teacher at the centre to orchestrate script activities. A different approach to scripting suggests interweaving a set of components (actors, roles, activities, resources) with a set of mechanisms (group distribution, etc.).

Section 3.5. "IMS - Learning design" specification

On a formal level, the IMS[19] LD (Learning Design) constitutes a specification for designing pedagogical scenarios that can be interpreted by machines in the future. It implements the following basic design model:

[19] "The IMS Global Learning Consortium (usually known as IMS) is a non-profit standards organization concerned with establishing interoperability for learning systems and learning content and the enterprise integration of these capabilities. Their mission is to 'support the adoption and use of learning technology worldwide'"(Wikipedia via the Free Dictionnary, http://encyclopedia.thefreedictionary.com/IMS+Global).

ROLE -> performs -> ACTIVITIES -> within -> an ENVIRONMENT

Actors adopt roles and perform activities within a given environment, interacting with other actors and with the learning environment. “The formal IMS LD language is both a general concept and the name of a particular technology. Learning Design describes the educational process. It is more or less a formal description of a pedagogical scenario and that may or may not adopt an instructional design model” (Schneider, 2008, p. 129). “IMS LD is a formal pedagogical standard, an educational modeling language to describe technology supported pedagogical scenarios that focus on learner activities. Currently, it represents the most popular formal language to describe learning designs” (Schneider, 2008, p. 130).

> The basic idea of EML [Educational Modeling Language] and LD [Learning Design] is in essence simple. It represents a vocabulary which users of any pedagogical approach understand, and into which existing designs can be translated. The core of LD can be summarised as the view that, when learning, people in specific groups and roles engage in activities using an environment with appropriate resources and services. (Rob Koper and Colin Tattersall, creators of EML/IMS Learning Design, quoted by Schneider, 2008, p. 130)

The design is central to the learning unit, it frames the overall scenario. According to the Learning Design Specification,

> regardless of pedagogical approach, a person gets a *role* in the teaching-learning process, typically a learner or a staff role. In this role s/he works toward certain outcomes by performing more or less structured *learning activities* within an *environment*. The environment consists of the appropriate learning objects and services to be used during the performance of the activities. Which role gets which activities at what moment in the process, is determined by the method. The *method* is designed to meet learning objectives (specification of the outcomes for learners), and presupposes certain prerequisites (specification of the entry level for learners). The method consists of one or more concurrent play(s); a play consists of one or more sequential act(s) and an act is related to one or more concurrent role-part(s), each role-part associates exactly one role with one activity or activity-structure.
> (http://www.imsglobal.org/learningdesign/ldv1p0/imsld_infov1p0.html#1495548)

Pedagogical scenarios are referred to as *play* and the three main components are *roles*, *learning activities* and *environment*. The scenario itself is called *method*. Within this overall design, the design of activities may be expressed with Unified Modeling Language (UML) activity diagrams. The diagram presents the general flow of activities for all actors. The following example represents an activity diagram for problem-based learning (Figure 7).

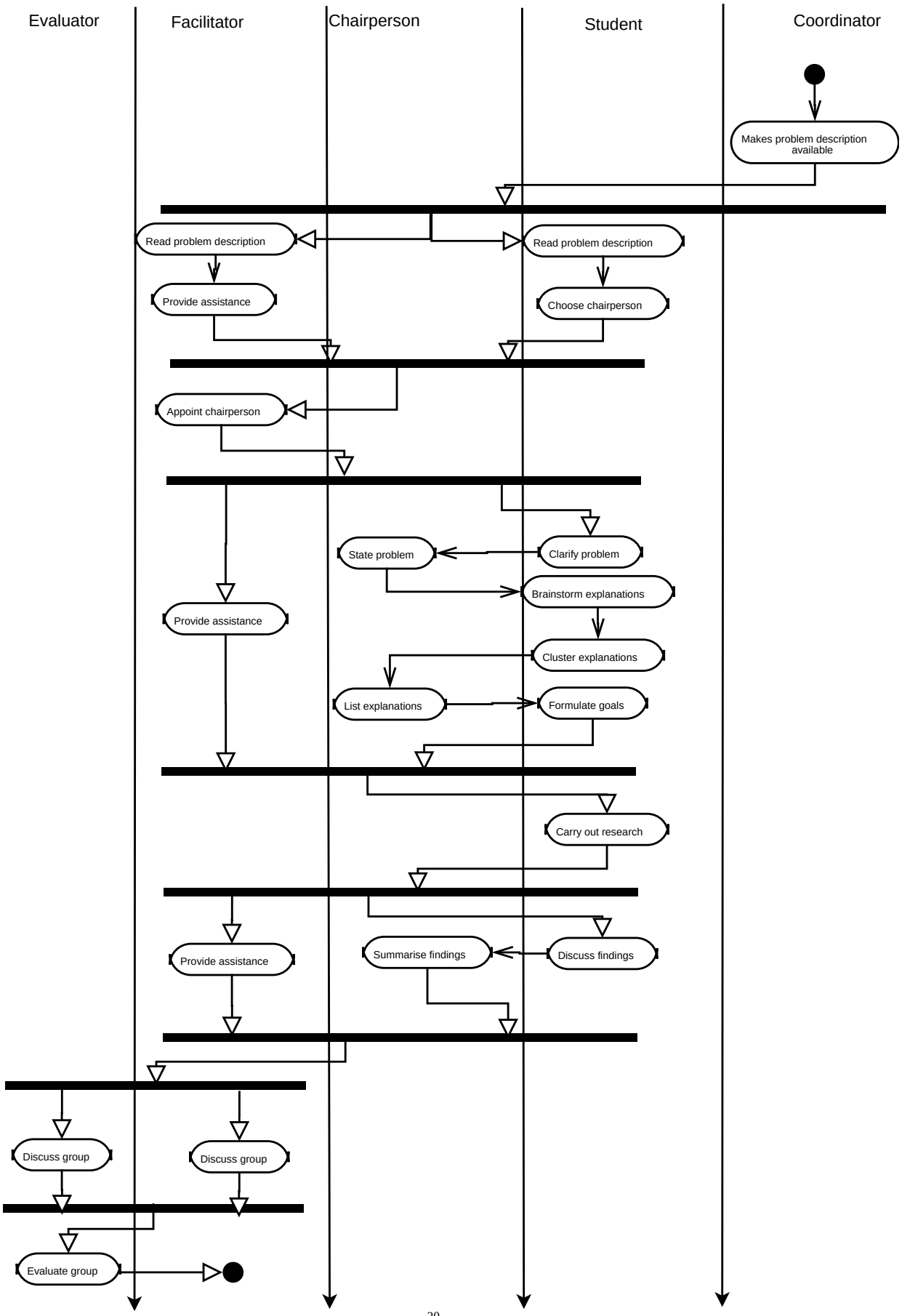


Figure 7: Activity diagram for problem-based learning[20]

[20] http://www.imsglobal.org/learningdesign/ldv1p0/imsld_bestv1p0.html

IMS LD is a formal language that calls pedagogical scenarios "plays" and implements the basic design model of actors adopting roles, performing activities within an environment, and interacting with other actors and the environment. Activity diagrams can be used to describe the general flow for all actors involved.

Section 3.6. Scaffolding

We have seen two aspects of the scenario as it is used in an educational context: its pedagogical foundations and how it can be formalised in a machine-readable language – though it is important to notice that, today, machines cannot yet interpret it to deliver the scenario. Underlying the idea of scenarios are notions of how learners learn. Once teachers have identified the learning goals and taken into consideration the audience – novice, expert, etc. – they design learning activities. This design takes into account a process of scaffolding that is woven into the design – the simple order of activities constitutes a scaffold – or is made available more explicitly with the help of scaffolding tools, for instance. How can scaffolding be understood?

> In education, scaffolding is a metaphor for a structure that is put in place to help learners reach their goals and is removed bit by bit as it is no longer needed, much like a physical scaffold is placed around a building that is under construction and removed as the building nears completion. […] Scaffolding is much more than a physical support in a learning context, addressing student learning of concepts, procedures, strategies, and metacogntive skills. (Dennen, 2004, p. 814)

According to McLoughlin (2002), effective scaffolding is characterized by: "reducing the scope for failure in the task that the learner is attempting; enabling learners to accomplish a task that they otherwise would not be able; moving learners to a new and improved zone of understanding; bringing learners closer to a state of independent competence (McLoughlin, 2002, p. 155). To achieve this effectiveness, the author has identified different types of scaffolding: they range from the simple communication of expectations to conceptual, metacognitive, procedural and strategic scaffolds, regulated by an expert human agent. These different types of scaffolding respond to different learners' needs and should support learners' progress towards becoming autonomous, self-regulated learners. The four types of explicitly named scaffolds are of particular interest to us and consist in:

- Conceptual scaffolding > Help is provided when the problem or task is presented so as to focus the learner towards problem definition where there may be multiple interpretations. This may be achieved through the presentation of parallel scenarios and problems that enable the learner to practice analytic skills.

- Metacognitive scaffolding > Metacognitive scaffolding can be provided by a cognitive tool (e.g., an electronic notepad) to enable students to record their thinking while engaging with an actual problem. This supports the underlying processes associated with learning management and reflection.
- Procedural scaffolding > Procedural scaffolding supports learners in using available tools and resources. In Web-based teaching, this may be in the form of access to databases, support for collaborative learning and resource sharing.
- Strategic scaffolding > Strategic scaffolding is afforded by emphasizing alternative courses of action and learning pathways that might be applied in classroom contexts. The presentation of multiple scenarios, events and perspectives enables students to engage in planning and decision making. (McLoughlin, 2002, p. 153)

The author attempts to give some rules for designing scaffolds. The identified goal of introducing scaffolds is stated as learners' "independent performance and their movement into a new zone of development" (p. 156). Finally, the author identifies ten dimensions, each of which is represented as a continuum with contrasting values at each end, to take into account while integrating scaffolds in the design of a learning sequence (Table 13).

Goal orientation	highly focused	↔	unfocused
Adaptability	fixed	↔	flexible
Accessibility	high	↔	low
Alignment	high	↔	low
Experiential value	high	↔	low
Collaboration	high	↔	low
Constructivism	strong	↔	weak
Learning orientation	teacher regulation	↔	learner regulation
Multiplicity	one-dimensional	↔	multi-dimensional
Granularity	low granularity	↔	high granularity

Table 13: Design of scaffolds : Dimensions that support both process and product outcomes (McLoughlin, 2002, p. 156)

The different dimensions are briefly presented below.

- Goal orientation > for scaffolding to succeed, the goal for the support must be planned and designed to achieve independent learning and task performance.
- Adaptability > Scaffolding must be flexible enough to engage the learner at his/her present level of understanding and to diminish once improved performance is achieved.
- Accessibility > The scaffold needs to be accessible to students when they need it, in the form of "just-in-time" support.
- Alignment > Support should be aligned with task goals and learning outcomes so that the learning experience is a seamless one for the student. Aligning scaffolds with task and assessment design ensures consistency.

- Experiential value > To foster effective learning, it is important to make sure that the learners are not just exposed to inert facts and information but that they are afforded an experience that enables them to plan, act and reflect. Scaffolds should enable transfer of skill to a novel task and provide concerted support for learning.
- Collaboration > Use of the web as a tool to scaffold collaboration and create shared public representation of knowledge through dialogue and collaboration.
- Constructivism > Cognitive apprenticeship theory has drawn attention to scaffolding, with an emphasis on modelling expert performance. Technology-based scaffolding supports knowledge construction by representing learners' ideas, beliefs and understandings, and by offering tools for accessing needed information so that learners can create new knowledge.
- Learning orientation > Effective scaffolds are not intended to increase teacher intervention or supplant learner-generated activity, but to encourage self-regulation and reflection by learners on their own processes and actions.
- Multiplicity > The multiplicity continuum suggests that scaffolds can range from one-dimensional (limited to one aspect of learning) to multi-dimensional (applicable to many aspects of learning).
- Granularity > Granularity refers to the "relative size of instructional resources". High granularity in scaffolding enables learners to select and reconstruct the parts that are meaningful to them within a task and are therefore more efficient. (Adapted from McLoughlin, 2002, pp. 156-9)

The design of a pedagogical scenario takes into account a process of scaffolding that is woven into the design – the simple order of activities constitutes a scaffold – or is made available more explicitly with the help of scaffolding tools, for instance. Several types of scaffolds exist. Conceptual, metacognitive, declarative, procedural and strategic are the five major types of scaffolds identified in the literature (Azevedo *et al.*, 2005). A myriad of scaffolding techniques delivered by at least three agent resources – human coach, peer learner, computer-based artifact – exist. The human coach provides adaptive scaffolding while the computer-based artifact provides fixed scaffolding. To help designers integrate scaffolds into their designs, McLoughlin proposes design scaffolding rules that integrate the following dimensions: goal orientation, adaptability, accessibility, alignment, experiential value, collaboration, constructivism, learning orientation, multiplicity and granularity.

Having traced the broad outlines of scaffolding, we will now turn our attention to conceptual scaffolding, either adaptive or fixed.

Sharma and Hannafin (2007) mention two considerations to bear in mind for designing cognitive scaffolding in technology-enhanced learning environments: the scaffold makes cognitive processes explicit and it facilitates the use of appropriate representations. Within the first consideration – making cognitive processes explicit - the following key design features for scaffolds are listed:

- Explicate process using procedural scaffolds (i.e. provide models of thinking to mitigate extraneous load, for instance organizational tools like a management timeline to visualize procedures and consider them recursive in ill-defined problems);
- Make understanding visible by using metacognitive scaffolds (i.e. communicate underlying reasoning, provide opportunities for students to clarify and externalise their misunderstandings);
- Balance metacognitive and procedural scaffolds (provide process prompts to support task achievement and metacognitive prompts to support externalization of thoughts);
- Account for learner characteristics (motivation, need for domain, strategic and metacognitive scaffolds);
- Account for learner expectations of task (consider students' expectations of the scaffold in supporting existing strategies and skills). (Adapted from Sharma & Hannafin, 2007, pp. 34-37)

Within the second consideration - facilitating the use of appropriate representations - the following key design features for scaffolds are listed:

- Integrate contextually appropriate scaffolds (provide embedded contextual scaffolds to improve student performance);
- Use scaffolds sensitive to learner assumptions, needs and differences (textual and graphic scaffolds);
- Ensure scaffold visibility and utilization (provide visible and essential scaffolds to support student performance; demonstrate scaffold function);
- Ensure appropriate modelling (student use of scaffolding maps, instructor demonstrations of tool; support hard scaffolding with customized instructor scaffolding). (Adapted from Sharma & Hannafin, 2007, pp. 34-37)

This dual role of conceptual scaffolds - making cognitive processes explicit and integrating appropriate representations – should help learners move to a new zone of understanding while giving them the tools to solve a similar learning task independently in the future.

Jonassen, Strobel and Gottdenker (2005) also conducted research to better understand conceptual scaffolding. They concentrated on how learners build conceptual models.

> When solving a problem or answering a complex conceptual question, learners must construct a mental model of the phenomena and use that model as the basis for prediction, inference, speculation, or experimentation. Constructing a physical, analogical, or computational model of the world reifies the learner's mental model. One reason that constructed models are so powerful is because of their intellectual autonomy. (Jonassen *et al.*, 2005, p. 20)

While constructing a model, learners need to externalise and schematise their understanding of a phenomenon. That is why the authors qualified model building in terms of "conceptually engaging tasks" with the following characteristics:

- Model building is a natural cognitive phenomenon.
- Modelling is essentially constructivist – constructing personal representations of experienced phenomena.
- Modelling supports hypothesis testing, conjecturing, inferring, and a host of other important cognitive skills.

- Modelling requires learners to articulate causal reasoning, the cognitive basis for most scientific reasoning.
- Modelling is important because it is among the most conceptually engaging cognitive processes that can be performed, which is a strong predictor of conceptual change.
- Modelling results in the construction of cognitive artefacts (externalized mental models).
- When students construct models, they own the knowledge. Student ownership is important to meaning making and knowledge construction.
- Modelling supports the development of epistemic beliefs. (Jonassen *et al.*, 2005, p. 21)

A conceptual model is a two-sided coin: the model refers both to the model the learner builds and also to the model the coach provides as feedback to foster long-term conceptual change within the learners' representations. It is thus referred to as conceptual scaffolding and can be affiliated with cognitive apprenticeship.

Conceptual scaffolding does not function on its own. It is related to metacognitive capacities and regulation of the activity. Regulation and self-regulation help learners shift from being active consumers of cognitive scaffolds to being discarders of scaffolds because these will have accomplished their cognitive long-term mission.

Conceptual scaffolding is related to metacognitive capabilities and regulation of activities. Conceptual scaffolds help learners to move to new zones of understanding by making cognitive processes explicit and favouring the integration of appropriate representations. The activity of building a conceptual model can also be considered as conceptual scaffolding, since learners start from their own model and end the learning process by integrating an assimilated-to-expert model (through the feedback the expert provides).

Section 3.7. Evaluation

Finally, to close this chapter on pedagogical design, we will briefly address evaluation. Evaluation can be viewed as a way to enhance one's everyday learning in a socially rich context that extends beyond the academic world. To adopt such a perspective requires designing appropriate evaluation instruments, but before, it is important to recall what evaluation is about.

The question of assessment is very broad. It can be summarized in terms of two broad types of assessment: summative evaluation involves the assignment of grades and the certification of studies; formative evaluation is intended to help learners throughout the learning process. Here the focus is on formative evaluation, that is, the feedback learners receive while they are performing as well as after they have completed an activity.

Boud (2000) introduces the very interesting notion of "sustainable assessment," a notion that entails all aspects of assessment practice:

- Confidence that new learning task can be mastered: Learners must be sufficiently confident to be able to succeed and be assured that they have the necessary skills and knowledge.
- Exploration of criteria and standards which apply to any given learning task: If assessment criteria are not made explicit, learners will have to look for these criteria in the learning context (advanced learners, peers, teachers, etc.).
- Active engagement with learning tasks with a view to testing understanding and application of criteria and standards: Learners need to engage actively in the task, having the evaluation criteria in mind.
- Development of devices for self-monitoring and judging progression towards goals: Learners must develop self-regulation and self-evaluation strategies to be able to evaluate if their production meets the evaluation criteria.
- Practice in discernment to identify critical aspects of problems and issues: Learners must be able to demonstrate skills in handling situations they have never been faced with by discerning pertinent aspects of a problem.
- Access to learning peers and others with expertise to reflect on challenges and gain support for renewed efforts: Faced with complex learning activities, learners need peers for many purposes, i.e. to check their understanding, see alternative ways of interpreting a task, etc.
- Use of feedback to influence new ways of engaging in the learning tasks: Learners must master the feedback loop and know when they have attained a satisfying stage of new knowledge.
- Care in the use of language to avoid creating premature closure on ongoing learning: Evaluation providers need to be careful in the choice of their words because they have a powerful – positive and negative – influence on learners. (Adapted from Boud, 2000, pp. 8-10)

Refining the concept of sustainable assessment, Boud and Falchikov (2005) suggest some ideas to stimulate it: selecting and using evidence (feedback), making decisions and judgements (self-assessment), transparency (reflexivity), scaffolding and structure (participatory approaches), context (situated learning), integration (portfolios). This is a simplified version of the authors' table (p. 37).

To put these ideas into practice, they have to be integrated into the design beforehand. Boud and Falchikov (2005) give five recommendations for designing evaluation instruments:

- Assessment is acknowledged as a major influence on student learning in all course design and development. Thus, all assessment activities need to be examined from the point of view of what they contribute to prompting desired student learning in general and learning beyond the point of assessment in particular. Some assessment practices actively inhibit some kinds of learning, often by excluding the pursuit of particular key skills and knowledge from assessment tasks, others focus student attention on the immediate test only. All should reflect the learning that is the intended outcome from the program.
- Assessment should be judged first in terms of its consequences for student learning and second in terms of its effectiveness as a measure of achievement. An educational measurement that has negative

consequences for learning can hardly be considered educational. The apparent dominance of reliability over validity in some practices should be reassessed. In other cases, the type of validity favoured should be reassessed.

- A key question for assessment activities is what do they contribute to students' understanding of the act of assessment in general and their ability to engage in self assessment in particular. Assessment needs to be demystified if students are to become confident enough to understand and use it in the world of practice. This is not simply about publishing criteria and weightings, but of students appreciating the connections between assessment activities and their learning and finding ways to make assessment work for them.
- As students will inevitably be active players in making their own assessments of their learning after graduation, they need to be given opportunities within their courses to practice this skill in a number of different domains. Active student involvement in understanding assessment processes and contributing to them is essential.
- Equipping students for long term learning and enabling them to effectively engage in their own assessments after graduation is a function of both the assessment practices to which they are exposed and the teaching and learning activities in which they take part. Assessment practices cannot therefore be examined independently of the learning tasks in which students participate prior to them. The often rigid divide between teaching and learning activities on the one hand and assessment activities on the other needs to be modified and a holistic view taken which looks at the overall impact of these on student long term learning. (Boud & Falchikov, 2005, pp. 36-38)

Boud and Falchikov (2006) push the idea of sustainable assessment beyond university and suggest "a conceptualisation of the place of assessment in learning beyond the academy and the contribution higher education can make to it" (Boud & Falchikov, 2006, p. 400). They suggest some design principles to foster a more "contextualised, participatory and relational assessment regime" (Boud & Falchikov, 2006, p. 408) in a mature, socially constructed context. These principles entail transparency, collaboration, responsibility, maturity and self-confidence (Table 14).

Assessment principles	Sub-principles
Engages with standards and criteria and problem analysis	– provides practice in discernment to identify critical aspects of problems and issues and knowledge required to address them – involves finding appropriate assistance to scaffold understanding from existing knowledge base – gives learners practice in identifying, developing and engaging with criteria and – standards
Emphasises importance of context	– locates issues in a context that must be taken into account – identifies aspects of context that must be considered – decides on what aspects of work requires feedback from others – recognises solutions vary according to context –

Assessment principles	Sub-principles
Involves working in association with others	– participates in giving and receiving feedback – utilises practitioners and other parties external to the educational institution – involves engagement with communities of practice and ways in which their knowledge is represented – involves working collaboratively with others (not necessarily involving group assessment), including parties external to the educational institution
Involves authentic representations and productions	– identifies and uses communities of practice to assist in developing criteria for good work and peer feedback – tasks directly reflect forms of activity in professional practice commensurate with level of skill possessed (i.e. high level of authenticity)
Promotes transparency of knowledge	– invites analysis of task structure and purpose – fosters consideration of the epistemology of learning embedded in tasks – tasks draw attention to how they are constructed and seek to make this transparent
Fosters reflexivity	– fosters linking of new knowledge to what is already known – not all information required for solution of problems is given – prompts self-monitoring and judging progression towards goals (testing new – knowledge)
Builds learner agency and constructs active learners	– involves learners in creating assessment tasks – assumes learners construct their own knowledge in the light of what works in the world around them – focuses on producing rather than reproducing knowledge (fosters systematic inquiry) – provides opportunities for learners to appropriate assessment activities to their own ends
Considers risk and confidence of judgement	– provides scope for taking initiative (e.g. always taking the safe option is not encouraged) – elements of task are not fully determined – confidence in outcomes is built and sought (e.g. tasks encourage students to be confident of what they know and do not know)
Promotes seeking appropriate feedback	– involves seeking and utilising feedback – feedback used from a variety of sources (e.g. from teacher, peer, and practitioner) – grades and marks subordinated to qualitative feedback

Table 14: Socially constructed, participative, embedded and necessarily contextualised assessment principles (Adapted from Boud & Falchikov, 2006, pp. 408-10)

Formative evaluation is really to be considered as a tool to enhance learning and to help learners become autonomous, self-regulated knowledge builders.

Evaluation entails two broad aspects: summative evaluation, which assigns grades and

certificates, and formative evaluation, which consists in providing effective feedback to learners to help them progress in their learning.

The concept of sustainable assessment is introduced, echoing the concept of sustainable development. It encompasses notions of confidence, standards, self-monitoring, acute discernment, reflection, use of feedback, and care in the use of language. Five recommendations for designing evaluation tools are given: examine assessment activities in terms of learning outcomes (and not achievement), examine assessment issues in terms of consequences for learners' learning, demystify assessment as a process to make it an effective tool for learning and self-assessment, allow learners to practice assessment in order to fully grasp it as a process, and, provide for the integration of learning and assessment as a long-term enabling tool. Evaluation is extended beyond the academic world, and principles based on transparency, collaboration, responsibility, maturity and self-confidence are suggested to ground such a perspective.

Section 3.8. Summary

The theoretical background of general cognitivist pedagogical models is concerned with learners processing information. Both models, Merrill's (2002) and Van Merriënboer's (2007), are associated with objectivist instructional design. They seek to provide models that put learners at the centre of the educational enterprise, as active knowledge builders, aiming at acquiring higher-order learning skills in authentic contexts. In such models, all the steps of instruction are predetermined. Within these steps, constructivist and socio-constructivist activities are built in. In other words, the instructional design theory remains objectivist but constructivist perspectives on learning underlie the activities. General cognitivist pedagogical models are far, for instance, from a rapid prototyping instructional method that considers design and learning as interdependent and mutually reinforcing cyclical processes. When instructional designers design learning activities, they draw from pedagogical models and strategies that have already been reported in the research and proved to be efficient and effective. In this research, three major pedagogical strategies are addressed: cognitive apprenticeship, knowledge building and collaborative learning. These strategies provide an overall framework for implementing pedagogical models such as inductive thinking, concept acquisition, scientific inquiry or role play. When instructional designers design learning activities they also have to take into account the learning environment. Activity-based learning environments are composed of a set of technological tools to support socio-

pedagogical goals. Communication, collaboration, social, and cognitive scaffolding resources constitute core tools for facilitating activity-based learning. The teacher's role is transformed to that of a coach who scaffolds meaningful learning experiences for the students. Psycho-pedagogical values underlying such learning environments are related to situated learning, metacognitive monitoring and progressively refined higher-order learning.

To support design models, some tools are needed: pedagogical scenarios and scaffolding are two of them. A pedagogical scenario – also called a script or storyboard – entails detailed scenarios of learning activities, a learning environment to support the development and enactment of these activities and, finally, specific learning materials. IMS LD is a formal language that calls pedagogical scenarios "plays" and implements the basic design model of actors adopting roles, performing activities within an environment, and interacting with other actors and the environment. Activity diagrams can be used to describe the general flow for all actors involved. The design of a pedagogical scenario takes into account a process of scaffolding that is woven into the design – the simple order of activities constitutes a scaffold – or is made available more explicitly with the help of scaffolding tools. The human coach provides adaptive scaffolding while the computer-based artifact provides fixed scaffolding. Conceptual scaffolding is related to metacognitive capabilities and regulation of activities and help learners to move to new zones of understanding by making cognitive processes explicit. Finally, when instructional designers design learning activities, they not only design the activity but also how it will be assessed. The concept of sustainable assessment with notions of confidence, standards, self-monitoring, acute discernment, reflection, use of feedback, and care in the use of language is introduced. It is suggested that evaluation should extend beyond the academic world and be based on principles of transparency, collaboration, responsibility, maturity and self-confidence.

Chapter 4. Instructional Design Methods

We have reviewed pedagogical design models and tools used to implement them concretely. Instructional design theory (IDT), instructional systems design (ISD) and agile designs are concrete design methods used to design instructional sequences. While IDT offers an overall framework with methods on the one hand and situations on the other, ISD concentrates on information processing and how the learner learns, and builds the entire design around this cornerstone. Agile designs offer an opportunity both to address learners' emerging needs and to innovate rapidly. The transition from instructional design to constructional design, as an attempt to offer customised instructional sequences, is also introduced.

Section 4.1. Instructional systems design

From a conceptual point of view, most design-theories are goal-oriented. This means that the entire design is predetermined by the learning goals instructors have defined. In this sense, IDT can be perceived as a reverse-engineering theory. First you identify the learning goals and once this is done, you proceed backwards, step-by-step, until you have designed the entire learning unit. The process is not linear, but iterative: it involves a continual movement backwards and forwards between steps with a view to readjusting and responding to predetermined goals.

"Instructional-design theories are design oriented, they describe methods of instruction and the situations in which those methods should be used, the methods can be broken into simpler component methods, and the methods are probabilistic" (Reigeluth, 1999, p. 7). IDT represents a kind of generic database that instructional designers can appeal to: for a given situation X, with instructional goals Z, methods A, B and C are likely to work best. Figure 8 shows the different components IDT entails.

Concerning *Situations*, *Instructional conditions* (right part of Figure 8) include "the nature of what is to be learned, the nature of the learner, the nature of the learning environment, the nature of the instructional development constraints" (Reigeluth 1999, p. 8). *Desired instructional outcomes*, on the left side at the same level, refer to the level of effectiveness of instruction (whether the learner has learned what was intended), the level of efficiency (the ratio between the effectiveness of instruction and what it has cost in terms of human resources, development, money, etc.) and finally the appeal (how much learners have enjoyed learning).

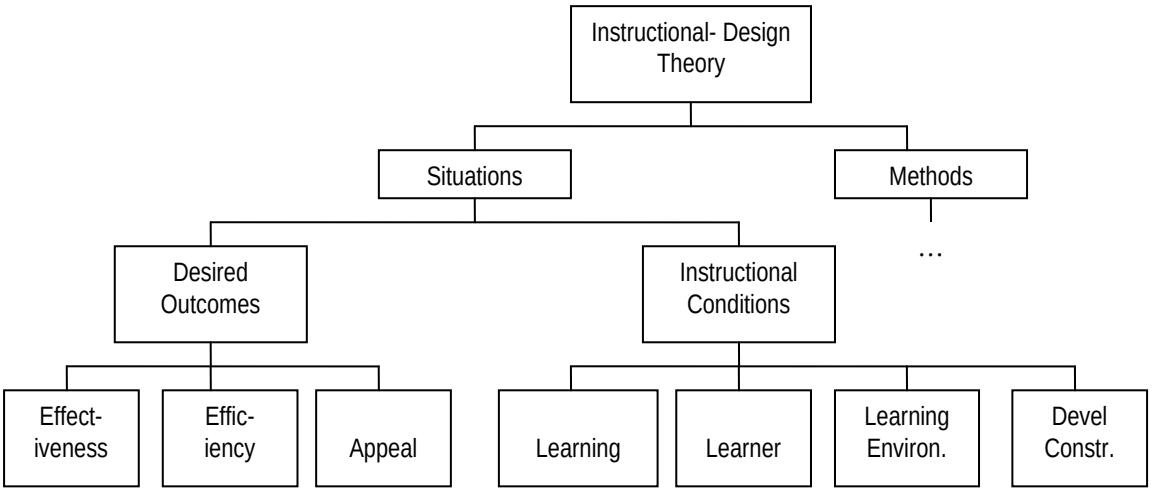


Figure 8: The components of instructional-design theories (Reigeluth, 1999, p. 9)

An evolution in the understanding and design of the overall instructional system between the 1960s and the 1990s attests to these changing needs. First, what is to be understood by instructional systems design? ISD is *the* cognitive design method. Based on information-processing theory, it focuses on how the learner comes to know in a given instructional sequence. It does not concentrate on how a learner reacts and responds in a given learning sequence, but instead focuses exclusively on learning processes, what goes on in the "black box". "Instructional system design is the *systematic* process of planning instructional systems" (Gagné, Briggs & Wager, 1992, p. 20). A myriad of methods exist to develop instructional systems. ISD concerns different levels of education: it is used at the national level, the school level, the course level or even at the level of individual lessons. Whatever the level, the steps involved in the process and the core elements are the same. The ADDIE - analysis, design, development, implementation, and evaluation – cycle "ensures congruence among goals, objectives, strategies, and evaluation, and the effectiveness of the resulting instruction" (Gustafson & Branch, 2007, p. 11) (Figure 9).

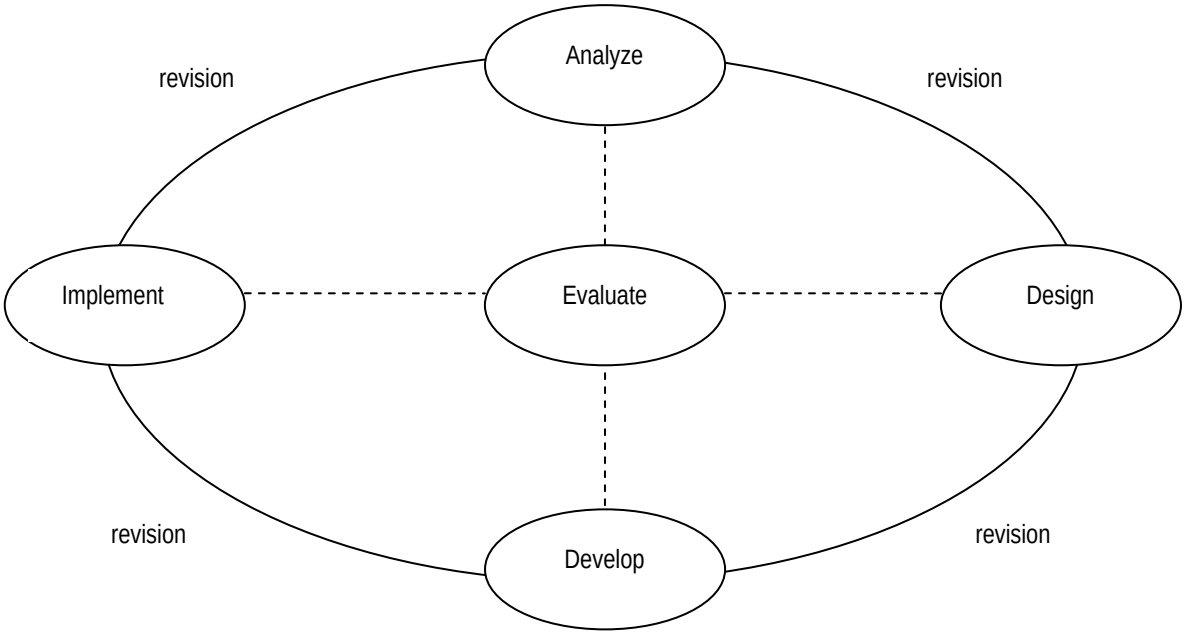


Figure 9: Core elements/phases of instructional design (ADDIE elements/phases) (Gustafson & Branch, 2007, p. 12)

Gagné *et al.*, (1992) discuss two major methods, both articulated around three cornerstones: performance objectives, materials and evaluation. One method consists in nine steps (Figure 10) and concerns "smaller" projects, while the other includes additional steps, taking into account more factors, and concerns "larger" projects. What does the nine-step method consist in (Gagné *et al.*, 1992, pp. 21-30)?

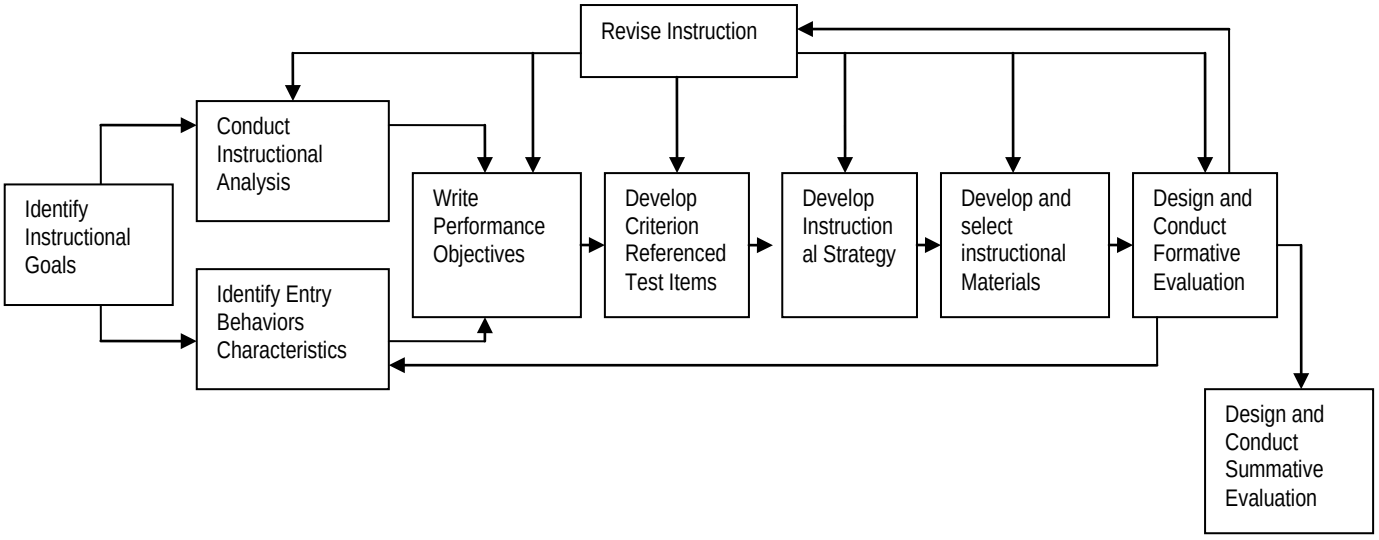


Figure 10: A systems approach method for designing Instruction (From W. Dick & L. Carey, cited by Gagné *et al.*, 1992, p. 22)

Step 1 consists in defining instructional goals by conducting a needs analysis. The discrepancy between the present state and the desired state determines what is needed.

Step 2 consists in conducting an instructional analysis to identify the skills and knowledge needed to reach the goal. The result of this analysis is the identification of the learning outcomes in either of the following categories: intellectual skill, cognitive strategy, verbal information, motor skill, and attitude.

Step 3 consists in identifying and deciding on entry behaviours and learner characteristics. This involves deciding where to start instruction if it is to be neither too redundant nor too difficult, and foreseeing alternative remediation.

Step 4 consists in detailing the analysis of objectives and determining performance objectives, i.e. what learners are expected to know and be able to do at the end of the learning sequence.

Step 5 consists in measuring learners' performance. It may be useful to evaluate learners' performance at difference stages: a) to identify the starting point of instruction, b) to establish a diagnosis that indicates whether learners master prerequisite skills, c) to check learners' progress, d) to report progress to interested stakeholders, e) to evaluate instruction itself and improve those areas that need improvement.

Step 6 consists in identifying instructional strategies. It entails all resources, structures and processes provided to learners in order to meet previously defined performance objectives.

Step 7 consists in selecting or developing instructional materials in conformity with performance objectives.

Step 8 consists in developing formative evaluation tools with target audiences in order to revise and improve instructional materials.

Step 9 involves conducting summative evaluation to assess the effectiveness of the system as a whole. This occurs once it has been implemented and used.

This nine-step method is a blueprint that serves to guide instructional designers, teachers, and any other institutional actor concerned, in designing an instructional system. The process starts with the definition of goals and performance objectives, moves on to the development of instructional sequences and selection of supporting resources and ends with an evaluation of the overall system.

Now, what about the method appropriate for larger projects? Table 15 summarises all the additional stages and factors that are to be taken into account. It is particularly at the system level that we encounter these elements: analysis of constraints and alternative delivery systems, teacher preparation, installation and diffusion.

System Level	
1.	Analysis of needs, goals, and priorities
2.	Analysis of resources, constraints, and alternate delivery systems
3.	Determination of scope and sequence of curriculum and courses; delivery system design
Course Level	
4.	Determining course structure and sequence
5.	Analysis of course objectives
Lesson Level	
6.	Definition of performance objectives
7.	Preparing lesson plans for modules
8.	Developing, selecting materials, media
9.	Assessing student performance (performance measures)
System Level	
10.	Teacher preparation
11.	Formative evaluation
12.	Field testing, revision
13.	Summative evaluation
14.	Installation and diffusion

Table 15: Stages in designing instructional systems (Gagné *et al.*, 1992, p. 31)

Once implemented, an instructional design method yields a learning product that is learner-centred, goal-oriented, focused on meaningful performance, empirical, iterative and self-correcting, a team effort (most often but not necessarily), and has outcomes that can be measured against goal-aligned criteria (Adapted from Gustafson & Branch 2007, p. 13).

To summarise, ISD is a systematic process for designing and implementing instructional systems. It is very detailed, and can be heavy, complex and time-consuming. Since it can address several levels of education, it might be appropriate for larger organisations, but too heavy for a lesson or a course design.

Instructional design theories (IDT) are goal-oriented. IDT is a combination of situations on the one hand and methods on the other hand. Situations refer to the contextual parameters, typically related to learners, teaching staff, content and learning environments. Methods refer to a potential description of the process. Methods are probabilistic, which means that they should work for a recommended situation, but there is no guarantee.

Instructional systems design is the cognitivist design method *par excellence*. Based on information-processing theory, it focuses on how the learner learns. The ADDIE - analysis, design, development, implementation, and evaluation – cycle ensures the homogeneity and

quality of the created instructional sequence. Methods centred around performance objectives, materials and evaluation ensure the design and implementation of instructional systems according to systematic design processes.

Section 4.2. Agile methods

Regarding instructional design products resulting from ISD as described above, it has been argued (Tripp & Bichelmeyer, 1990) that while the product is indeed effective, the efficiency of the process is another issue that has not been taken into account. Another group of instructional designers developed a niche for small-scale projects – courses, lessons – typically suitable for teachers wishing to innovate. In reaction to heavy ISD, the rapid-prototyping ISD method was launched. Tripp and Bichelmeyer (1990), inspired by design methodologies used in software engineering, have imported one specific methodology, referred to as *rapid prototyping*, to instructional design. It is all the more appropriate when used to design computer-based instruction. The method developed consists, first, in conducting a needs analysis and setting overall learning objectives in a recursive process, followed by constructing the prototype and using it, which in turn gives birth to a new system that will have to be installed and maintained (Figure 11).

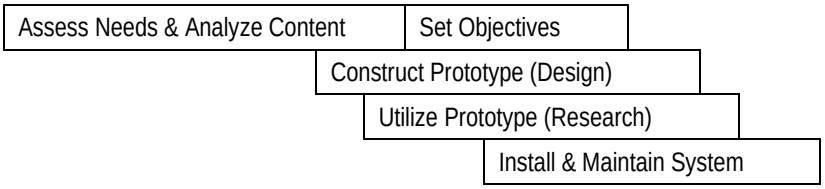


Figure 11: The rapid prototyping ISD method (Tripp & Bichelmeyer, 1990, p. 36)

As with any method, rapid prototyping has its advantages and disadvantages. Both are outlined in the table below (Table 16). First of all, designers must be sure it is an ISD method that is able to address the problematic aspects of their design. Second, they must be aware that the process of design is a process of knowledge acquisition, the efficiency of which can be improved with this kind of method. Thirdly, they must acknowledge the importance of usability-testing with target users to improve the prototype until it is considered acceptable enough to be used with the real audience.

Advantages	Disadvantages
It encourages and requires active student participation in the design process.	Prototyping can lead to a design-by-repair philosophy, which is only an excuse for lack of discipline.
Iteration and change are natural consequences of instructional systems development. Clients tend to change their minds.	Prototyping does not eliminate the need for front-end analysis. It cannot help if the situation is not amenable to instructional design.
Clients don't know their requirements until they see them implemented.	A prototype cannot substitute completely for a paper analysis.
An approved prototype is the equivalent of a paper specification--with one exception. Errors can be detected earlier.	There may be many instructional design problems that are not addressed by prototyping.
Prototyping can increase creativity through quicker user feedback.	Prototyping can reduce creativity by eliminating the urge to find better designs.
Prototyping accelerates the development cycle.	When prototyping an instructional package, creeping featurism (the adding of bells and whistles) may lead to designs that get out of control.
	Prototyping may lead to premature commitment to a design if it is not remembered that a design is only a hypothesis.
	Prototyping environments can lead to designs that are executed less efficiently than designs instantiated in dedicated authoring languages.

Table 16: Pros and cons of rapid prototyping (inspired by Tripp & Bichelmeyer, 1990, p. 42)

Rapid prototyping can be an interesting instructional design solution for small teams or teachers wanting to innovate without being excessively burdened in the process. Rapid prototyping can also be an effective way to address learners' emerging needs. The rapid prototyping method is related to theory and typically used in innovative contexts in which learners express new and emerging needs. Teachers or teams opting for this kind of method must be sure, however, that it is in line with their purpose. Also, teachers are not expected to be instructional design specialists who combine models and find the most suitable solution in terms of both effectiveness and efficiency.

Rapid prototyping belongs to so-called *agile designs*. Agile design methodologies are methodologies that promote iterations, teamwork, collaboration, and process adaptability throughout the life-cycle of the design project. In software engineering, for example, agile design is characterised as follows: "A project management process that encourages frequent inspection and adaptation; a leadership philosophy that encourages team work, self-organization and accountability; a set of engineering best-practices that allow for rapid

delivery of high-quality software; and a business approach that aligns development with customer needs and company goals"[21]. A teacher innovating on his/her own or within a small team, i.e. without the top-down institutional support and load, can be considered a teacher, as opposed to an instructional designer, who experiments with agile designs to improve his/her course.

To summarise, there are two major trends in instructional systems design. Large-scale projects are usually institutionally backed and benefit from important support. The process is a heavy, very detailed, long-term and time-consuming one. Smaller projects, on the other hand, emerge in niches, with small teams mobilised around a dynamic, innovating teacher, often trying to answer learners' emerging needs. These projects evolve in a recurrent process of prototyping, using and adjusting.

Rapid prototyping and agile designs in general are an attempt to design instructional sequences without the burden of heavy ISD methodologies. The steps typically consist in conducting a needs analysis and setting overall learning objectives, implementing the prototype, using it and refining it. Agile designs represent an opportunity to address learners' emerging needs while offering small teams or individual teachers possibilities to innovate if they so desire.

Section 4.3. Constructivist instructional design

Let us now consider the influence of socio-constructivism in its recent period and the impact of technology. In the last twenty years, IDT has integrated principles borrowed from constructivist epistemology. The focus is no longer on the development of "technologically standardised content", but rather on learners' construction of knowledge. Learners are considered active "sense makers". Thus, instructional designers concentrate on methods of active learning, having learners work on authentic tasks, encouraging them to engage in a reflective process, etc. Instructional designers of the older generation (Merrill for instance) started as objectivists and their perspectives on instruction and the methods they develop remain basically objectivist, even if, as mentioned before, they opened to constructivist epistemology. In parallel, the younger generation created a new branch of instructional design, labelled the "learning sciences" (Jonassen *et al.*, 2007, p. 47), which is firmly anchored in a constructivist perspective.

[21] Wikipedia, http://en.wikipedia.org/wiki/Agile_software_development

Constructivism regards learning as an active, constructive process. Learners actively construct their own representations of objective reality. They build subjective mental schemas on the basis of their existing knowledge and previously acquired knowledge and experience. Learners are active knowledge builders. For Mayer (1999), constructivist learning "is active learning in which the learner possesses and uses a variety of cognitive processes during the learning process. The major cognitive processes include paying attention to relevant information, organizing that information into coherent representations, and integrating these representations with existing knowledge" (p. 146).

How did constructivism, as an epistemological paradigm, influence instructional design? Jonassen *et al.* (2007) summarise the situation as follows:

> Constructivism has changed the emphasis of the instructional design process. It has resulted in a shift from attempts to communicate to students about the world in efficient ways to attempts to create learning situations that promote the engagement or immersion of learners in practice fields (simulations and project-, inquiry-, and problem-based activities) and fields of practice (communities of practice, apprenticeships, workplace activities). Concomitant changes include a shift from direct instruction and instructional strategies that support learner acquisition of given facts, concepts, and rules to an approach that focuses on coaching and scaffolding meaningful experiences as well as providing opportunities to reflect on those experiences. (p. 47)

Hannafin and Hill (2007) have summarised the major implications of this paradigm shift for instructional design (Table 17), contrasting them with constructional design characteristics. The framework has undergone a fundamental change and design practices have evolved accordingly. In the constructivist paradigm, it is the entire environment that constitutes the stage and learners control their learning (i.e. learning is defined as "the individual negotiating meaning in an effort to evolve personal understanding" [Hannafin & Hill, 2007, p. 54]). Learning goals are negotiated (the concept of a learning contract is often associated with this notion), and activities are authentic (i.e. "learners engage in activities which present the same type of cognitive challenges as those in the real world, that is, tasks which replicate the particular activity structures of a context" [Jonassen 1999, p. 221]). Finally, evaluation is context-driven and a process of reflection is carried out concurrently with learning activities, individually and within the community of practice.

Epistemological Perspectives	Design Frameworks	Design Practices
Positivism	*Objectivism*	*Instructional Design*
- Knowledge exists independent of the learner	- Transfer knowledge from outside to inside the learner	- Classroom
- There is an absolute truth	- Arrange conditions to promote specific goals	- Directed
		- Teacher directing; learner receiving
		- Goal predetermined
		- Objectives defines
		- Activities, materials, assessment teacher driven
	- Knowledge engineered externally	- Products given to teacher for assessment
Relativism	*Constructivism*	*Constructional Design*
- Knowledge is constructed by the learner	- Guide the learner in constructing knowledge	- Environment
- Truth is contextual	- Provide a rich context for negotiation and meaning construction	- Learner centered
		- Teacher facilitating; learner controlling
		- Learning goals negotiated
		- Learning problems and contexts authentic
	- Knowledge constructed internally	- Activities, materials, assessment context driven and individually constructed
		- Artifacts shared and reflected on, collectively and individually

Table 17: Epistemological perspectives, design frameworks, and design practices (Hannafin & Hill, 2007, p. 54)

These changes within the framework naturally lead to the design of learner-centred activities (Table 18) with a major goal being the resolution of a problem (strategic and information-research skills), the understanding of underlying processes activated to achieve this result (metacognitive capabilities), and the capacity to solve a similar problem in another context (transfer).

ISD Phases	Objectivist Design Activities	Constructivist Design Activities
Analysis	- Content	- Context
	- Learner	- Learner
	- Instructional need	- Problem described
	- Instructional goal	- Key concepts identified
Design	- Instructional objectives	- Learning goals
	- Task analysis	- Identify learning sequences (group and/ or individual)
	- Criterion-referenced assessment	- Context-driven evaluation

ISD Phases	Objectivist Design Activities	Constructivist Design Activities
Development	- Develop instructional materials	- Construct learning resources / artifacts
Implementation	- Teacher: conveying, directing	- Teacher: consulting, facilitating
	- Learner: receiving, acquiring	- Learner: directing, controlling
	- Focus: objective attainment	- Focus: problem solving
Evaluation	- What a learner knows	- How a learner knows
	- Knowing that, knowing how	- "Knowing your way around"

Table 18: Instructional systems design (ISD) phases with objectivist and constructivist design activities (Hannafin & Hill, 2007, p. 57)

As a result of the paradigm shift from objectivism to constructivism, a similar movement can be observed in instructional strategies. A shift from learner acquisition of a set of skills and knowledge to coaching and scaffolding meaningful learning experiences is the trend (Jonassen *et al.*, 2007). An examination of the etymology of these words – instruction, design and construction – helps to better understand the historical background of the terminology.

> Instruction, 1412, comes from Latin *instructionem* "building, arrangement, teaching," from instructus, pp. of instruere "arrange, inform, teach," from in- "on" + struere "to pile, build".
>
> Design, 1548, comes from Latin *designare* "mark out, devise," from de- "out" + signare "to mark".
>
> Construction, 1432, comes from Latin *constructionem* "pile up together, build," from pp. stem of construere "pile up together, build", from com- "together" + struere "to pile up"[22].

If the word *design* takes us back to the notion of distinguishing something, the word *instruction* evokes the notion of building on something already existing, as opposed to building *together* in a constructivist perspective. The prefix *in* conveys this rigidity. The term *instructional design* must be a heritage of the positivists, who assumed "that learning is an individual process, that it has a beginning and an end, that it is best separated from the rest of [our] activities, and that it is the result of teaching" (Wenger, 1998, p. 3). Shifting from an instructive type of education to a more active and constructive one, it is no surprise that some "instructional designers" attempt to change the label. For Jonassen *et al.*, (2007),

> academically, these changes have resulted in the emergence of a new discipline, the learning sciences, which provides a theoretically rich set of assumptions for the design of meaningful learning experiences. […] Learning, from a learning sciences perspective, is activity or practice based, rather than communicative. Learning sciences are the convergence of design of activity systems, cognition and sociocultural context. The learning sciences apply theories to the design of technology-enriched learning environments that engage and support learners in accomplishing more complex, authentic and meaningful learning activities with the goal of meaningful learning and conceptual change. […]. The learning sciences are research based. […] Learning scientists use a variety of research approaches to study learning, including ethnographies, cognitive analyses

[22] Etymologies are retrieved from http://www.etymonline.com

> of problem solving, studies of social policy and organizational change, analyses of social interactions, technology design, and human-computer interaction studies. […] Another significant change in the focus of learning sciences is the integration of design and research. […] Design research integrates the design of learning environments with the development of prototheories of learning. […] Design is research and research is design. (p. 47)

Instructional design has shifted to "constructional design" or design in the "learning sciences", changing the focus from standardised content to customised education, engaging learners in authentic and meaningful learning situations. The role of the teacher has changed in parallel, shifting from the role of direct instructor to that of coach and scaffolder. With respect to the design of activities, the shift results in learners "knowing their way around" rather than "knowing that and knowing how". The focus is no longer on what learners know, but on how they are able to manipulate, transfer, and build on this knowledge.

Section 4.4. Summary

IDT and ISD constitute concrete methods for designing instructional sequences. IDT is a combination of situations on the one hand and methods on the other hand. Situations refer to the contextual parameters, typically related to learners, teaching staff, content and learning environments. Methods refer to a potential description of the process and are probabilistic. ISD is the cognitivist design method *par excellence*. Based on information-processing theory, it focuses on how the learner learns. The ADDIE - analysis, design, development, implementation, and evaluation – cycle ensures the homogeneity and quality of the created instructional sequence. Methods centred around performance objectives, materials and evaluation ensure the design and implementation of instructional systems according to systematic design processes. In reaction to heavy and standardised instructional sequences, rapid prototyping and agile designs in general are an attempt to design instructional sequences without the burden of heavy instructional systems design methodologies. The steps typically consist in conducting a needs analysis and setting overall learning objectives, implementing the prototype, using it and refining it. Agile designs represent an opportunity to respond to learners' emerging needs while offering small teams or individual teachers possibilities to innovate if they so desire. In recent years, it should be noted that instructional design has shifted to "constructional design" or design in the "learning sciences", changing the focus from standardised content to customised education, engaging learners in authentic and meaningful learning situations. The role of the teacher has changed in parallel, shifting from the role of direct instructor to that of coach and scaffolder. With respect to the design of

activities, the shift results in learners “knowing their way around” rather than “knowing that and knowing how”. The focus is no longer on what learners know but how they are able to manipulate, transfer, and build on this knowledge.

Chapter 5. Tutoring

As we have seen in the chapter on pedagogical design (Chapter 3) and will see in the one on educational technology (Chapter 6), activity-based learning is very demanding in terms of setting up authentic contexts and providing learners with ill-structured problems. It requires a solid framework of student support that has to be designed beforehand, but that is also flexible enough to adapt to learners' paths within the learning process. Tutoring is a very broad issue, but it is situated. Because it is situated, in order to address it fully, we have referred to articles dealing with all aspects of tutoring from a variety of different research trends as well as from online and face-to-face research contexts. We will first briefly address terminological issues related to tutoring in order to highlight the many epistemologies in which the concept is grounded. We will then deal with tutoring from different perspectives: 1) the research trends and the contemporary understanding of the word "tutor" in the American, English and European literature; 2) the different kinds of tutors, depending on the broader epistemology underlying the learning context; 3) the different pedagogical strategies tutors use, depending on the learning context; 4) the different roles adopted in these various learning contexts, by both learners and tutors; 5) the effectiveness of tutoring; 6) the tools at the service of tutors; and finally 7) tutoring design issues.

Section 5.1. Terminology, etymology and research

Historically speaking, the term *tutor*, with the meaning of instructor, in English, goes back to the Middle English *tutour*, originally from Anglo-French and Latin *tutor*, from *tueri*.[23] In Ancient Greece, it was the term *paidagogos* that conveyed the concept of tutor, guardian and guide (Gordon & Gordon, 1990, p. 2). "Among the Greeks and the Romans the name was applied to trustworthy slaves who were charged with the duty of supervising the life and morals of boys belonging to the better class.[24]"

The concept of tutoring as an educational process took root in Ancient Greece and continued to spread throughout history, taken over by the Church, by families on a private basis or by educational institutions.

> The "classical ideal" of the tutor-pupil relationship began in the Greco-Roman era. It was subordinated by the Church of the Middle Ages, only to be resecularized during the Renaissance revival. [...] The tutor theorists

[23] http://www.merriam-webster.com/dictionary/tutor
[24] http://www.searchgodsword.org/lex/grk/view.cgi?number=3807

> of the fifteenth century began to shape a definitive educational literature that played a major role in the history of childhood and the education of women. The following two hundred years formalized a philosophy of tutoring that broadened its appeal from the royal court to the modes of the newly emerging professional classes and laid the foundation of many modern education principles. [...] Schooling has dominated the twentieth century, but tutoring still holds an important role. Peer-tutors, after-school remedial programs, home-bound instruction and the "home-schooling movement" are tutoring's modern expressions. (Gordon & Gordon, 1990, p. 329).

Although schooling targets large numbers of learners, it did nevertheless borrow some principles from tutoring as an educational process. The distinguishing characteristic of tutoring is that it is individualised, that is, it is intended to address the particular needs of a single learner. History has shown that the teacher and the tutor, in their broadest meanings, are complementary.

> In its earlier origins and use tutoring was recognised intrinsically as an educational process. Only much later in the nineteenth and particularly in the twentieth century did tutoring become a part of "schooling". Schools absorbed and used certain aspects of tutoring. Modern historians obscured this issue by describing one-to-one instruction using other expressions rather than "tutoring". Over the centuries, many terms came into daily use that described the work of the tutor. [...] The history of tutoring is largely the study of individuals, not institutions. [...] Today the challenge of better schooling requires a much broader study of tutorial philosophy and methods. [...]This reassessment acknowledges the tutor as a vital part of our Western educational heritage. The tutor and teacher are not in competition with one another. Instead they seek an answer to the question of how a new alliance of "tutoring" and "teaching" will best serve society's learning requirements. (Gordon & Gordon, 1990, pp. 330-331)

Several terms exist to convey the concept of tutoring. Terminology is not innocent and etymology reveals the historical dimension of a word. Both terminology and etymology are loaded in terms of meaning. When a scientific community chooses a specific word to label a concept, it doesn't do so fortuitously. To express the idea of a learner supported by another human being in a learning process, several concepts are currently invoked. Some are rather learner-centred, presenting learner support from a cognitive point of view, such as *scaffold*. Others refer to the learner support as a protector, such as *tutor*. Others have a legal connotation, based on the concept of arbitration, such as *mediator*. Others are based on concepts of ruling or managing, such as *moderator*. Others are based on the carriage metaphor, "carrying" a learner through his/her learning process, such as *coach*. Others are related to meanings of conveying, carrying or bringing up, such as *learner support*, *supporter*. Others are related to making the learning process easier, such as *facilitator*. Others are related to "means of supplying a want or deficiency,[25]" such as *resource*. Still others refer to the

[25] http://www.etymonline.com/index.php?search=resource&searchmode=none

Odyssey and to Ulysses' trusted counsellor, such as *mentor*. Finally, some present the learner and the human support as actors in a system, such as *networked learning*. In addition to this flourishing terminology, all e-variations of these words have appeared in recent years.

Goodyear, Salmon, Spector, Steeples and Tickner (2001) use the term *online teaching*, preferring this terminology to *online tutor*, *online teacher* or *online instructor* for reasons of cross cultural terminology between the United Kingdom, Europe and the United States. "*Online tutor* has wide currency in the United Kingdom and among English-speaking researchers and practitioners in Europe, but has an unhelpfully narrow set of connotations in United States educational usage" (p. 68). Throughout this research, we will use the term *tutor*, considered both the most "neutral" and "universal" term to convey learner support that is individual in orientation.

Concerning tutoring as "continuous assessment, remediation, encouragement and support" (Gordon, Morgan, O'Malley & Ponticell, 2007, p. 91), Gordon *et al.* (2007) found that researchers paid more attention to the cognitive aspects of tutoring than to its social aspects. Retracing historical trends in tutoring research, they observed that the 1960s focused on the effects of tutoring and the 1980s on peer-tutoring. Around the year 2000, the attention shifted from remedial instruction associated with educational reform initiatives to research efforts focusing on the cognitive aspects of tutoring (p. 155).

In the particular context of problem-based learning, Merrill *et al.* (1995) identified two "foci of tutoring research. Some researchers (e.g. Fox, 1991, Lepper & Chabay, 1988) have concentrated on the content of tutorial utterances, whereas others (e.g. Littman *et al.*, 1990; McArthur *et al.*, 1990; Putnam, 1987; Schoenfeld *et al.*, 1992) have chiefly considered the ways that tutors organize sessions" (p. 320).

While conducting this literature review, taking into account articles in the past twenty years, the researcher identified three main research areas: tutors' roles, tutors' pedagogical strategies and the effectiveness of tutoring interactions. The most interesting development in recent research is the increased attention given to tutoring as a means to support self-regulated learning.

The concept of tutoring, as associated with individual learning, goes back as far as the Greco-Roman era. Today, a myriad of terms express the concept of tutoring, each focusing on one particular aspect. Effects of tutoring, peer-tutoring, cognitive issues related to tutoring, content and organisation of tutorial sessions, tutors' roles and pedagogical strategies, effectiveness of tutoring and tutoring as a support for self-directed learning are the major research trends reported in the literature.

Section 5.2. Tutor types and pedagogical strategies

The overall learning context in which tutoring is to take place determines the type of tutor that is chosen and the degree and quality of his/her engagement in the learning process. The context can range along a continuum from a highly structured context with the tutor being in control to a more open, constructivist-like context with the tutor scaffolding the learning process when needed. De Lièvre *et al.* (2006) describe two tutoring models used in distance education: "the academic model" with the tutor controlling, and the "autonomous model" based on constructivist theories, with the tutor functioning as a facilitator, helping learners reach a higher level of knowledge (Deschênes & Lebel, 1994; Weedon, 1997 cited by De Lièvre *et al.*, 2006, p. 102).

The same issue is addressed in terms of the degree of autonomy, that is, the learner's autonomy with respect to his/her tutor and the tutor's autonomy with respect to his/her teacher. Baudrit discusses Goodlad and Hirst's (1989, cited by Baudrit, 2000, pp. 13-15) four categories of tutors: the first, labelled "surrogate teaching", applies when teachers delegate some of their tasks, i.e. providing feedback, teaching, etc., to advanced learners. The second is labelled "proctoring" and consists in individual guidance in the learning process. The third is labelled "co-tutoring" and applies to two learners in the same course working together, alternatively playing the role of tutor and tutee. The fourth category is labelled "teacherless group" and is characterised by learners working on their own with material that has been previously determined with the teacher.

The tutor uses very different pedagogical strategies, depending on the orientation to learning that has been adopted. These strategies also vary according to the tutor's degree of professionalism and the training s/he has received. For instance, Graesser, Bowers, Hacker and Person (1997) contrast *professional* with *naturalistic* tutoring. Naturalistic tutoring offers a setting of controlled pedagogical strategies. Components that have been identified include: extensive use of examples and curriculum scripts, which provides a top-down organisation of subtopics: explanatory reasoning, which imposes functional, causal or logical structures on the content; and collaborative problem solving and question answering, in which tutor and learner collaborate to solve a problem and verbalise extensively. Within this naturalistic tutoring framework, interactions typically follow a five-step pattern: "1) tutor asks question, 2) student answers question, 3) tutor gives short evaluation on the quality of the student's answer, 4) tutor and student collaboratively improve the quality of the answer, 5) tutor assesses the student's understanding of the answer" (Graesser *et al.*, 1997, p. 167). In contrast

with naturalistic tutoring, professional tutoring is based on four guiding principles. First, learners are responsible for their own learning and are active in their learning process, looking for information, asking questions, etc. Second, the tutor models desired attitudes and processes and serves as a model for the learner. Third, a professional tutor only rarely reacts on-the-spot to a learner's error: s/he identifies the error, tries to understand why the error has been committed and sets temporary new goals for the learner to correct his/her error. Fourth, professional tutors try to anchor learning in the learner's ecosystem so that s/he can take a critical stance towards information and knowledge, while discovering new processes and associations. The authors looked for sophisticated pedagogical strategies one could expect from professional tutors, such as "the Socratic method (Stevens, Collins & Goldin, 1982), the modeling-scaffolding-fading method (Collins, Brown & Newman, 1989; Rogoff, 1990), the reciprocal training method (Palincsar & Brown, 1984), building on prerequisites (Gagné, 1977) and the cascade method (VanLehn, Jones, & Chi, 1992; Graesser *et al.*, 1997, p. 158), but they noticed that the professional tutors considered in their study were not specifically trained in these strategies nor did they use them.

From this study, it appears that the degree of control is closely related to the professionalism of tutors: the more professional the tutor is, the more responsible the learner will be.

Yet, in a controlled learning oriented environment, Lepper, Drake, O'Donnell-Johnson (1997) observed effective expert human tutors in one-on-one tutoring sessions in order to understand their strategies and their motivational and instructional techniques when providing this kind of learner support. The tutor's actions were highly contingent upon the tutee's actions, but the tutor always remained firmly in charge of the session. The authors describe a typical "helical" structure. The *initial diagnosis period* is very soon followed by the tutor *selecting a problem* and *presenting* it to the tutee. Then comes the *problem resolution* phase, during which the tutor uses his/her instructional strategies. Four main responses to the tutee's errors have been identified: *ignoring*, when the error is minor or inconsequential; *forestalling*, by asking leading questions or by providing hints in order to prevent the tutee from committing errors s/he committed in the past but has not yet repaired; *intervening* when immediate remediation is needed; and *debugging* by the tutee when errors have remained during the problem-resolution phase. Finally, when the problem has been resolved, the tutor engages the tutee in a process of *reflection* upon that problem with a view to developing declarative and conceptual knowledge associated with the procedural skills that have just been put into action. In conclusion, tutors pay constant attention both to cognitive and informational factors and to affective and motivational factors. Tutors assess the tutee's affective and cognitive state on an

on-going basis and react accordingly, always playing on both stages. In conclusion, Lepper *et al.* qualify such tutors as "INSPIRE" tutors: Intelligent, Nurturant, Socratic, Progressive, Indirect, Reflective, Encouraging (p. 130).

In a context of online moderation with a tutor functioning as a manager, thus embodying aspects of both control and autonomy, four components of learning strategies have been identified: *interest* (raising awareness, facilitating debate, promoting a challenging relationship between tutor and learner), *relevance* (ensuring appropriateness of learning to real-life scenarios), *expectancy* (managing teacher-learner relationships regarding participation and quality of work), and *satisfaction* (providing constructive feedback and rewarding achievements) (Keller & Burkman, 1993, cited by Packham *et al.*, 2006, p. 243).

Pushing the idea of learners' autonomy to its extreme, more recent articles have focused on self-regulation skills. Gynnild, Holstad and Myrhaug (2008) investigate the relationship between the tutor and the learner's academic achievement due to "high self-monitoring skills such as self-evaluation, comprehension monitoring and rehearsals, in order to ensure in-depth understanding" (p. 159). On the hypothesis that self-regulated learning strategies improve academic achievement (Lan, 1996, cited by Gynnild *et al.*, 2008, p. 159), the authors suggest that tutors could help learners improve their self-regulation skills. This could be achieved with "interventions maintaining alertness, goal setting, planning, problem solving, training and performance monitoring" (p. 159). According to Gynnild *et al.* (2008), the ultimate consequence of fostering self-regulation skills in the learning process would be the ability of learners to self-monitor accurately, as a result of experiencing their learning as their own responsibility. Self-monitoring skills and decision-making strategies are related to issues of self-awareness about the learning process and perceptions of self-efficacy.

Along the same lines, in the context of inquiry-based learning, Muukkonen, Lakkala and Hakkarainen (2005) identify the ultimate goals of instruction as involving meta-skills and epistemological changes.

> Such goals would most likely include the development of self-regulative and metacognitive skills (cf. Boekaerts, Zeidner & Pintrich, 1999); reflective and critical thinking skills (King & Kitchener, 1994; Kuhn, 1991), demonstrated academic literacy in reading and writing (e.g. Geisler, 1994; Wineburg, 1991); skills of collaboration and interaction (Brown & Campione, 1994); and developed epistemic agency, which paves the way for collective, knowledge-building efforts (Bereiter, 2002; Scardamalia & Bereiter, 1994, 2003). *Epistemic agency* means that the students themselves take responsibility for their own learning efforts and advancement of understanding. (Muukkonen *et al.*, 2005, p. 528)

The transition from a tutor who controls the learning process to a tutor "who seeks to promote advancement of the students' own metacognitive skills and knowledge-building practices"

(Muukkonen *et al.*, 2005, p. 560) is very difficult. "Tutoring should provide additional models and tools for advancing inquiry – that is, asking for clarifications, focusing on looking for answers to own research problems, returning to earlier questions and theories, and re-evaluating and reformulating them with the support of knowledge sources" (Muukkonen *et al.*, 2005, p. 560).

Autonomy and control are not as simple as black and white. Both concepts along with their related strategies interact, but we can identify some strategies that lean towards the control end of the continuum, others that lean towards the autonomy end, and still others that are clearly at the extreme end of autonomy. The pedagogical strategy depends also on tutors' roles and responsibilities. If they are assigned a cognitive role, it is unlikely that they will be using social animation strategies.

The type of tutor varies according to the context, from a highly structured context with the tutor being in control to a more open, constructivist-like context with the tutor scaffolding the learning process adaptively. Pedagogical strategies vary similarly on a continuum between control, autonomy and extreme autonomy. Depending on the learning context and activities, tutors' roles will also vary considerably.

Section 5.3. Tutors' and learners' roles

In the literature, much has been written about tutors' roles and very little about learners' roles. Green (2001), for instance, addresses learners' needs and roles in the following four points, emphasising that the regulation between tutors' and learners' roles has to be fine-tuned and adapted throughout the learning process. Learners must be:

- in the right place at the right time and with the necessary equipment and materials;
- confident in their ability to succeed;
- able to review progress, prioritise conflicting demands, set realistic personal targets and seek help to address weaknesses;
- able to develop learning skills and a positive work ethic. (Green, 2001, p. 3)

How is it possible to define roles attributed to one actor without defining the other's, since it is a one-on-one learning relationship? Maybe it is implicit: if the learning orientation is situated on the autonomy end of the continuum and the tutor's role defined accordingly, then the learner's role will follow. We believe that learners' roles and responsibilities depend largely upon the overall orientation of the learning context. In a rather controlled learning context, learners' have to follow guidelines and complete tasks. In a more constructivist learning context, learners have to take responsibility for their own learning. As Muukkonen *et*

al. (2005) state, in an inquiry-based process, tutors "should be in charge of the organization of the entire process without taking the cognitive responsibility away from the students" (p. 560). More generally speaking, a review of the literature indicates that tutors' roles vary considerably.

Merrill *et al.* (1995) have examined tutors' behaviours with learners who were working with problem solving methods. They provide a brief overview of the literature and report that Fox (1991, cited by Merill *et al.*, 1995, p. 318) found that the tutor acts as a "safety net" for learners and that his/her role is primarily a *confirmatory role* to assure the learner that s/he is on the right way. Lepper *et al.*, (1990, cited by Merrill *et al.*, 1995, p. 318) worked on the *motivational aspect* of problem solving. When learners showed discouragement and blamed themselves for not being able to attack the problem, tutors redirected the blame on the problem, emphasising it as difficult and helping them with "leading questions" (p. 318). Scardamalia, Bereiter, McLean, Swallow and Woodruff (1989, cited by Merrill *et al.*, 1995, p. 318) characterised the tutor as the person who helps the learner identify and repair his/her errors, giving him/her a feeling of *controlling the problem-solving process*. Mc Arthur *et al.* (1990, cited by Merrill *et al.*, 1995, p. 319) found that tutors use "micro-plans" or scripts to structure their tutorial intervention and keep acting as *a mirror* for learners, reminding them what they are doing, why they are doing it and what the final goals are. In their own study, the authors noticed behaviours already reported by other researchers – confirmatory feedback, error flagging – and tutor involvement in the process of problem solving.

Goodyear *et al.* (2001) enumerate the following tutor roles: process facilitator, advisor-counsellor, assessor, researcher, content facilitator, technologist, designer, manager-administrator. The process facilitator role "is concerned with facilitating the range of online activities that are supportive of student learning" (Goodyear *et al.*, 2001, p. 69) by welcoming, establishing ground rules, creating community, managing communication, modelling social behaviour and establishing one's own identity. The advisor-counsellor role is concerned with "working on an individual or private basis, offering advice or counselling to help learners get the most out of their engagement in the course" (Goodyear *et al.*, 2001, p. 69). The assessor role "is concerned with providing grades, feedback, and validation of learners' work" (Goodyear *et al.*, 2001, p. 69). The researcher role "is concerned with engagement in the production of new knowledge of relevance to the content areas being taught" (Goodyear *et al.*, 2001, p. 69). The content facilitator role "is concerned directly with facilitating the learners' growing understanding of course content" (Goodyear *et al.*, 2001, p. 69). The technologist role "is concerned with making or helping make technological choices

that improve the environment available to learners" (Goodyear *et al.*, 2001, p. 69). The designer role "is concerned with designing worthwhile online learning tasks", a "pre-course activity" (Goodyear *et al.*, 2001, p. 69). The manager-administrator role "is concerned with issues of learner registration, security, record keeping, and so on" (Goodyear *et al.*, 2001, p. 69).

According to Packham *et al.* (2006), within the virtual learning environment, e-tutors undertake the following roles: technical advisor, facilitator and manager (Paulsen, 1995; Berge, 1995; Collins & Berge, 1996, cited by Packham *et al.*, 2006, p. 243).

Barker (2002) identified the role of "'pastoral care' of students in terms of advising them about careers and course choices" (p. 7). This role has also been mentioned by Annoot (2001) and Tait *et al.* (2002). Tait *et al.* (2002) note a transformation of the tutor's role, "from a largely pastoral and administrative function to what is frequently regarded as a central feature of a learner's experience" (p. 6). Another role is that of key-skill tutor or content expert (Tait *et al.*, 2002; Annoot, 2001). Other roles that Barker (2002) identified are "marking students' assignments and coursework and providing feedback on submitted material" (p. 7). Tutors can moderate conferences, act as mentors for less-experienced peers and "monitor other tutors' work for the purpose of quality control" (p. 7). Noakes (no date) has reviewed tutor roles between 1981 and 1998 and concludes that they can be classified into five major categories: technical, social, organisational or managerial, pedagogical or intellectual and evaluative or assessment.

Baudrit (2000) reports on the difficult balance between the social characteristics of the tutor's role - moderate group discussions, show empathy with learners' preoccupations, act as resource in a particular learning process, guide, help and advise learners – and the knowledge outcome characteristics – demonstrate expertise in a particular domain and make learners progress (p. 87).

In their study of the use of help tools, De Lièvre *et al.* (2006) have also examined the tutor's role. According to them,

> The distant tutor must take on a large part of the responsibilities normally assumed by the classroom teacher:
>
> – Cognitive support: the tutor must possess disciplinary and methodological skills (Burge *et al.*, 1991; Laurent *et al.*, 1992; Henri & Kaye, 1985; Denis, 2003).
> – Socio-affective and relational support: the tutor must encourage and support the learner (Henri & Kaye, 1985; Burge *et al.*, 1991; Pettigrew 2001; Glikman, 1999; Gagne´ *et al.*, 2001).
> – Motivational support: the tutor must stimulate and maintain at a high level the motivation of the student (Lebel, 1995; Carrier & Schofield, 1991).

- Metacognitive support: tutors must help learners develop their abilities so that they realise the need to plan their learning, organise their work, etc (Henri & Kaye, 1985).
- Administrative and technical support: tutors must help learners through the difficulties they may meet in contact with their learning institution, e.g. at the administrative level and in the use of the communication tools placed at their disposal (Lebel, 1995;Denis, 2003). (De Lièvre *et al.*, 2006, p. 99)

What conclusions can we derive from this review of tutors' roles? First, that tutors' roles vary according to the learning context and activity. Second, that learners' roles also have to be taken into account when designing tutors' roles, because the two are intertwined. Third, that the range of tutors' roles addresses cognitive, social, motivational, affective, administrative, technical, organisational, evaluation, advisory and quality control issues.

While designing tutors' roles, it is important to consider learners' roles simultaneously, because both are intertwined. The range of tutors' roles addresses cognitive, social, motivational, affective, administrative, technical, organisational, evaluation, advisory and quality control issues. An additional parameter to take into account is related to modality, types and moments of tutor interventions. Tutors can intervene proactively or reactively. They intervene differently according to their content expertise, focusing either on content or on process.

Section 5.4. Tutoring modality, intervention and effectiveness

Concerning the modes of intervention, De Lièvre *et al.* (2006) ask whether tutors should opt for a more proactive attitude – intervening in learners' work without being asked - or a more reactive one – intervening upon demand. Looking at proactivity and reactivity through the lens of help seeking, the authors identify four reasons why learners do not ask for help: 1) some learners get together to find the answer, 2) others do not ask for fear of showing their lack of understanding, 3) a few do not want to deal with the tutor because of a bad first impression, 4) others are not aware that they need help (Glikman, 1999; Posner *et al.*, 1992; Dijkstra *et al.*, 1999, cited by De Lièvre *et al.*, 2006, p. 103).

Dolmans *et al.*, (2002) focused on the types of tutor intervention in problem-based learning within the last decade. Three major trends were observed in their review. The first group of studies deals with the differential influence of content-expert and non content-expert tutors on achievement. These studies yielded contradictory findings, sometimes revealing no differences (De Volder & Schmidt, 1981; Swanson *et al.*, 1990; Davis *et al.*, 1994; Regehr *et al.*, 1995, Dolmans *et al.*, 1996, cited by Dolmans *et al.*, 2002, p. 175), sometimes revealing

better results for learners with content-expert tutors (Davis *et al.*, 1992; Schmidt *et al.*, 1993; Schmidt, 1994, cited by Dolmans *et al.*, 2002, p. 175). Authors attribute these mixed findings to a difference in the definition of what constitutes a content expert and a non-content-expert *as well as* to differences in methodology from one study to the other. The second group of studies deals with process variables, revealing that content-expert tutors use their subject matter expertise more often, whereas non-content-expert tutors use their process facilitation expertise more in order to direct discussion (p. 179). The majority of these studies show that a content-expert tutor has a tendency to take on a more directive role but also generates more learning issues, whereas non-content-expert tutors promote learners' interaction and execute the facilitator role better, in the sense that they stimulate learners to engage in group activities. The third group of studies are related to the context variable: a tutor acts differently, depending on the context s/he is performing in. This finding confirms that tutoring is situated (p. 179).

Deschryver (2002) researched important moments for tutor intervention and identified three key moments: the first contact and first weeks, in order to make the learners feel comfortable in the new setting; formative evaluation throughout the learning process and within a reasonable period of time to fully support the learning process (Rodet, 2000): and finally, taking stock of and closing – at the course level - the entire learning process.

Moments, modality and types of tutor intervention must have an influence on both learner satisfaction and tutoring effectiveness. As was the case with roles, the effectiveness of tutoring must be addressed from both the learners' and the tutors' perspectives. It is context dependent and varies considerably. Tutoring effectiveness is also very much tutor dependent.

In a broader analysis of the effects of tutoring, De Lièvre *et al.* (2006), discuss the drop-out effect, which has yielded contradictory or unexpected results when researched. It was expected that the presence of tutors in distance education settings would reduce learners' feelings of isolation and would have a positive effect on their perseverance. This hypothesis did not engender the expected results (Bourdages & Delamotte, 2001, cited by De Lièvre *et al.*, 2006, p. 100), or when it did, they were only subsidiary results (Towles *et al.*, 1993, cited by De Lièvre *et al.*, 2006, p. 100). The tutor is claimed to have an influence on learners' level of interactivity when s/he guides them in the learning environment, explaining how to communicate efficiently and effectively (Wozniak & Silviera, 2004, cited by De Lièvre *et al.*, 2006, p. 100). Early contact with the tutor has been shown to have a positive influence on learners' satisfaction (Gagné *et al.*, 2001, cited by De Lièvre *et al.*, 2006, p. 100). The tutor's attitude, whether s/he shows empathy or remains distant, has also proved to have an influence

on the quality of the tutor-learner relationship, particularly concerning trust (Schweizer *et al.*, 2001; Desmarais, 2000, cited by De Lièvre *et al.*, 2006, p. 101). The quality of tutor-learner interactions also depends on the tutor's understanding of the learner's personality. This "insight" (p. 102) allows the tutor to adjust the quality and number of actions-reactions appropriately (Goodyear, 2002, cited by De Lièvre *et al.*, 2006, p. 102).

Thorpe and McAteer (2001) underline the fact that the tutor is a determining factor in assessing the effectiveness of tutoring. "In the online teaching context, the quality of the learning experience is heavily dependent on the resources the group bring to bear and on the skill and commitment of their online tutor. Where these both work well, the technology and social interaction truly enable the 'defeat of distance'" (p. 9).

Green (2001) suggests that effective tutors "work within a framework of common standards" and have:

- a positive and enabling approach to learners;
- relevant and up-to-date information about each learner's attendance and progress;
- well-developed people and communication skills to manage one-to-one and group sessions;
- good quality resources to enable them to respond flexibly to support needs identified.

Enabling processes that can make this happen are:

- recruitment and training staff who have a clear role and job description along with the experience, skills and support needed to feel comfortable and confident in their ability to fulfil the role;
- good quality information management systems which provide accurate and timely information on attendance and progress across subjects/units/modules to support meaningful individual reviews;
- centrally produced and managed resources which tutors can use flexibly to respond to individual/group learning needs. Where all these things come together, colleges have demonstrated that tutoring can instil feelings of self-belief, be a strong motivational force and empower learners to achieve. (Green, 2001, pp. 11-12)

Stevenson, MacKeogh and Sander (2006) have built a framework, similar to Laurillard's (2002) conversational framework, for starting the tutoring process by gathering learners' expectations. It consists in a cyclical pattern (Figure 12) of asking learners questions and briefing tutors, and leads to increased satisfaction with the support on the part of both learners and teachers. Tutors were asked to express their opinions towards learners' expectations. On the whole, expectations were seen as realistic; they did not lead to major changes in tutorial plans but they did make tutors reflect on tutorial provision, and soliciting expectations was indeed considered a worthwhile endeavour.

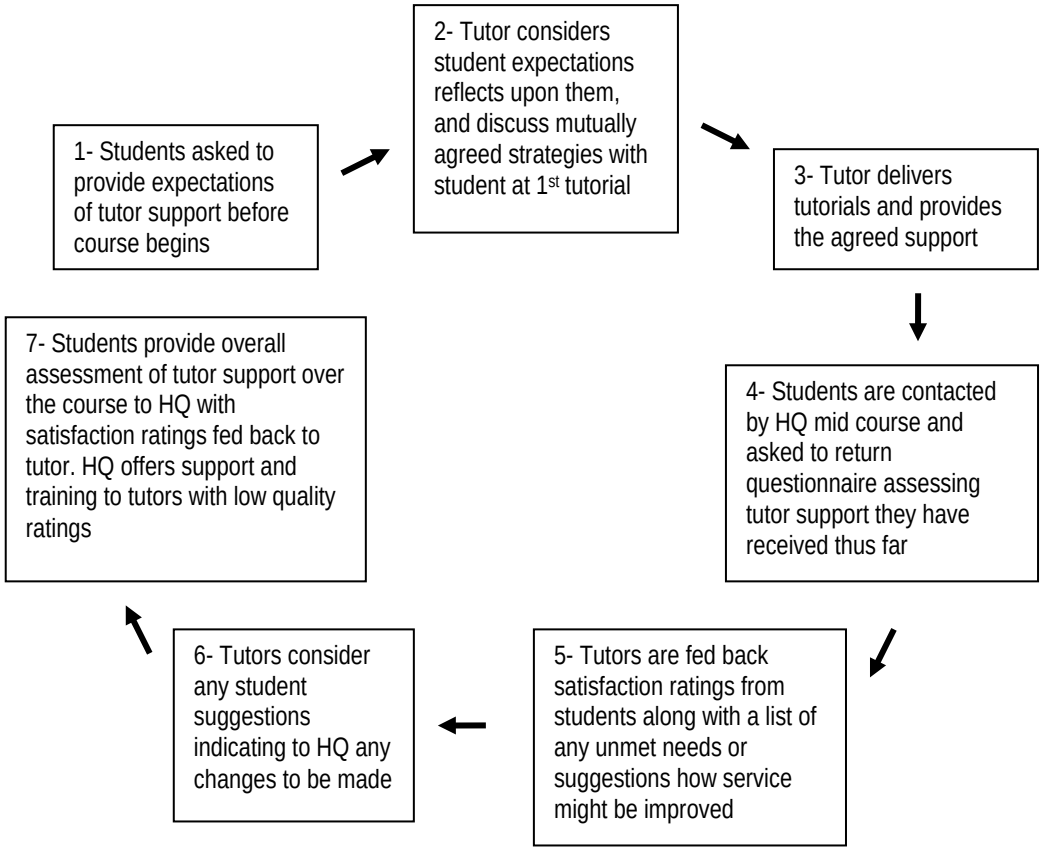


Figure 12: The seven-step model of quality assurance using student expectations of tutor support needs (Stevenson *et al.*, 2006, p. 142)

In another study, Packham *et al.* (2006) report on e-moderation effectiveness. From the learners' perspective, it addresses issues related to quality of feedback, moderator support and encouragement, and module management (p. 245). From the tutors' perspective, effective e-moderation is related to motivation, time-management skills, building an online personality and organisational skills (Packham *et al.*, 2006, p. 247). The authors summarise their findings in the table below (Table 19).

Key attributes (literature)	Student perspective	E-moderator perspective
Efficient and effective feedback	Quality of feedback	Motivation
Organisational skills management skills	Module management	Organisational skills time management
On-line persona socialisation skills	Support and encouragement	On-line personality

Table 19: Student and tutor perceptions of effective e-moderation (Packham *et al.*, 2006, p. 249)

It appeared important to address the following particular domain of tutor effectiveness, namely the delivery and reception of feedback. Weaver (2006) researched learners' perception of the written feedback they received. Feedback is considered a multifaceted pedagogical tool. First, how is it related, in terms of value, to learners' conceptions of feedback? Learners must understand the purpose of feedback (Wojtas, 1998, cited by Weaver, 2006, p. 381) and perceive it as enabling learning and a way to improve their work

(Maclellan, 2001, cited by Weaver, 2006, p. 381). Language used to express feedback must be carefully chosen: judgement statements are considered unhelpful and can lead to learners becoming unreceptive to tutor feedback (Boud, 1995; Hounsell, 1995 cited by Weaver, 2006, p. 381). Feedback is also related to self-esteem: learners with low self-esteem "tend to view feedback as a judgement of ability" (Young, 2000, cited by Weaver, 2006, p. 381). When feedback is received after module completion, it is of no help (Hartley & Chesworth, 2000, cited by Weaver, 2006, p. 382). In practice, "coursework assessment is used to provide summative as well as formative feedback" (p. 38), but it seems that the combination of formative and summative evaluation ceases to be of value (Atkins, 1995; Brown *et al.*, 1997 cited by Weaver, 2006, p. 382). Written assessment criteria defined and shared among tutors before evaluation benefit both the tutor and the learners (Miller *et al.*, 1998, cited by Weaver, 2006, p. 390). Weaver's findings can be summarised as follows: Learners need guidance to fully understand tutors' terminology and make effective use of feedback. Too general feedback or feedback without suggestions for improvement is unhelpful. Feedback must contain advice for future work and be more comprehensive when dealing with positive evaluation.

The effectiveness of tutoring is a very difficult issue to tackle and has to be approached from both the learners' and the tutors' perspectives. Effectiveness is normally assessed in terms of the learners' achievements.

Independently of their expertise, tutors intervene differently according to the learning and tutoring context. Tutoring is definitely situated. Three key moments for intervention have been identified: the beginning, to establish a relationship based on trust and to situate learners in their new learning setting; regular formative evaluation throughout the learning process; and the end, to retrace the entire learning process and help move the experience forward. The effectiveness of tutoring is a very difficult issue to tackle and has to be approached from both the learners' and the tutors' perspectives. Effectiveness is normally assessed in terms of the learners' achievements. One way of increasing tutoring effectiveness is to gather learners' expectations of tutoring beforehand or through a participatory approach (i.e. concepts of learning contracts). In the particular domain of providing feedback, in order for it to be effective, it is crucial that learners fully understand the feedback culture, perceive it as enabling learning, and share feedback standards.

Section 5.5. Tutoring tools and tutor training

This section addresses cognitive tools, under the name of scaffolding, technological tools tutors use, and tutor training.

Wood, Bruner & Ross (1976) are usually recognized as the first to define tutoring in terms of scaffolding. In their view, the scaffolding process is firmly embedded in the social context. This scaffolding process enables the novice to solve a problem beyond his/her capacity, what s/he could not do if s/he were unassisted. At the end, there is a transfer of responsibility from the tutor to the tutee, not only at the level of content but also at the level of process. Well-executed scaffolding begins by luring the child into actions that produce recognizable-for-him/her solutions. Then the tutor can interpret any discrepancies on the part of the tutee. Finally, the tutor stands in a confirmatory role until s/he fades totally because the tutee has become independent. In order to provide tutees with valuable feedback, effective tutors must appeal to at least two theoretical models: a theory of the task or problem and how it may be completed, and a theory of the performance characteristics of the tutee.

Rohler and Cantlon (1997) observed different types of scaffolding and their characteristics within a classroom setting (Table 20). They define scaffolding in terms of Vygotsky's Zone of Proximal Development (ZPD): "learning is the development of higher level psychological processes occurring first on an interpersonal level through social interaction and later internalized" (p. 9). Scaffolding, then, is assistance given in the ZPD. "Scaffolding is an instructional tool that reduces learning ambiguity, thereby increasing growth opportunities" (Doyle, 1986, cited by Rohler & Cantlon, 1997, p. 9).

Six stage scaffolding process by Wood *et al.* (1976)	Types of scaffolding observed by Rohler & Cantlon (1997)
Recruitment: get the novice interested and involved	*Explanations*. "Explicit statements adjusted to fit the learners' emerging understandings about what is being learned (*declarative or prepositional knowledge*), why and when it is used (*conditional or situational knowledge*), and how it is used (*procedural knowledge*)" p. 17.
Reduction: simplifying the task by reducing the number of constituent acts to reach the solution. The tutor acts as an activator for the learner to fully understand the problem.	*Inviting student participation*. Offering learners the opportunity to join in the process that is taking place so that they can complete the pieces they understand and master.

Six stage scaffolding process by Wood *et al.* (1976)	Types of scaffolding observed by Rohler & Cantlon (1997)
Direction maintenance: the tutor is in charge of keeping the tutee in pursuit of a particular objective	*Verifying and clarifying* student understandings. Teachers check learners' emerging understandings and skills and adapt his/her teaching strategies according to learners' responses.
Marking critical features: the marking provides the tutee with relevant information about the task and possible best ways of resolving it	*Modelling* of desired behaviours by making things visible, as, for example, think-aloud modelling to show learners all the steps that they need to go through or by asking questions or commenting according to certain rules- i.e. making constructive comments.
Frustration control: the tutor motivates the tutee and encourages him/her	*Invite learners to contribute* clues by helping them to reason about the solution to the problem or at least formulate appropriate hypotheses.
Demonstration: the tutor models solutions to a task, closely observed by the tutee.	

Table 20: Parallel between Wood *et al.*'s stages of scaffolding and Rohler and Cantlon's types

Puntambekar and Hübscher (2005) discuss scaffolding tools in complex learning environments, i.e. typically a classroom (Table 21). First, it is important to note that the current understanding of scaffolding does not necessarily mean that the scaffold is a more experienced human being; an artifact, a resource or an entire environment can also serve as a scaffold. The authors re-situate the notion of scaffolding in its original context and values - establish an ongoing diagnosis of the learner, calibrate support accordingly and fade to allow the learner to perform independently – and compare the features of scaffolding associated with the original notion to those associated with the current notion.

Feature of scaffolding	Original notion of scaffolding	Evolved (current) notion of scaffolding
Shared understanding	Adult or expert establishes shared understanding of common goal and provides motivation	Authentic task, often embedded in the environment, provides a shared understanding
Scaffolder	Single, more knowledgeable person provides support to complete the task Multimodal assistance provided by a single individual	Assistance is provided; tools and resources Distributed expertise – Support is not necessarily provided by the more knowledgeable person, but by peers as well

Feature of scaffolding	Original notion of scaffolding	Evolved (current) notion of scaffolding
Ongoing diagnosis and calibrated support	Dynamic scaffolding based on ongoing assessment of the learner (individual) Adaptive scaffolding – Support is calibrated and sensitive to the changing needs of the learner	Passive support – Ongoing diagnosis by peers and/or software is not necessarily undertaken "Blanket scaffolding" – Support (especially in the form of tools) is the same for all students
Fading	Eventual fading of scaffolding as students become more capable of independent activity	In most cases, support is permanent and unchanging

Table 21: Evolution of the notion of scaffolding (Puntambekar & Hübscher, 2005, p. 7)

The authors conclude that more research is needed to understand what kind of scaffolding tools really work in a classroom setting, especially how to render them more adaptive, more proactive in order to facilitate the transfer of responsibility to the learner. Other recommendations include: taking into consideration the multiple ZPDs in a classroom when designing tools; building fading into the whole environment rather than into each tool; orchestrating the environment so that all tools and agents play a role in supporting learning.

A "tool set" (Barker, 2002, p. 9) to support tutors in carrying out their tutoring activities in effective and efficient ways is necessary and is determined according to the learning context and learning environment. Green (2001) also insists on the importance of providing tutors with a tutoring guide. The range of tools to support tutoring activities is very wide, from cognitive to social and from ethical to technological. In order to be effective, tutors need support and training (Salmon, 2000). Salmon (2000, pp. 55-68) suggests a tutor-training architecture, based on her five-step model for teaching and learning online. In the context of tutor training, the five steps involve 1) welcoming – warming up and being assured the technological environment is set, 2) induction – learning about protocols and software skills, 3) teaching – giving and receiving information, 4) knowledge construction – discussing in particular how to implement CMC with learners, 5) development – exploring the web for teaching. Bennett and Marsh (2002) report an increased awareness of the need to train tutors not only from the technological point of view but also to "raise practical competence in the support of learning" (p. 14).

Dolmans, Gijselaers, Moust, De Grave, Wolfhagen and Van der Vleuten (2002) recommend that, ideally, tutors should be both content experts and experts in learning processes; that

tutors should be trained on some basic pedagogical strategies such as metacognitive activities, scaffolding, etc.; and that future research should investigate the effect and effectiveness of training on the professional development of tutors.

Macdonald and Hills (2005) researched professional development among distance tutors, using reflective logs in addition to current electronic networking facilities. The findings of this approach to networked reflection among distance tutors revealed that tutors benefit from the opportunity to "meet" other tutors, whatever their discipline, and share positive and negative experiences. The time-consuming nature of this kind of professional training was pointed out. The authors' recommendations regarding this type of professional development, using metacognition in a remote context, are as follows:

- The provision of a simple log proforma can formalise and structure reflection, and can ensure that participants are encouraged to consider common themes.
- The facility for reflection in a group environment, and use of a rota for log completion, restricts flexibility in timescales, and can create a sense of occasion and community.
- There is much to be learnt from peers across disciplines.
- It is helpful to employ an administrator to remind participants of their commitment, and to remind moderators to keep the online discussion on track.
- The technology involved should be as simple and accessible as is possible.
- Participants need to be well briefed on the time commitment and paid appropriately for their participation. (Macdonald & Hill, 2005, p. 337)

Baudrit (2000, p. 102) asks a fundamental question regarding tutor training. If tutors are trained to be professionals, is there not a risk that they will lose their specificity, their social proximity to learners? The balance between professional and naturalistic tutoring probably depends on the needs inherent in each learning context.

To support tutors in their pedagogical work, tutors make use of a set of tools – cognitive as well as technological – and tutor training can help tutors become more effective.

Section 5.6. Design considerations

Rekkedal and Qvist-Eriksen (2003) discuss the twofold historical tradition in student support: the first tradition relies solely on the teaching material and guiding activities and does not include a parallel communication component, while the other includes regular face-to-face contact (Rekkedal & Qvist-Eriksen, 2003, p. 17). It may be as a result of this historical specificity that, in the context of distance learning, student support services can be found in two different areas, "one being support structures built into the material (course development

sub-system) and the other area being activities carried out to support the individual student during his/her studies (the teaching/learning process sub-system)" (Rekkedal & Qvist-Eriksen, 2003, p. 18).

With respect to the "teaching/learning process sub-system", Thorpe and McAteer (2001) state that "since learner support is no longer an add-on to a predefined course, but itself defines what the course becomes, the old model of course design first, learner support second, should be questioned and possibly reversed" (Thorpe, 2002, p. 106). "Learner support is defined as all those elements capable of responding to a known learner or group of learners, before, during, and after the learning process" (Thorpe, 2002, p. 108). This definition is grounded on *identifying*, which requires that learners and learner-supporters "know" each other to a certain point, *interacting*, and the *time factor*. (Thorpe and McAteer , 2001, p. 5).

To design tutoring support, Gordon *et al.* (2007) remind us of the importance of addressing the "who, what, why, when, where, and how" (p. 217) questions about tutors and tutoring: Who are tutors? What do tutors do? Why does tutoring work? When does tutoring become effective? Where does tutoring happen best? How can we ensure high-quality tutoring programs? Concerning the *who* question, for instance, it is important to specify the academic status required of the tutor: a peer learner? a more advanced learner? a teacher? (Baudrit, 1999; Baudrit, 2000; Annoot, 2001). Concerning the organisation of actors involved in the tutoring process, it is useful to think about its structure: hierarchical? flat? star-like? blended? (Goodlad & Hirst, 1989, cited by Baudrit, 2000). The actors involved are another element to be taken into account: tutorial support coordinator? tutor manager? tutor (Green, 2001); or subject tutor? personal tutor? key skill tutor? (Tait *et al.*, 2002).

Rekkedal and Qvist-Eriksen (2003) discuss a former study and raise some interesting design issues pertaining to tutoring: Are tutors the same throughout the course or do they change? Are tutors employed on a permanent basis or on another basis? Is the tutor responsible for only part of the tutoring or for the entire process (i.e. communication, evaluation, motivation, etc.)? How long is the turn-around time for reacting to learners' demands? How is contact between tutors and learners initially established? How does the tutor react to absenteeism? Are tutors' and learners' communication protocols (i.e. proactive, reactive, interactive, etc.) made explicit? Is there a pool of feedback and comment criteria that have proved effective in former courses and that tutors can appeal to?

A recent perspective, known as networked learning, is to integrate the tutor in a landscape of exchanges. According to Goodyear, Banks, Hodgson and McConnell (2004), networked learning

> is centered on some key social, personal and technological challenges of our time. It raises issues about learning as a cognitive achievement and as a social practice, and about the use of the Internet in the accomplishment of individual and collective goals. It raises questions of identity and belonging, conflict and cooperation, change and continuity. (Goodyear *et al.*, 2004, p. 1)

Networked learning is defined as: "learning in which information and communication technology is used to promote connections: between one learner and other learners; between learners and tutors; between a learning community and its learning resources" (Goodyear *et al.*, 2004, p.1).

The design of learner support is a key issue in the entire design process and it may determine the entire learning sequence. If a teacher wishes to design socio-constructivist learning activities that are very demanding in terms of learner support, but the necessary skilled human resources are not available, s/he will probably need to review the entire learning design. At that point, networked learning might constitute a possible solution.

Section 5.7. Summary

In the design of an instructional sequence, learner support is a key issue that has to be taken into account from the very beginning. It is particularly important to design learner support in contexts of activity-based learning both to support learners and to adapt to their learning paths.

The concept of tutoring, conveying individual learning, goes back at least to the Greco-Roman era. Today, a myriad of terms express the concept of tutoring, each focusing on one particular aspect. The effects of tutoring, peer-tutoring, cognitive issues related to tutoring, the content and organisation of tutorial sessions, tutors' roles and pedagogical strategies, the effectiveness of tutoring, and tutoring as support for self-directed learning are the major research trends reported in the literature. The type of tutor varies according to the context, from a highly structured one with the tutor being in control to a more open, constructivist-like context with the tutor scaffolding the learning process adaptively. Pedagogical strategies vary similarly on a continuum between control, autonomy and extreme autonomy. Depending on the learning context and activities, tutors' roles also vary considerably. When designing tutors' roles, it is important to consider learners' roles simultaneously, because the two are intertwined with each other. The range of tutors' roles addresses cognitive, social, motivational, affective, administrative, technical, organisational, evaluation, advisory and quality control issues. An additional parameter to take into account is related to modality,

types and moments of tutor interventions. Tutors can intervene proactively or reactively. They intervene differently according to their content expertise, focusing either on content or on process. Independently of their expertise, tutors intervene differently according to the learning and tutoring context. Tutoring is definitely situated. Three key moments for intervention have been identified: the beginning, to establish a relationship based on trust and to situate learners in their new learning setting; regular formative evaluation throughout the learning process; and the end, to retrace the entire learning process and help move the experience forward. The effectiveness of tutoring is a very difficult issue to tackle and has to be approached from both the learners' and the tutors' perspectives. Effectiveness is normally assessed in terms of the learners' achievements. One way of increasing tutoring effectiveness is to gather learners' expectations of tutoring beforehand or through a participatory approach (i.e. concepts of learning contracts). In the particular domain of providing feedback, in order for it to be effective, it is crucial that learners fully understand the feedback culture, perceive it as enabling learning, and share feedback standards. To support their pedagogical activities, tutors make use of a set of tools – cognitive as well as technological – and tutor training can help tutors become more effective. The design of learner support is a key issue in the entire design process and it may determine the entire learning sequence. If a teacher wishes to design socio-constructivist learning activities that are very demanding in terms of learner support, but the necessary skilled human resources are not available, s/he will probably need to review the entire learning design. At that point, networked learning might constitute a possible solution.

Chapter 6. Educational technology and tools for blended learning

Section 6.1. Technology

To support the shift from standardised to customised learning, technology is an important factor. Instructional designers have introduced technology in their designs and report their experiences and theoretical reflections in the literature. "Instructional technology is a design field in which people endeavour to increase the effectiveness of instruction and learning through the integration of pedagogy and technology" (Woo & Reeves, 2007, p. 15).

We will try to understand what the field of *educational technology*, sometimes also called *instructional technology* or *information technology* encompasses.

According to the International Technology Education Association:

> Educational technology is concerned with technology *in* education. It is involved in the *use* of technology as a "tool" to enhance the teaching and learning process across all subject areas. Educational technology is concerned about teaching and learning *with* technology. Educational technology is involved with a more narrowed spectrum of technology, dealing primarily with information and communication technology centered around the didactic practice of using technology to improve the teaching and learning process. Key words and phrases found in National Educational Technology Standards for Students related to educational technology include: use of technology; media; multimedia; hardware and software; information; telecommunications; web environments; communicate; process data; use technological resources for solving problems; locate, evaluate, and collect information; and other instructional technology terms. (Dugger & Nike, 2001, p. 32)

Reiser's (2007) definition is based on the two aspects - 1) "the focus on systematic processes" and 2) the "use of technological resources" - of the definition given by the Association for Educational Communication and Technology (cited by Reiser, 2007, p. 6). In addition, the objective of educational technology is to improve human performance and learning in the workplace with instructional and non-instructional (i.e. knowledge management, reward structures) methods.

> The field of instructional design and technology (also known as instructional technology) encompasses the analysis of learning and performance problems, and the design, development, implementation, evaluation, and management of instructional and non-instructional processes and resources intended to improve learning and performance in a variety of settings, particularly educational institutions and the workplace. Professionals in the fields of instructional design and technology often use systematic instructional design procedures and employ instructional media to accomplish their goals. Moreover, in recent years, they have

paid increasing attention to non-instructional solutions to some performance problems. Research and theory related to each of the aforementioned areas is also an important part of the field. (Reiser, 2007, p. 7)

In the glossary of Northeastern Illinois University, the following definition of educational technology is provided: "A complex, integrated process involving people, procedures, ideas, devices, and organization, for analyzing problems, and devising, implementing, evaluating and managing solutions to those problems, involved in all aspects of human learning."[26]

Yet another definition: "Technology means the systematic application of scientific or other organized knowledge to practical task. Therefore, educational technology is based on theoretical knowledge from different disciplines (communication, psychology, sociology, philosophy, artificial intelligence, computer science, etc.) plus experiential knowledge from educational practice (Nathalie Deschryver)."[27]

Finally, Schneider's definition provides a glimpse of the enormity of the field: "Educational technology can be considered either as a design science or as a collection of research interests addressing fundamental issues of learning, teaching and social organization" (Schneider, 2008, p. 13).

Just as the notion of instructional design expanded to constructivist design, so the definition of educational technology has become broader, starting from a design framework that was instruction-oriented and ending with one based on socio-learning sciences.

The result of the introduction of technology in instructional design can be perceived from two perspectives: either from the instructional technology perspective or from the constructivist technology perspective. If one looks at it from the instructional technology perspective, technology and the Internet do not fundamentally change the instructional designer's role, even if "crafting an instructional message that is customized to the environment, learners, domain, and mode requires the complex application of scientific and artistic principles" - i.e. reusable learning objects[28] (Dempsey & Van Eck, 2007, p. 292).

From the constructional perspective, interactions, and especially social interactions, have become a very important parameter in a distributed learning setting. Different types of interactions, for instance learner-learner, learner-content, learner-teaching staff, and learner-learning environment interactions result in different outcomes. These outcomes can be of a communication, knowledge-building, metacogntitive or community building nature. These

[26] http://www.neiu.edu/~dbehrlic/hrd408/glossary.htm#e

[27] http://edutechwiki.unige.ch/en/Educational_technology

[28] The authors define learning objects as "individual components of learning material that can be aggregated or disaggregated to form instructional units of varying size" (p. 292). SCORM (Shareable Content Object Reference Model) is "an emerging set of standards for creating and identifying learning objects for use in distributed and computer-based learning" (p. 293).

different interactions, resulting in higher-order outcomes, are crucial supports for learning and teaching. Additionally, the learning environment plays a central role and many "course developers are coming to see the information they incorporate as less of a product (permanent in the sense of a textbook) and more of a process of a learning group in action among an increasing array of learning options and shared experiences" (Dempsey & Van Eck, 2007, p. 295).

Technology can be considered an additional tool that instructional designers can integrate while designing an instructional sequence. Depending on the design, technology may or may not enhance learning. Within a constructivist approach to design, on the other hand, technology is considered an opportunity to immerse learners in a practice field, providing them with the support of a community of practice.

Section 6.2. Community of practice

6.2.1. Community of practice

According, to Wenger (1998), a community of practice is the meeting point of theories emanating from several intellectual traditions, as shown below (Figure 13).

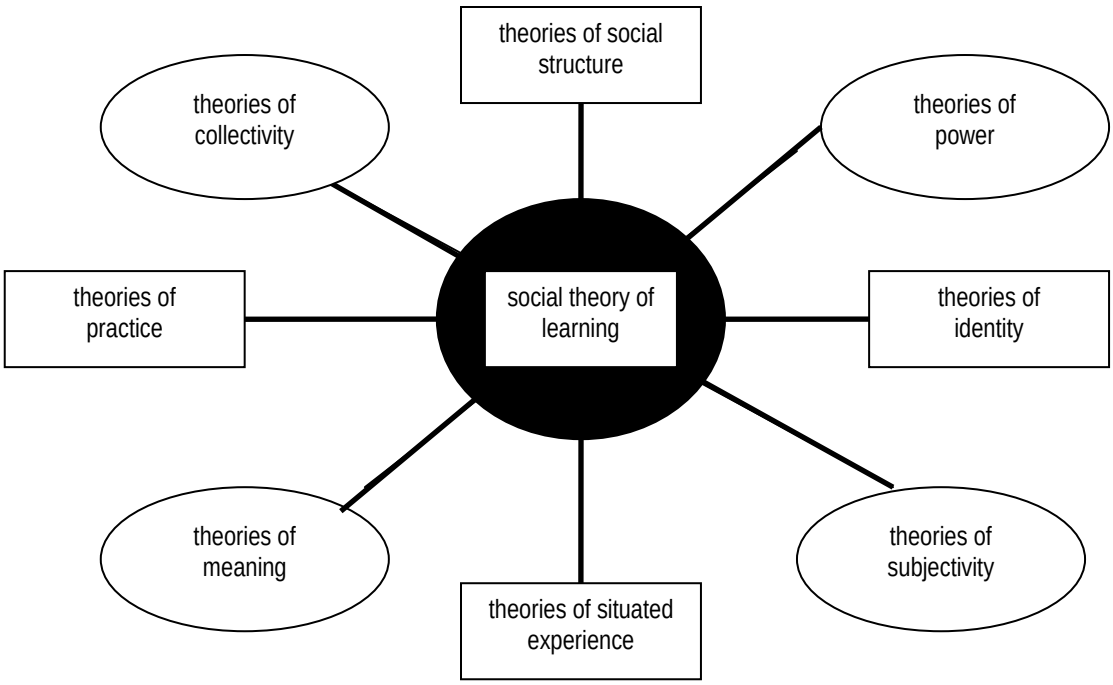


Figure 13: Refined intersection of intellectual traditions (Wenger, 1998, p. 14)

The vertical axis is concerned with the tension between theories that give primacy to social structure and those that give primacy to action. The horizontal axis mediates the poles of the

vertical axis, highlighting the tension between notions of practice and identity. The left side of the diagram is concerned with community while the right side concentrates on the individual. What do these different theories represent in terms of the interactions within a community?

Theories of *social structure* "give primacy mostly to institutions, norms and rules. They emphasize cultural systems, discourses, and history" (Wenger, 1998, p. 12). Theories of *situated experience* "give primacy to the dynamics of everyday existence, improvisation, coordination, and interactional choregraphy" (Wenger, 1998, p. 13). Theories of *social practice* "address the production and reproduction of specific ways of engaging with the world. These theories emphasise the social systems of shared resources by which groups organize and coordinate their activities, mutual relationships, and interpretations of the world" (Wenger, 1998, p. 13). Theories of *identity* "are concerned with the social formation of the person, the cultural interpretation of the body, and the creation and use of markers of membership such as rites of passage and social categories. They […] attempt to understand the person as formed through complex relations of mutual constitution between individuals and groups" (Wenger, 1998, p. 13). Theories of *collectivity* "address the formation of social configurations of various types, from the local (families, communities, groups, networks) to the global (states, social classes, associations, social movements, organizations)" (Wenger, 1998, p. 14). Theories of *subjectivity* "address the nature of individuality as an experience of agency. Rather than taking for granted a notion of agency associated with the individual subject as a self-standing entity, they seek to explain how the experience of subjectivity arises out of engagement in the social world" (Wenger, 1998, p. 15). Theories of *power*. "The question of power is a central one in social theory. The challenge is to find conceptualizations of power that avoid simply conflictual perspectives (power as domination, oppression, or violence) as well as simply consensual models (power as contractual alignment or as collective agreement conferring authority to, for instance, elected officials)" (Wenger, 1998, p. 15). Theories of *meaning* "attempt to account for the ways people produce meanings of their own. […] Because this notion of meaning production has to do with our ability to "own" meanings, it involves issues of social participation and relations of power in fundamental ways" (Wenger, 1998, p.15).

With these different interactions and tensions between action and social structure on the one hand and the group and the individual on the other, building knowledge within a community can only be a source of richness, tensions and discipline. This is particularly true for a community concerned with learning, since its essence is to create knowledge and meaning. The result of taking part in this community accelerates the change, and identity and power

may become issues. With respect to interactions between the community and the individual, mutual modelling between the individual and the community takes different forms, depending on how individuals engage in the community. From a learning perspective, this may mean strong regulation, self-discipline, awareness of all the parameters at stake when learning in a community, and coaching.

6.2.2. How can a teacher design a community of practice for learning?

Before attempting to answer this question, it is important to understand the basic interactions between a community and the individuals that make it up. With respect to the community, Wenger has identified different dimensions of a community of practice and different modes of belonging to this community (Figure 14).

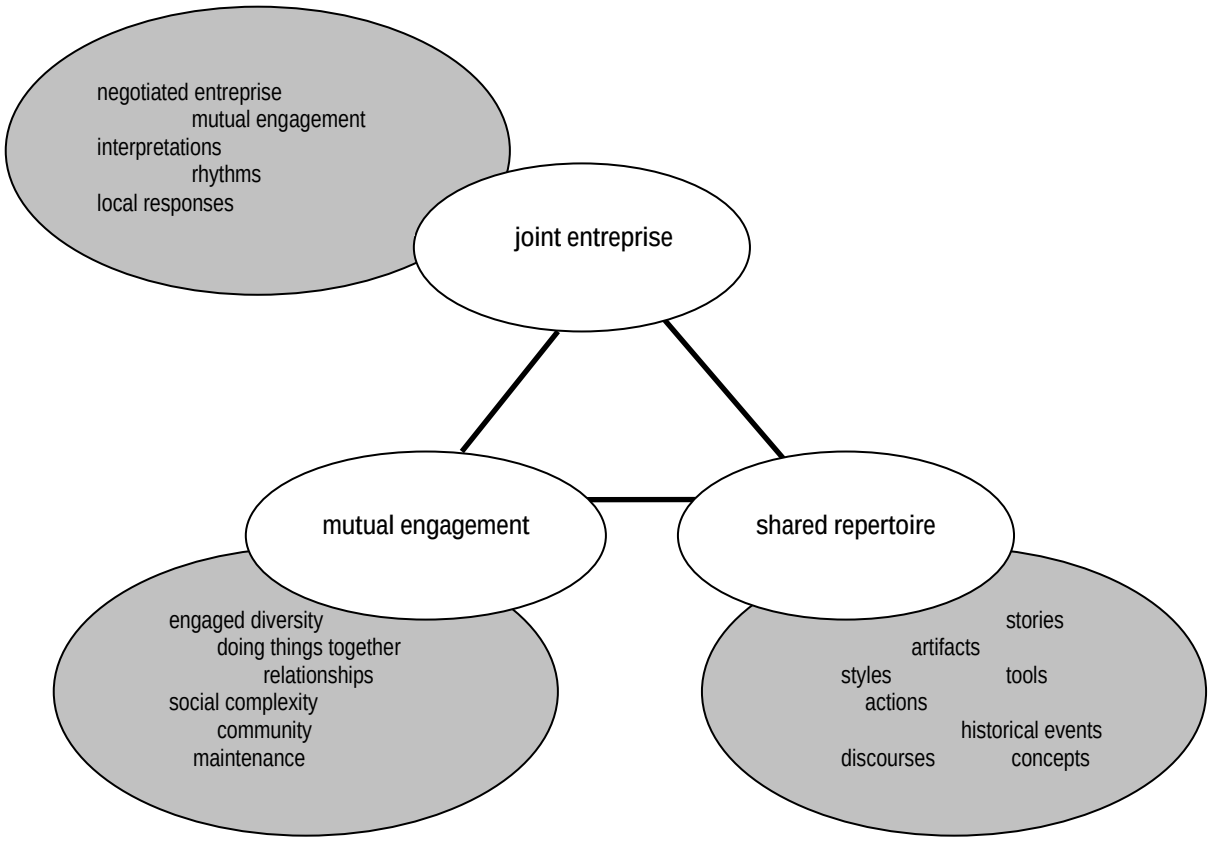


Figure 14: Dimensions of practice as the property of a community (Wenger, 1998, p. 73)

Mutual engagement means that participants in a community are "engaged in actions whose meaning they negotiate with one another" (Wenger, 1998, p. 73). *Joint enterprise* is an added concept of common grounding: it refers, on the one hand, to common understanding – the result of negotiations – added to the complexity of what mutual engagement entails, and on

the other hand, to mutual accountability. The *shared repertoire* refers to "routines, words, tools, ways of doing things, stories, gestures, symbols, genres, actions, or concepts that the community has produced or adopted in the course of its existence, and which have become part of its practice" (Wenger, 1998, p. 83).

With respect to the individual, the process of identity formation is deeply influenced by the way the individual belongs to the community. Wenger has identified three modes of belonging: "1) engagement – an active involvement in mutual processes of negotiation of meaning; 2) imagination – creating images of the world and seeing connections through time and space by extrapolating from our own experience; 3) alignment – coordinating our energy and activities in order to fit with broader structures and contribute to broader enterprises" (Wenger, 1998, pp. 173-4).

The design of a community of practice for learning cannot be addressed as a recipe. It can only be addressed in terms of general questions that must be answered if decisions have to be taken, and it can only give an overview of the general shape of the outcome as a potential result. The design can be organised around four dimensions: 1) participation and reification, 2) the designed and the emergent, 3) identification and negotiability, 4) the local and the global.

The first dimension entails the dynamic tensions between how actors participate in the community, i.e. how they act in relation to other members of the community (p. 55) and how they concretely give "form to their experience by producing objects that congeal this experience into 'thingness'" (p. 58). The second dimension refers to the planned and the unplanned. The third dimension refers to the dynamic tensions between the "process through which modes of belonging become constitutive of our identities by creating bonds or distinctions in which we become invested" (p. 191) and the "ability, facility and legitimacy to contribute to, take responsibility for, and shape the meanings that matter within a social configuration" (p. 197). The last dimension refers to what is particular to the community and what addresses more general patterns that can be found across certain kinds of communities.

These four dimensions of design represent a scaffold to support the different modes of belonging to the community: engagement, alignment and imagination.

Wenger suggests a matrix, crossing dimensions and components and resulting in various ways of combining them. A teacher can choose to focus on any particular combination, depending on the shape s/he wants to give his/her community of practice (p. 240).

To complete these considerations on the design of a community of practice for learning, we will quote Wenger on the community aspect and on the conception of learning respectively.

"Communities of practice already exist throughout our societies – inside and across organizations, schools, and families – in both realized and unrealized forms. 1) some are potential; 2) some are active; 3) some are latent" (Wenger, 1998, p. 228).

> Communities of practice are not a novelty. They are not a new solution to existing problems; in fact, they are just as likely to have been involved in the development of these problems. In particular, they are not a design fad, a new kind of organizational unit or pedagogical device to be implemented. Communities of practice are about content – about learning as a living experience of negotiating meaning – not about form. In this sense, they cannot be legislated into existence or defined by decree. They can be recognized, supported, encouraged, and nurtured, but they are not reified designable units. Practice itself is not amenable to design. In other words, one can articulate patterns or define procedures, but neither the patterns nor the procedures produce the practice as it unfolds. One can design systems of accountability and policies for communities of practice to live by, but one cannot design the practices that will emerge in response to such institutional systems. One can design roles, but one cannot design the identities that will be constructed through these roles. (Wenger, 1998, p. 229)

How is learning conceptualised in designing a community of practice for learning?

This social perspective of learning may be summarised succinctly by the following principles:

- *Learning is inherent in human nature*: it is an ongoing and integral part of our lives […].
- *Learning is first and foremost the ability to negotiate new meanings*: it involves our whole person in a dynamic interplay of participation and reification […].
- *Learning creates emergent structures*: it requires enough structure and continuity to accumulate experience and enough perturbation and discontinuity to continually renegotiate meaning […].
- *Learning is fundamentally experiential and fundamentally social*: it involves our own experience of participation and reification as well as forms of competence defined in our communities […].
- *Learning transforms our identities*: it transforms our ability to participate in the world by changing all at once who we are, our practices, and our communities.
- *Learning constitutes trajectories of participation*: it builds personal histories in relation to the histories of our communities, thus connecting our past and our future in a process of individual and collective becoming.
- *Learning means dealing with boundaries*: it creates and bridges boundaries; it involves multimembership in the constitution of our identities, thus connecting – through the work of reconciliation - our multiple forms of participation as well as our various communities.
- *Learning is a matter of social energy and power*: it thrives on identification and depends on negotiability; it shapes and is shaped by evolving forms of membership and of ownership of meaning […].
- *Learning is a matter of engagement*: it depends on opportunities to contribute actively to the practices of communities that we value and that value us, to integrate their entreprise into our understanding of the world, and to make creative use of their respective repertoires.
- *Learning is a matter of imagination*: it depends on processes of orientation, reflection, and exploration to place our identities and practices in a broader context.

- *Learning is a matter of alignment*: it depends on our connection to frameworks of convergence, coordination, and conflict resolution that determine the social effectiveness of our actions.
- *Learning involves an interplay between the local and the global*: it takes place in practice, but it defines a global context for its own locality. The creation of learning communities thus depends on a dynamic combination of engagement, imagination, and alignment to make this interplay between the local and the global an engine of new learning. (Wenger, 1998, p. 226-8)

What happens when technology is added to the design? Technology-mediated communities of practice imply *interacting* – discussing issues, working on tasks, etc., *publishing* – producing, sharing and collecting artifacts relevant to their practice, and tending – nurturing the community. Tools must support these activities (Figure 15).

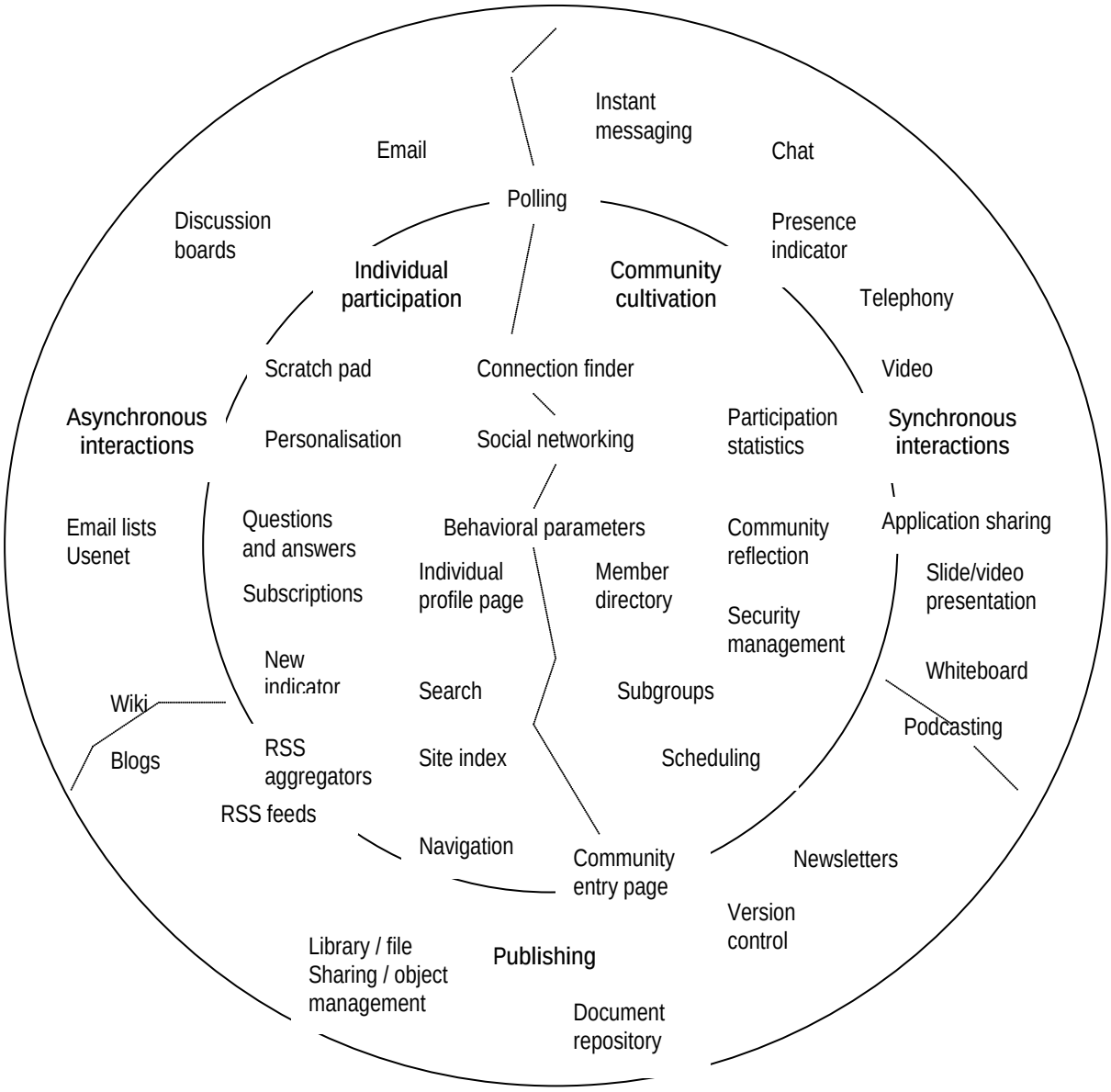


Figure 15: Community tools viewed in a complex landscape of activities (Wenger *et al.*, 2005, p. 5)

> The diagram has five regions. On the outer band are three general types of activities: synchronous interactions, asynchronous interactions, and publishing. In the middle are community-building activities, showing individual participation on the left and cultivation from the perspective of tending for the community's togetherness on the right. We have attempted to place each tool in a location that gives some insights as to its intended use, and when possible, its relation to other tools. Such a synoptic two-dimensional representation inevitably involves compromises that highlight some aspects and miss others, but it does place tools in a broader landscape that reflects their overall relation to community life. (Wenger *et al.*, 2005, p. 5)

Even if it is not possible to predict how a community will behave and take ownership of its tools and knowledge, it is possible to identify some broad design principles, such as those mentioned above. Barab and Duffy (2000), for their part, identified the following design principles for a practice field (synonym of community of practice) in a learning environment, be it technology-enhanced or not:

- Doing domain-related practices. Learners must be actively doing domain-related practices, not listening to experiences of others. The notion of an active learner has its roots in the work of Dewey who advocated for learning by doing.
- Ownership of the inquiry. Students must see the problem as a real one, worth investing their efforts in and must see their efforts as geared toward a solution that makes a difference (not a school solution). They must feel responsible for the solution.
- Coaching and modeling of thinking skills. The teacher has a participatory problem-solving expert role and coaches students in this sense.
- Opportunity for reflection. The reflective process - an active, rigorous, and analytic process – is essential to the quality of learning.
- Dilemmas are ill-structured. Problems must be ill-defined so that students can impose their own problem frames and own the problem and process.
- Support the learner rather than simplify the dilemma. The problem students encounter should reflect the complexity of the thinking and work they are expected to be able to do outside of the school context when this learning is completed.
- Work is collaborative and social. Meaning is a process of continual negotiation. The quality and depth of this negotiation and understanding can only be determined in a social environment.
- The learning context is motivating. (Barab & Duffy, 2000, p. 31-33)

To build the foundations for a community of practice within a learning context, these principles cannot guarantee that it will work, but should at least maximise the chances.

A community of practice is the meeting point of several intellectual traditions, combining interactions between theories of the individual and community on the one hand, and interactions between theories focusing on social aspects and theories focusing on action on the other hand. To design a community of practice for learning, designers need to take into

account the different dimensions and ways of belonging to the community. The design can be organised around four dimensions: 1) participation and reification, 2) the designed and the emergent, 3) identification and negotiability, 4) the local and the global. These four dimensions serve to support the different ways of belonging to the community: engagement, alignment and imagination. Mediating a community of practice with technology implies interacting, publishing, producing, sharing and collecting artifacts relevant to the members' practice, and nurturing the community. Specific tools are geared to these functionalities. Finally, a learning environment that favours the development of a community of practice for learning is one that cultivates collaborative learning in authentic contexts with active pedagogical strategies coupled with an effective coaching structure.

Section 6.3. Blended learning

The mixture of technology and face-to-face learning situations, when orchestrated from a constructivist perspective on learning, can enhance learning. In the case studies we investigate, the setting was a blended one, and we will therefore briefly address this issue. Blended learning refers to "systems that combine face-to-face instruction with computer-mediated instruction" (Graham, 2005, p. 5). It has also been defined as a combination of media, of web-based technologies, of instructional methods of learning and working tasks. We find Graham's definition interesting for its simplicity: it can entail anything along the spectrum from face-to-face instruction to computer-mediated instruction. Enhanced instructional creativity with distant activities enriching face-to-face ones can be designed within this frame of reference.

Six main reasons for using blended learning have been identified: pedagogical richness, access to knowledge, social interaction, personal agency, cost-effectiveness, and ease of revision. The three overwhelming reasons are improved pedagogy, increased access and flexibility and increased cost-effectiveness (Graham, 2005, p. 8). Blending can occur at different levels (activity, course, program, institution), combining a face-to-face context and a distant computer supported context. Graham (2005) has identified three categories of blended learning systems (Table 22): enabling, enhancing and transforming blends.

Enabling blends	Primarily focus on addressing issues of access and convenience – for example, blends that are intended to provide additional flexibility to the learners or blends that attempt to provide the same opportunities or learning experience but through a different modality.
Enhancing blends	Allow incremental changes to the pedagogy but do not radically change the way teaching and learning occurs. This can occur at both ends of the spectrum. For example, in a traditional face-to-face learning environment, additional resources and perhaps some supplementary materials may be included online.
Transforming blends	Blends that allow a radical transformation of the pedagogy – for example, a change from a model where learners are just receivers of information to a model where learners actively construct knowledge through dynamic interactions. These types of blends enable intellectual activity that was not practically possible without the technology.

Table 22: Categories of blended learning systems (Graham, 2005, p. 13)

Bonk *et al.* (2005) conducted a survey of current and future uses of blended learning in two settings, the workplace and higher education institutions. From a pedagogical perspective, their first important finding was that blended learning, as a pedagogical method, is not a passing fashion. Blended learning is something that has always existed in one form or another and is a permanent trend. Their second finding was that there is some correspondence between what education institutions will offer in the next few years and what is offered through continuing education in the workplace. “On-line collaboration, case learning, and problem-based learning are the preferred instructional methods during the coming decade” in educational institutions. In parallel, “authentic cases and scenario learning would be the most widely used method” in the same time span for corporate training (Bonk *et al.*, 2005, p. 8). To summarize, active learning, problem solving, authentic learning and collaboration are the pedagogical methods that will be most widely used in the near future.

Technology and pedagogy are closely and deeply interwoven, and this is the very essence of blended learning. From a technological point of view, the authors report that the future is promising for “reusable content objects, wireless technologies, peer-to-peer collaboration tools, digital libraries, simulations and games, assistive technologies and digital portfolios.” On the corporate side, the most widely used technology will consist in “knowledge management tools, followed by simulations, wireless technologies, reusable content objects, adaptive technologies, tablets PCs, and handheld devices” (Bonk *et al.*, 2005, p. 9).

The authors end their survey with a list of future trends in blended learning, as summarised in the table below (Table 23).

1. Mobile Blended Learning	Increasing use of mobile and handheld devices will create rich and exciting new avenues for blended learning.
2. Greater Visualization, Individualization, and Hands-on Learning	Blended learning environments will increasingly become individualized; in particular, emphasizing visual and hands-on activities.
3. Self-Determined Blended Learning	Blended learning will foster greater student responsibility for learning. Decisions about the type and format of blended learning will be made by students instead of instructors or instructional designers. Learners will be designing their own programs and degrees.
4. Increased Connectedness, Community, and Collaboration	Blended learning will open new avenues for collaboration, community building, and global connectedness. It will become used as a tool for global understanding and appreciation.
5. Increased Authenticity and On-Demand Learning	Blended learning will focus on authenticity and real world experiences to supplement, extend, enhance, and replace formal learning. As this occurs, blended learning will fuel advancements in the creation and use of online case-learning, scenarios, simulations and role play, and problem-based learning.
6. Linking Work and Learning	As blended learning proliferates, the lines between workplace learning and formal learning will increasingly blur. Higher education degrees will have credits from the workplace and even credit for work performed.
7. Changed Calendaring	The calendar system or time scheduling of learning will be less appropriate and predefinable.
8. Blended Learning Course Designations	Courses and programs will be increasingly designated as blended learning paths or options.
9. Changed Instructor Roles	The role of an instructor or trainer in a blended environment will shift to one of mentor, coach, and counselor.
10.The Emergence of Blended Learning Specialists	There will emerge specialist teaching certificates, degree programs, and resources or portals related to blended learning courses and programs.

Table 23: Trends and predictions pelated to blended learning (Bonk *et al.*, 2005, p. 11)

What is particularly promising is the harmonisation between higher education training that focuses on professional training and workplace training. This echoes Boud and Falchikov's (2005, 2006) wish regarding higher education evaluation as a pedagogical tool for self-regulation in life-long learning. The other particularly promising point is the unlimited creativity with which technology and pedagogy can be combined in the production and adaptation of a pedagogical scenario that a teacher would like to implement.

Blended learning has different forms and modes: enabling, enhancing and transforming blends are the three categories identified. They represent a movement from convenience of

access to consistent pedagogical change with technology. Trends and predictions in blended learning have taken a socio-constructivist direction, with collaborative learning, case studies and problem-based learning as major pedagogical orientations.

Section 6.4. Community, Content and Collaboration Management Systems

A few years ago, with the growth of community websites, Schneider, Synteta, Fréte, Girardin and Morand (2003) coined these systems *Community, Content and Collaboration Management Systems* (C3MS). These systems use simple web applications that existed on a stand-alone basis (i.e. forums, chats, news exchanges, etc.), in modular formats, so that each user/institution can configure the environment according to his/her community's needs. Based on open-source technology and philosophy, they allow a community to develop customised modules precisely tailored for a particular community (Figure 16). These systems constitute so-called "portals".

> A portal gathers a variety of useful information and communication resources into a single, 'one-stop' web page (Looney and Lyman, 2000). A portal therefore is a collection of objects (information bricks) and services (operation on these bricks) that can be accessed from the portal (web) page. When the user works with a specific resource, e.g. a collaborative hypertext, only a part of the interface changes. A portal therefore is a kind of "cockpit" where the central view changes, but the other instruments stay in reach. (Schneider *et al.*, 2003, p. 15)

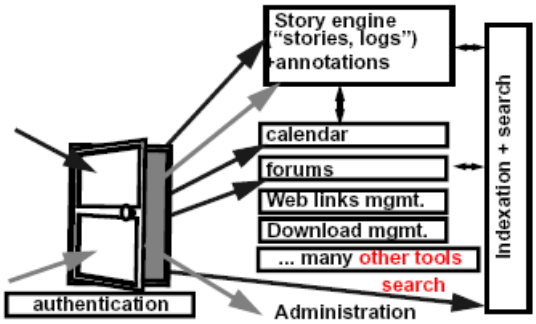


Figure 16: Basic functionalities of the collaborative portal (C3MS system), (Schneider *et al.*, 2003, p. 15)

"Since C3MS systems have a modular and an extensible architecture they can be adapted/combined/configured to many specific usage scenarios." Teachers can set up the portal from an increasingly large set of 'core' or 3rd party modules" (Schneider, Fréte & Synteta, 2002, p. 6).

For learners, the learning environment serves as a locus of knowledge building through multiple interactions with actors and tools. Learners evolve with and in this environment and

if the scaffold has been thought-out in advance, all the rest is built according to the group of learners involved.

> A well configured C3MS portal is a community engine that transforms a pure work tool into a collective and collaborative "place" that boosts class dynamics. In our opinion, a pedagogical portal should have a "clear focus" but "fuzzy edges" (Rieber 2001). As we design it, a pedagogical portal marries the more rigid "workflow" approach often encountered in modern social constructivism with the spirit of open virtual environments that provide a feeling of "place" with identities, social rules, multiple activities, and therefore what is often called "presence". (Schneider *et al.*, 2003, p. 36)

A C3MS portal can be turned into a powerful learning environment to support socio-constructivist pedagogical scenarios, enabling higher-order learning activities. To give an example of tools and their potential pedagogical use, the tables below (Table 24, Table 25, Table 26, Table 27, Table 28) list, respectively, content and production tools, communication and regulation tools, metacognitive tools, awareness and organisational tools and additional miscellaneous tools used in the context of this research.

Tool	Pedagogical use
News	Text editor. Used exclusively by teaching staff to post information covering organisational matters or providing content information related to modules.
Forum	Discussion tool, organised by topic. Used by learners and teaching staff to build knowledge, exchange on content and interact with the community.
Wiki	Webpage editor that can be modified by anyone through a simple web browser. Used by learners to draft collaborative documents.
Portfolio/homepage	Webpage editor. Used by learners to build a personal area, with both personal information and course related performances.
Activity folder	Upload/download tool. Used by learners to deposit final productions requested for activities.
Wrap-up book	Word file. Synthesis of all modules with references to learners' productions sent out to participants at the end of the course for future reference.

Table 24: Content and production tools

Tool	Pedagogical use
Chat	Synchronous discussion tool. Used by teaching staff, usually at the end of the module, for debriefing. It can also be shared at any time among learners, knowing that all conversations are being recorded for easy retrieval.
Call someone	Instant messenger tool. Used by learners and teaching staff to talk to another person logged on to the portal. It can be used as well for social, as well as for work and learning, purposes.
Shoutbox	Short message boards. Used equally by learners and teaching staff either to reinforce organisational tools or for social purposes.

Tool	Pedagogical use
Private messenger	Internal to the portal asynchronous messaging system. Used for private communication by learners and teaching staff.

Table 25: Communication and regulation tools

Tool	Pedagogical use
Journal	Text editor. Used by learners and teaching staff as a reflection tool to report progress in activities, emotions, new understandings, etc.

Table 26: Metacogntitive tools

Tool	Pedagogical use
Who is online	Social awareness tool. Used to check who is connected to the portal at the same time as oneself.
Calendar	Calendar tool. Used by teaching staff to remind learners of important dates, such as beginning and end of a module or synchronous meetings.
Module scenario	Detailed description of each module. Used by learners to get information about activities, resources, deadlines, evaluation.
Member list	Directory. Used by teaching staff and learners to access any member registered in the portal's information base.

Table 27: Awareness and organisation tools

Tool	Pedagogical use
Faculty homepage	Webpage editor. Used by teaching staff to provide a short biography of all teaching staff members.
Library	Upload/download tool. Used by teaching staff to store all compulsory readings and by learners to download them.
Portal guide	PDF file. Used to provide newcomers with an overview of all the tools and spaces used both pedagogically and technically.
Chat recording tool	Recording tool. Used to facilitate retrieval of any conversation that took place in a chatroom on the portal.

Table 28: Additional tools

With the advent of the social web, an up-to-date version of a C3MS portal would consist in a webtop used as a personal learning environment (PLE), according to Schneider (2008).

"A webtop is a kind of rich Internet application that runs in a web browser and that integrates various web-based applications, typically lots of different kinds of information feeds, some virtual office applications, interfaces to social artifacts share software" (Schneider, 2008, p. 200).

How can webtops play a role as learning environments?

Webtops have growth potential in education since they are one of technical solutions to implement personal learning environments or learning e-portfolios. In addition, for some variants of project-oriented learning

> scenarios, webtops can replace more traditional portalware like C3MS. […] Webtops will be successful if they do not try to mimic e-learning architectures that clone old CBT dreams, but if they focus on learning with computers, and aim to become cognitive tools, collective environments, personal learning environments, learning e-portfolios and so forth. (Schneider, 2008, p. 200)

How is the notion and the potential technology of a personal learning environment to be understood? The main idea is the possibility of customising and adapting the design of the learning environment to every single actor involved.

> Graham Attwell (2007) defines Personal Learning Environments (PLE) as an idea that first integrates "pressures and movements" like lifelong learning, informal learning, learning styles, new approaches to assessment, cognitive tools. Furthermore, PLEs are inspired by the success of "sticky" new technologies in ubiquitous computing and social software.
>
> While it's not clear whether a PLE is a system or an idea, a number of design criteria for next generation learning environments can be formulated, in particular the one that learners should shape their own learning space. Future learning environments have to be PLEs in at least some regards, since the whole history of educational technology demonstrates that the most popular applications in education always have been professional tools useful to individuals, not software made specifically for education. (Schneider, 2008, p. 198)

Community, Content and Collaboration Management Systems (C3MS) are collaborative open-source portalware using simple web applications. Its modular architecture allows the learning environment to be customised according to a teacher's pedagogical needs and goals. A set of different categories of tools support learning activities. In the future, C3MS might be replaced by webtops used as personal learning environments that have the immense advantage of allowing each actor to customise his/her own environment.

Section 6.5. Summary

Technology can be considered an additional tool that instructional designers can appeal to when designing an instructional sequence. Depending on the design, technology may or may not enhance learning. Within the constructivist design approach, on the other hand, technology is considered an opportunity to immerse learners in a practice field, offering them the support of a community of practice. A community of practice is the meeting point of several intellectual traditions, combining interactions between theories of the individual and community on the one hand, and interactions between theories focusing on social aspects and theories focusing on action on the other hand. To design a community of practice for learning, designers need to take into account the different dimensions and ways of belonging to the

community. The design can be organised around four dimensions: 1) participation and reification, 2) the designed and the emergent, 3) identification and negotiability, 4) the local and the global. These four dimensions serve to support the different ways of belonging to the community: engagement, alignment and imagination. Mediating a community of practice with technology implies interacting, publishing, producing, sharing and collecting artifacts relevant to the members' practice, and nurturing the community. Specific tools are geared to these functionalities. Finally, a learning environment that favours the development of a community of practice for learning is one that cultivates collaborative learning in authentic contexts with active pedagogical strategies coupled with an effective coaching structure.

The mixture of technology and face-to-face learning situations, when orchestrated from a constructivist perspective on learning, can enhance learning. Blended learning has different forms and modes: enabling, enhancing and transforming blends are the three categories identified. They represent a movement from convenience of access to consistent pedagogical change with technology. Trends and predictions in blended learning have taken a socio-constructivist direction, with collaborative learning, case studies and problem-based learning as major pedagogical orientations. A potential learning environment that meets aforementioned needs is the Community, Content and Collaboration Management System (C3MS). C3MS is a collaborative open-source portalware using simple web applications. Its modular architecture allows the learning environment to be customised to a teacher's pedagogical needs and goals. A set of different categories of tools support learning activities. In the future, C3MS might be replaced by webtops used as personal learning environments, which have the immense advantage of allowing each actor to customise his/her own environment.

Chapter 7. Innovation, change and teacher training

Section 7.1. Innovation

The process of innovation, of transformation of an organisation, is an in-depth process that demands cultural change on the part of teachers and learners. Faculty and learners have to be trained to the new culture and supported afterwards. Bates (2000) developed a change management theory and method, based on observation, to characterise what universities face when introducing technology. It is a top-down approach. It is only representative of our research in the sense that the director of one of the two units of a school (not a university department) took the initiative to implement the change and introduce technology. The administrative concerns of the author were addressed by the university's central administration and, along with cost issues, are not reported here. Bates (2000) recommends the following strategies for introducing technology in an academic organisation: use the potential of new technologies to enhance learning, change actors' behaviours towards learning, and design the introduction of technology in terms of a wider pedagogical and social strategy.

- New technologies such as the World Wide Web and multimedia have the potential to widen access to new learners, increase flexibility for "traditional" students, and improve the quality of teaching by achieving higher levels of learning, such as analysis, synthesis, problem solving, and decision making. These new technologies can also be used to develop learners' skills in seeking, analyzing, and interpreting information relevant to their subject domain. […]
- History suggests that the introduction of new technology is usually accompanied by major changes in the organization of work. New technologies are associated with postindustrial forms of organization based on highly skilled and flexible workers with a good degree of autonomy organized into relatively small and flexible operational units. […]
- The use of technology needs to be embedded within a wider strategy for teaching and learning.
- Teaching departments need to develop concrete, innovative, future-oriented plans for teaching that take account not only of changes in technology but also other changes in society that should influence their work.
- Appropriate technology infrastructure is an essential requirement for technology-based teaching. This means adequate technology support staff for faculty members as well as networks, hardware, and software. […]
- All faculty members must understand and comply with copyright law. […]

- An organizational structure encompassing a mix of centralized and decentralized strategies is recommended to support teaching with technology. […]
- As the institution starts to use technology outside its local area, new administrative and academic procedures will be necessary in the areas of admissions, finance, and academic policy. […]
- The implementation of these strategies will require fundamental change in the way our higher education institutions are organized and managed. They will affect the nature of the work of faculty members, and above all will affect the relationship between teachers and learners. (Bates, 2000, pp. 1-5)

Bates' (2000) considerations are part of a top-down approach to innovation. Another, more participatory approach would be Engeström's (2001), for instance. With the help of the triangle model of a human activity system (Engeström, 1987, p. 78 cited by Engeström, 2001, p. 135) and the theory of expansive learning, the author uses activity theory as a framework to analyse the transformation of organisations. The idea is to research human activity as an ongoing, developmental process. This allows changes and contradictions within an activity to be identified. Contradictions are the focal point to be examined, because they engender new knowledge about the activity. Mwanza and Engeström (2003) reproduce the conceptualised representational model of a human activity system (Figure 17).

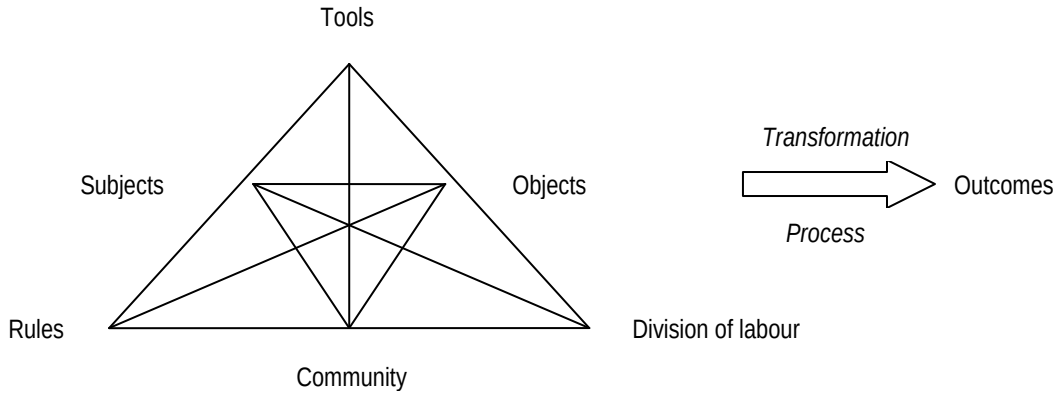


Figure 17: The Activity Triangle Model (Engeström, 1987, cited by Mwanza & Engeström, 2003, p. 2)

> The Activity Triangle Model or activity system representationally outlines the various components of an activity system into a unified whole. Participants in an activity are portrayed as *subjects* interacting with objects to achieve desired *outcomes*. In the meanwhile, human interactions with each other and with *objects* of the environment are mediated through the use of *tools*, *rules* and *division of labour*. Mediators represent the nature of relationships that exist *within* and *between* participants of an activity in a given *community* of practices. (Mwanza & Engeström, 2003, p. 2)

Mwanza (2002, cited by Mwanza & Engeström, 2003, pp. 2-3) draw up a list of questions in the "Eight-Step-Model" (Table 29) that help operationalise Engeström's activity triangle.

The Eight-Step-Model		
Identify the : -	*Question to Ask*	
Step 1	Activity of interest	What sort of activity am I interested in?
Step 2	Object-ive	Why is the activity taking place?
Step 3	Subjects	Who is involved in carrying out the activity?
Step 4	Tools	By what means are the subjects performing this activity?
Step 5	Rules and Regulations	Are there any cultural norms, rules or regulations governing the performance of activity?
Step 6	Division of labour	Who is responsible for what, when carrying out activity and how are the roles organised?
Step 7	Community	What is the environment in which this activity is carried out?
Step 8	Outcome	What is the desired *Outcome* from carrying out this activity?

Table 29: The Eight-Step Model (Mwanza 2002, cited by Mwanza & Engeström, 2003, p. 3)

In parallel, the theory of expansive learning addresses issues of a learning theory that activity theory does not address. It is based on a cyclic development on the one hand and on internal contradictions on the other (Figure 18).

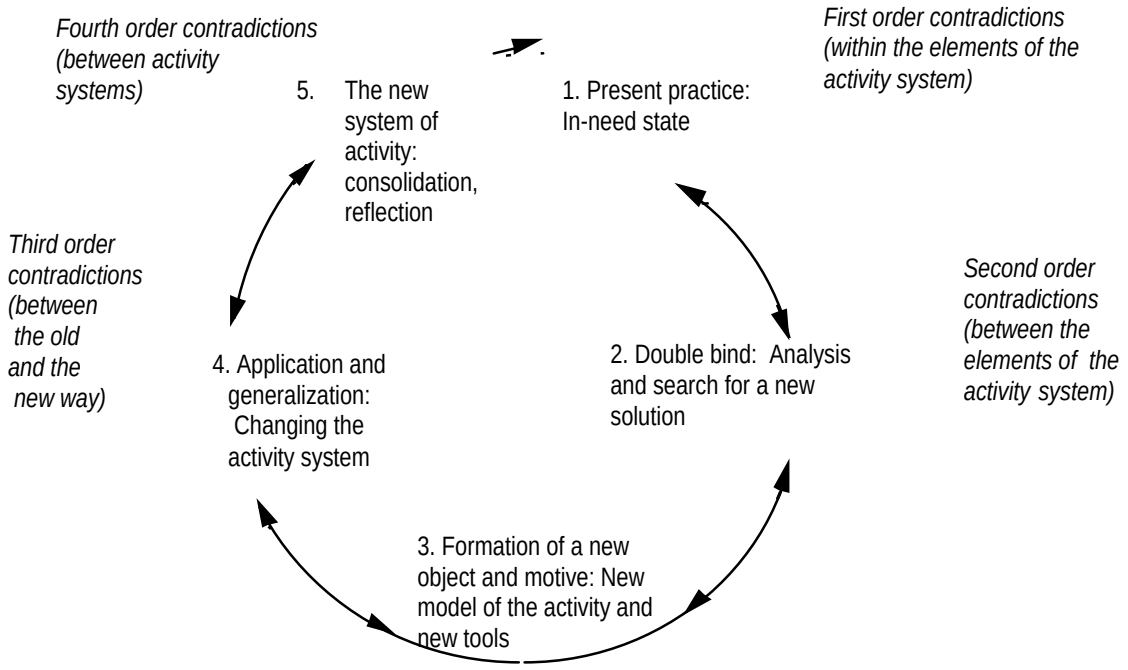


Figure 18: Phases of a cycle of expansive learning (Engeström, 1987, p. 189, cited by Engeström, 2001 a, p. 10)

Engeström (2001 a) summarises the ideal-typical sequence of expansive learning actions as follows:

1) Questioning: Problematizing, criticizing or rejecting some aspects of the present practice or accepted wisdom

2) Analyzing: Analysis involves mental, discursive or practical transformation of the situation in order to find out causes or explanatory mechanisms, asking 'why' and finding explanations. One type of analysis is

historical-genetic; it seeks to explain the situation by tracing its origination and evolution. Another type of analysis is actual-empirical; it seeks to explain the situation by constructing a picture of its inner systemic relations.

3) Modeling: Fixating the newly found explanatory relationship or principle in some publicly observable medium. This means constructing an explicit, simplified model of the new idea that explains and offers a solution to the problematic situation.

4) Examining the model: Running, operating, and experimenting on the model in order to fully grasp its dynamics, implications, potentials, and limitations and dynamics.

5) Implementing: Concretizing the model by means of practical applications, enrichments and conceptual extensions, putting the model into practice, using it in real on-line activity.

6) Reflecting and evaluating: Assessing and monitoring the process of concept formation as well as its outcomes and consequences. This includes asking the crucial 'why' questions with regard to the direction and content of the process.

7) Consolidating: Building the solution into a new stable form of practice, including its diversification, dissemination and diffusion. (Engeström, 2001 a, pp. 12-13)

Transforming an organisation is an in-depth process addressing major cultural changes. With the help of Bates' change management theory, Engeström's triangle of a human activity system and his theory of expansive learning, along with Mwanza's Eight-Step Model, we will analyse the changes involved in the transition from a pre-technology learning context to a technology-enabled learning context.

Technology transforms organisations and learning transforms human beings, both learners and teachers. The research trend that considers teacher training as transformation through action is particularly relevant for us, since we have already used activity theory to analyse the transformation of the organisation.

Section 7.2. Training audience: future trainers

Learning is concerned with transforming identities (Wenger, 1998) and engaging in activities. The field that constitutes our case studies is very specific. It is a trainers' training program offered in the format of blended continuing education in the domain of conference interpretation. A cross-mirroring effect between learners and teachers complicates the situation. Learners and teachers share one common ground: they are both interpreters (most of the time, they do not have the same expertise as professional interpreters and some are definitely novices). They may share another feature, that of teaching conference interpreters (about half of the MAS learners are already teaching while taking the continuing education

program, while others are not teaching yet). For the rest, learners and teachers have different identities:

- Learners are learners in the MAS program, but most of them are already teachers and are training to become conference interpreter trainers in their respective universities. As a result, they share a threefold identity: that of professional interpreter, that of professional teacher and that of active learner (Figure 19).

- Teachers also have a multifaceted identity: they are professional interpreters, professional teachers and professional teacher trainers (Figure 20).

In addition to those identities that are directly linked to the course, both, teachers and learners share multiple identities on other levels (individual, social, professional, etc.).

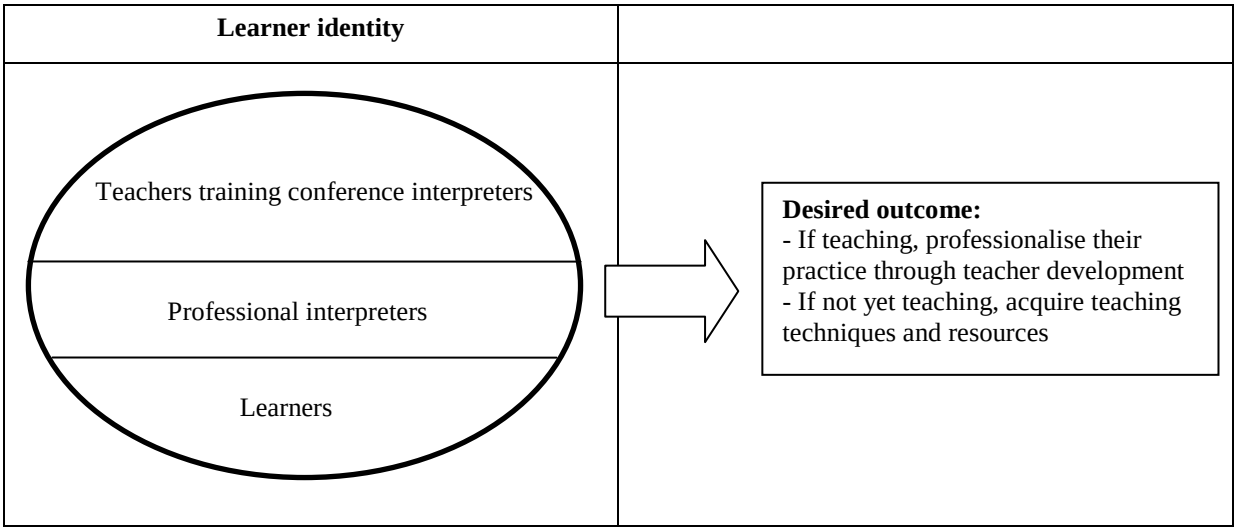


Figure 19: Learner identity in the training program

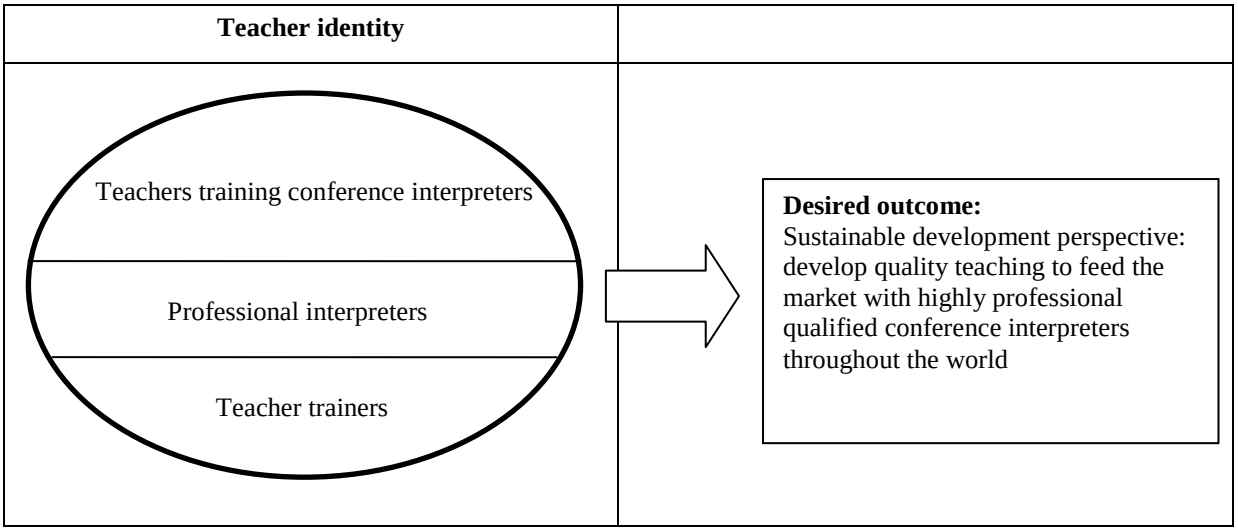


Figure 20: Teacher identity in the training program

Considering learners who are equipped with a threefold identity is a specific aspect of this research. This comes from the fact that we are training trainers. An additional specificity of

this research is that conference interpreter training, at the MA level, in regular university courses, in Geneva at least, is a form of professional training.

This research is conducted with learners that are future trainers – that is, it is concerned with the training of interpreter trainers. Learning leads to transforming identities and several identities, both on the side of teachers and learners get involved.

Section 7.3. Summary

Transforming an organisation is an in-depth process involving major cultural changes. With the help of Bates' (2000) change management theory, Engeström's (2001) model of a human activity system and his theory of expansive learning and, finally, Mwanza's (2002) Eight-Step Model, we will analyse the changes involved in the transition from a pre-technology learning context to a technology-enabled learning context. Technology transforms organisations and learning transforms human beings, both learners and teachers. This research is conducted with learners that are future trainers – it is concerned with the training of interpreter trainers.

Chapter 8. Research approach and research questions

The three objectives of this research are:

- to design and implement a blended socio-constructivist course within an activity-based learning environment;

- to evaluate the design and implementation of the entire course from the perspectives of both the learners and the faculty;

- to formulate a theory, in terms of design rules, for any adult training course set in an activity-based learning environment with a face-to-face component.

The first objective is concerned with the implementation of a "transforming blend," according to Graham's (2005) classification, involving a radical transformation of pedagogical practice (see Section 6.3 for more details). Interest is directed both to outcomes and to design issues, with particular attention to the use of the TSS framework to design the entire course.

Evaluation, the second objective, is threefold: evaluation of the course – from the perspective of the learners' performance; evaluation of the learning environment – from the perspective of socio-constructivist orientations (see Section 6.4 for more details); and evaluation of the faculty's perceptions – from the perspective of change (Section 7.1).

The third objective (addressed in Chapter 12) is to formulate a set of design rules based on this evaluation and on the findings from the analysis of the research questions.

The research was conducted within a development research framework. The output of the research consists in practical considerations about how the design was implemented and evaluated (see Chapter 11). It also consists in testing the theories presented in the literature review (see sub-section 8.2.8). It consists, finally, in presenting the new design model, "the component model of activity-based training" (see Section 12.1). The present chapter focuses on the research approach and then presents the research questions and shows how they are grounded in the literature review.

Section 8.1. Research approach

There are different approaches to research in educational technologies. Reeves (2000, p. 9) has compared the traditional empirical approach with the development approach. Development research involves an iterative, cyclical process of identifying a problem,

developing solutions, evaluating, producing design rules, and from there, identifying a new problem, and so on (Figure 21).

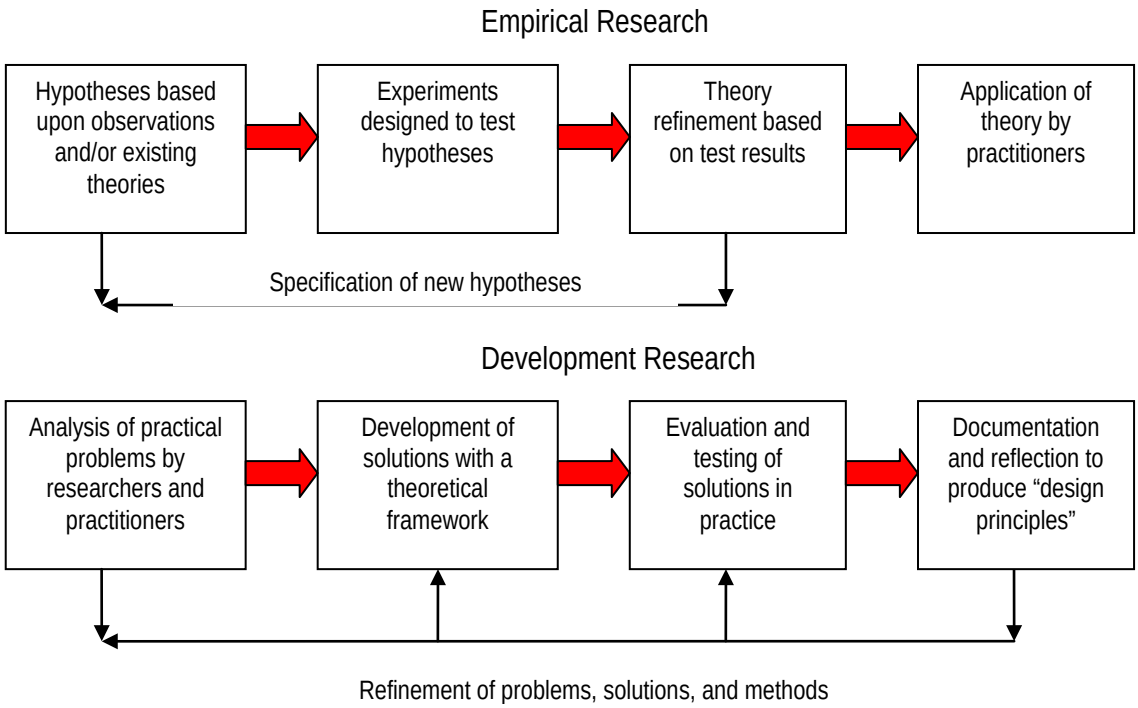


Figure 21: Empirical and development approaches to IT research (Reeves, 2000, p. 9)

> Design experiments were developed as a way to carry out formative research to test and refine educational designs based on theoretical principles derived from prior research. This approach of progressive refinement in design involves putting a first version of a design into the world to see how it works. Then, the design is constantly revised based on experience, until all bugs are worked out. (Collins *et al.*, 2004, p. 18)

It should be noted that "design research is not aimed simply at refining practice. It should also address theoretical questions and issues. (…) Design research should always have dual goals of refining both theory and practice" (Collins *et al.*, 2004, p. 19).

This articulation of theory and practice is fundamental, as Van den Akker reminds us:

> More than most other research approaches, development research aims at making both practical and scientific contributions. (…) The interrelation between theory and practice is more complex and dynamic: is it possible to create a practical and effective intervention for an existing problem or intended change in the real world? The innovative challenge is usually quite substantial, otherwise the research would not be initiated at all. Interaction with practitioners is needed to gradually clarify both the problem at stake and the characteristics of its potential solution. An iterative process of "successive approximation" or "evolutionary prototyping" of the "ideal" intervention is desirable. Direct application of theory is not sufficient to solve those complicated problems. (Van den Akker, 1999, p. 9)

Finally, what type of knowledge can be gathered from design-based research?

> The major knowledge to be gained from development research is in the form of (both substantive and methodological) "design principles" to support designers in their task. Those principles are usually heuristic statements of a format such as: "If you want to design intervention X [for the purpose/function Y in context Z], then you are best advised to give that intervention the characteristics A, B, and C [substantive emphasis], and to do that via procedures K, L, and M [procedural emphasis], because of arguments P, Q, and R." (Van den Akker, 1999, p. 9)

Instructional design and design-based research are closely interrelated. While the first aims at designing learning units – whatever the granularity, that is, whether the unit is a single learning activity or an entire course – in a consistent way, the purpose of the second is to evaluate this empirical product and contribute to instructional design *theory*. Evaluation not only provides useful feedback necessary for the product to move forward, but also results in more generally applicable design rules. Design rules can also serve as the starting point for new theories and kick off the cycle again (theory, embodied conjectures, design rules). A final objective is to satisfy situational constraints, that is, each context is specific and has local properties that require adaptation of the design.

In another study, Reeves (2006) classified the different approaches to research in educational technologies into six categories, based on their goal orientation – theoretical, empirical, interpretivist, postmodern, developmental, evaluation – as outlined in the following table (Table 30):

Theoretical	research focused on explaining phenomena through the logical analysis and synthesis of theories, principles, and the results of other forms of research such as empirical studies.
Empirical	research focused on determining how education works by testing conclusions related to theories of communication, learning, performance, and technology.
Interpretivist	research focused on portraying how education works by describing and interpreting phenomena related to human communication, learning, performance, and the use of technology.
Postmodern	research focused on examining the assumptions underlying applications of technology in human communication, learning, and performance with the ultimate goal of revealing hidden agendas and empowering disenfranchised minorities.
Developmental	research focused on the invention and improvement of creative approaches to enhancing human communication, learning, and performance through the use of technology and theory.
Evaluation	research focused on a particular program, product, or method, usually in an applied setting, for the purpose of describing it, improving it, or estimating its effectiveness and worth.

Table 30: Research goal classification scheme (inspired from Reeves, 2006, pp. 6-7)

And these goals can potentially use the following methods (Table 31):

Quantitative	experimental, quasi-experimental, correlational, and other methods that primarily involve the collection of quantitative data and its analysis using inferential statistics, e.g. the analysis of variance in exam results among students in traditional courses and web-based courses.
Qualitative	observation, case-studies, diaries, interviews, and other methods that primarily involve the collection of qualitative data and its analysis using grounded theory and ethnographic approaches, e.g., participant observation in a web-based course.
Critical Theory	deconstruction of "texts" and the technologies that deliver them through the search for binary oppositions, hidden agendas, and disenfranchisement, e.g., a critical analysis of the “digital divide”.
Historical	an objective and accurate reconstruction of the past, often in reaction to the tenability of a hypothesis, e.g., that John Dewey was the originator of progressive education.
Literature Review	various forms of research synthesis that primarily involve the analysis and integration of other forms of research, e.g., frequency counts and meta-analyses.
Mixed-methods	research approaches that combine a mixture of methods, usually quantitative and qualitative, to “triangulate” findings, e.g., a pre-test, post-test design integrated with classroom observations.

Table 31: Research methods classification scheme (Reeves, 2006, p. 8)

What does design based research focus on?

With respect to terminology, “design research” and “development research” are used interchangeably. They hark back to the 1990s, when a real need to develop new methods of investigation in the field of educational interventions emerged. They share a practical development goal, namely to address a specific problem encountered by practitioners, as well as a more theoretical goal, which is to determine design rules at the end of the research process to guide future initiatives. Design-based research is not “objective” research. The researcher is fully involved in the entire process and his/her research goals “are influenced by many factors, including the epistemological views of the investigator, his/her research training, and the dominant research paradigms within his/her line of inquiry” (Reeves, 2000, pp. 5-6).

As Collins *et al.* (2004, p. 16) state, design research faces three major challenges:

- Difficulties arising from the complexity of real-world situations and their resistance to experimental control;
- Large amounts of data arising from a need to combine ethnographic and qualitative analysis;
- Comparing across designs.

To better understand what design research does and does not achieve, authors tend to compare it to more established research methodologies. Collins *et al.* (2004, pp. 20-21) report his 1999 findings, comparing design research to laboratory research. Seven contrasting points are highlighted:

- *Laboratory settings vs messy situations*. Whereas laboratory experiments are well defined, conducted in a restricted and controlled environment, "design experiments are set in the messy situations that characterize real life learning, in order to avoid the distortions of laboratory experiments."
- *A single dependent variable vs multiple dependent variables*. "In design experiments there are many dependent variables that matter, though the researchers may not pay attention to all of them."
- *Controlling variables vs characterizing the situation*. "In design experiments, there is no attempt to hold variables constant, but instead, the goal is to identify all the variables, or characteristics of the situation, that affect any dependent variables of interest."
- *Fixed procedures vs flexible design revision*. "Design experiments start with planned procedures and materials, which are not completely defined, and which are revised depending on their success in practice."
- *Social isolation vs social interaction*. "In most psychological experiments, the subjects are learning in isolation. There is no interaction with other learners and usually no interaction with a teacher or expert; the material to be learned is simply presented by text or video. By contrast, design experiments are set in complex social situations, such as a classroom."
- *Testing hypotheses vs developing a profile*. "In design experiments, the goal is to look at many different aspects of the design and develop a qualitative and quantitative profile that characterizes the design in practice."
- *Experimenter vs co-participant design and analysis*. "In design experiments, there is an effort to involve different participants in the design, in order to bring their different expertise into producing and analyzing the design."

Design research is deeply anchored in human and social life. It tries to paint a picture at a given moment, in a given environment, aware that it is just a picture and trying to integrate it as much as possible in its dynamic real-world context.

One way of practising design-based research is to use conjecture maps. What do conjecture maps consist of?

The concept of conjecture map was developed by Sandoval (2004). A conjecture map consists of theoretical conjectures about designing instructional sequences. These theoretical conjectures are implemented in the design of a learning environment context and become embodied conjectures. Embodied conjectures entail "tools, materials, and activity structure" (Sandoval, 2004, p. 6). When designing a specific instructional sequence, embodied conjectures are reified in specific tools and materials used for this situation as well as the activity structure designed in that particular context. The activity structure involves processes that are also identified on the map. Finally, embodied conjectures predict learning outcomes: what learners should *know about* and what *know how* they should have acquired. These outcomes can be designed with fine granularity, distinguishing between intermediate and intervention outcomes. The former refer to the predicted steps learners should go through

while the latter refer to the knowledge and skills learners should have acquired by the end of the process. To summarise, a conjecture map is a design tool used to visualise a piece of theory, how this piece of theory is reified within a particular situation and what outcomes it generates. The schematic representation of these concepts allows one to visualise the global design. For example, Sandoval created the following conjecture map for the BGuile system, a learning environment to support science teaching (Figure 22).

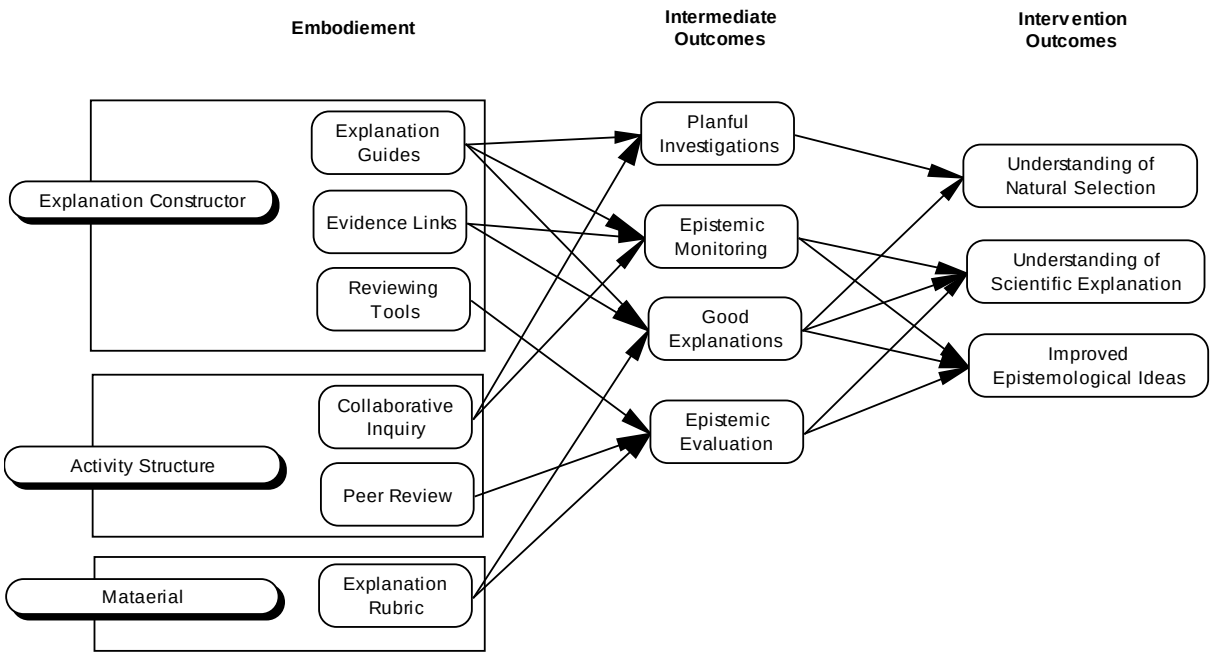


Figure 22: Map of embodied conjectures and predicted outcomes (Sandoval, 2004, p. 13)

A conjecture map is a construct that organises development research within a coherent framework. We have used conjecture maps retrospectively to gain a general view of the course design and the design of each module. They have been used on three occasions, for slightly different purposes. Figure 23 shows the first use: to provide a detailed picture of the relationship between research questions, theoretical conjectures, design elements/embodied conjectures, processes and outcomes. A *process* is plainly defined as "a series of actions, changes, or functions bringing about a result."[29] In our conjecture maps, we use about eight processes derived from the list of theoretical conjectures, which we introduce in sub-section 8.2.8. A first series of processes concerns interaction, production, modelling and autonomy. Interacting with peers and experts and producing content leads to knowledge building and skill acquisition. Modelling involves following the expert's model, which leads to the same outcomes as interaction and production. Becoming autonomous is a process that involves taking responsibility and knowing how to reach one's learning and research objectives. The

[29] http://www.thefreedictionary.com/process

remaining processes mentioned refer to cognitive processes: metacognition, reflection, awareness, regulation and evaluation. Metacognition and reflection refer to thinking about something, the performance of a task, for instance. Awareness refers to having knowledge of something; in this context it refers to cognitive awareness. Regulation and evaluation refer to processes linked to the process of becoming aware: once you have the knowledge, you can act on something. In this context, it is linked to monitoring the building, acquisition and use of one's knowledge and skills. This first use of the conjecture map is very close to Sandoval's use, except for the *outcomes* item, which is less detailed (Figure 23).

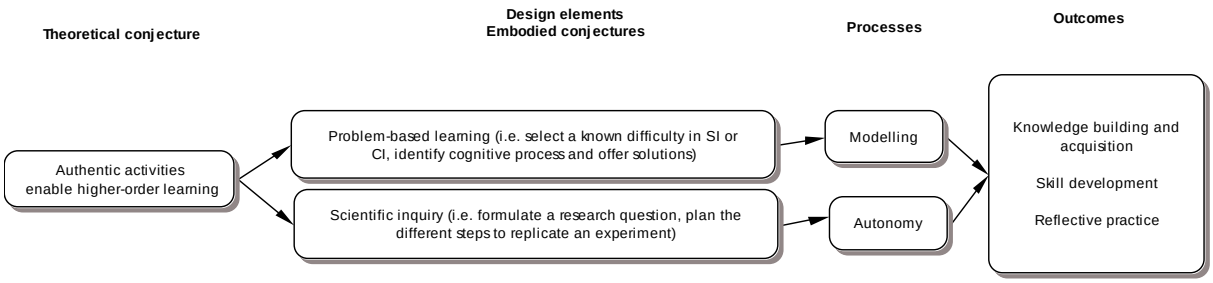


Figure 23: Example of first use of a conjecture map

In Chapter 10, which presents the case studies, conjecture maps are used in two different ways. In the first place, they are used to provide an overview of all theoretically grounded design elements as well as their expected impact on processes and outcomes (Figure 40, Figure 44) and include five categories. Theoretical conjectures refer to the underlying theoretical conjectures of the case study, namely, those presented in Figure 27 (or as highlighted in Figure 24), but in the conjecture map they are not linked in a one-to-one relationship with design elements/embodied conjectures, since each course module implements different (selected) design elements. Design elements are linked to *enabling tools*. This new category was added to the conjecture map to underline the important mediating role of the tools in the context of the present research, which addresses issues of designing a distant learning portal. All tools are identified, with a brief description of their pedagogical function. Tools are linked to processes and processes to outcomes (Figure 24). This second use provides an overall picture of the entire case study.

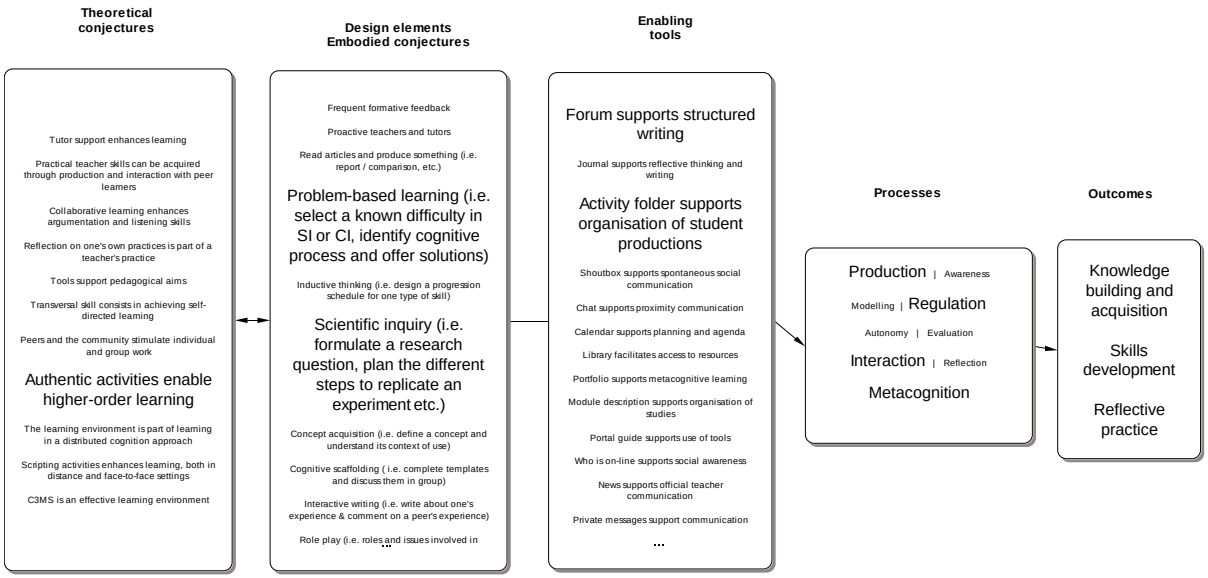


Figure 24: Example of second use of a conjecture map

The third use of conjecture maps, in order to provide a detailed picture of each module, consists in using the same categories but zooming into the conjecture map to better understand how the design was actually implemented and which particular tools were used. Thus, the theoretical conjecture is drawn from what was formerly in the design elements/embodied conjectures column, and in the design elements/embodied conjectures column, there is the actual description of the activity. The tool column indicates which tools have been used to carry out the activity. When the line is full, it means that the tools were actually used by all participants, and when the line is dotted, it means that the tools were used only by some. Tools lead to processes and processes to the particular outcomes of the module (Figure 25).

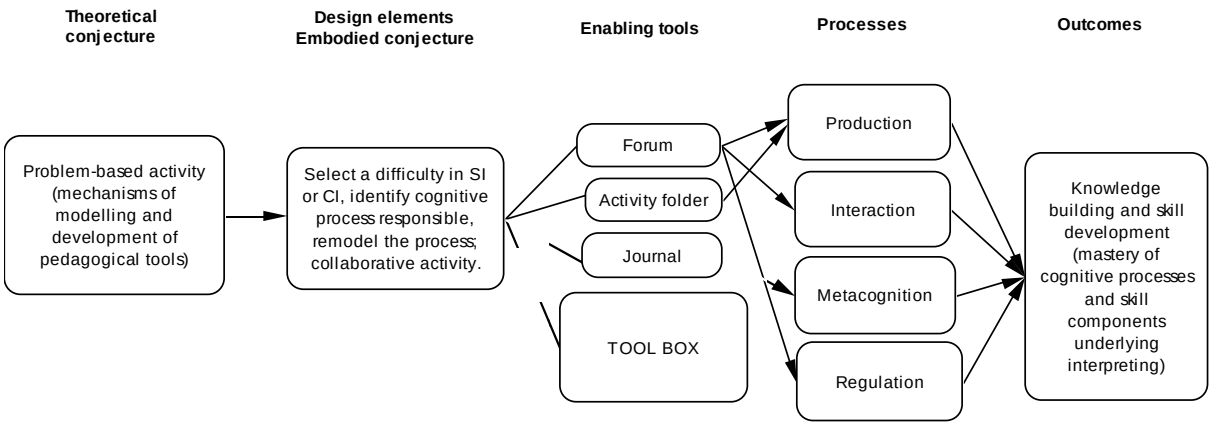


Figure 25: Example of third use of a conjecture map

With this introduction to the two concepts of design-based research and conjecture maps as well as to the particular use of conjecture maps within this research, we will now briefly

explain why the design-based research approach was considered appropriate for this particular context and describe the role of the two pilot studies and the two case studies.

The process of the present research study began when the researcher came on board a blended training course, in charge of designing three learning units (referred to as “Pilot Study 1”). The literature fed both the process and the content of the course design. Once the first group of learners completed the course, the researcher refined the content. To refine the process, she built what she called the “Tutoring Support Structure (TSS),” a design framework. Use of the TSS framework to analyse the context revealed that student support was the most significant area in need of improvement, and thus the entire design of the learning units was reviewed through this particular lens. The design framework also highlighted another important and correlated issue: the learning environment did not fit with the overall constructivist approach adopted for the learning units. In other words, the problem encountered with student support revealed a much larger underlying problem, namely that the learning environment did not easily lend itself to the chosen pedagogical approach. The decision was therefore taken to change the learning environment to ensure a better match with the pedagogical philosophy underlying the learning units and to facilitate the practice of cognitive apprenticeship (i.e. the content of one learning unit was devoted to constructivist pedagogy and constructivist learning environments); this undertaking is referred to as “Pilot Study 2”. This is a good example of how design-based research is influenced by the training, the epistemology underlying the training and its ontology. After this new go, learning units underwent slight revision but basically worked out well. The TSS was not refined at that stage. A new job opportunity provided the researcher with an occasion to implement another course with the TSS in another context, which however shared many similarities with the first (teacher training, project-oriented pedagogy, blended learning). The entire training was designed with the help of the TSS and gave birth to what is called “Case Study 1” in the present dissertation. After this first edition, local adjustments had to be built in, and resulted in what is called “Case Study 2”. Between Case Study 2 and the third edition, some other local adjustments were built in, but will not be considered here, since the course is still in progress. The fourth edition will likely undergo more substantial changes, particularly since a certain degree of maturity and expertise in the design process will have accrued from the present research (Figure 26). The TSS framework will be discarded and a more comprehensive model, taking into account new issues that emerged from Case Study 1 and Case Study 2 is presented in Section 12.1.

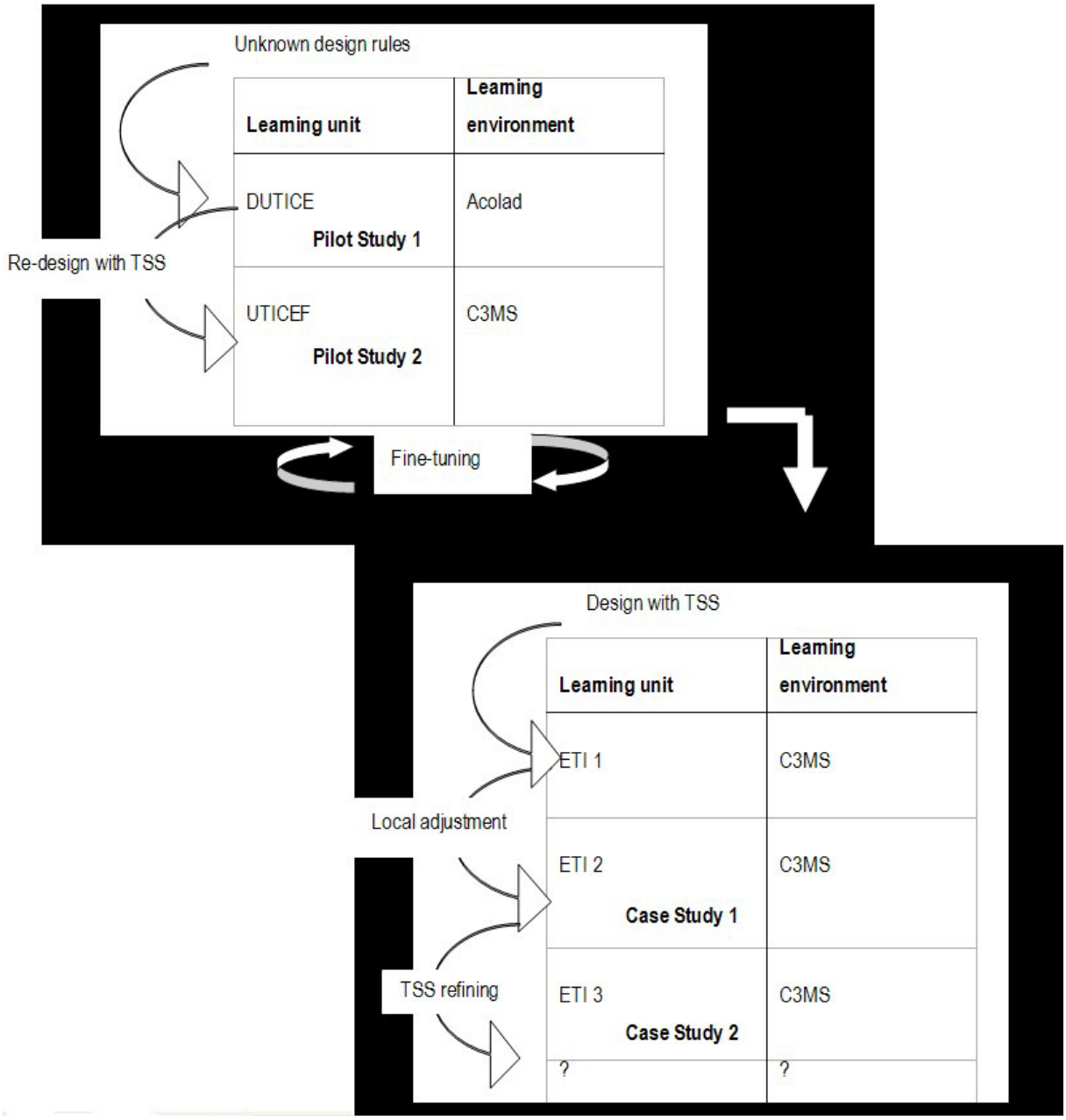


Figure 26: Design-based research in the present study

Design or development research addresses a practical developmental goal, which is to respond to a specific problem encountered by practitioners. At the same time, it addresses a more theoretical goal, which is to formulate design rules at the end of the research process to guide future initiatives. It is not an "objective" research approach: the researcher is fully involved in the entire research process. From the perspective of activity theory, it can be seen as a never-ending cycle, starting with the identification of a problem, followed by the development of a solution, the evaluation of this solution, the production of design rules, and then moving on to the identification of a new problem, and so on. Conjecture maps are a construct that organises development research within a coherent framework, showing the

relationship between the theoretical conjectures, embodied conjectures, processes and outcomes of a particular instructional sequence. In this research, conjecture maps have been used at different levels of granularity.

Section 8.2. Research questions

As mentioned in the introduction to this chapter, three main objectives are targeted by this research: 1) to design and implement a blended socio-constructivist course within an activity based learning environment; 2) to evaluate the design and implementation of the entire course from the perspectives of both the learners and the faculty; 3) to formulate a theory, in terms of design rules, for any adult training course set in an activity-based learning environment with a face-to-face component. The conjecture map below (Figure 27) details the links between research questions, theoretical conjectures, embodied conjectures, processes and outcomes. This section begins by introducing the seven research questions (including an associated conjecture map and sub-questions). For didactical purposes, the theoretical conjectures and how they are grounded in the literature review is discussed only after the presentation of the research questions.

Our seven research questions are the following:

A- To what extent did we implement a socio-constructivist learning design?

B- What are the effects of the design on skill acquisition and knowledge building?

C- To what extent is the portal an effective learning environment and in what ways did tools support pedagogical goals?

D- To what extent did the TSS framework help to create an effective socio-constructivist learning design?

E- How did faculty perceive the implementation of the blended format of the course?

F- What do the individual differences among learners consist in?

G- What are the relations among variables that we used to answer the previous questions?

These seven questions are concerned with the same object – the course for interpreter trainers as it was designed and implemented in its blended format – from different perspectives. As will be seen, they address the very fundamental issues of the design – the tutoring support structure, activity-based learning, the collaborative portal, faculty training - and would allow any researcher to design and implement a similar course.

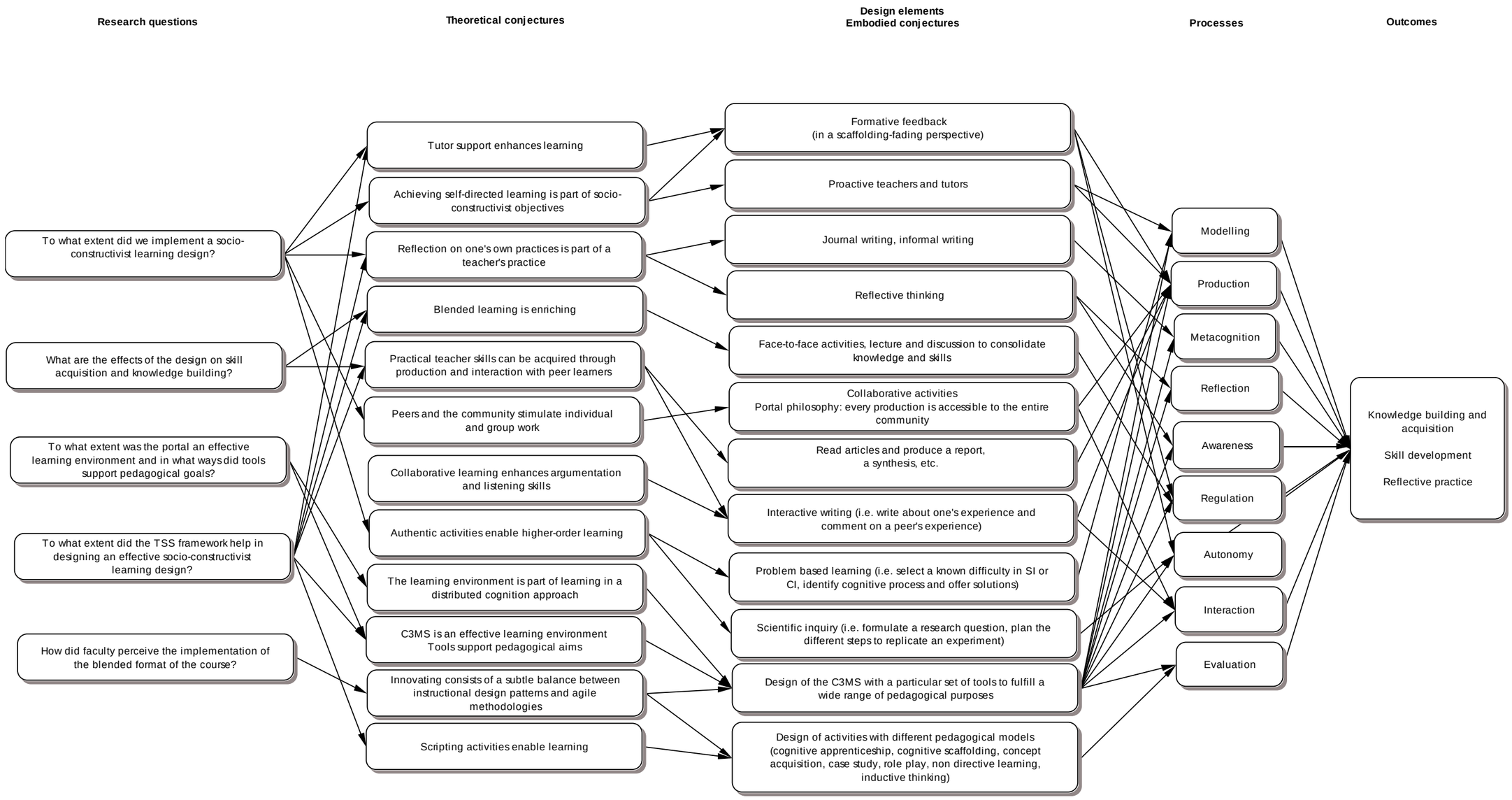


Figure 27: Relationship between research questions, conjectures, processes and outcomes

8.2.1. Question A: To what extent did we implement a socio-constructivist learning design?

This question addresses socio-constructivist issues (Figure 28). While anchoring the interpreter trainer's course in such a learning design, the aim was, first of all, to provide interpreter trainers with flexible, professionnally embedded learning opportunities, with a view to feeding the market with quality conference interpreters; a second aim was to model a culture of activity-based teaching applied to interpreter training with technology (see Figure 37 and Section 10.1 for further details). Issues 1 and 7 address the question of learner support. In a socio-constructivist learning context, with a course implemented in an activity-based collaborative learning environment, learner support is in high demand. It is essential to respond to learners' needs while at the same time helping them to become autonomous and to take responsibility for their own learning. Teachers must show expertise in the entire scaffolding-fading process. Both issues are rooted in the fifth theoretical conjecture, namely, that tutor support enhances learning. The remaining issues are rooted in the following five theoretical conjectures: authentic activities enable higher-order learning (issues 2 and 8), reflection on one's own practices is part of a teacher's practice (issue 3), the community stimulates individual and group work (issues 4 and 5), and self-directed learning is part of a socio-constructivist orientation (issue 6).

1- Did teaching staff support active learning?

2- Did learners work on authentic activities embedded in professional practice?

3- Did the course promote reflective practice?

4- Did teaching staff and peers support collaborative learning?

5- Did peers stimulate individual participation in the community?

6- To what extent were learners supported in achieving self-directed learning?

7- Issues pertaining to the organisation of human resources, from the learners' perspective: did it support their learning?

8- Do authentic activities embedded in a socio-constructivist learning environment enable higher-order learning?

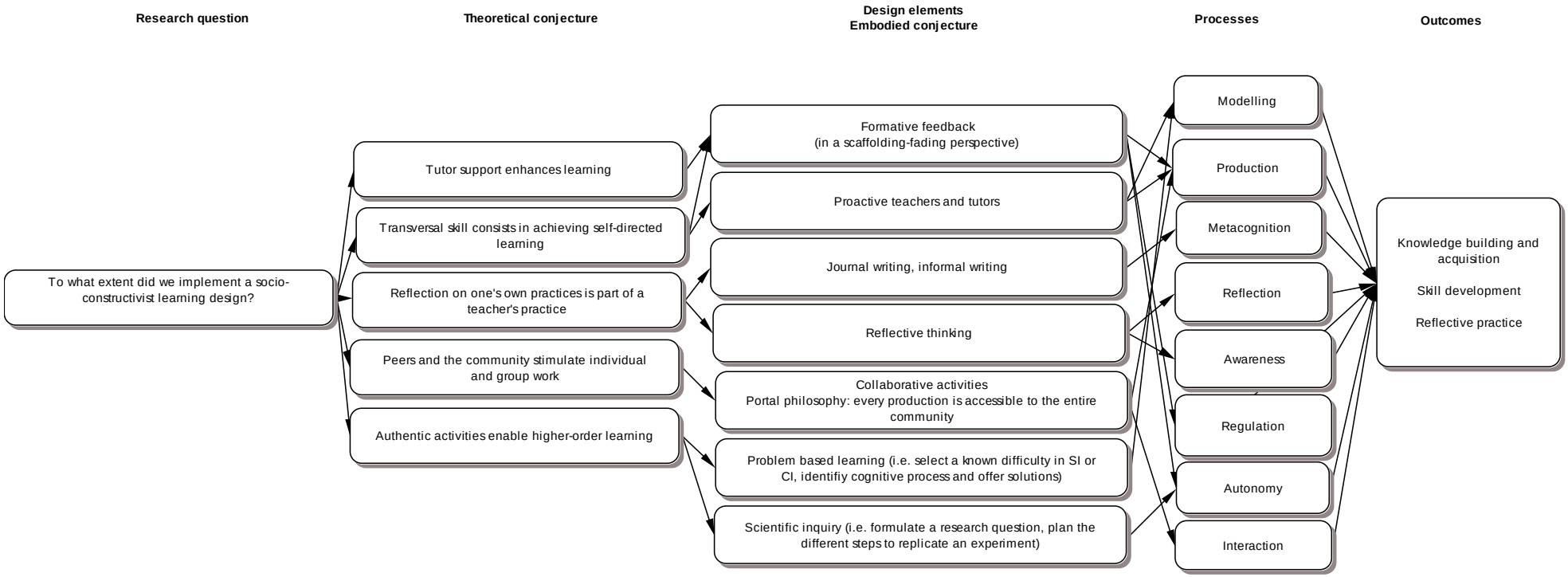


Figure 28: Detailed conjecture map for research question A

8.2.2. Question B- What are the effects of the design on skill acquisition and knowledge building?

This question addresses issues of skill acquisition and knowledge building (Figure 29). It is rooted in the following theoretical conjectures: practical teacher skills can be acquired through production and interaction with peer learners, and blended learning is enriching. The five issues (9, 10, 11, 12 and 13) that help us answer the question address knowledge building and skill acquisition with the presupposition that the entire learning process unfolds through writing, producing and interacting with peers and experts on the portal. The second conjecture - blended learning is enriching - addresses the issue of implementing an activity-based course in which learners are active knowledge and skill builders in constant interaction with peers and experts. It is particularly interesting to see how this plays out in the complementary relation between the online and face-to-face components of the course (issue 14).

9- Did learners acquire techniques for training student interpreters?

10- Are they confident about conducting a face-to-face course?

11- Are they confident about introducing distant learning tools in their course?

12- Would they like to learn more about how to teach in a blended mode?

13- In terms of profiles identified, is there a difference in performance?

14- Is blended learning, as it was set up in the context of this research, pedagogically enriching?

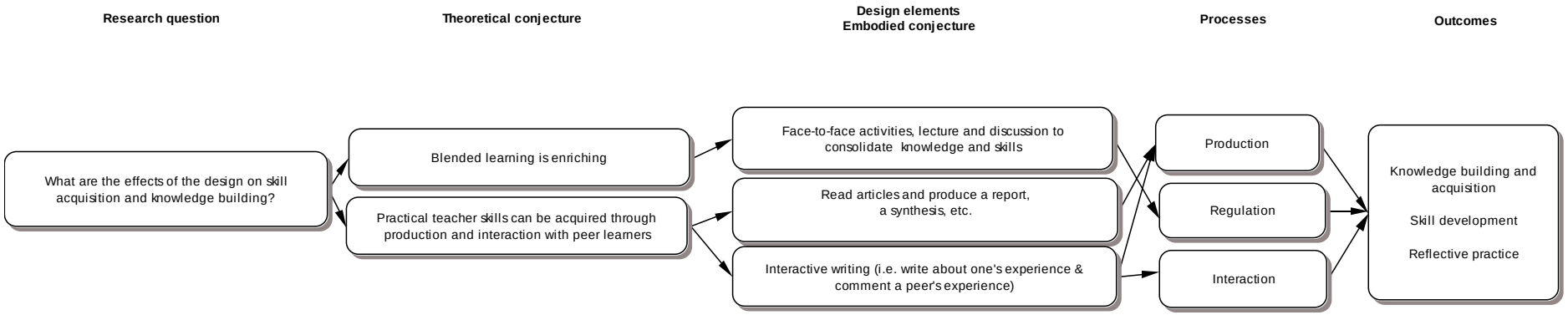


Figure 29: Detailed conjecture map for research question B

8.2.3. Question C- To what extent is the portal an effective learning environment and in what ways did tools support pedagogical goals?

This question addresses portalware and tools issues (Figure 30). It is rooted in the following theoretical conjecture: a C3MS is an effective learning environment and tools support pedagogical aims. Issues are related to both aspects of the portal: the portal's tools (15, 16, 17) and the pedagogical philosophy it empowers (18, 19, 20). Both are related to the tool as "mediating artifact" between the subject and the social world s/he is acting in. During the design and implementation of the portal, tools were selected, designed and used for specific pedagogical goals.

15- Tools issue: which tools did learners use most often?

16- Tools issue: which tools did teachers and tutors use most often?

17- Tools issue: did tools support pedagogical goals?

18- Is the C3MS learning portal an effective socio-constructivist learning environment?

19- Issue pertaining to the C3MS learning portal and teaching: did the portal support the teaching staff?

20- Issue pertaining to the C3MS learning portal and teaching: did the media influence teaching?

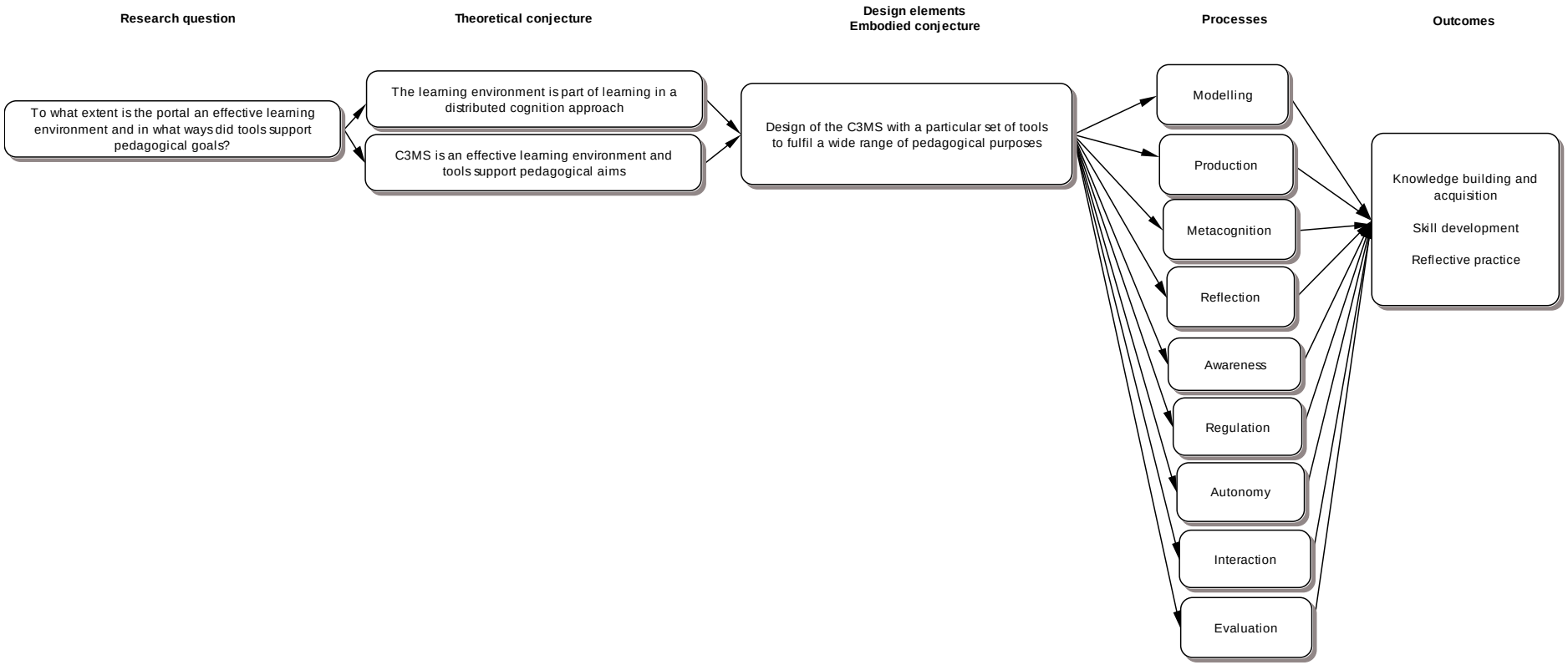


Figure 30: Detailed conjecture map for research question C

8.2.4. Question D- To what extent did the TSS framework help to create an effective socio-constructivist learning design?

This question addresses design issues (Figure 31). It is rooted in theoretical conjectures related to two components of the TSS framework, namely, the organisation of human resources and the cognitive component. The last component, the learning environment, is dealt with in question C. The present question, then, is rooted in several theoretical conjectures, because it addresses several aspects of design. These conjectures are as follows: tutor support enhances learning (related to the organisation of human resources, issues 21, 22, 23); achieving self-directed learning is part of constructivist objectives; reflection on one's own practices is part of a teacher's practice; blended learning is enriching; practical teacher skills can be acquired through production and interaction with peer learners; and scripting activities enable learning (related to activity design and cognitive design, issues 24, 25, 26 and 27).

21- Issue pertaining to the organisation of human resources, from the teaching staff's perspective: did teachers and tutors receive adequate training prior to encountering the learners?

22- Issue pertaining to the organisation of human resources, from the teaching staff's perspective: how effective was the organisation of human resources? Were the respective roles of teacher and tutor clearly defined?

23- Teacher-tutor relationship: To what extent was the organisation of teachers and tutors appropriate? To what extent was the distribution of work between them appropriate?

24- To what extent did the TSS framework help to create an effective learning design?

25- What design-related aspects worked out well?

26- What did not work out well and could possibly be changed through the design?

27- Do scripting activities enhance learning?

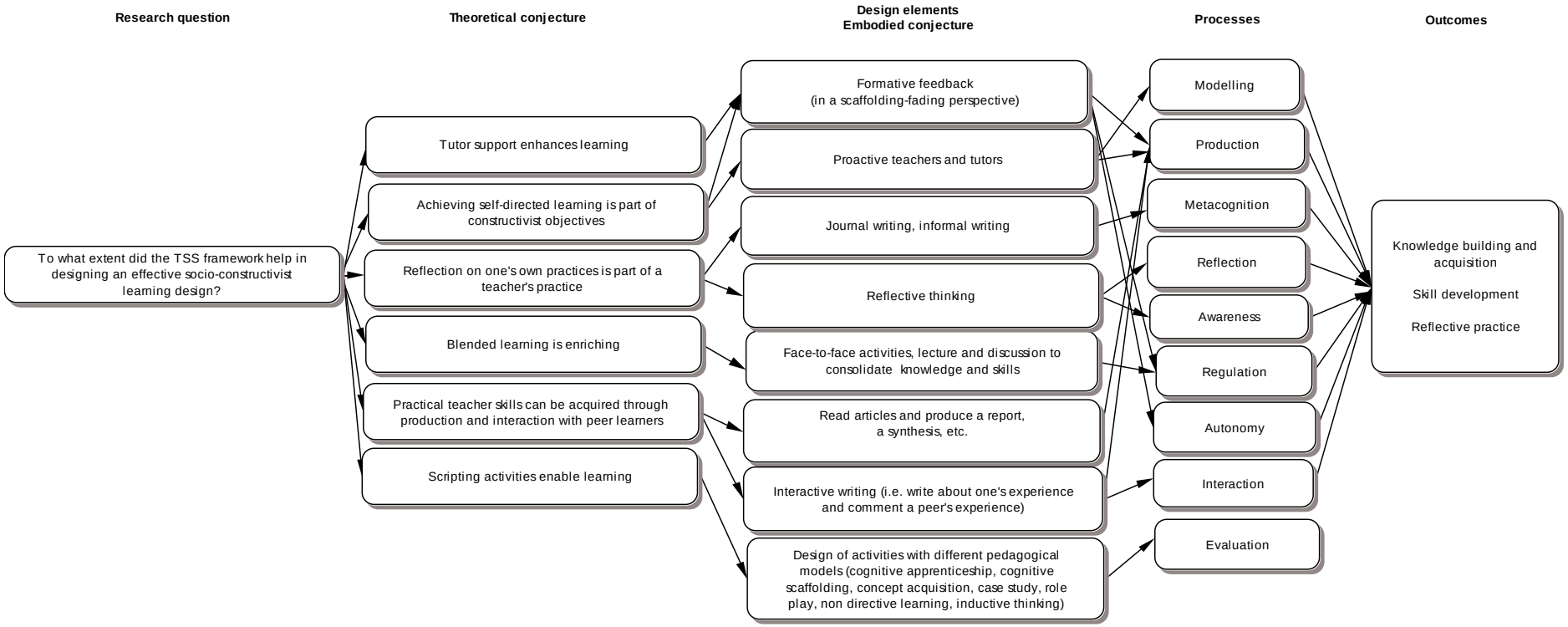


Figure 31: Detailed conjecture map for research question D

8.2.5. Question E- How did faculty perceive the implementation of the blended format of the course?

This question addresses change and innovation (Figure 32). It is anchored in the following theoretical conjecture: innovation involves a subtle balance between instructional design patterns and agile development methodologies. The course for interpreter trainers was conducted successfully in a face-to-face format every two years as of 1996. Yet, it could not meet the demand, and faculty agreed that the format had to be changed. On the initiative of the course director, it has been transformed into a socio-constructivist blended course supported by an activity-based learning environment. We will try to understand how the entire change was initiated and to what extent the teaching team was implicated in this major change (issues 28, 29, 30 and 31).

28- How did teaching staff perceive and experience the course as it was implemented and conducted in Case Study 1?

29- How did teaching staff perceive and experience the course as it was implemented and conducted in Case Study 2?

30- From the perspective of the teaching staff, what were the outstanding strengths and drawbacks of the blended editions?

31- Did the teaching staff enjoy teaching with the portal?

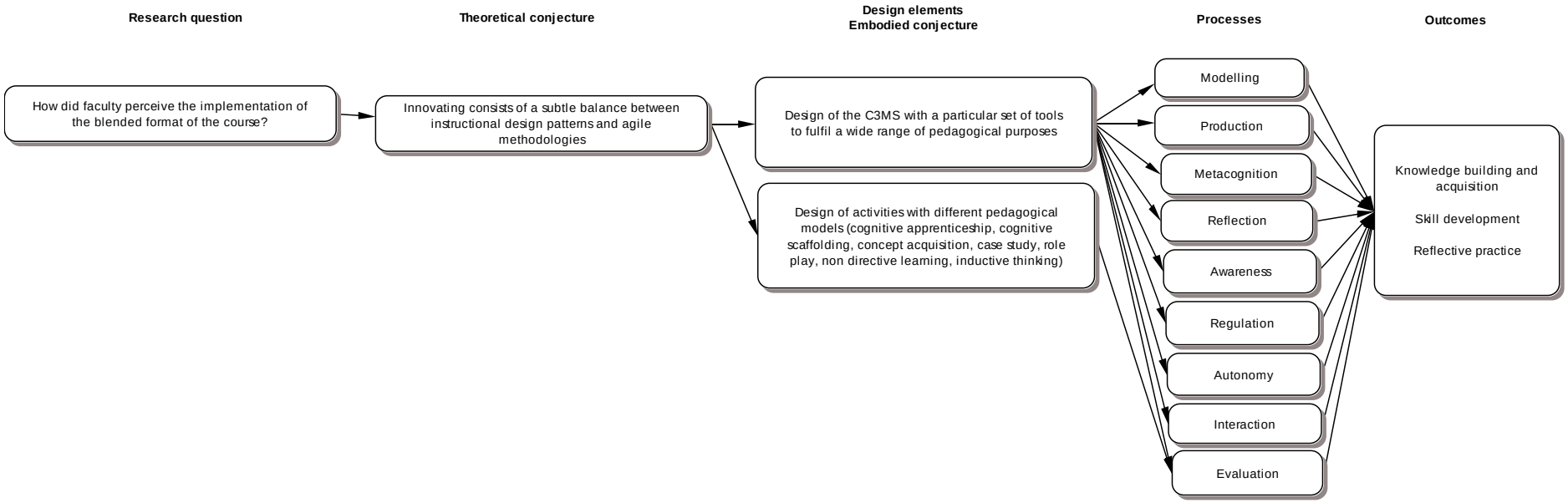


Figure 32: Detailed conjecture map for research question E

8.2.6. Question F- What do the individual differences among learners consist in?

This research focuses on the global analysis of learning designs, their enactment and outcomes. However, since we observed important differences in individual learners' behaviours, we also developed a typology of learners, which allowed us to study how scenarios were enacted differently by different types of learners. Individual differences among learners represent a source of information on how the learning design was actually "lived". Three profiles have been identified.

8.2.7. Question G- What are the relations among variables that we used to answer the previous questions?

To understand the relationship among design elements within this research, we have looked at relationships among variables. We have conducted factor, correlation and cluster analyses on the variables to see whether it was possible to identify latent underlying variables.

8.2.8. Grounding of theoretical conjectures in the literature review

Throughout sub-sections 8.2.1 to 8.2.5, explicit links were drawn between the first five research questions and the theoretical conjectures they were rooted in. The present section explores the theoretical conjectures in greater detail and shows how they, in turn, are grounded in the literature review. First we review the different theoretical conjectures identified in the global conjecture map (Figure 27): 1) tutor support enhances learning; 2) achieving self-directed learning is part of constructivist objectives; 3) reflection on one's own practices is part of a teacher's practice; 4) blended learning is enriching; 5) practical teacher skills can be acquired through production and interaction with peer learners; 6) peers and the community stimulate individual and group work; 7) collaborative learning enhances argumentation and listening skills; 8) authentic activities enable higher-order learning; 9) the learning environment is part of learning in a distributed cognition approach; 10) C3MS is an effective learning environment and tools support pedagogical aims; 11) innovating consists of a subtle balance between instructional design patterns and agile methodologies; and 12) scripting activities enable learning. The conjecture map shows explicitly how these theoretical

conjectures lead to the following design elements or embodied conjectures: 1) formative feedback; 2) proactive teachers and tutors; 3) journal writing / informal writing; 4) reflective thinking; 5) face-to-face activities, lecture and discussion to consolidate knowledge and skills; 6) collaborative activities; 7) reading and written production; 8) interactive writing; 9) problem-based learning; 10) scientific inquiry; 11) design of a C3MS portal; and 12) design of activities with different pedagogical models. The conjecture map also shows which processes (modelling, production, metacognition, reflection, awareness, regulation, autonomy, interaction, evaluation) are involved and which outcomes they lead to.

The global conjecture map (Figure 27) is a way to represent the entire course: it is useful for thinking about and understanding the entire environment. It would be overly ambitious to analyse the entire map in detail. Instead, seven research questions have been selected, which address five decisive aspects, namely 1) the implementation of a socio-constructivist design, 2) the effects on skill acquisition, 3) the effectiveness of the learning environment, 4) the role of the TSS framework in designing the course, and 5) the faculty's perception of the newly implemented course. These five aspects should allow any researcher to reproduce a similar design.

In the following pages, each theoretical conjecture, along with its links to the literature review, is discussed.

1) *Tutor support enhances learning*: This conjecture is related to Section 5.4, tutoring intervention and effectiveness. The context of this course is open-ended and constructivist in its orientation, one in which the tutor scaffolds the learning process adaptively. As Wood *et al.* (1976) and all their successors claim, tutoring is essentially a scaffolding-fading process that takes place in the ZPD. The tutor supports the learner until s/he reaches full autonomy. The effectiveness of the tutor is very situation-dependent, but can be summarised as follows: from the learners' perspective, it is related to the quality of feedback, moderator support and module management (Packam *et al.*, 2006).

2) *Achieving self-directed learning is a socio-constructivist objective*: This conjecture is related to Section 3.7, which deals with the notion of sustainable evaluation. Boud's (2000) notion of sustainable evaluation considers formative evaluation as a tool to enhance learning and to help learners become autonomous, self-regulated knowledge builders. It encompasses notions of confidence, standards, self-monitoring, acute discernment, reflection, use of feedback, and care in the use of language. Similar to the scaffolding-fading process, the aim

of sustainable evaluation is to empower learners with a capacity to conduct quality self-evaluation.

3) *Reflection on one's own practices is part of a teacher's practice*: This conjecture is anchored in the broader socio-constructivist learning philosophy (Section 2.1 and Section 2.7). According to Fosnot and Perry (2005), one of the four major principles derived from constructivist strategy is reflection, the other three being development, disequilibrium and interaction. In order to make meaning, learners seek to organise, categorise and generalise across situated experiences in an abstract, representational form. Allowing time for reflection, be it through journal writing, discussion or any other artifact, should help learners to achieve the desired level of abstraction. It views the teacher as a 'reflective practitioner', regularly looking back at the work accomplished and the process involved, and considering how to improve.

4) *Blended learning is enriching*: This conjecture is based on both blended learning (Section 6.3) and pedagogical models (Section 3.2). According to Graham's (2005) terminology, this course consists in a transforming blend. Blending the course actually involved a radical transformation of pedagogical practice, turning it into an activity-based course that requires learners to be active knowledge and skill builders in constant interaction with peers and experts. The three major pedagogical strategies used in the design of particular learning activities were cognitive apprenticeship, knowledge building and collaborative learning. Pedagogical models are used in both the online and face-to-face components, which mutually reinforce each other.

5) *Practical teacher skills can be acquired through production and interaction with peer learners*: This conjecture is anchored both in socio-constructivist learning philosophy (Section 2.1) and in the knowledge-building community model (Section 2.2). The model of the knowledge-building community developed by Scardamalia and Bereiter (2006) is a combination of situated learning, writing-to-learn and community building. Learners are considered members of a knowledge-building community, which makes them real resources responsible and accountable for the knowledge they create. Knowledge is said to be situated because it is in part a product of the activity and of the social, technological and cultural context in which it develops. Finally, the production dimension, which in this context is related to writing, refers to the positive effects of writing on the learning process (Gavota *et al.*, 2008).

6) *Peers and the community stimulate individual and group work*: This conjecture is rooted in the concept of community of practice, applied specifically to learning (Section 6.2, Wenger, 2005; Barab & Duffy, 2000). On the one hand, the design of a community of practice mediated by technology implies *interacting* (discussing issues, working on tasks, etc.), *publishing* (producing, sharing and collecting artifacts relevant to their practice), and *tending* (nurturing the community). On the other hand, a community of practice in a learning environment cultivates collaborative learning in authentic contexts with active pedagogical strategies to support learners. In this context, learning is collaborative and social, and meaning making is achieved through a process of constant negotiation that takes place in a given social environment.

7) *Collaborative learning enhances argumentation and listening skills*: This conjecture is linked to the previous one. On a general level, it is anchored in collaborative learning as described in Section 2.5 and in Dillenbourg's (1999) approach. On a more specific level, it is grounded in the concept of meaningful interaction (Woo & Reeves, 2007), as described in Section 2.3. The practice of creating meaning and learning out of a process of active interaction through responding, negotiating internally and socially, arguing, building on ideas, offering alternative perspectives, sharing insights and critiques, etc., inherently leads to a culture of enhanced listening. If learners do not listen, they cannot interact meaningfully and thus cannot learn in a socio-constructivist learning environment.

8) *Authentic activities enable higher-order learning*: This conjecture invokes the concepts of authentic activities (Herrington *et al.*, 2003) and higher-order learning (Berge *et al.*, 2004), discussed in Section 2.4. Higher-order learning and skills involve cognitive categories associated with analysing, evaluating and creating (Overbaugh & Shultz, no date). In parallel, authentic activities provide learners with a chance to experience learning in a designed real-life context and to produce something that is relevant for the community. Thus, authentic activities provide an ideal context for higher-order learning, since they are inherently complex, ill-structured and challenging.

9) *The learning environment is part of learning in a distributed cognition approach*: This conjecture is rooted in the notion of distributed cognition, discussed in Section 2.6. The perspective of distributed cognition addresses the question of where knowledge resides: in the individual, in the environment or in both? It is concerned with the physical and social extension of human cognitive processes (Hutchins, 2000). In such a perspective, the learning

environment plays a fundamental role, since it constitutes the very locus and media that learners interact in and with to produce knowledge.

10) *A C3MS is an effective learning environment and tools support pedagogical aims*: This conjecture is anchored in the concepts of activity-based learning environments (Section 3.3) and community, content and collaboration management systems – C3MS (Section 6.4). Jonassen (1999) and Hannafin *et al.* (1999) have developed different activity based learning environments that comprise a set of technological tools to support socio-pedagogical goals. Activity-based learning is facilitated through a set of core tools, namely, communication, collaboration, social, and cognitive scaffolding tools and resources. The fact that C3MS have a modular architecture and can be entirely customised to meet teachers' pedagogical needs and goals makes them powerful learning environments.

11) *Innovating consists of a subtle balance between instructional design patterns and agile methodologies*: This conjecture is anchored in the two concepts of innovation (Section 7.1) and design (Section 4.1, Section 4.2). Innovation concerns processes of in-depth change within an organisation (Bates, 2000; Engeström, 2001). These processes can take place in both a top-down pattern or a more participatory one. Even if the global pattern is participation-oriented and the overall design employs instructional design patterns involving the majority of actors, it can happen that some decisions, particularly those that call for rapid action, can be made in smaller committees. While the first part of the pattern is related to instructional design as described by Reigeluth (1999) and Gustafson *et al*. (2007), the second is related to agile design methodologies as described by Tripp *et al.* (1990).

12) *Scripting activities enable learning*: This conjecture is anchored in the concept of pedagogical scenario (Section 3.4) and scaffolding (Section 3.6). A pedagogical scenario – also called script or storyboard – requires detailed scenarios of learning activities, a learning environment to support the development and enactment of these activities and, finally, specific learning materials. This view of a pedagogical scenario is comparable to the definition of a macro-script in CSCL (Dillenbourg *et al.*, 2007 and 2008). The simple fact of designing a pedagogical scenario is already an act of scaffolding (Dennen, 2004). The enactment of the scenario should enable learning because of its scaffolding properties.

Section 8.3. Summary

Design or development research addresses a practical developmental goal, which is to respond to a specific problem encountered by practitioners. At the same time, it addresses a

more theoretical goal, which is to formulate design rules at the end of the research process to guide future initiatives. It is not an “objective” research approach: the researcher is fully involved in the entire research process. From the perspective of activity theory, it can be seen as a never-ending cycle, starting with the identification of a problem, followed by the development of a solution, the evaluation of this solution, the production of design rules, and then moving on to the identification of a new problem, and so on. Conjecture maps can be used to show the relationship between the theory, embodied conjectures, processes and predicted outcomes of a particular instructional sequence.

This research is associated with development-based research and addresses three objectives: 1) to design and implement a blended socio-constructivist course within an activity based learning environment; 2) to evaluate the design and implementation of the entire course from the perspectives of both the learners and the faculty; and finally, 3) to formulate a theory, in terms of design rules, for any adult training course set in an activity-based learning environment with a face-to-face component. Seven leading questions help to assess whether these objectives have been achieved: A) To what extent did we implement a socio-constructivist learning design? B) What are the effects of the design on skill acquisition and knowledge building? C) To what extent is the portal an effective learning environment and in what ways did tools support pedagogical goals? D) To what extent did the TSS framework help to create an effective socio-constructivist learning design? E) How did faculty perceive the implementation of the blended format of the course? F) What do the individual differences in learners consist in? G) What are the relations among variables that we used to answer the previous questions?

Chapter 9. Methodology

This research project is inspired by development research and uses mixed methods. Sandoval's (2004) conjecture map has been used to describe the global theoretical framework underlying the pedagogical design (see Section 8.1 for further details). A simplified version of Unified Modelling Language (UML) activity diagrams (Booch et. al, 1998) has been used to describe the flow of activities in learning scenarios. The methodology involved the collection of both quantitative and qualitative data. Quantitative data comprises data gathered from a questionnaire administrated to learners (i.e. opinions about use) and data gathered from the portal (i.e. real use). Qualitative data was gathered from interviews with teachers and tutors. This chapter is therefore composed of two sections. The first one is related to data collection and analysis and the second one to design.

Section 9.1. Data gathering and analysis

9.1.1. Questionnaire, interviews and objective data

The data are composed of 1) data gathered through a questionnaire distributed to learners at the end of the course (Appendix 1.), 2) data gathered through semi-structured interviews with teaching staff at the end of the course (Appendix 2. and Appendix 3.) and 3) objective data retrieved from the portal.

The purpose of both the questionnaire and the interview was to understand how actors evolved in the environment, if the course was appropriate to their learning and teaching needs and if skills and knowledge were mastered.

The semi-structured interview guide contains five sections: portal and pedagogical aims, organisation of human resources, training, tools, and cognitive scaffolding. Interviews were conducted at the end of the face-to-face week. The researcher interviewed teachers and tutors and transcribed the interviews afterwards. No precise form of coding - such as that provided by Atlas software for instance – was used. The researcher coded the data according to broad categories (for example: teacher-tutor training, teacher-tutor roles, human resources, etc.) and directly quoted teachers' and tutors' answers to the research questions.

The questionnaire distributed in Case Study 1 and Case Study 2 has six sections: personal information, teacher behaviour, learning environment, tutoring support structure, tools and

skills, and an additional optional section for comments. It contains a total of 121 questions. There is some variation in the tool section of the questionnaire between Case Study 1 and Case Study 2, because some tools were removed and others added in the second study. Questions were derived from three sources:

The *first source* is Dolmans, Wolfhagen, Scherpbier and Van der Vleuten (2003), who developed an instrument to evaluate the effectiveness of teachers in guiding small groups in face-to-face settings. Questions related to constructive/active, self-directed, contextual and collaborative learning were deemed appropriate for our context. These four dimensions of learning are explained by the authors as follows:

- *Constructive learning* implies that teachers stimulate students to actively construct their own knowledge. Students should elaborate on and interpret information instead of knowing facts and should be encouraged to construct their own understandings [Ertmer & Newby, 1993]. […] Elaboration plays an important role in constructive learning. Elaboration can take several forms, such as discussion, note-taking, or answering questions. […]
- *Self-directed learning* implies that teachers should help learners to become expert learners, i.e. learners that are self-directed and goal-oriented, purpose-fully seeking out needed information [Ertmer & Newby, 1996]. Teachers should help students to play an active role in planning, monitoring and evaluating the learning process. […]
- *Contextual learning* implies that students should be exposed to a professionally relevant context. Constructivism assumes that anchoring learning in meaningful contexts promotes transfer of learning [Ertmer & Newby, 1993]. […]
- *Collaborative learning* takes place when the following conditions are met: students have a common goal, share responsibilities, are mutually dependent and need to reach agreement through open interaction [Van der Linden *et al.*, 2000]. […] (Dolmans *et al.*, 2003, pp. 432-433)

The *second source* is Taylor and Maor (2000), who developed a survey to assess the efficacy of online teaching in a constructivist learning environment. Questions related to relevance, reflection, interaction, tutor support, peer support and making sense of each other's productions were included in our questionnaire. The authors define these dimensions as follows:

- Professional relevance: the extent to which engagement in the on-line classroom environment is relevant to students' professional worldviews and related practices.
- Reflective thinking: the extent to which critical reflective thinking is occurring in association with online peer discussion.
- Interactivity: the extent to which communicative interactivity is occurring on-line between students and between students and tutors.

- Tutor support. Cognitive demand: the extent to which challenges and communicative role modelling is provided by tutors. Affective support: the extent to which sensitive and encouraging support is provided by tutors.
- Making sense: the extent to which students and tutor co-construct meaning in a congruent and connected manner. (Taylor & Maor, 2000)

Peer support is not explained, but judging from the questions, it involves encouraging, praising, valuing peers' productions and empathising with a peer's struggle to learn.

The *third source* is our own and addresses questions related to constructivism, human resources, the presence of teaching staff and the learning environment.

- Constructivism addresses issues of learners being active, engaged, responsible for their learning and constructing their own "learning objects".
- Human resources refers to the overall organization of the course, with a director, teachers and tutors, a pedagogical advisor and a technical support person. It also addresses issues related to the roles of the teaching staff and training.
- The presence dimension addresses the question of how present, available and responsive the director, teachers and tutors were.
- The learning environment dimension refers to the use of a community portal, accessing peer learners' productions and the use of cognitive scaffolding.

All questionnaire items used a scale in which learners had to assign a score between 1 and 4, 5 or 6, depending on the section. The statistical analysis section provides details of indices, descriptive statistics, correlations and a typology of the learners, based on a comparison of learners' opinions about how they used tools and their real use of tools (see sub-section 9.1.3 for more details about the statistical methodology).

9.1.2. How are research questions and issues addressed?

For each of the research questions and associated issues identified in Section 8.2, this section indicates the specific source of the data that was collected and analysed to address those questions and issues.

Question A: To what extent did we implement a socio-constructivist learning design?

Question A / Issue 1- Did teaching staff support active learning?

Answers to this issue are based on the data obtained from two sets of questions. The first set is related to learner support considered as a means of promoting social participation in the community, enhancing motivation on the cognitive level, and representing a way to learn from a model (i.e. teacher and tutor). The second set is related to learner support as a means of

promoting active learning (summarising, creating links, understanding underlying theories). The issue is addressed in questions 4 to 8 and 31 to 34 of the questionnaire administrated to learners at the end of the course.

Question A / Issue 2- Did learners work on authentic activities embedded in professional practice?

Answers to this issue are based on the data obtained from two sets of questions: questions pertaining to contextual learning (the fact that learners are exposed to a professionally relevant context), and questions pertaining to relevance (the extent to which learners' engagement in the learning environment is relevant to their professional worldviews and related practices). These questions comprise items 11 to 14 and 19 to 22 of the questionnaire administrated to learners at the end of the course.

Question A / Issue 3- Did the course promote reflective practice?

This issue is addressed by a set of questions directly related to critical reflective thinking and comprise items 23 to 26 of the learners' questionnaire.

Question A / 4- Did teaching staff and peers support collaborative learning?

This issue is addressed by three sets of questions: one is directly linked to collaborative learning (sharing common goals and responsibilities, situations of mutual interdependence, reaching agreement by means of interaction with conceptual reframing as a learning outcome); another is related to "making sense" (the extent to which learners and teaching staff co-construct meaning in a congruent and connected manner); and the last one is related to interaction. These questions comprise items 15 to 18, 39 to 42 and 27 to 30 of the learners' questionnaire.

Question A / 5- Did peers stimulate individual participation in the community?

This issue is addressed by questions dealing with the extent to which peers encourage and support the individual's participation in the community. These questions comprise items 35 to 38 of the learners' questionnaire.

Question A / 6- To what extent were learners supported in achieving self-directed learning?

Self-directed learning refers to learners' autonomy and aptitude to become expert self-regulated learners, able to monitor and regulate the learning process on their own. The issue is addressed by questions 9 and 10 of the learners' questionnaire.

Question A / 7- Issues pertaining to the organisation of human resources, from the learners' perspective: did it support their learning?

This issue is addressed by questions directly related to the tutoring support structure (TSS) framework, specifically items 52 to 54 of the learners' questionnaire.

Question A / 8- Do authentic activities embedded in a socio-constructivist learning environment enable higher-order learning?

This issue would be of interest but we do not have enough data to answer it within this study.

Question B: What are the effects of the design on skill acquisition and knowledge building?

Question B / 9- Did learners acquire techniques for training student interpreters?

Questions 114 and 118 are designed to address this issue, which concerns the acquisition of skills, both by learners who already have some teaching experience and by those who don't.

Question B / 10- Are they confident about conducting a face-to-face course?

This issue is addressed by questions 115 and 119 of the learners' questionnaire, and concerns learners' confidence about conducting a face-to-face course, some of whom have teaching experience and others who don't.

Question B / 11- Are they confident about introducing distant learning tools in their course?

The issue is addressed by questions 116 and 120 of the learners' questionnaire and concerns learners' (both with and without teaching experience) confidence about introducing distant learning tools in their course.

Question B / 12- Would they like to learn more about how to teach in a blended mode?

Questions 117 and 121 of the learners' questionnaire ask learners (both with and without teaching experience) to indicate their degree of interest in learning more about teaching in a blended mode.

Question B / 13- In terms of profiles identified, is there a difference in performance?

In order to answer this question, the findings from the summative evaluation administered for the two modules on simultaneous and consecutive interpreting (Modules 4 and 5 in Case Study 1 and Modules 5 and 6 in Case Study 2), which were evaluated in a similar way in both case studies, are considered and related to learners' profiles and their real use of tools.

Question B / 14- Is blended learning, as it was set up in the context of this research, pedagogically enriching?

This issue is addressed by the qualitative data collected through interviews with teaching staff.

Question C: To what extent is the portal an effective learning environment and in what ways did tools support pedagogical goals?

Question C / 15- Tools issue: Which tools did learners use most often?

This issue is concerned with the frequency of use of tools. In Case Study 1, it is addressed by questions 58 to 76 of the learners' questionnaire, and in Case Study 2 by questions 58 to 72 and 122 to 125 of the learners' questionnaire.

Question C / 16- Tools issue: which tools did teachers and tutors use most often?

This issue is addressed by the qualitative data collected through interviews with teaching staff.

Question C / 17- Tools issue: did tools support pedagogical goals?

This issue is concerned with learners' perception of the pedagogical utility of tools. In Case Study 1, it is addressed by questions 98 to 113 of the learners' questionnaire, and in Case Study 2 by questions 98 to 101, 103, 105 to 113, and 130 to 131 of the learners' questionnaire.

Question C / 18- Is the C3MS learning portal an effective socio-constructivist learning environment?

This issue is addressed by three questions in the learners' questionnaire (items 55 to 57), one directly related to the learning environment, another related to accessing peers' productions and the last one related to the use of cognitive scaffolding.

Question C / 19- Issues pertaining to the C3MS learning portal and teaching: did the portal support teaching staff?

This issue is addressed by the qualitative data collected through interviews with teaching staff.

Question C / 20- Issue pertaining to the C3MS learning portal and teaching: did the media influence the teaching?

This issue is addressed by the qualitative data collected through interviews with teaching staff.

Question D- To what extent did the TSS framework help to create an effective socio-constructivist learning design?

Question D / 21- Issue pertaining to the organisation of human resources, from the teaching staff's perspective: did teachers and tutors receive adequate training prior to encountering the learners?

This issue is addressed by the qualitative data collected through interviews with teaching staff.

Question D / 22- Issue pertaining to the organisation of human resources, from the teaching staff's perspective: how effective was the organisation of human resources? Were the respective roles of teacher and tutor clearly defined?

This issue is addressed by the qualitative data collected through interviews with teaching staff.

Question D / 23- Teacher-tutor relationship: To what extend was the organisation of teachers and tutors appropriate? To what extent was the distribution of work between them appropriate?

This issue is addressed by the qualitative data collected through interviews with teaching staff.

Question D / 24- To what extent did the TSS framework help to create an effective learning design?

This issue is addressed by three sets of questions in the learners' questionnaire. The first (items 52 to 54) is related to the organisation of human resources, the second (items 55 to 57) is related to the learning environment and the third (items 50 to 51) is related to the presence of key actors throughout the course.

Question D / 25- What design-related aspects worked out well?

Answers to this question are based on a synthesis of the answers to all the other questions and related issues addressed in this research.

Question D / 26- What did not work out well and could possibly be changed through the design?

Answers to this question are based on a synthesis of the answers to all the other questions and related issues addressed in this research.

Question D / 27- Do scripting activities enhance learning?

This issue would be of interest but we do not have enough data to answer it within this study.

Question E- How did faculty perceive the implementation of the blended format of the course?

Question E / 28- How did teaching staff perceive and experience the course as it was implemented and conducted in Case Study 1?

This issue is addressed by the qualitative data collected through interviews with teaching staff.

Question E / 29- How did teaching staff perceive and experience the course as it was implemented and conducted in Case Study 2?

This issue is addressed by the qualitative data collected through interviews with teaching staff.

Question E / 30- From the perspective of the teaching staff, what were the outstanding strengths and drawbacks of the blended editions?

This issue is addressed by the qualitative data collected through interviews with teaching staff.

Question E / 31- Did teaching staff enjoy teaching with the portal?

This issue is addressed by the qualitative data collected through interviews with teaching staff.

Question F- What do the individual differences among learners consist in?

Statistical data were used to identify the different learner profiles, as detailed below in the sub-section *Identification of learner profiles.* Activity diagrams were used to analyse the enacted scenarios, as detailed below in sub-section 9.2.2.

Question G- What are the relations among variables that we used to answer the previous questions?

We have conducted factor, correlation and cluster analyses on the variables. The first type of analysis aims at grouping variables according to shared variance in order to identify underlying variables. The second looks at some interesting bi-variate correlations between chosen variables. The third analysis involves clustering variables according to similarity for the entire group of variables.

9.1.3. Statistics methodology

This sub-section is devoted to statistical analysis and describes the grouping of variables. First of all, we test the reliability of the scales that measure theoretical variables in sections 2 to 4 of the questionnaire (dealing respectively with teacher behaviour, learning environment, and

tutoring support structure). Questionnaire items are reduced by factor analysis, and items used for scales construction are tested with Cronbach's alpha. Cronbach's alpha, which varies between 0 and 1, evaluates the consistency among variables and is considered alongside indices. The closer the alpha is to 1, the more consistent the variables are. We can then compare our "results" with the authors' indices (Dolmans *et al.*, 2003 and Taylor & Maor, 2000). We then examine the overall consistency of the questions (sections 2 to 4 of the questionnaire) and report the findings from an analysis of correlations on the indices.

Next, we describe the type of analysis performed on section 5 of the questionnaire (dealing with tools). Tools were used in different ways by different learners. A closer look at how learners used tools helped to identify different learner profiles. These profiles are useful later on, in the discussion of how learners enacted activities. The description of how learners from each profile enacted the activities, both in groups and individually, constitutes the final part of this sub-section.

Indices

A total of 21 respondents in Case Study 1 and 29 respondents in Case Study answered the questionnaire, which represents respectively a response rate of 100% (21 learners out of 21) and 85% (24 identified questionnaires plus 5 anonymous questionnaires from a total of 34 learners). Out of the 121 questions on the questionnaire, some remained unanswered. In order not to lose the entire data supplied by a specific respondent, we decided to replace the missing values, per section. That is, for any particular section of a learner's questionnaire in which less than one-third of the questions were unanswered, we replaced the missing values with the mean obtained from all respondents on this question. The following lines provide an overview of the proportion of missing values in the returned questionnaires: For section 1 (personal information) of the questionnaire, two learners answered all but one question, and one learner failed to answer three questions. For section 2 (teacher behaviour), five learners omitted one question, two learners omitted two questions and one learner omitted four questions. For section 3 (learning environment), one learner failed to respond to one of the questions. For section 4 (tutoring support structure), two learners omitted one questions. For section 5 (tools), nine learners omitted one question, one learner omitted two questions and one learner omitted 16 questions. For section 6 (skills), all learners answered all questions. It is important to note that, on the overall questionnaire, no particular question stood out as widely unanswered and rejected.

Based on the 50[30] responses to the questionnaire, a factorial analysis yielded the following results. For section 2 (teacher behaviour) of the questionnaire, the questions (items 4 to 18) were derived from Dolmans *et al.* (2003). Variables are highly correlated and we find four indices that are very close to, but not exactly the same as, the ones the authors identify.

- questions 15, 16, 17, 18, (collaborative learning) and 13 (contextual learning) have an alpha of .85
- questions 11, 12, 14 (contextual learning) and 7 (constructive/active learning) have an alpha of .76
- questions 4, 5, 6, 8 (constructive/active learning) have an alpha of .75
- questions 9 and 10 (self-directed learning) have an alpha of .76

If we use exactly the same indices as Dolmans *et al.* (2003), we obtain the following results:

- questions 4, 5, 6, 7, 8 (constructive/active learning) have an alpha of .75
- questions 9 and 10 (self-directed learning) have an alpha of .76
- questions 11, 12, 13, 14 (contextual learning) have an alpha of .74
- questions 15, 16, 17, 18 (collaborative learning) have an alpha of .85

Since Cronbach's alpha is above .70 for all indices, we decided to retain Dolman *et al.*'s (2003) indices and conducted our analyses on that basis.

For section 3 of the questionnaire – learning environment – questions 19 to 42 were derived from Taylor and Maor (2000). If we ask for six indices (or even if we do not), we obtain exactly the same classification as the authors, with an alpha value equal to or above .80.

- questions 19 to 22 (relevance) have an alpha of .82
- questions 23 to 26 (reflection) have an alpha of . 82
- questions 27 to 30 (interaction) have an alpha of . 88
- questions 31 to 34 (tutor support) have an alpha of . 80
- questions 35 to 38 (peer support) have an alpha of .85
- questions 39 to 42 (making sense) have an alpha of .89

With respect to the other questions (items 43 to 69) in section 3 of the questionnaire, we find one indice for questions 43 to 47, which we label “constructivism” and for which Cronbach's alpha has a value of .68. We also find two independent variables: question 48, which deals with information distribution, and question 49, which deals with constructivist course design.

[30] Both case studies involve 55 learners but only 50 did answer the questionnaire.

For section 4 – tutoring support structure – of the questionnaire, we find two indices: the first pertains to questions 52 to 54, with an alpha value of.77, and which we label "human resources organisation and training". The second pertains to questions 55 to 57 with an alpha value of .71, and which we label "learning environment, peers' productions and cognitive scaffolding". In addition, we find two independent variables: question 50 – presence of the director - and question 51 – presence of teachers and tutors.

The table below (Table 32) summarises the different indices, the questions and their original source.

Question number	Indices	Source
4-8	Constructive / active learning	Dolmans *et al.* (2003)
9-10	Self-directed learning	Dolmans *et al.* (2003)
11-14	Contextual learning	Dolmans *et al.* (2003)
15-18	Collaborative learning	Dolmans *et al.* (2003)
19-22	Relevance	Taylor and Maor (2000)
23-26	Reflection	Taylor and Maor (2000)
27-30	Interaction	Taylor and Maor (2000)
31-34	Tutor support	Taylor and Maor (2000)
35-38	Peer support	Taylor and Maor (2000)
39-42	Making sense	Taylor and Maor (2000)
43-47	Constructivism	Own
48	Information distribution	Own – in opposition to constructivism
49	Constructivist course design	Own
52-54	Human resources organisation and training	TSS
55-57	Learning environment, peers' productions, cognitive scaffolding	TSS
50	Presence of director	TSS
51	Presence of teacher/tutor	TSS

Table 32: Questionnaire: summary of indices

For section 5 – tools – of the questionnaire, descriptive statistical analyses were performed, without identifying any indice, because this section deals with the different tools available on the portal.

Descriptive statistics analysis

To analyse the data collected from the questionnaire, which involves mainly descriptive statistics, we decided to use boxplots. A boxplot is an efficient method of graphically displaying numerical data. It depicts the following information: the smallest observation (sample minimum), the lower quartile (25%), the median (50%), the upper quartile (75%),

and the largest observation (sample maximum). If there are outliers, the boxplot indicates them as well. The box is constructed from the bottom, lower quartile to the top, upper quartile. The whiskers connect the box to the smallest and largest values that are not outliers (Figure 33).

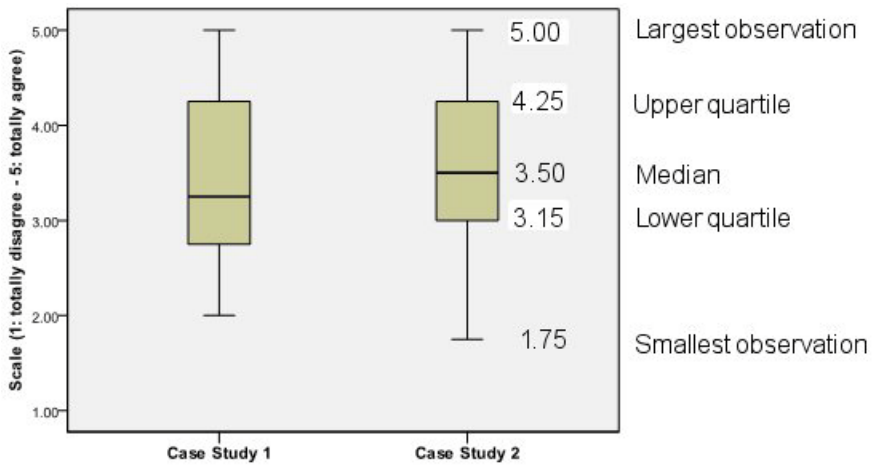


Figure 33: Example of a boxplot

Thus, in a normal distribution, the entire sample is represented in the box and in the whiskers. Outliers (Figure 34) - either extreme or mild – are observations that are numerically distant from the rest of the sample. They are not represented in the whiskers. Extreme outliers are observations that lie outside the box at a distance from the first or third quartile of more than three times the inter-quartile range (IQR: the difference between the third and first quartiles); they are indicated in the figure by a star. Mild outliers are observations that lie more than 1.5 times the IQR from the first or third quartile but not as far as extreme outliers; these are indicated in the figure by a dot.

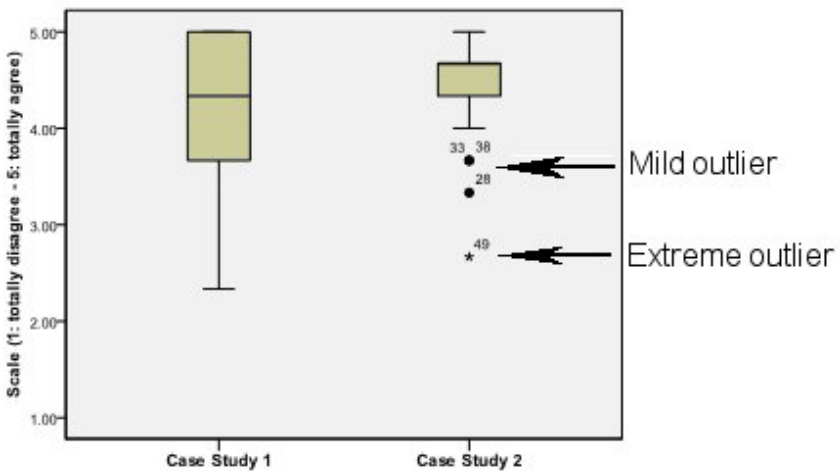


Figure 34: Representation of outliers

To interpret a boxplot, the researcher looks at the numerical values of the three quartiles, representing respectively 25 percent, 50 percent and 75 percent of the sample. S/he also looks at the general shape of the box and whiskers for indications of symmetry or asymmetry and outliers.

> Five summaries of the data are graphically presented in a way that makes the information about the location, spread, skewness, and longtailedness of the batch available with a quick glance. To be more specific, location is displayed by the cut line at the median (as well as by the middle of the box), spread by the length of the box (as well as by the distance between the ends of the whiskers and the range), skewness by the deviation of the median line from the center of the box relative to the length of the box (as well as by the length of the upper whisker relative to the length of the lower one, and by the number of individual observations displayed on each side), and longtailedness by the distance between the ends of the whiskers relative to the length of the box (as well as by the number of observations specifically marked). (Benjamini, 1998, p. 257)

Gravemeijer and Cobb (2006) also recommend the use of boxplots to "reason about characteristics of (univariate) distributions, like skewness" (p. 68).

Identification of learner profiles

In order to identify different learner profiles, a cluster analysis was performed on items 59, 61, 63 and 66 (related to the frequency of use, in the learners' opinions, of the forum, the shoutbox, the personal messages, and the journal, respectively). The frequency of use of these four tools helped to distinguish three different learner profiles. The data gathered from the portal was used to determine whether learners' opinions about their use of the tools corresponded with their actual use of the tools. But before comparing the two sets of data (opinions about use and real use), it was noted that the means were lower in Case Study 1 than in Case Study 2. In order to ensure an accurate ratio when combining the results of the two case studies, we decided to first group the results for each tool and each case study into three categories representing degrees of frequency of use: "few," "average," and "a lot." For example, in Case Study 1, the number of messages posted on the forum by a respondent varied between 23 and 149, and in Case Study 2 between 94 and 777. Thus, for Case Study 1, the category labelled "few" included those respondents who posted between 23 and 51 messages, "average" included those who posted from 57 to 99 messages, and "a lot" included those who posted from 103 to 149 messages. For Case Study 2, the "few" category covered a range between 94 and 232 messages posted, the "average" category from 275 to 377 messages posted and the "a lot" category from 390 to 777 messages posted. This yielded three groups (1, 2 and 3) for each case study, which were ordered according to the frequency

of real use of the four tools (1 = few, 2= average, 3= a lot). In a second step, groups from both case studies were combined (the "few" from Case Study 1 combined with the "few" from Case Study 2, etc.). In this way, data pertaining both to opinions about frequency of use and to real use was ready to be analysed and compared for both case studies. Data from the two case studies had to be combined, due to the small number of respondents: only 45 learners could be included in the analysis, since the data available in the five anonymous questionnaires could not be used for purposes of comparison. A cluster analysis was then conducted to identify different learner profiles and to see if there was any correspondence between *opinions about frequency of use* and *real use* of the four tools.

Starting with the three learner profiles obtained by means of the cluster analysis, two typical learners from each profile were selected and investigated to determine how they enacted activities, how they interacted within their group and with the teaching staff, and how they used tools in their learning and communication processes. Learners were chosen on the basis of how representative they were of the profile to which they belong (Table 33, Table 34). This was determined by measuring the distance of a learner from the centre (0 indicates that the learner is at the centre, 1 indicates that s/he is a bit further from the centre). In Table 34, 0 indicates that learners are very close to the centre and thus highly representative, while 1 indicates that they are slightly less representative. However, we were unable to find six learners who were highly representative (i.e. 0 distance from the centre) in both clusters (opinions about use and real use). We therefore decided, in the first place, to select learners who were equally representative within a group: in Case Study 1, the three learners are highly representative (learners from the three profiles are very close to the centre, 0, on the scale), and in Case Study 2, the three learners are slightly less representative (learners from the three profiles are a bit further away from the centre, at 1, on the scale). And in the second place, we gave priority to real use over opinions about use when these two categories did not match (i.e. in Richard's case).

Learners	**Grouping according to opinion**	**Grouping according to real use**
Roman (Case Study 1)	1 (few)	1 (few)
Alex (Case Study 2)	1 (few)	1 (few)
Marina (Case Study 1)	2 (average)	2 (average)
Emily (Case Study 2)	2 (average)	2 (average)
Richard (Case Study 1)	1 (few)	3 (a lot)
Vicky (Case Study 2)	3 (a lot)	3 (a lot)

Table 33: Representativeness of learners for each profile, Case Studies 1 and 2

Learners	Distance from the centre, according to opinion (0: closest – 3: farthest)	Distance from the centre according to real use (0: closest – 2.45: farthest)
Roman (Case Study 1)	0.00	0.00
Alex (Case Study 2)	1.41	1.00
Marina (Case Study 1)	1.73	0.00
Emily (Case Study 2)	1.73	1.00
Richard (Case Study 1)	2.00	0.00
Vicky (Case Study 2)	1.73	1.00

Table 34: Distance from the centre (0: closest to centre)

Finally, it is important to mention that for confidentiality reasons, fictive names have been attributed to the six learners mentioned in the table. Learners with secondary roles are mentioned under the label “LearnerA”, “LearnerB”, etc. in activitiy diagrams.

With respect to the indices, for section 2 (teacher behaviour – questions 4 to 18) and section 3 (learning environment – questions 19 to 42) of the questionnaire, we found the same indices as those identified by the original source of the questions (Dolmans *et al.*, 2003). For section 4 (tutoring support structure), two indices and two independent variables were identified. All indices are summarised in Table 32.

With respect to identifying learner profiles in terms of the frequency of use of the four tools (forum, shoutbox, personal messages, journal), a cluster analysis was performed, which involved crossing opinions about frequency of use with actual use. In order to understand how learners from each of the three profiles enacted an activity at the beginning and at the end of the curriculum, we used collaborative and individual activity diagrams to visualise the workflow within the group and the type of action taken by the individual.

In addition, descriptive statistical analyses have been performed on sections 2 to 6 of the questionnaire (dealing, respectively, with teacher behaviour, learning environment, tutoring support structure, tools and skills), with a view to addressing some of the issues related to the seven research questions.

Section 9.2. Design

As mentioned at the end of Section 8.1, the process of the present research study began when the researcher came on board a blended training course, in charge of designing three learning units and providing tutoring for them. The course involved learning how to use internet technologies in one’s courses, and the audience was composed of university teachers and

adult education trainers from French speaking countries (Francophonie). A single learning unit lasted approximately two weeks, representing about thirty learner working hours, and consisted exclusively of distance learning, except for the final summative evaluation. The entire course was of twelve months' duration, and was composed of eighteen learning units plus a personal project, which represented, in terms of time, about one third of the course. At the very beginning (Pilot Study 1), the official learning environment was Acolad. Later on (Pilot Study 2), two other learning environments were added for specific learning units. Tutoring was very demanding and time-consuming (many more hours were dedicated to tutoring than what the official programme stipulated) and it was important to analyse and understand why this was the case. It was in this context that the present researcher developed the TSS design framework. The most important aspect of the course that needed improvement concerned the provision of learner support, and thus the entire design of the learning units was reviewed through this particular lens. This design tool revealed another important and correlated issue: the learning environment did not correspond with the overall constructivist approach adopted for the learning units. As already mentioned, the problem encountered with student support was in fact embedded in a much larger problem, namely that the learning environment did not easily lend itself to the chosen pedagogical approach. The TSS was created and used to redesign the learning units that the researcher was in charge of, with particular attention to human resources, training, tutor roles, choice of learning environment, support tools for tutors, knowledge management, and cognitive scaffolding tools provided in activities. This new design served to increase the learners' satisfaction with the learning units. Content, learning environment and learner support strategies remained essentially the same for several future groups of learners. Some years later, the researcher had the opportunity to transform a face-to-face course into a blended one in another, but similar context. The course lasted twelve months, and the audience was composed of professional interpreters who were studying to become trainers of conference interpreters. The TSS framework was used to design the first edition of the course. The design of this first blended edition of the course is referred to in this dissertation as "Case Study 1."

Inspired by Collins *et al.*'s (2004, p. 33) methodology for carrying out design-based research, our design process involved the following steps:

- Implement the design (Section 10.2, Case Study 1, description)
- Modify the design (Section 10.3, Case Study 2, description)

- Analyse the design with the help of conjecture maps and activity diagrams (refer to Section 10.4, *Enactment* sections for all modules)
- Report on the findings (Chapter 11)
- Produce a set of design principles and formulate a theory, in terms of design rules (Chapter 12)

The analysis of the changes that occurred between the original face-to-face edition of the course and its first blended edition is based on Engeström's (2003) activity triangle and expansive learning theory as presented in Section 7.1.

9.2.1. Description of modules

To analyse the *design goal* section of the modules in the case studies, a conjecture map of each module was drawn up (as illustrated in Figure 25). To analyse the *enactment* of the modules in the case studies, an activity diagram based on the pedagogical scenario was created, using a simplified version of Unified Modelling Language (UML) activity diagrams (Booch, Jacobson & Rumbaugh, 1998). UML activity diagrams use software engineering methods to describe workflows, business processes and other procedures (see Section 3.5 for details). This design technique has become fairly popular in the learning design community as a way to describe the flow of pedagogical scenarios (Derntl & Motschnig, 2007; Hernandez-Leo *et al.*, 2005).

In order to facilitate comparison, pedagogical scenarios have been broken down into five stages, based on Salmon's (2000) model for teaching and learning online. The model can be used both for the design and for the analysis. It identifies the steps that were used in both case studies and was chosen precisely for this feature. The five stages of the model are 1) access and motivation, 2) online organization, 3) information exchange, 4) knowledge construction, and 5) development. To these five, we added a sixth stage entitled "consolidation" to complete the analysis of the pedagogical scenarios in the two case studies. Table 35 identifies what is involved at each stage for both major categories of actors in the teaching-learning process, namely, teaching staff and learners. Teachers and tutors have been grouped together under the category "teaching staff," because their roles are complementary and our aim with these global activity diagrams is to focus on the workflow and workload distribution among actors within a module.

	Access and motivation	Online socialisation	Information exchange	Knowledge construction	Development	Consolidation
Learners	Setting up technical environment. Accessing.	Reading and presenting themselves.	Understanding activities. Posting questions, replying to peers' questions. Getting used to interacting in the flow of information.	Engaging in individual and collaborative knowledge building processes	Reflecting, regulating and evaluating their products.	Demonstrating transfer capabilities. Reviewing the entire learning process and asking questions about anything unclear.
Teaching staff	Making sure everybody is on board and has the environment up and working. Welcoming and encouraging	Presenting teaching staff and pedagogical orientations.	Supporting and suggesting strategies to manage the flow of information.	Supporting and guiding the knowledge building process.	Supporting and offering new tracks to explore.	Supporting transfer and reviewing anything not fully acquired.

Table 35: Components of Salmon's (2000) model

Pedagogical scenarios track how the module unfolds. They represent, in a global manner, how the workflow moved from one actor to another during the module. Details about how specific learning activities unfolded are not provided, because there were too many variations from one learner to another. The diagram depicts the workflow and the roles of the different actors involved. In other words, it represents the transformation of an input into an output. It is a way of visualising at a glance how the entire module unfolded.

For example, the activity diagram below (Figure 35) indicates that the module starts with the teacher posting the welcome message. Then the task shifts to the learners, who have to read the welcome message and act accordingly. This occurs during the *access and motivation* stage. During the *online socialisation* stage, learners find peers and set up groups in preparation for the upcoming collaborative activities. When needed, the teacher regulates the formation of groups: for example, since learners X, Y and Z do not yet belong to a group and since it is time to start the activity, they will work together. During the *information exchange* stage, the task moves to the learners: they must develop strategies to carry out the activity. The tutor is available to answer questions or deal with uncertainties, and the teacher helps learners develop their strategies when needed. During the *knowledge construction* stage, learners actively engage in the learning activities, interacting with their peers, the tutor and the teacher until they deliver a final product for the activity concerned. In the *development* stage, the workflow passes to the teacher, whose role is now to provide formative and summative evaluation. The tutor does the same. Both teacher and tutor also conduct a debriefing chat in view of the module's closure. During this stage, the learners' role is to

understand the evaluation they received and participate in the debriefing session, making sure they have achieved the module's learning goals. During the last stage, *consolidation*, the teacher and tutor respond to whatever reactions learners had to their feedback. For the learners' part, a group of volunteers writes a summary of the module for the wrap-up book. The teacher continues to provide feedback on the summary until it reaches an acceptable form. Inclusion of the summary in the wrap-up book is intended to provide learners with a record that they can refer to in the future, whenever they are confronted with an issue related to the content of the module. This closes the module.

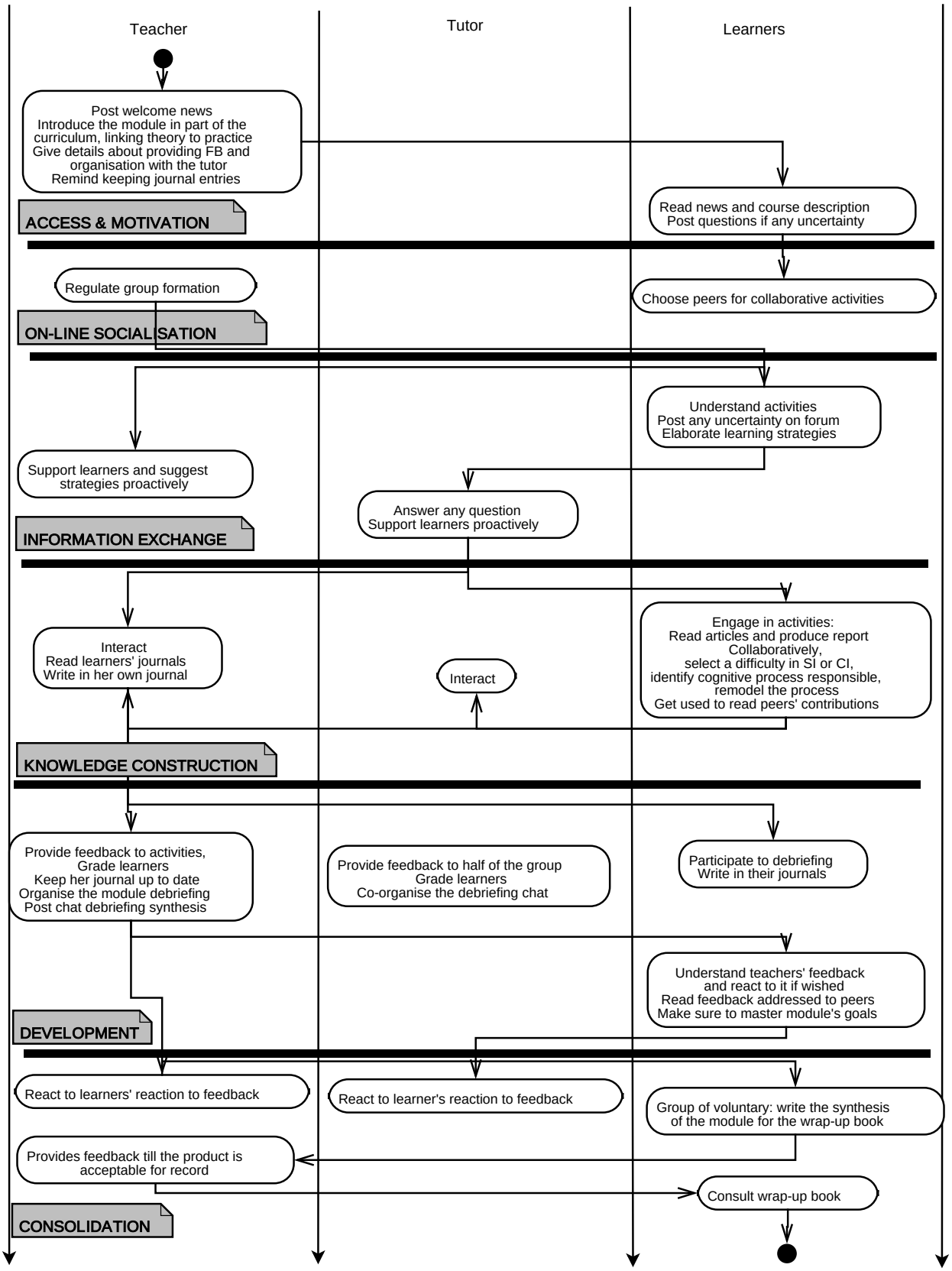


Figure 35: Example of a pedagogical scenario using an adapted and simplified version of UML activity diagrams

9.2.2. Analysis of enacted activities

Activity diagrams were also used to analyse how learners from the three profiles enacted activities. For each profile, there are two activity diagrams: one depicts the entire group's actions in the forum and the other focuses on the individual learner's actions. The latter defines two sets of categories: one for actions performed (participative, social, interactive, cognitive, metacognitive, organisational) and one for tools used (forum, chat, wiki, private messages, shoutbox). The analysis begins with the diagram for the entire group, focusing on the most interesting aspects (who leads, who takes decisions, etc.) and highlighting the impact of the "observed" learner's actions on the group. We then turn our attention to the "observed" learner and report his/her activities and the tools s/he used to perform those activities. Since learners are studied across two different activities, one at the beginning of the course and one at the end, we then discuss any changes in behaviour that may have occurred over that time-span. We conclude with two comparisons: one of learners with the same profile across case studies and one of all the profiles.

Let us provide further details about the role of the activity diagrams in the analysis of enacted activities. Learners' interactions were analysed in two activities: the first took place at the beginning of the curriculum - Module 2, activity 2, *Modelling the interpreting process,* conducted by the teacher T1 and the tutor Tutor1[31]; the other occurred at the end of the curriculum - Module 7, activity 1, *Curriculum design and decisions,* conducted by the teacher T3 and the tutor Tutor1 in Case Study 1, and by the same teacher T3 and the tutor Tutor2 in Case Study 2. Both activities were essentially the same for the two editions of the course, because the design worked out well in this case, except for the time span provisions. For both activities, learners had to work collaboratively in groups of four. For the first activity – activity 2, Module 2, learners chose their own groups, whereas for the second, the teacher formed the groups, trying to pair learners with no teaching experience with learners who were also teachers. For both activities, learners had to identify and select a problem to work on. In the first activity, they had to identify a difficulty in simultaneous or consecutive interpreting and in the second, they had to choose a conference interpretation curriculum. In both cases, they had to submit a collaborative report (800 and 1200 words, respectively). The first activity for Case Study 1 took place between November 8 and November 11, 2004. The second activity for Case Study 1 took place between January 24 and January 27, 2005. For Case

[31] It is important to notice that for confidentiality reasons, we have chosen to name teachers "T1", "T2", etc. and to talk of teachers as SHE whereas tutors are refered to as "Tutor1", "Tutor2", etc. and we talk of them as HE.

Study 2, the first activity took place between October 11 and October 18, 2006, and the second activity between January 29 and February 6, 2007.

Our intention was to look carefully at how learners from each profile – alone and within their groups - enacted the activity. We investigated current ways of analysing data, particularly content analysis of forum discussions (De Wever, Schellens, Valcke, Van Keer, 2006), but did not opt for such detailed coding. Our interest was to provide structured tales of how the activity was carried out by learners with different profiles, and to examine how learners from these different profiles interacted with their peers and with the teaching staff. We were also interested in how learners developed in their enaction of an activity from the time when they were still newcomers to the portal to the time when they had become familiar with the portal and its pedagogical functioning. To describe enacted activities in the form of structured tales, we used activity diagrams inspired by the IMS - learning design specification (see Section 3.5). In the activity diagram, the different learners of the group are represented, including the teacher and the tutor. The horizontal thick black bar is used in a different way from the way it is used in UML activity diagrams. Here it is used to demarcate all the interactions that happened during a single day. Whatever the action (decision, production, discussion, etc.) and no matter how time consuming it was (10 minutes or 2 hours), it is represented in a similar way on the diagram. We were interested in the overall workflow within the group, the interactions among peers and the interactions within the group.

We also wanted to look more closely at a single learner's actions. To do so, we went back to Henri's (1992) categories. To her participative, social, interactive, cognitive and metacognitive categories, we added an organisational category (i.e. to categorise request for meetings, etc.) and a tool category to specify which tool the learner used to carry out a particular action. This second, individual activity diagram indicates which tool was used when and for which action. While collaborative activity diagrams provide a cursory overview of how the group enacted an activity, the more detailed individual activity diagrams provide a more detailed picture of the type of action performed and the tools used to perform it.

Section 9.3. Summary

The research was conducted with three types of data: 1) data collected from a questionnaire distributed to learners at the end of the course, 2) data collected through semi-structured interviews with teaching staff at the end of the course, and 3) objective data retrieved from the portal. Three types of analyses were performed on the data. The first involved statistical

analysis: descriptive statistical analysis to address the issues associated with the research questions, and cluster analysis to identify different learner profiles. The second involved the use of activity diagrams to analyse enacted activities at both the group level (because activities were collaborative) and the individual level. The third involved analysing quotations from the semi-structured interviews with teaching staff, which also helped to address the issues related to the research questions.

Chapter 10. Case studies

Section 10.1. Introduction

The present chapter on case studies begins with an analysis of the context of innovation that is the concern of this research. The analysis appeals to the features of expansive learning, the triangle model and the Eight-Step Model presented in Chapter 7.

The learning context will be examined first in terms of the actions of expansive learning and the sequences identified by Engeström (2001). Then, with the help of the Eight-Step Model and the activity system triangle, the situation before and after introducing technology in the course for interpreter trainers will be examined. Engeström's terminology and sequence of expansive learning actions are used to review the following steps: questioning, analyzing, modelling, examining and implementing, reflecting and evaluating, and consolidating.

1) Questioning. Before the introduction, in 2004 of the first blended edition of the course, learners were very satisfied. Despite the high demand for this training, it proved difficult to implement, for two reasons: for one thing, trainers could not run the program more often than once every two years, and for another, it is difficult for conference interpreters to take two solid weeks out of their professional agenda to attend a face-to-face course.

2) Analyzing. The main question that arose was whether or not technology and distant education could help in this situation. The system seemed ripe for innovation and motivation for change was not lacking.

3) Modelling. The answer was yes, technology could help. The design of a socio-constructivist learning environment seemed to be the most appropriate choice. This led to the transformation of the curriculum into a one-year blended course.

4 & 5) Examining and implementing the model. The first blended edition of the course was run and constitutes the first case study of this research.

6) Reflecting and evaluating. The reflection and evaluation that resulted from this first run led to local changes, which will become evident in the analyses of Case Study 1 (Section 10.2) and Case Study 2 (Section 10.3). The major change pertained to end-of-course certification, which had originally been a Continuing Education Certificate but became a Master of Advanced Studies, a move that was justified by the volume of activities and the number of working hours learners were expected to invest in the new version of the course.

7) Consolidating. As a result of the evaluation, blended socio-constructivist activities spread beyond the continuing education courses into the regular Master's courses for conference interpreters. Gradually, this gave birth to a so-called virtual institute with several learning portals to support Master's, postgraduate and continuing education courses.

Figure 36 applies the Eight-Step Model and the activity system triangle to provide a more detailed picture of the former context for training interpreter trainers. This figure can be compared with Figure 37, which displays the new context. The case studies of the present research are situated in the second context. Certain local changes in the context took place from Case Study 1 to Case Study 2; these are reported later on in the analysis.

A comparison of the two figures highlights the significant changes with respect to the subjects involved, the object and the desired outcomes. The community and the set of tools has been greatly expanded, the teaching procedure is more varied and the division of labour is much denser.

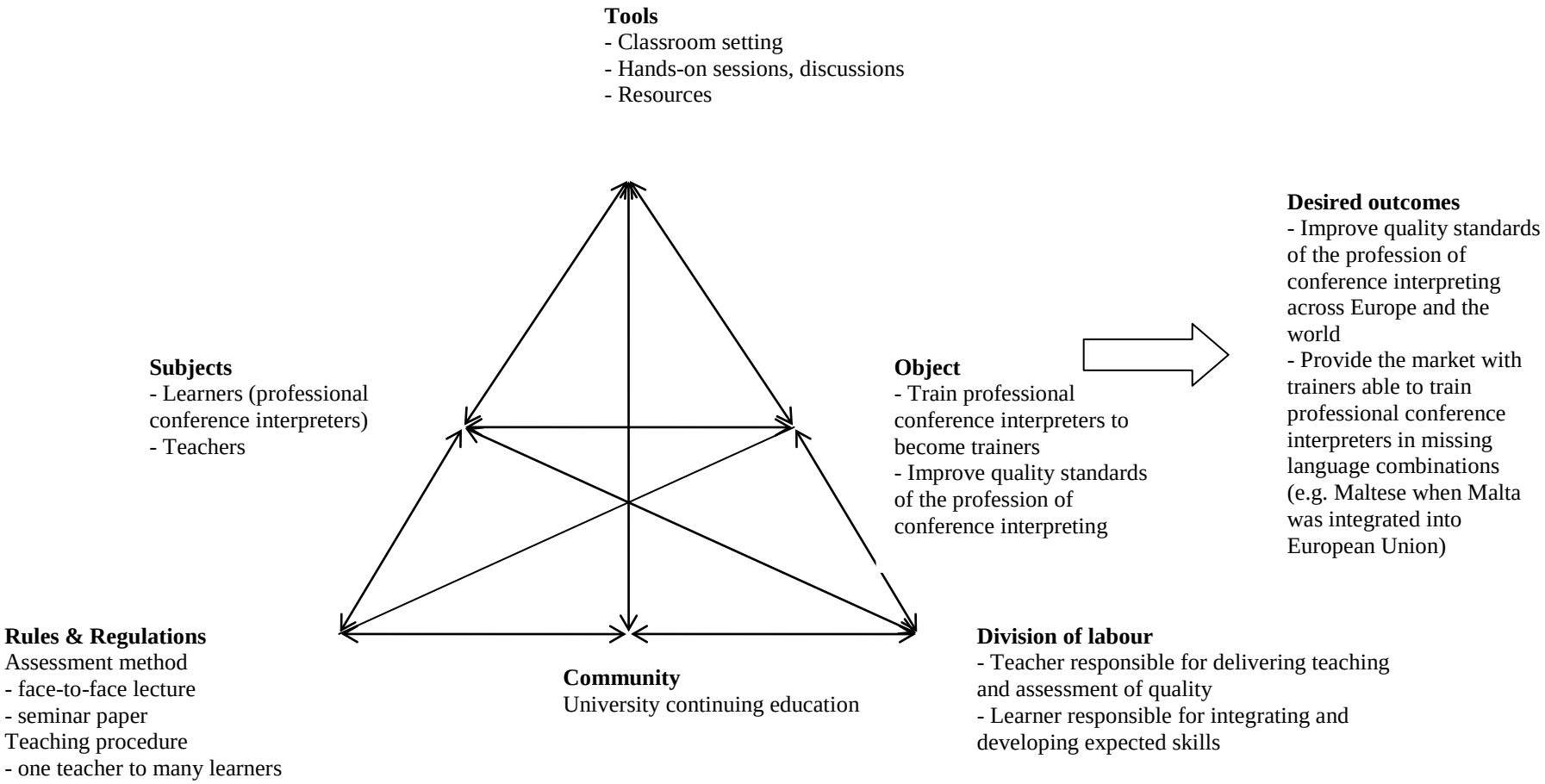


Figure 36: Activity system for the former face-to-face training of interpreter trainers

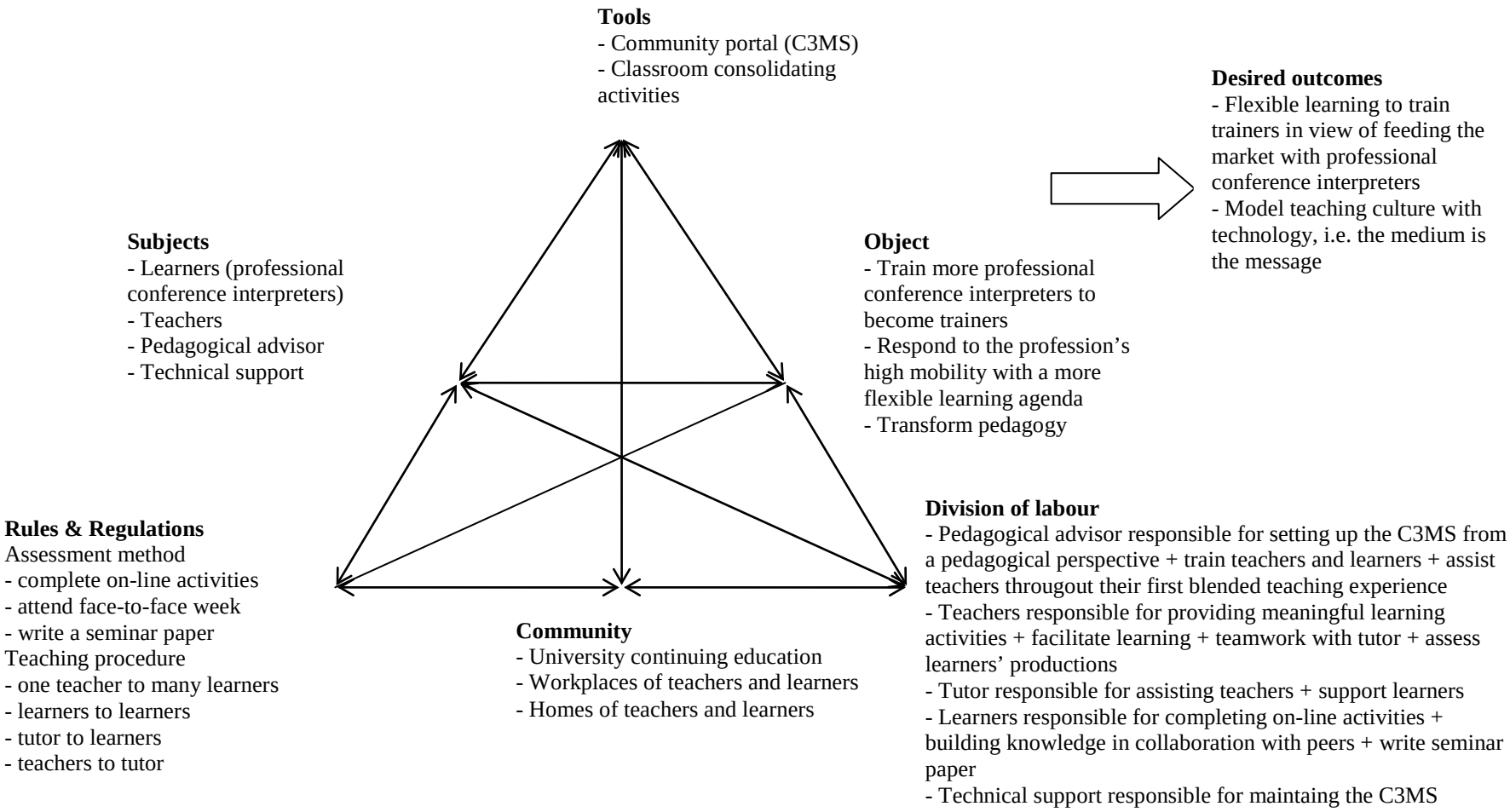


Figure 37: Activity system for the innovated blended training of interpreter trainers

Both case studies took place in the context displayed in Figure 37. To bring about the situation described schematically in Figure 37, teachers received training on both the learning environment, with an emphasis on how the different tools could be used from a pedagogical point of view, and on writing pedagogical scenarios for socio-constructivist blended learning contexts. Teachers designed their courses and activities, and the pedagogical advisor provided feedback. The process went back and forth until both parties were convinced that the activities would meet the knowledge and skill objectives as well as the distant socio-constructivist setting objectives. From a tool-support perspective, we used the so-called *Pscenario* tool, a tool specifically developed to design pedagogical scenarios. The entire course and the details of each module, including information about activities, resources, deadlines and evaluation were designed with the support of that specific tool. In the context of this research, we used conjecture maps and activity diagrams to describe each module. Furthermore, the description of each module follows the same pattern: the *description* section focuses on the learning goal and describes the module in broad terms; the *design goals* section describes the underlying pedagogical models and how they have been implemented in the particular situation of the module; the *enactment* section provides information about how the pedagogical scenario unfolds; and finally the *comment* section highlights some major features of either the teachers' interviews or the learners' journals. A conjecture map for the entire module supports the *design goals* section and an activity diagram represents the *enactment* of the module (see Section 8.1 for theoretical details about conjecture maps and Section 3.5 and 9.2.1 for details about activity diagrams).

Section 10.2. Case Study 1, overall description

10.2.1. Description

The Certificate for interpreter trainers is a one-year continuing education course. It is a postgraduate course for professional interpreters aiming at becoming interpreter trainers. There are two major types of interpretation: simultaneous interpretation (SI) and consecutive interpretation (CI). The *Association internationale des interprètes de conférence* (AIIC) defines the two types as follows: "In simultaneous mode, the interpreter sits in a booth with a clear view of the meeting room and the speaker and listens to and simultaneously interprets the speech into a target language. Simultaneous interpreting requires a booth (fixed or mobile) that meets ISO standards of acoustic isolation, dimensions, air quality and accessibility as

well as appropriate equipment (headphones, microphones).[32]" "The interpreter providing consecutive interpretation sits at the same table with the delegates or at the speaker's platform and interprets a speech into the target language after the speaker speaks. The length of the speeches varies. For this purpose the interpreter may take notes.[33]"

From an academic point of view, the Certificate represents a course of approximately 10 ECTS credits. It employs both distance and face-to-face formats: one face-to-face week embedded, respectively, in five months of distance teaching and learning, and in seven months of distance learning devoted to writing the seminar paper.

The curriculum consists of ten modules. Modules are organised as follows and represent approximately thirty-five learner working hours each, with the exception of Module 10, which is a one-day, face-to-face course and will not be detailed.

- Module 1: Fundamentals of distance learning
- Module 2: The interpreting process
- Module 3: Skill acquisition and expertise
- Module 4: Teaching consecutive interpreting
- Module 5: Teaching simultaneous interpreting
- Module 6: Feedback
- Module 7: Curriculum design, syllabus design and lesson planning
- Module 8: Legal interpreting
- Module 9: Research methodology
- Module 10: Voice training

Before 2004, the Certificate was offered in a face-to-face format four times (1996, 1998, 2000, 2002), and provided two solid weeks of training for fifteen to sixteen participants per session. Attendance was a prerequisite for certification, and evaluation was both formative and summative (candidates needed to take three teaching exams and write a seminar paper). In 2004, the Certificate course welcomed 21 participants and was the first course at ETI to be designed with a community portal. The portal had two interfaces. The anonymous interface (Figure 38) included general information, a list of resources, a calendar of conferences on issues related to interpreting, and a forum for discussing topics related to interpreter training.

[32] AIIC Website: http://aiic.net/glossary/default.cfm?ID=262
[33] AIIC Website: http://aiic.net/glossary/default.cfm?ID=103

Once logged in, the learner interface (Figure 39) provided access to the proper learning environment, a C3MS, with learning materials, activities and tools.

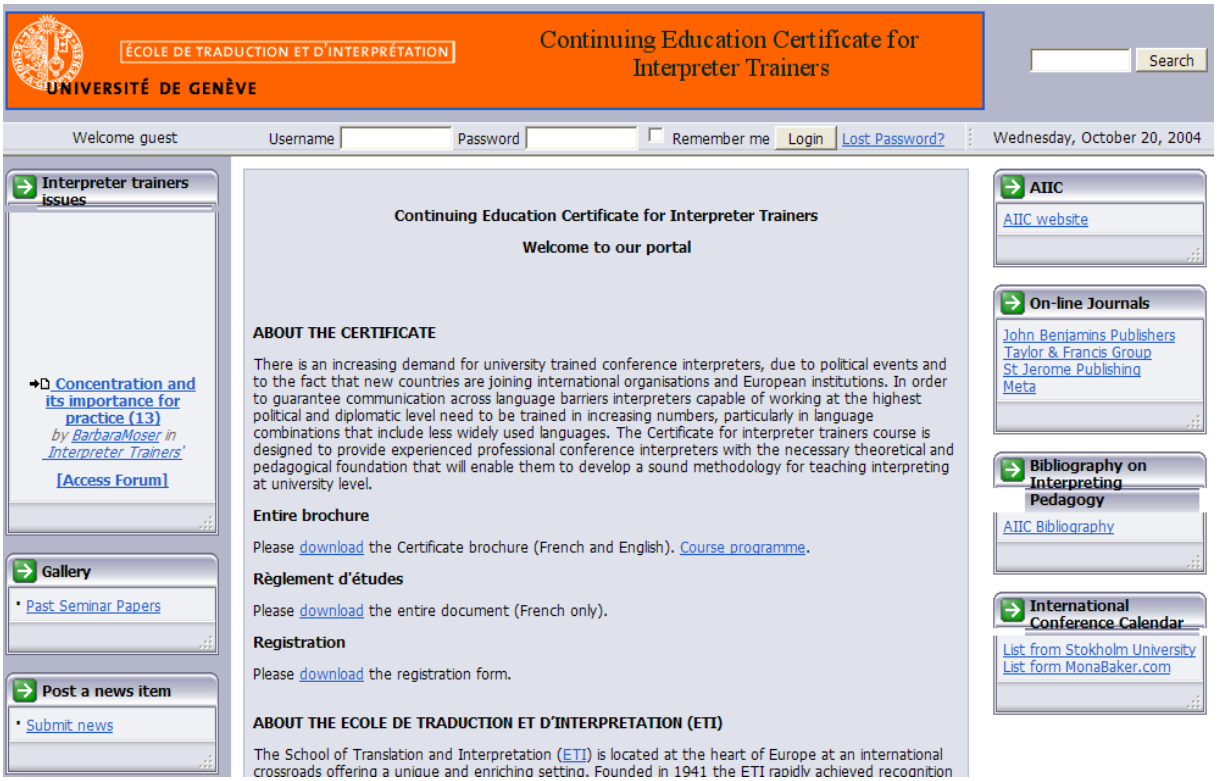


Figure 38: Screenshot of the Certificate portal, the anonymous interface

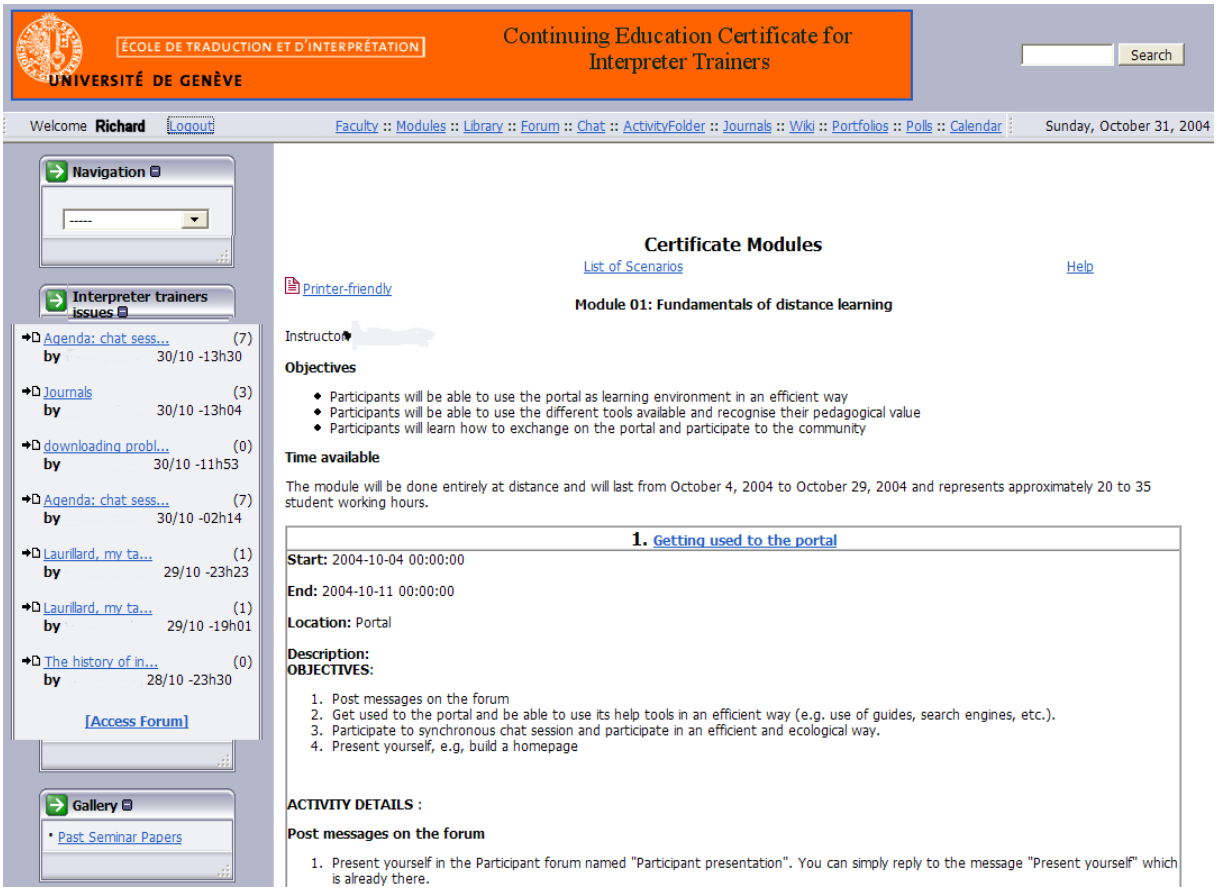


Figure 39: Screenshot of the Certificate portal, the learner interface

Four types of tools were selected to support, respectively, content and production (Table 36), communication (Table 37), metacognition (Table 38), and awareness and organisation (Table 39). Some additional tools were also made available (Table 40).

Tool	Pedagogical use
News	Text editor. Used exclusively by teaching staff to post information covering organisational matters or providing content information related to modules.
Forum	Discussion tool, organised by topic. Used by learners and teaching staff to build knowledge, exchange on content and interact with the community.
Wiki	Webpage editor that can be modified by anyone through a simple web browser. Used by learners to draft collaborative documents.
Portfolio/homepage	Webpage editor. Used by learners to build a personal area, with both personal information and course-related performances.
Activity folder	Upload/download tool. Used by learners to submit final productions requested for activities.
Wrap-up book	Word file. Synthesis of all modules with references to learners' productions sent out to participants at the end of the course for future reference.

Table 36: Content and production tools

Tool	Pedagogical use
Chat	Synchronous discussion tool. Used by teaching staff, usually at the end of the module for debriefing purposes. It can also be shared at any time among learners, knowing that all conversations are being recorded for easy retrieval.
Call someone	Instant messenger tool. Used by learners and teaching staff to talk to another person logged on to the portal. It can be used for social as well as for work and learning purposes.
Shoutbox	Short message boards. Used equally by learners and teaching staff either to reinforce organisational tools or for social purposes.
Private messenger	Internal to the portal asynchronous messaging system. Used for private communication by learners and teaching staff.

Table 37: Communication and regulation tools

Tool	Pedagogical use
Journal	Text editor. Used by learners and teaching staff as a reflection tool to report progress in activities, emotions, new understandings, etc.

Table 38: Metacognitive tools

Tool	Pedagogical use
Who is on-line	Social awareness tool. Used to check who is connected to the portal at the same time as oneself.
Calendar	Calendar tool. Used by teaching staff to reminds learners of important dates such as beginning and end of a module or synchronous meetings.
Module scenario	Detailed description of each module. Used by learners to obtain information about activities, resources, deadlines, evaluation.
Member list	Directory. Used by teaching staff and learners to access any member registered in the portal's information base.

Table 39: Awareness and organisation tools

Tool	Pedagogical use
Faculty homepage	Webpage editor. Used by teaching staff to provide short biographies of all teaching staff members.
Library	Upload/download tool. Used by teaching staff to store all compulsory readings and by learners to download them.
Portal guide	PDF file. Used to provide newcomers with an overview of all the tools and spaces used both pedagogically and technically.
Chat recording tool	Recording tool. Used to facilitate retrieval of any conversation that took place in a chatroom on the portal.

Table 40: Additional tools

10.2.2. Design goals and design strategies

The face-to-face week, which occurred after Module 8 was designed, on the one hand, to help learners consolidate the knowledge they acquired in the online part of modules and, on the other hand, to prepare them for their seminar paper. Work for the face-to-face week was assigned as follows (Table 41):

Module number	Module name	Instructor(s)	Date	Schedule
4	Teaching consecutive interpreting	T2	March 7	9:30-12:30 14:00-16:00
5	Teaching simultaneous interpreting	T1	March 8	9:30-12:30 14:00-16:00
6	Feedback	T2 and T3	March 9	9:30-12:30 14:00-16:00
7	Curriculum and syllabus design	T3	March 10	9:30-12:30 14:00-16:00
8	Legal interpreting	T5	March 11	8:15-11:45 13:00-14h30
9	Research methodology	T4	March 11	15:15-18:30
10	Voice training	T6	March 12	9:30-12:30 14:00-16:30

Table 41: Daily schedule of the face-to-face week, Case Study 1

With respect to the seminar paper, five out of the six teachers plus the tutor were responsible for coaching learners on their seminar papers. The topic was left entirely free for the learners to choose. Learners had from April, after the research methodology module, to September to write the paper. Each learner was provided with five hours of personal tutoring on his/her paper during this period. Learners were asked to use a style sheet, which also contained some scaffolding, i.e. it indicated the different parts the paper should contain.

More generally speaking, when we started designing the first edition of the course for interpreter trainers, the philosophy behind the entire course had two orientations: the first was based on the *learn-by-doing* principle, and the second was based on cognitive apprenticeship, the teach-by-modelling principle (see Section 3.2 for details about pedagogical models). With respect to the first orientation, it was important for the course designers to avoid 'transmitting' teaching methods to the learners, but rather to have them build on their former and current practices, either as teachers or learners or both. It was felt that allowing learners to

ground the theoretical background in their own experience would be more effective. In parallel, reflecting about different issues related to teaching simultaneous or consecutive interpretation would engage learners in seeking solutions to authentic problems. This orientation involved opting for a profession-based approach to training interpreter trainers.

The other orientation was for teachers to act as models for these future trainers. Since the audience for the blended training did not have similar experiences in the past, it was considered all the more important to provide learners with teaching models they would be able to refer to later on. The teaching staff was conscious of playing this reference role. The choice of learning environment had been made in accordance with both these pedagogical orientations: it was intended to support collaborative knowledge building and skills development and to accommodate modelling. For example, the feedback provided by a teacher or tutor would be in written form and thus accessible to the entire community, so that any learner could access it and retrieve it later on. The feedback would be structured in such a way as to constitute a “model of how to provide feedback in this particular situation.”

The design of the course was based on two powerful pedagogical orientations - constructivism and cognitive apprenticeship - and on the following theoretical conjectures (see sub-section 8.2.8 for details):

- tutor support enhances learning;
- achieving self-directed learning is part of constructivist objectives;
- reflection on one's own practices is part of a teacher's practice;
- blended learning is enriching;
- practical teacher skills can be acquired through production and interaction with peer learners;
- peers and the community stimulate individual and group work;
- collaborative learning enhances argumentation and listening skills;
- authentic activities enable higher-order learning;
- the learning environment is part of learning in a distributed cognition approach;
- C3MS is an effective learning environment and tools support pedagogical aims;
- innovating consists of a subtle balance between instructional design patterns and agile methodologies; and
- scripting activities enable learning.

To embody these conjectures, several pedagogical strategies and models (problem-based learning, inquiry-based learning, role play, information processing, etc.) have been used to develop authentic and meaningful learning activities, focusing on content, process and reflective practice (Figure 40). A conjecture map outlining the design, process, enabling tools and outcomes for each module will be presented. This allows the focus to alternate from the largest picture of the overall training to the details of each module. Putting the nine conjecture maps back-to-back offers another perspective on the overall training, emphasising, for instance, preferred pedagogical strategies and tools.

10.2.3. Enactment

From October 2004 to February 2005, learners were engaged in working on the modules, starting with Module 1 and ending with Module 8. They interacted with each other and produced knowledge, guided by activities that had been designed beforehand. Then, in March, they participated in the one-week, on-site, face-to-face session. During this week, learners consolidated the skills and knowledge they had constructed online, working from 9:30 am to 4:30 pm from Monday to Saturday. Teaching staff reviewed things that were not fully understood and suggested activities to transfer the knowledge acquired during online activities. From the end of March till mid-April, learners were occupied with Module 9, research methodology, which prepared them for the final phase of the course, the seminar paper. Finally, the time from mid-April to October was devoted to writing the seminar paper (Figure 41).

10.2.4. Comments

The overall design of the course, in its first blended edition, worked out rather well from a content point of view. It was very demanding for both learners and teaching staff, but this might be the price of shifting to blended socio-constructivist pedagogy. Concerning the design of the curriculum proper, some adjustments were needed. These adjustments concerned, first, the place of the research module within the entire curriculum, and second, changing the status of the module on legal interpreting, which involved removing it from the prescribed curriculum and offering it on a stand-alone basis. Adjusting the research module was an occasion to adjust the status of the seminar paper. In this edition of the course, the seminar paper was largely written on an individual basis, the choice of topic was left open, and the teacher coached the learner until it was completed, hardly taking into account the

number of hours and the time span required. Also for this first course, the wrap-up book was written by teachers *a posteriori*, and it required a tremendous amount of work to go back to each module and provide a synthesis. It was decided that for future courses, the wrap-up book would be done differently.

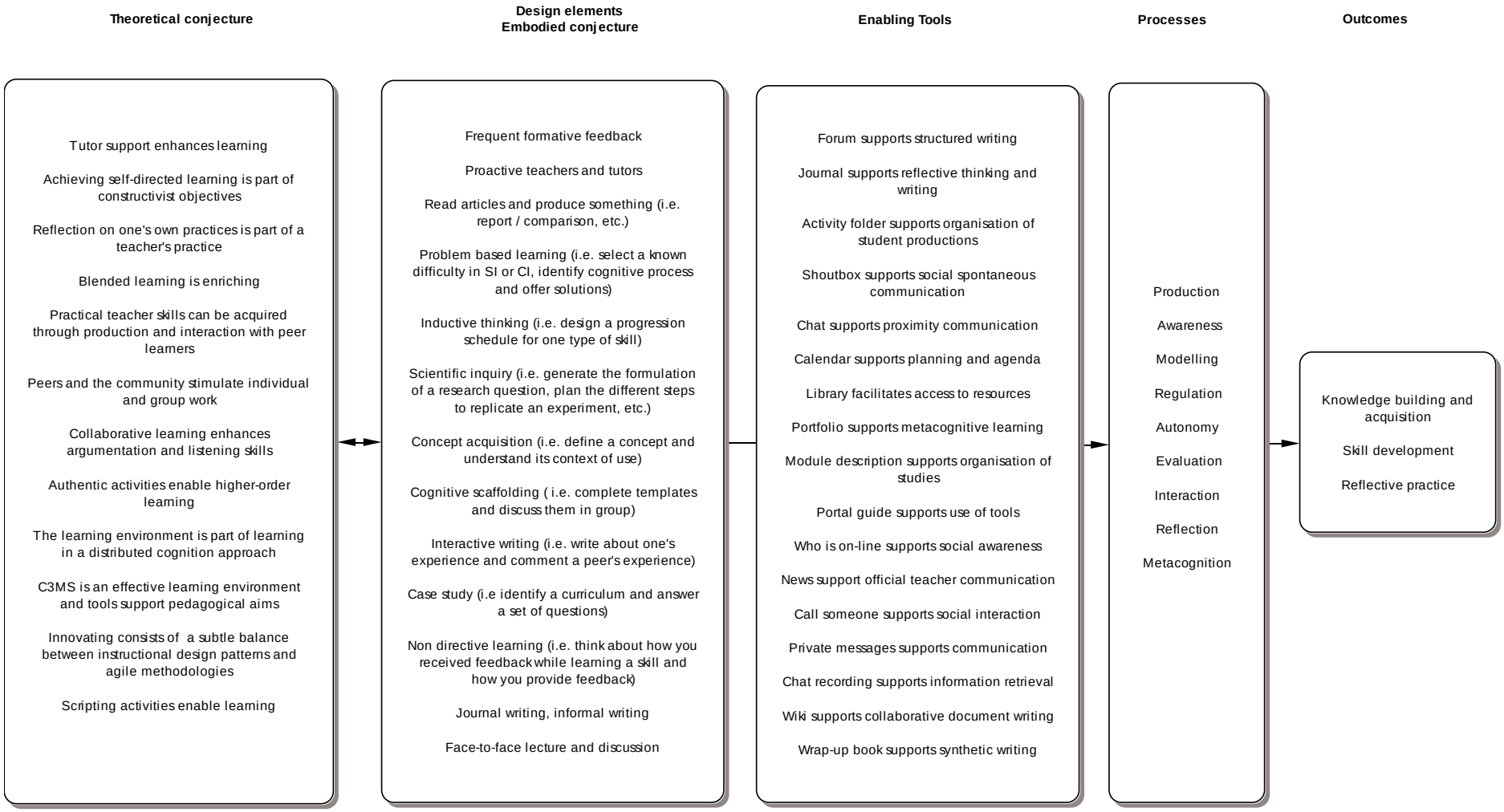


Figure 40: Overall conjecture map, Case Study 1

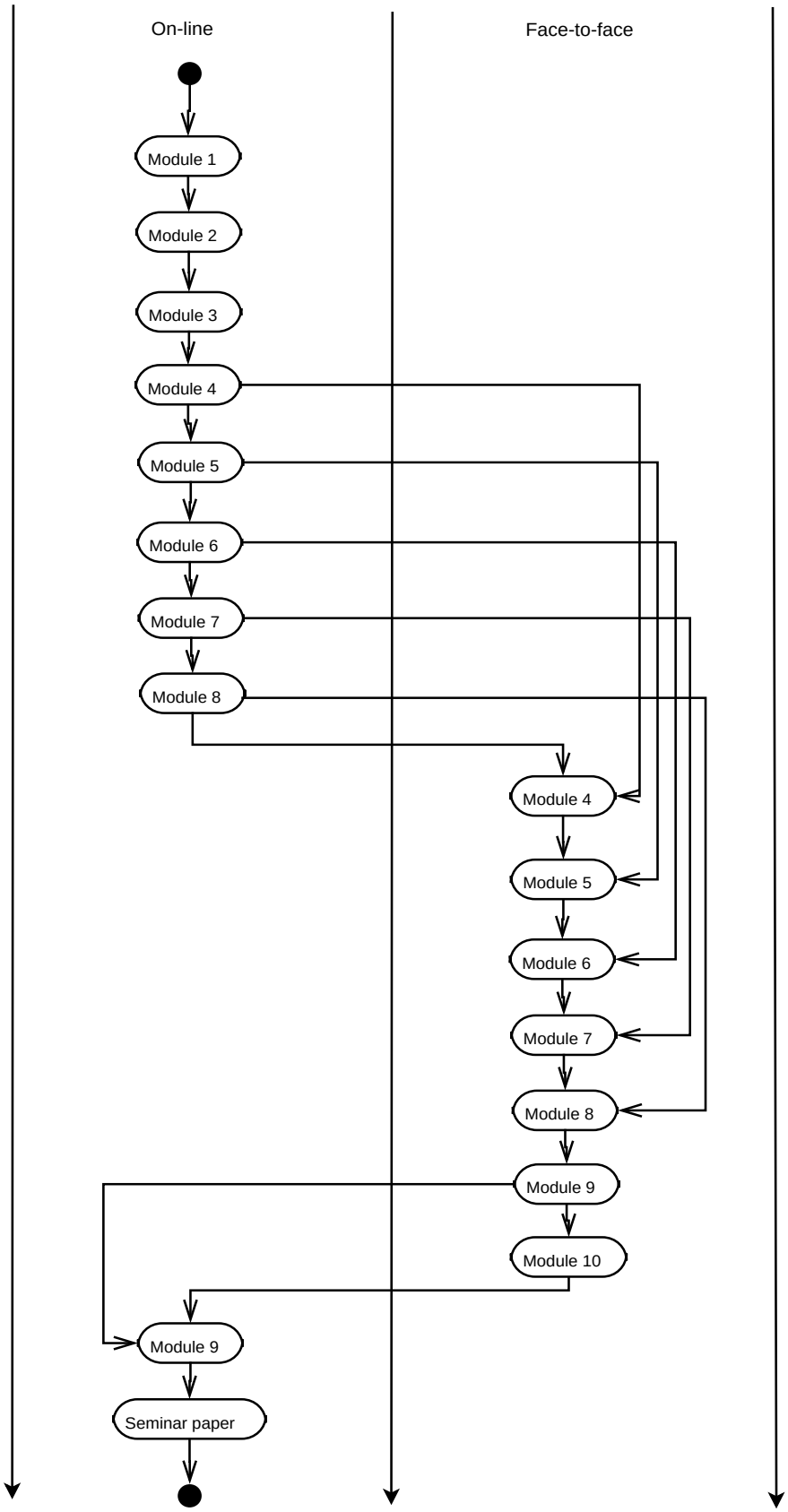


Figure 41: Overview of entire training: on-line and face-to-face portions, Case Study 1

Section 10.3. Case Study 2, overall description

10.3.1. Description

The Master of Advanced Studies (MAS) for interpreter trainers is a one-year continuing education course. It is a postgraduate course for professional interpreters aiming at becoming trainers. From an academic point of view, the MAS represents a programme of 60 ECTS credits.[34] It is offered in both distance and face-to-face formats, with one face-to-face week embedded respectively in eight- and five-month sessions of distance teaching and learning.

The curriculum comprises nine modules. Modules are organised as follows and represent approximately thirty-five working hours each, except for Module 9, which is a one-day, face-to-face course and will not be detailed.

- Module 1: Fundamentals of distance learning
- Module 2: The interpreting process
- Module 3: Developing expertise in interpreting
- Module 4: Design and implementation of research projects
- Module 5: Teaching consecutive interpreting
- Module 6: Teaching simultaneous interpreting
- Module 7: Curriculum, syllabus design and lesson planning
- Module 8: Evaluating classroom performance: Providing feedback to students
- Module 9: The interpreter's voice

The 2006 course for interpreter trainers was the first MAS course, an upgraded version of the Certificate course. The course welcomed 34 participants. The course was one component of the ETI Virtual Institute: several learning portals were accessible from a more general interpreter portal (Figure 42). The MAS portal was devoted exclusively to the interpreter trainer course (Figure 43). It consisted in a C3MS, with learning materials, activities and tools.

[34] Master of Advanced Studies (MAS): There are two types of MAS at the Univeristy of Geneva, with a minimum of 60 ECTS credits each. Here we are concerned with the Master of Advanced Studies that is part of Continuing Education (http://www.unige.ch/formev/glossaire.html).

Figure 42: Virtual Institute homepage

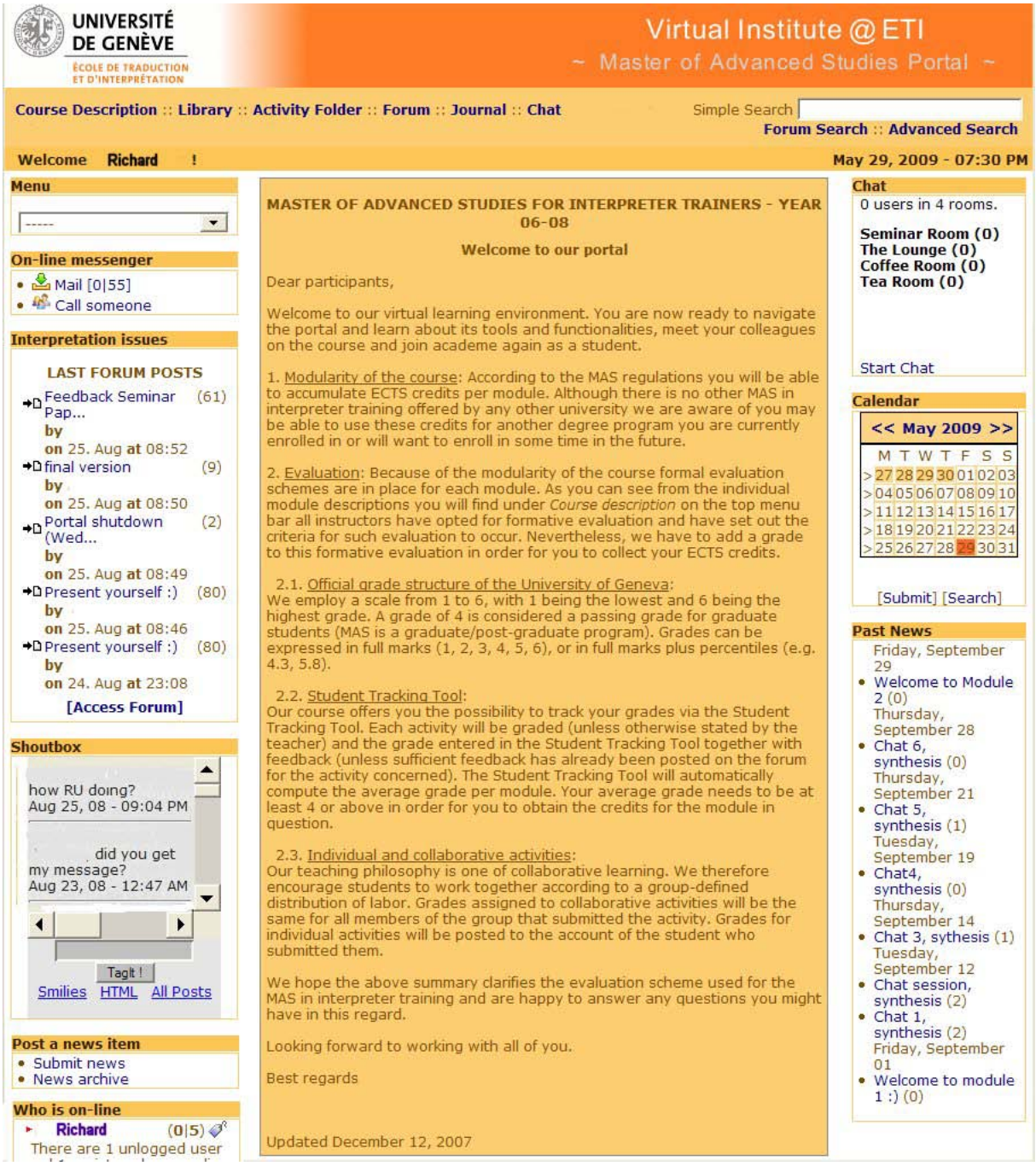


Figure 43: MAS learning portal

Five types of tools have been selected to support production (Table 42), communication (Table 43), meta-cognition (Table 44), awareness and organisation (Table 45) and evaluation (Table 46) as reported in the tables below. Some additional tools were also available (Table 47).

Tool	Pedagogical use
News	Text editor. Used exclusively by teaching staff to post information covering organisational matters or providing content information related to modules.
Forum	Discussion tool, organised by topics. Used by learners and teaching staff to build knowledge, exchange on content and interact with the community.
Homepage	Webpage editor. Used by learners to build a personal area, with personal information.
Portfolio	Shared portfolio. At the end of each module, a group of learners would summarise the module, synthesise learning content and edit recommendations. The teacher would provide feedback till a reliable version, that will constitute the basis for the wrap-up book, would be reached.
Activity folder	Upload / download tool. Used by learners to deposit final productions requested for activities.
Wrap up book	Word file. Synthesis of all modules with references to learners' productions sent out to participants at the end of the course for future reference.

Table 42: Content and production tools

Tool	Pedagogical use
Chat	Synchronous discussion tool. Used by teaching staff, usually at the end of the module for the debriefing. It can also be used at anytime among learners, knowing that all conversations are being recorded for easy retrieval.
Shoutbox	Short messages board. Used equally by learners and teaching staff either to reinforce organisational tools or with a social functionality.
Private messenger	Internal to the portal asynchronous messaging system. Used for private communication by learners and teaching staff.

Table 43: Communication and regulation tools

Tool	Pedagogical use
Journal	Text editor. Used by learners and teaching staff as reflection tool to report progression in activities, emotions, new understandings, etc.

Table 44: Metacogntitive tools

Tool	Pedagogical use
Who is on-line	Social awareness tool. Used to check who is connected to the portal at the same time as one is.
Calendar	Calendar tool. Used by teaching staff to reminds learners important dates such as beginning and end of a module or synchronous meetings.
Module scenario	Detailed description of each module. Used by learners to get information about activities, resources, deadlines, evaluation.
Member list	Directory. Used by teaching staff and learners to access any member registered to the portal's information.

Table 45: Awareness and organisation tools

Tool	Pedagogical use
Student tracking tool	Evaluation tool for tracking grades and feedback when this was not available on the forum. Used by teachers to provide grades and sometimes feedback. Used by learners to gather grades and feedback.

Table 46: Evaluation tool

Tool	Pedagogical use
Faculty homepage	Webpage editor. Used by teaching staff to provide short biographies of all teaching staff members.
Library	Upload/download tool. Used by teaching staff to store all compulsory readings and by learners to download them.
Portal guide	PDF file. Used to provide newcomers with an overview of all the tools and spaces used both pedagogically and technically.
Edit course description	Tool allowing teachers to upgrade and change their courses without asking technical staff to do it for them.

Table 47: Additional tools

10.3.2. Design goals and design strategies

As we mentioned in the introduction to this chapter (Section 10.1), design goals and strategies did not change from Case Study 1 to Case Study 2. The reader can thus refer to sub-section 10.2.2, *Design goals and design strategies,* for Case Study 1. Only local adjustments were made.

The major difference concerns the place of the research project module, which in Case Study 1 occurred after the face-to-face week, whereas in Case Study 2 it took place before the face-to-face week, along with all the other modules.

Other changes brought to the curriculum involved removing the module on legal interpreting from the course, offering it as a stand-alone module. Another change involved reversing the order of the curriculum and the feedback modules. In Case Study 1, the feedback module comes second, while in Case Study 2, it comes first, followed immediately by the curriculum module.

The second major change pertained to the seminar paper. In Case Study 2, only three out of six teachers plus both tutors coached learners for their seminar papers. Learners were encouraged to work collaboratively and had to choose one topic from among the twelve suggested. During the face-to-face week, learners would discuss the topic of their seminar paper with their advisor. A very tight plan, from March to June, with deadlines for deliveries of the different parts and dates for advisors' feedback, was established and ratified by both

learners and advisors by means of a “seminar paper contract”. Each group was provided with approximately five hours of personal tutoring on his/her paper during the allotted period. Learners were asked to use a style sheet, which also contained some scaffolding, i.e. it indicated the different parts the paper should contain.

The third major change concerned the wrap-up book, which was no longer written by teaching staff at the end of the course, but instead was written by different groups of learners throughout the duration of the course.

The fourth major change concerned teachers, who were now able to edit their course descriptions without the assistance of technical staff.

The face-to-face week, which occurred at the completion of the online modules and before the beginning of the seminar paper, was designed, on the one hand, to help learners consolidate the knowledge they acquired in the online modules and, on the other hand, to prepare them for their seminar paper. Work for the face-to-face week was assigned as follows (Table 48).

Module number	Module name	Instructor(s)	Date	Schedule
4	Design and implementation of research projects	T4	March 12	9:00-12:00 14:00-17:00
5	Teaching consecutive interpreting	T2	March 13	9:00-12:30 14:30-17:30
6	Teaching simultaneous interpreting	T1	March 14	9:00-12:00 14:00-17:00
7	Curriculum and syllabus design	T3	March 15	9:00-12:00 14:00-17:00
8	Evaluating classroom performance: Providing feedback to students	T2 and T3	March 16	9:00-12:00 14:00-17:00
9	The interpreter’s voice	T7	March 17	9:00-12:00 14:00-17:00

Table 48: Daily schedule of the face-to-face week, Case Study 2

In addition, the schedule indicated the availability of each seminar paper advisor to meet with participants, narrow down the topic and plan work in detail with the group in order to facilitate the work that would be done at a distance.

Concerning the overall design, conjectures remained the same as in Case Study 1. Pedagogical strategies and models remained more or less the same as well, and were also

applied in authentic and meaningful learning activities, focusing on content, process and reflective practice (Figure 44).

10.3.3. Enactment

From September 2006 to March 2006, learners were engaged in working on the modules, starting with Module 1 and ending with Module 9. They interacted with each other and produced knowledge, guided by activities that had been designed beforehand. In March, they participated in the one-week, on-site, face-to-face session. During this week, learners consolidated the skills and knowledge they had constructed online, working from 9:00 am to 5:00 pm from Monday to Saturday. Teaching staff reviewed things that were not fully understood and suggested activities to transfer the knowledge acquired during online activities. From April to June, learners were occupied with the seminar paper, which had to be finished by September (Figure 45).

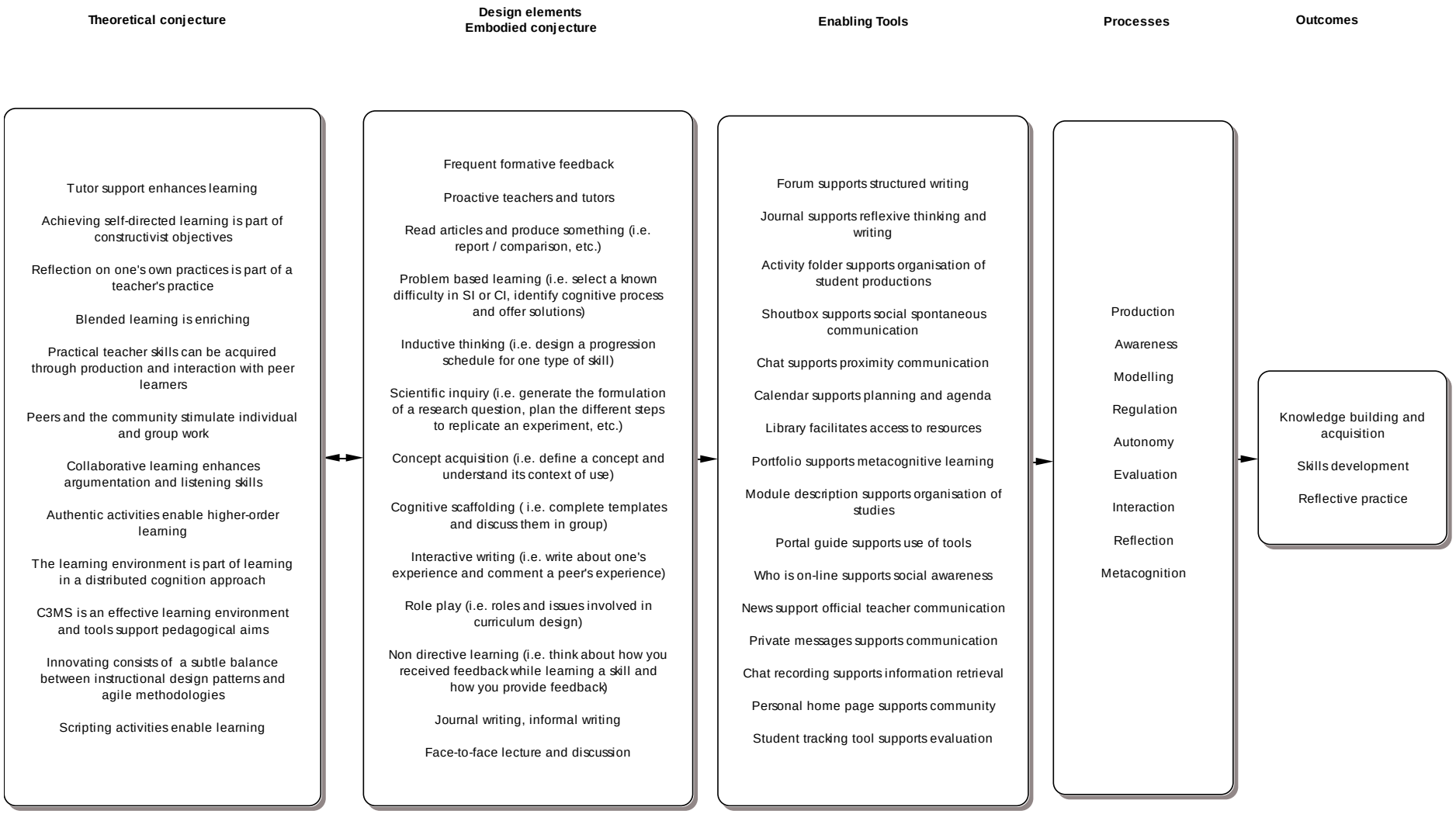


Figure 44: Overall conjecture map, Case Study 2

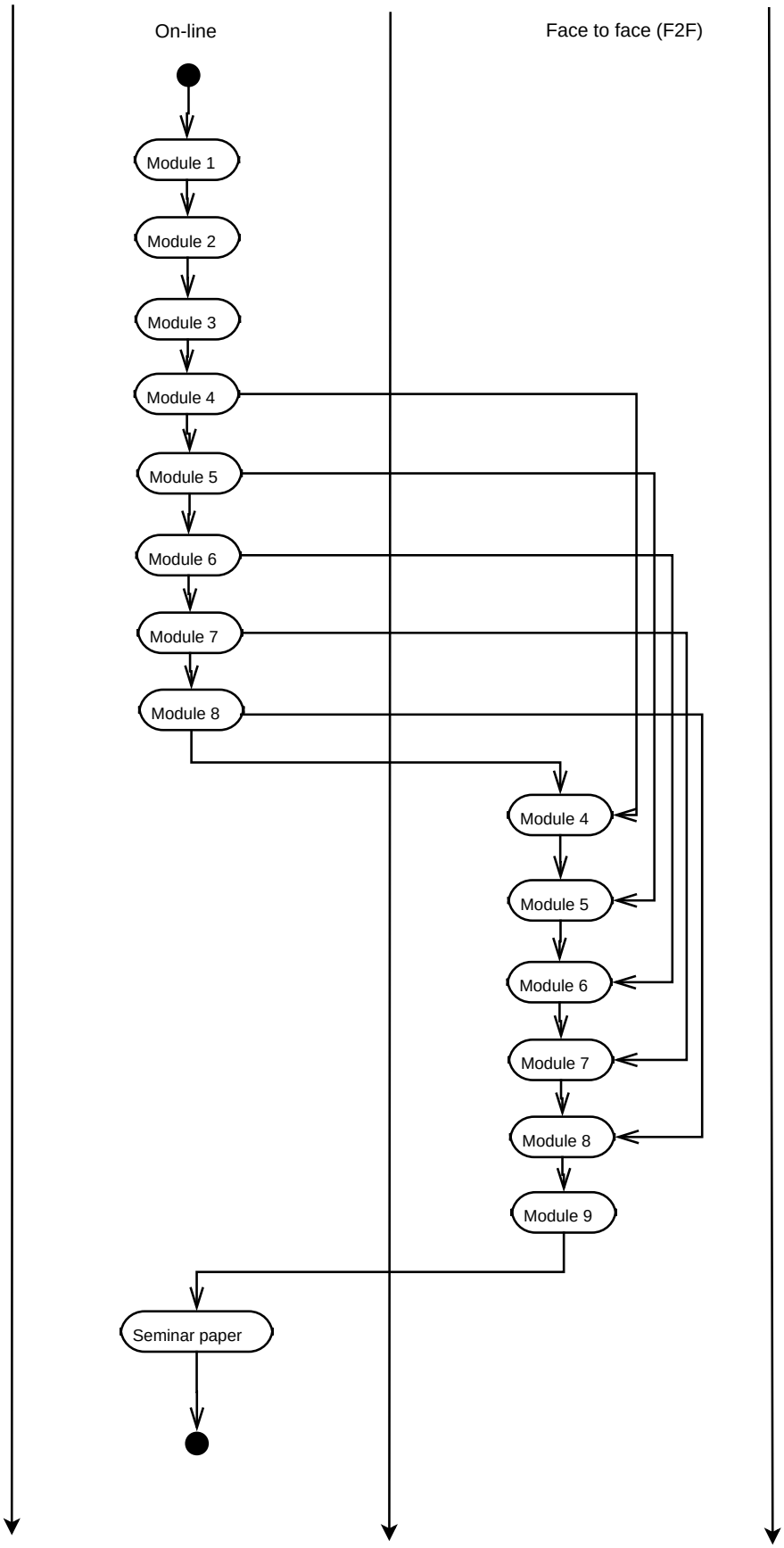


Figure 45: Overview of entire training: on-line and face-to-face portions, Case Study 2

Section 10.4. Modules description, Case Studies 1 and 2

10.4.1. Module 1

Description

Module 1, *Fundamentals of distance learning*, is an introduction to the pedagogical orientations and the learning environment. Activities are structured in such a way that learners must use all the tools and complete the learning activities to grasp the underlying socio-constructivist pedagogical orientations. In terms of the skills and knowledge that must be built up and acquired, by the end of the module learners are able to use the portal – as a learning environment – effectively and efficiently. They are able to use the different tools available and recognise their pedagogical value and, finally, they are able to exchange on the portal and participate in the community. During Case Study 1, they also learned about Laurillard's (2002) framework and used it to design a learning activity. During Case Study 2, this last activity was replaced by an activity that highlighted the complementary relation between journals and portfolios. Since it had been noticed that during the first edition of the course, learners did not make much use of either their portfolios or their journals, this new activity was intended to familiarise them with journal writing and portfolio keeping.

Design goals

This module is guided by the pedagogical principle of learning-by-doing in authentic contexts. In this case, the portal serves as the learning environment and thus constitutes the authentic context. Learners are invited to interact with and contribute to the portal. They learn to navigate, are prompted to search for a particular piece of information, and build their homepages with a view to laying the foundations of their emerging community. They are also encouraged to retrieve resources from the library and discuss them, comment on their peers' points of view and make a habit of writing in their journals to keep track of how their learning is unfolding. In addition, they learn where to find the portal's help tools in order to try out different strategies of solving problems autonomously. Finally, in Case Study 1, they start working collaboratively on the design of a learning activity for their own students (Figure 46). In Case Study 2, learners read articles about journal writing and portfolio keeping and write a collaborative report expressing their perspective on the complementary relation between journals and portfolios (Figure 47).

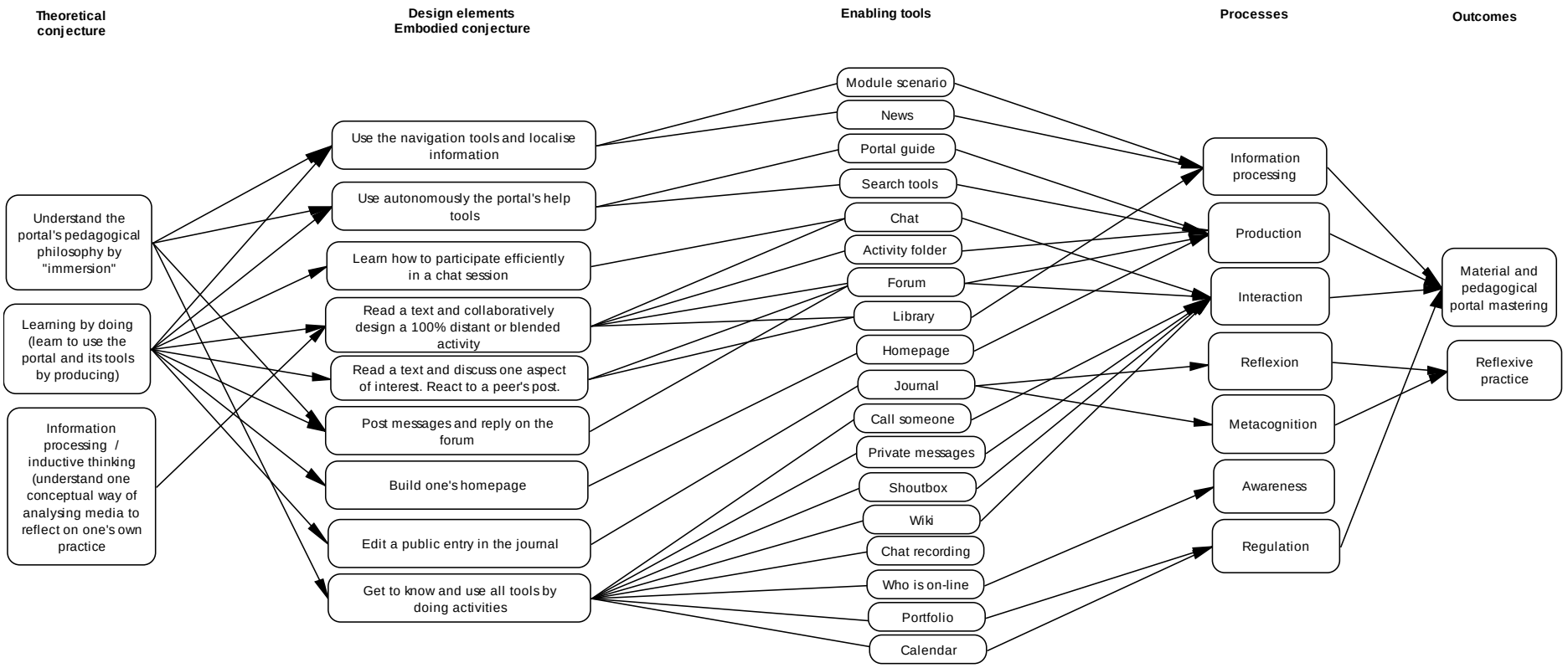


Figure 46: Module 1, conjecture map, Case Study 1

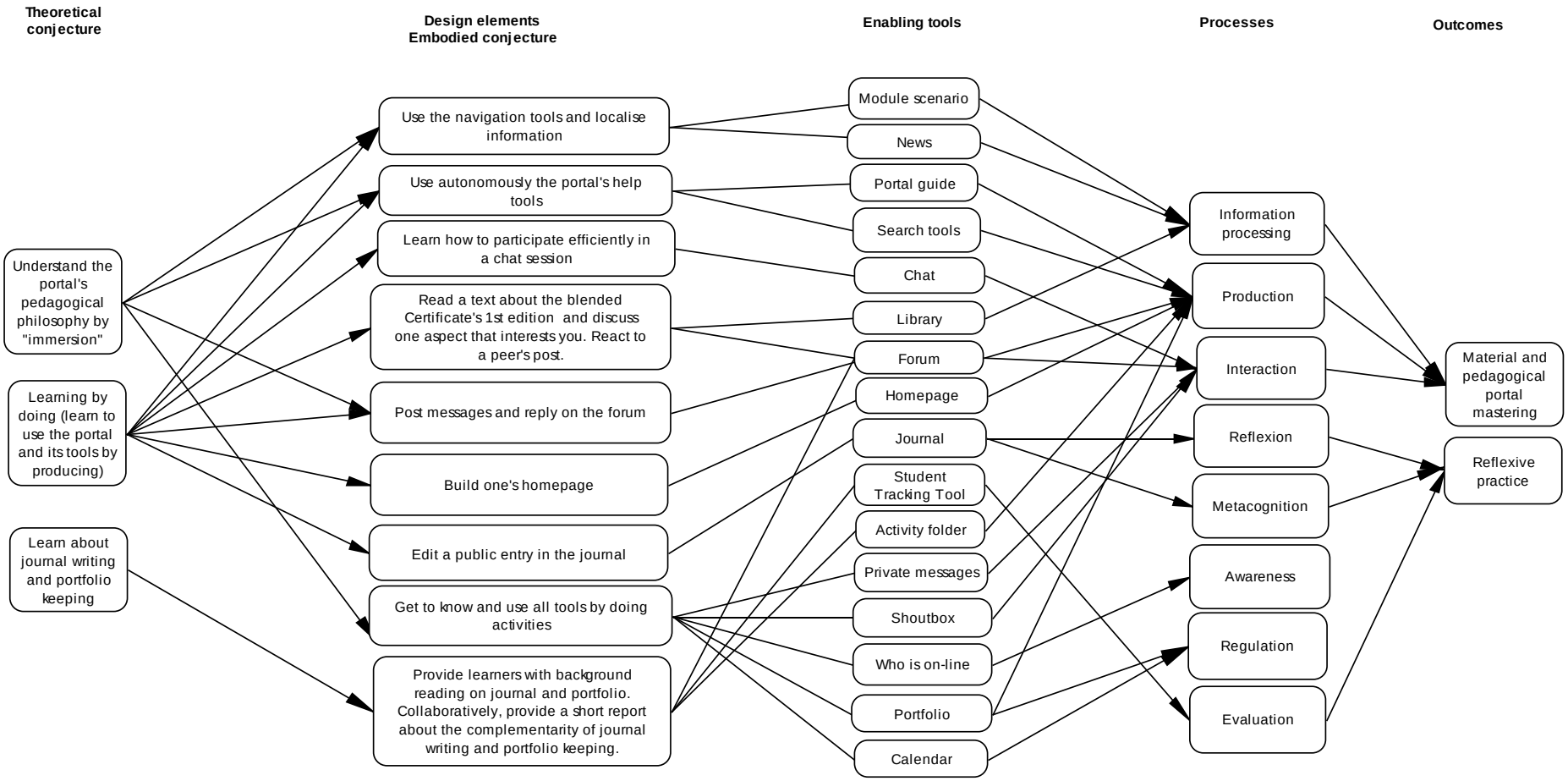


Figure 47: Module 1, conjecture map, Case Study 2

Enactment

Once these design goals are implemented, the workload is shared among three main actors: the learners, the teacher and the tutor (Figure 48). Each one has a particular role that we shall discuss for each of the phases, using Salmon's (2000) framework.

During the *access and motivation* phase, the teacher introduces the module and explains how it will unfold. Learners have to find and read the course description and post a message on the forum introducing themselves. This message serves a dual purpose: it allows the teacher to see who is already up and running from a technical point of view, and it constitutes a preliminary step towards community building, which takes place during the *on-line socialisation* phase. During the *information exchange* phase, learners prepare for the upcoming learning activity and make sure they fully understand the learning tasks. The teacher supports learners proactively during this phase. Then, in the *knowledge construction* phase, learners engage in activities, producing, integrating feedback and interacting. The teacher follows the production process closely and intervenes proactively or on demand. Journals are also a good source of information, for both learners and teachers, about whether activities are unfolding as they should. In the *development* phase, the teacher provides feedback and learners must understand and react to it, building new knowledge as they go along. A debriefing chat is organised to wrap up the module. Finally, the *consolidation* phase consists in a synthesis of the module provided by the teacher. It is included in the wrap-up book so that learners can refer to it in the future if they wish.

During Case Study 2, the enactment is similar to the one described above for Case Study 1, except for two things. The teacher has an additional task, namely, to carry out summative assessment and assign grades. The second difference concerns the writing of the wrap-up book, which becomes the responsibility of the learners (Figure 49).

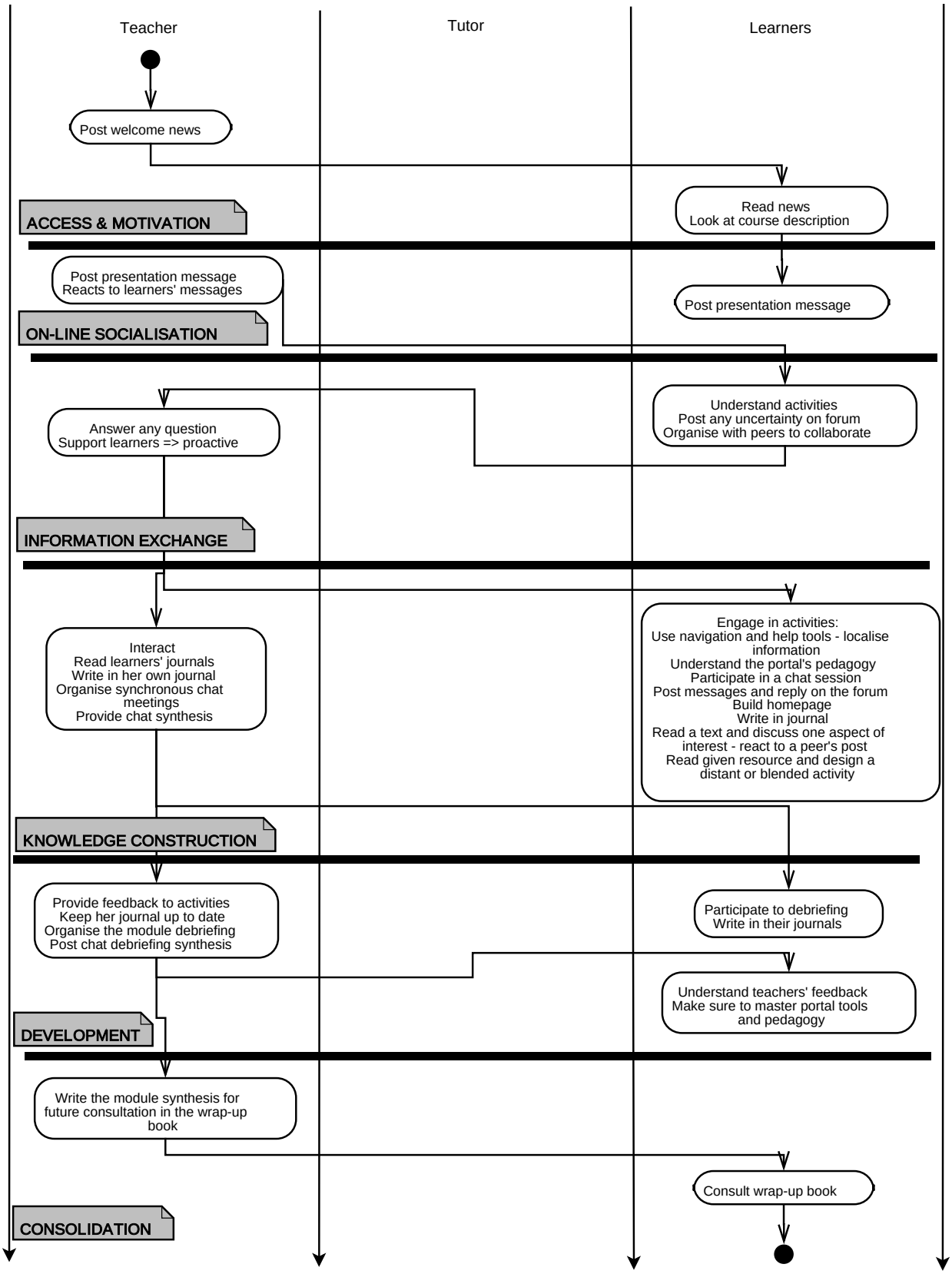


Figure 48: Pedagogical scenario, Module 1, Case Study 1

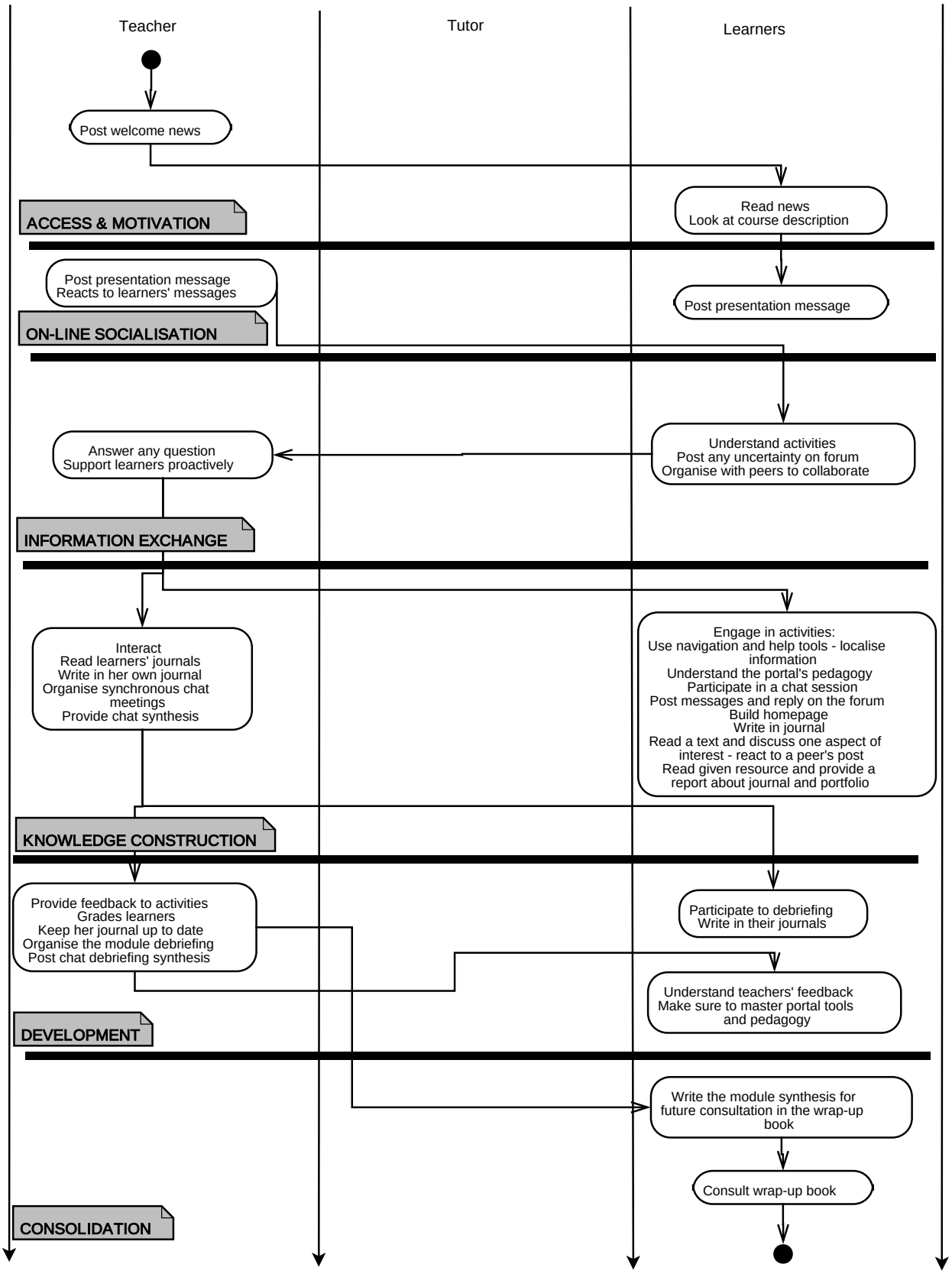


Figure 49: Pedagogical scenario, Module 1, Case Study 2

Comments

The status of this module is very particular: it is the only one that has nothing to do with interpretation but is completely portal and distance education driven. The teacher works alone without any tutor. The teacher is also the person who acts as pedagogical advisor throughout the entire course and is the researcher and author of the present dissertation. Consequently, there is no interview with the teacher of Module 1 that we could refer to for information about the effectiveness of the design. Maybe the fact that learners could concentrate on the following modules without having to worry about where to find what, how to post this, or how to do that, is an indication that this introduction was effective. T1 corroborates this: “I was very relieved that the first module put everyone on a same level” (T1, interview, CS1).

The data gathered in the teacher’s journal indicates that the group is very participative and motivated. Nevertheless, the teacher is concerned about a split in the community between the leaders and those who participate only to the minimum degree required in order to survive. After the first module, she reports that learners are ready to move ahead and deal with issues related to training interpreters.

In Case Study 2, the conclusions are very similar. According to the teacher’s journal, the first activity familiarised everyone with the portal: “Providing feedback to activity 1 was a relief because it showed - as when you take a picture - that most of the participants are adopting the portal and start having fun with it, i.e. concentrate on the content, no more on tools!” The other journal entry expresses concern about the workload involved in providing individual feedback to 34 learners without the help of a tutor.

Module 1 introduces learners to the learning environment, the use and functionality of the tools and the underlying approach to learning that supports it. From Case Study 1 to Case Study 2, the activity addressing the learning philosophy was modified to emphasize collaborative learning and reflection, two dimensions that often entail a difficult cultural shift for learners.

10.4.2. Module 2

Description

Module 2, *The interpreting process*, focuses both on the theoretical background to be acquired and on authentic problem solving, i.e. when a student[35] has a problem, s/he should be able to identify the process responsible for the problem and offer solutions. Reading and inductive thinking (see Section 3.2, Table 6) on the one hand and problem-based activities on the other enable knowledge building and skill development in this module. In terms of the skills and knowledge that must be built up and acquired, by the end of the module learners are expected to master the underlying cognitive processes and skill components involved in interpreting. Placed at the very beginning of the curriculum, this module is more theoretical in orientation. It aims at providing learners with a sound foundation for their pedagogical practice.

Design goals

This module embodies two activities. One is more theoretical and consists in reading some key resources from the literature related to cognitive processes and skill components that come into play in interpreting and producing a report. The other is more directly linked to practice: it is a collaborative activity that involves selecting a difficulty in simultaneous interpreting or consecutive interpreting, identifying the cognitive processes responsible and remodelling the process. From a learning process perspective, production, interaction, regulation and metacognition are all involved (Figure 50). This first theoretical module, entirely taught online, tries to establish a strong link between the acquisition of theoretical knowledge and putting that knowledge into practice.

[35] The word *learner* is used to refer to learners in the Certificate and MAS courses for interpreter trainers, and the word *student* refers to any external student

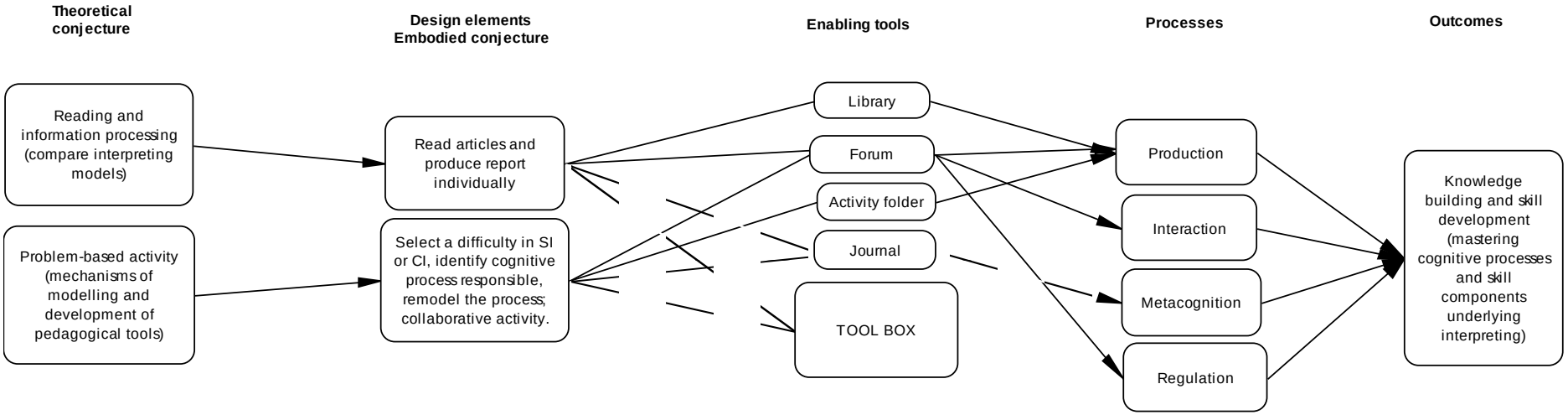


Figure 50: Module 2, conjecture map, Case Studies 1 and 2

Enactment

If the design goals remained exactly the same for Case Study 1 and Case Study 2, we will see how things differed significantly in the enactment.

In Case Study 1, during the *access and motivation* phase, the teacher presents the goals of the module and how they will be achieved. The tutor, during this first appearance on stage, stays in the background and performs "clerical tasks," such as developing a template to keep track of learners' productions. In other words, he is there without really being involved. Learners read the detailed course description and organise their time in order to meet deadlines. During the *online socialisation* phase, learners prepare for the upcoming collaborative activity with their peers. The teacher regulates group formation only when necessary; otherwise he just keeps track to be sure that all participants are integrated in a group. During the *information exchange* phase, learners ask for clarification if there is anything they are unsure of. Both the teacher and the tutor help them to develop learning strategies for the particular context of their activity. In parallel, the teacher pays close attention to information as it arises in the learners' journals and responds to it, if necessary, by re-tailoring the activity. During the *knowledge construction* phase, learners engage in learning tasks. To complete the first activity, they need to go to the library, download the resources, which consist of theoretical texts, read them, post any questions on the forum related to the readings and then produce a report comparing different models of interpreting. They upload the final report in the activity folder. At the same time, learners try to write regularly in their journal. In the *development* phase, the teacher provides feedback on the forum with a view to provoking discussion. Learners are invited to read each other's productions and the feedback received. The teacher organises a debriefing chat session and posts a summary of the chat on the forum. Learners can react to this summary. At this stage, learners concentrate on mastering the objectives of the module. During the *consolidation* phase, the teacher, with the tutor's help, writes a summary of the entire module, which remains on record in the wrap-up book. Learners will be able to refer to this wrap-up once the course is over (Figure 51).

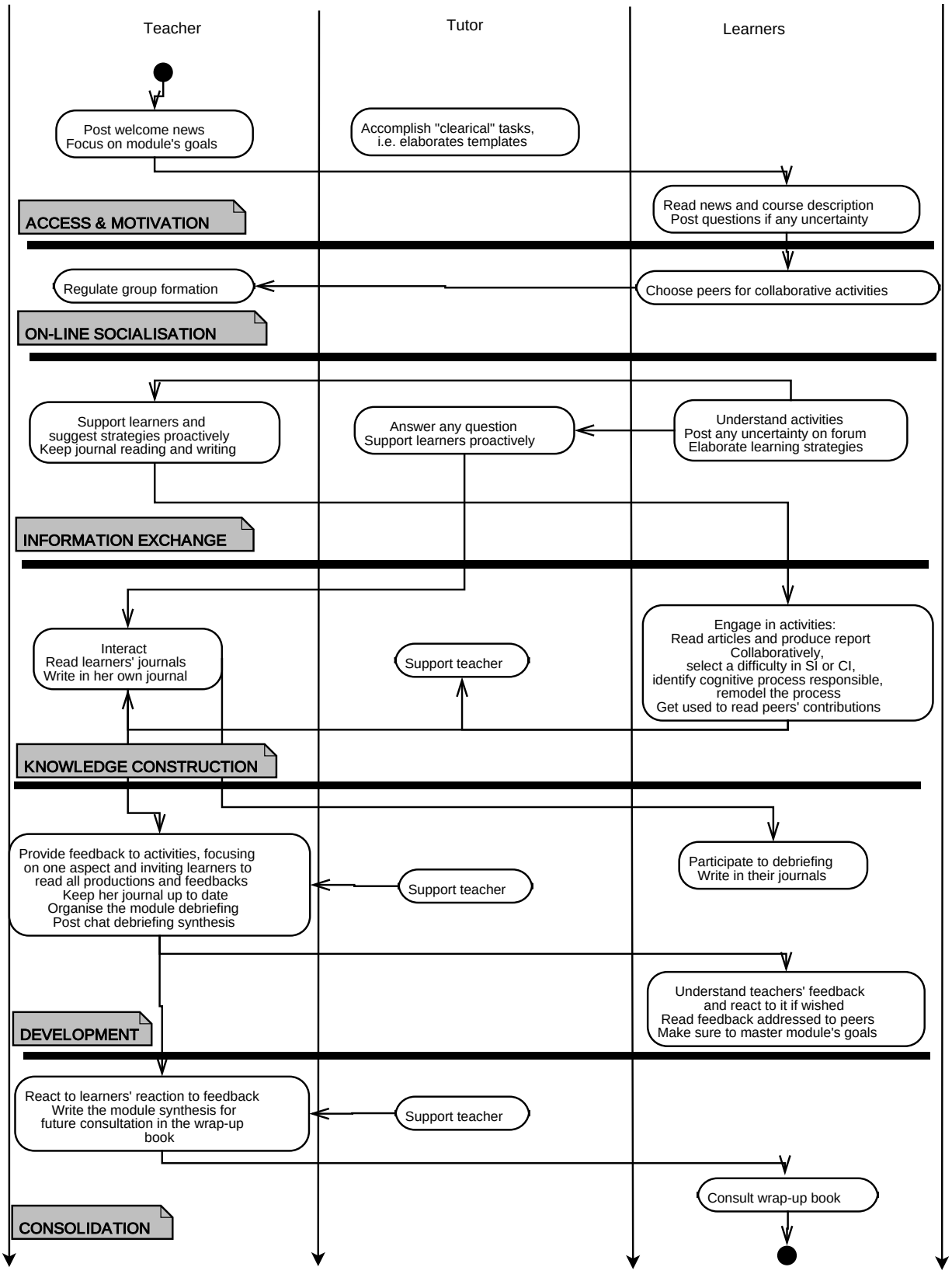


Figure 51: Pedagogical scenario, Module 2, Case Study 1

In Case Study 2, the enactment is very different, due mainly to the experience accrued by the teacher and tutor during the first blended edition of the course. What is most striking in the diagram is how the role of the tutor has become integrated.

During the *access and motivation* phase, the teacher welcomes the learners, situates the module within the entire curriculum, and highlights the need for theoretical grounding. She also informs them about how feedback will be provided, referring to how the work will be divided between her and the tutor: she will provide intermediate feedback to half of the learners and the tutor to the other half, and then for the final feedback they will change groups. In her welcome message, she also encourages learners to keep writing in their journals, since they had adopted this habit during Module 1, emphasising the importance of these entries because they allow teaching staff to better understand learners' needs. The *online socialisation* phase and the *information exchange* phase unfold in a way similar to Case Study 1. During the *knowledge construction* phase, the tutor's role becomes more interactive, both with the teacher and with the learners. Major changes emerge in the last two phases. During the *development* phase, the tutor is "part of the show" and is entrusted with the same responsibilities as the teacher: providing feedback, assigning grades and organising the debriefing chat. Often, learners react to this feedback, which is a good occasion to pursue the discussion. During the *consolidation* phase, both teacher and tutor respond to the learners' reactions to the final feedback. A group of learners is now responsible for summarising the module, which will be included in the wrap-up book for future reference (Figure 52).

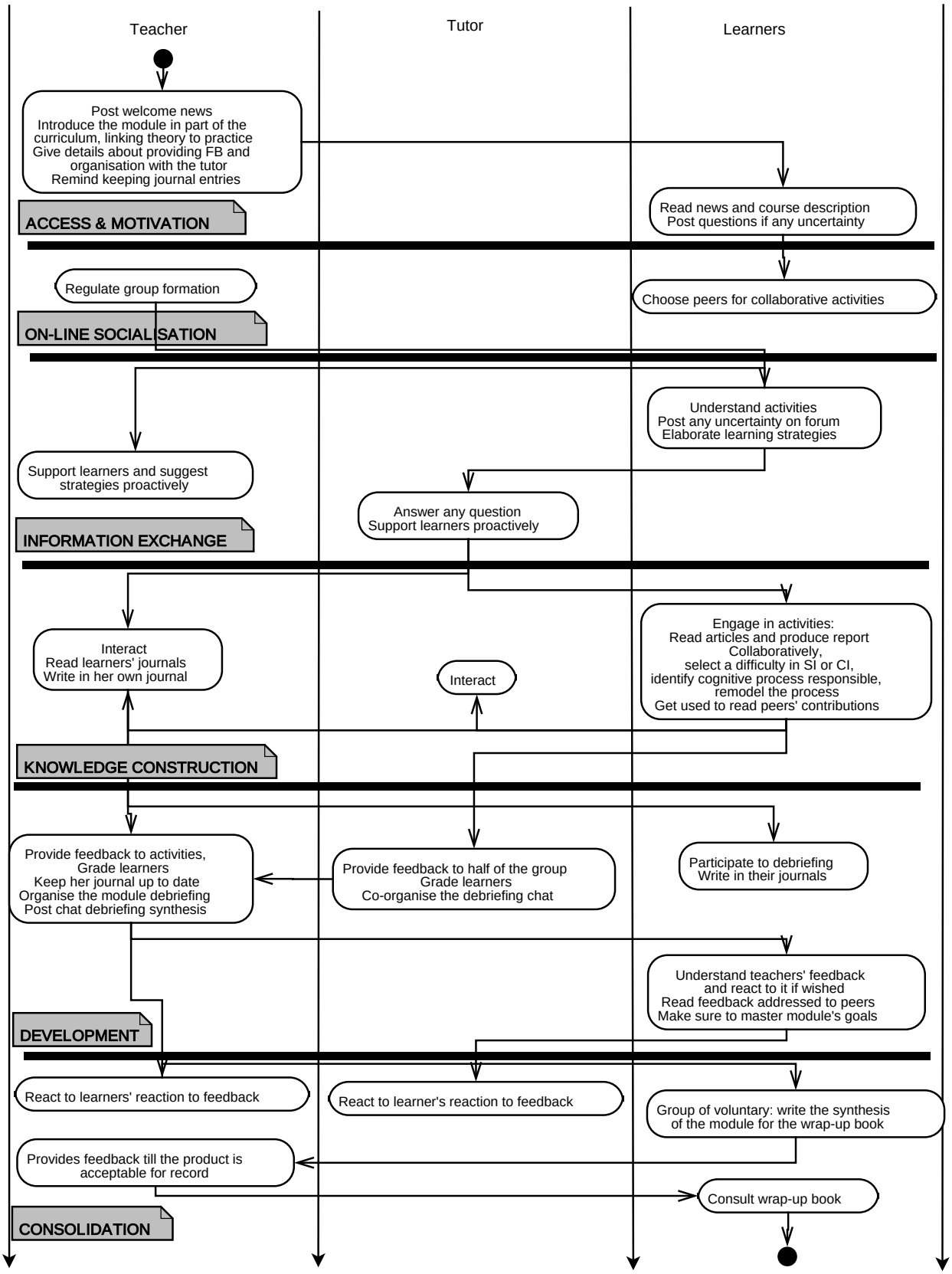


Figure 52: Pedagogical scenario, Module 2, Case Study 2

Comments

In Case Study 1, during this very first module on interpreting, the teacher is responsible for everything and the tutor clearly takes a backstage role. This is obvious from perusing the activity diagram, where twice the tutor's role is vaguely defined as "support teacher" and this support is not linked in any way to learner-teacher interactions. In the interview, the teacher states this overtly:

> I am not good at using tutors and I still have a way to go simply because I am somebody who constantly adjusts to how things are going. I size up the situation. The way I deliver my course is very much determined by the class environment. And that does not make it easy for anyone to work with me. To me, at least, in a distant environment, this is a bit difficult, there you cannot change everything, you have your activities. I could have made more use of the tutor but in the end, I wanted to read everyone's contribution! (T1, interview, CS1)

The teacher also reports on how she organised her first debriefing chat for a theoretical module all on her own. It was very demanding because learners asked very precise questions that required well thought-out answers, and providing them on the fly was quite a challenge. It is also hard for some learners to go "back to school" and read academic texts and produce academic reports, and consequently the teacher's support was in high demand. With respect to the tools for this first module, the forum was the tool most often used by the teacher. Concerning the quality of interactions and the knowledge learners produced, the teacher notes a significant increase in quality compared to the previous face-to-face edition of the course. She notices that the amount of work for the learners is much heavier. She also reports on the amount of time she spends on the portal and says she has stopped logging her hours because it makes her feel like she is running a marathon with her two modules back-to-back (Modules 2 and 3). In her journal, she says she enjoys "lulls" in the action because they are occasions to stand back and view the course as a whole.

During Case Study 2, T1 has written an entry in her journal, mentioning, with a sense of humour, that the worst part of the course, i.e. the theoretical part, is over. She reports that it was quite stressful, but that in the end, the reports were good and the learners managed well.

In the interview, T1 refers to the chat tool, deploring the fact that neither she nor the learners could see the agenda, with the result that every so often different topics were brought into the discussion. One of these was collaborative learning.

> What I did not like on the chat tool is that I could not visualise my agenda. I had it next to me but if there were any way with a permanent window where the chat agenda could remain visible - maybe in the upper right corner or somewhere - that would help, because I realised that some of the students did not have the agenda

> and would bring up all sorts of questions, which sometimes I would let them go because I knew that, judging by their journals, some things were on the top of their mind, and so they wanted to discuss collaborative learning for the nth time. That was before the big philosophical shift and transformation underwent in favour of collaborative learning. But boy it was a fight. For a long time they fought collaborative learning like crazy so obviously the chat was full of collaborative learning discussions. (T1, interview, CS2)

In her journal, she adds that from a content perspective, she was very glad to have had these chats:

> Well, I am glad we had our two debriefing chats this weekend, cleared the air, reflected on the best and the worst and what everyone was going to take away from Module 2. There was a little bit of everything, from soul-searching about collaborative learning, to further questions about contextualizing. In a way it brought closure to a module that managed to challenge just about everyone one way or another. The results are in, they look very good, and we all move forward. (T1, journal)

Because marks were assigned during this edition of the course, it was more difficult for learners to accept the idea of collaborative work. Every now and then, some learners felt that their mark was lower because of a particular peer, since everyone in the group received the same grade. T1 acknowledges this situation:

> With 34 you have more of a chance of getting outsiders on either ends. You know, you get the very top performance and … I can think of two participants who would probably not get the Certificate if they were in a regular face-to-face environment. They would not be able without the collaborative dimension. That worries me. (T1, interview, CS2)

She also mentions it explicitly in her journal:

> In a way I wish we could just dispense with the grading business - it always gets in the way of learning and enjoying learning. But then there was no choice, if we wanted to turn the course into a full-fledged MAS we had to abide by the university regulations. But if grades really weigh heavily on collaborative work and take the fun out of it, I will have to talk to the powers that be and let them know that we are into teacher training and know that the issue of grades is always a double-edged sword. (T1, journal)

With respect to the distribution of work between the teacher and the tutor, the teacher's comments show a remarkable difference from what T1 said during Case Study 1:

> I worked almost always with Tutor1 and it worked out very well. I think we both had responsibility for certain things and the way we organised ourselves was efficient, you know, as efficient as two Germanic people can get, there is probably also a cultural dimension in there. (T1, interview, CS2)

The tutor did not make any comment in his journal, in fact, he hardly used the journal at all throughout the course. During the interview, he also made some comments about learners introducing other topics during the debriefing chats:

> We had two chats if I remember correctly and we had said that T1 would take the first one and I would take the second one, but she did the introduction to the second one and then got carried away and started doing everything as she would! And only at some point said, "Would you answer that?" and then I took over and did the second half of the second one. But many of the things that came up, which I believe is why she was sucked into taking control, by way of criticising what they had to do for the module, had come up the night before, so she just wanted to make sure to nip it in the bud some complaints about some articles being too complicated or… collaborative work being worth nothing. (Tutor1, interview, CS2)

The large number of learners had an influence on all aspects of the course: for example, part of the reason why teachers favoured collaborative work was that they did not want to have too many contributions to assess. The tutor also comments about the risk, in collaborative work, of one learner 'disappearing' into the group:

> It [the large number of participants] did however make collaborative work difficult. Perhaps it was a matter of the strategy: we did not want to have too many groups, which is obvious because then we would have had a whole lot to do; but the groups perhaps sometimes were large, I feel, and that made it a) easy for people to disappear, b) just to sit there and say yes, no, I think so, basically benefiting… Perhaps in retrospect, I would say, groups of three to four people are the best size. Groups of three people is really good because everybody knows they have to work. In a group of three people there is no escaping contributing. Four is still doable. (Tutor1, interview, CS2)

With respect to sharing the workload with the teacher, that is, providing feedback to half of the group and then shuffling the participants and providing feedback to the other half, Tutor1 reports that it worked out well.

Module 2 is a theoretical module and is always difficult for learners who are no longer used to academic reading and writing. The same pedagogical scenario was used in Case Study 1 and Case Study 2, except that in the former, the teacher acted as the sole coach, whereas in the latter, the tutor was on an equal footing with her, which was found to be of great help. Another major change from Case Study 1 to Case Study 2 was the introduction of grades, necessitated by the switch from a Certificate to a MAS program, which was found to have an impact on collaborative learning.

10.4.3. Module 3

Description

Module 3, *Skill acquisition and expertise*, is also theoretically oriented. In terms of building and mastering skills and knowledge, by the end of the module, learners will have gained a thorough understanding of how skills are progressively acquired. First they need to master the concepts (progression, expertise, skill acquisition mechanisms), then they have to deal with data and organise it (i.e. report the stages of acquiring a skill), and finally, they need to apply these newly learned principles. They design a specific progression schedule for one type of interpreting skill, for a specific level, in a given course context (continuing education, crash course, university level program, etc.). In other words, by the end of this module, learners are able to design a progression schedule for a specific interpreting skill.

Design goals

Concept acquisition (see Section 3.2, Table 7) helps learners to understand and build on existing theories. Learners are expected to describe the different stages of acquiring a specific skill. The two remaining activities can be classified in the inductive thinking category (see Section 3.2, Table 6). One activity consists in reading certain resources and producing a report that addresses stages in skill development, the structure of expert knowledge and its importance for interpreting. The other activity consists in working collaboratively to design a progression schedule for a chosen course (Figure 53).

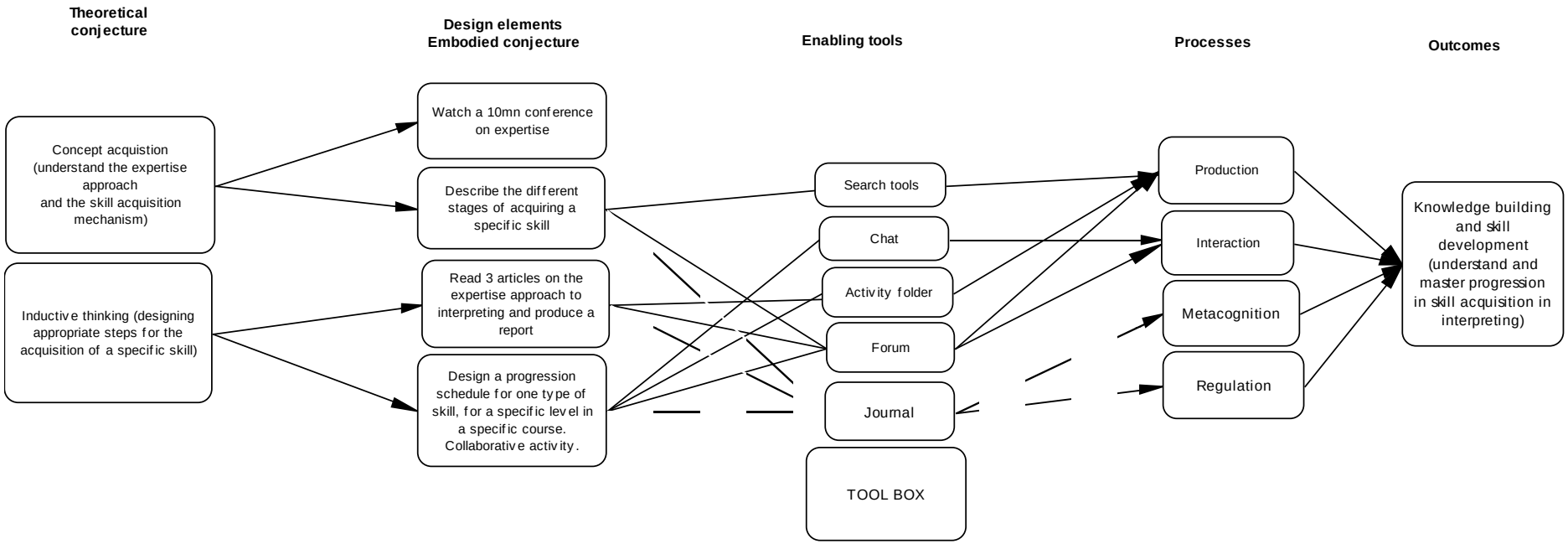


Figure 53: Module 3, conjecture map, Case Studies 1 and 2

Enactment

Again, if the design goals remained exactly the same during Case Study 1 and Case Study 2, things differed significantly in the enactment.

In Case Study 1, during the *access and motivation* phase, the teacher introduces the new module, relating the content to what has been previously learned. In her welcome message, she emphasises the importance of timing and of submitting short productions. Learners look at the course description and plan how to organise their work. During the *online socialisation* phase, they form groups with their peers for the collaborative activity, with the teacher supervising the group formation. During the *information exchange* phase, learners develop learning strategies, with the tutor and teacher supporting them proactively. This is followed by the *knowledge construction* phase, which is the real core of the module, where learners engage in activities. To complete the first activity, they watch a ten-minute conference on expertise. Then, they look back on their own experience of learning some skill other than interpreting (driving a car, playing an instrument, etc.), identify the stages as well as the setbacks involved in progressively acquiring this particular skill, and post it on the forum. The third activity consists in reading pertinent resources on the expertise approach to interpreting, and producing a report that they upload in the activity folder. The last activity is collaborative: learners design a progression schedule for one type of skill for a particular audience in a particular course setting. They upload their work in the activity folder. At the same time, they continue to engage in journaling, both writing their own entries and reading others'. The *development* phase focuses on the feedback provided in all these activities. The teacher provides this feedback, and learners are expected to understand it, integrate it, and respond to it in order to firmly ground their newly acquired knowledge. The debriefing serves as the final confirmation of this knowledge-building process. The *consolidation* phase is devoted to the wrap-up book, intended for future reference (Figure 54).

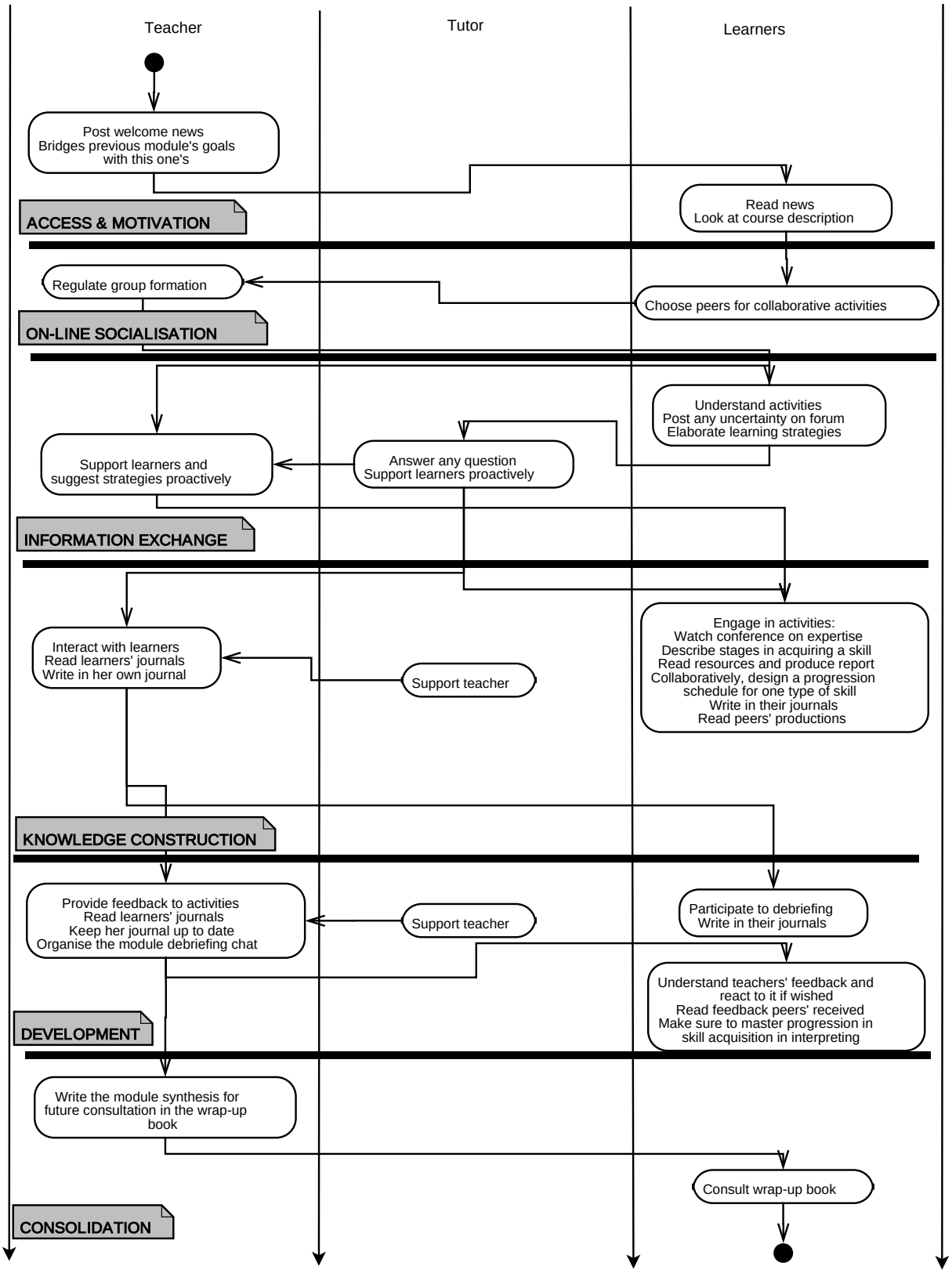


Figure 54: Pedagogical scenario, Module 3, Case Study 1

In Case Study 2, for the *access and motivation* phase, T1 writes a welcome message similar to the one she wrote for Module 2. She situates the module within the entire curriculum and explains how they are going to deal with the content. She also specifies how feedback will be provided, indicating how the work will be shared with the tutor: she will provide intermediate feedback to half of the learners and the tutor to the other half, and for the final feedback, teacher and tutor will exchange groups. Again, she encourages learners to keep writing in their journals as they have been doing all along, emphasising that the teaching staff is "making good use of their entries". During the *online socialisation* phase, the *information exchange* phase and the *knowledge construction* phase, the notable change between Case Study 1 and Case Study 2 concerns the tutor's role. This becomes even more obvious in the next two phases. In the *development* phase, just as in Module 2, the tutor is entrusted with the same tasks as the teacher: provide feedback on learners' productions, assign grades and organise the debriefing chat. During the *consolidation* phase, teacher and tutor respond to learners' reactions to the final feedback and indicate some new resources that have become available. A group of learners is charged with the responsibility of summarising the module, which is to be included in the wrap-up book for future reference (Figure 55).

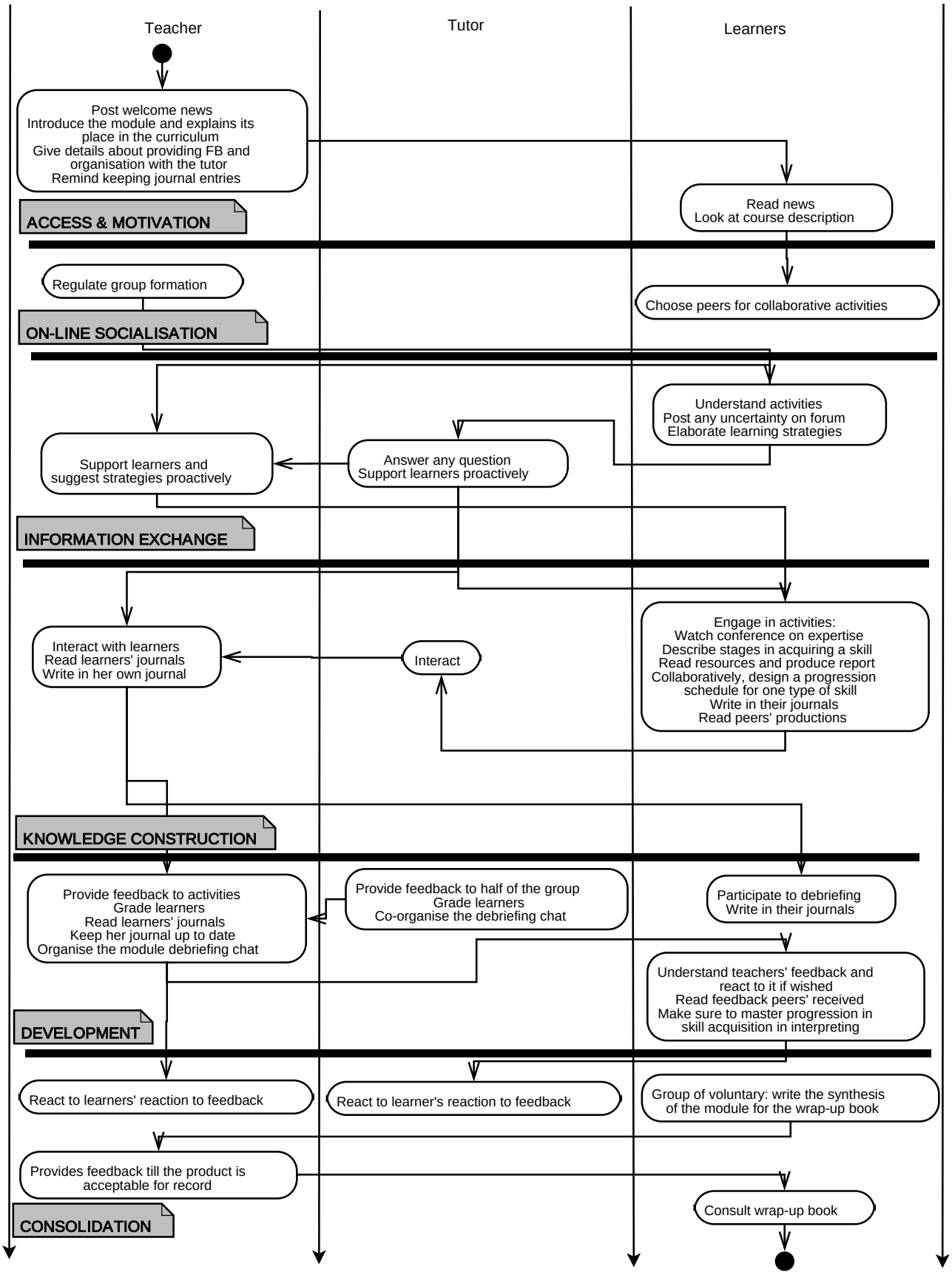


Figure 55: Pedagogical scenario, Module 3, Case Study 2

Comments

For Modules 2 and 3, the teacher is one and the same person. Both modules are taught entirely online and are theoretical. Case Study 1 is the first time the teacher teaches online in a socio-constructivist environment, and what was said in the comments section for Module 2 is also valid for this module. An additional point needs to be noted, however: the teacher recognizes the value of the teacher forum as a place to coordinate with other Certificate teachers, discuss what is going on and ask for advice when needed.

During Case Study 2, T1 taught the module with Tutor1. The fact that she opted for exactly the same workload distribution with the tutor as in Module 2 is already a sign that it worked out well in Module 2. In Module 3, it also worked out well. T1 did not make any comment about it in her journal, nor did anything of this nature emerge during the interview. The same applies to Tutor1.

In Module 3, the same pedagogical scenario was also used in both case studies. The major difference occurs, again, in the enactment phase, with the teacher and the tutor sharing the same work and co-coaching learners in Case Study 2. In Case Study 1, it was during this module that the teacher recognized the usefulness of the teacher forum as a means to obtain feedback from colleagues, and she mentions this explicitly.

10.4.4. Module 4 / 5

Description

In Case Study 1, this module corresponds to Module 4; in Case Study 2, it corresponds to Module 5. The module, *Teaching consecutive interpreting*, is devoted to consecutive interpretation. Inductive thinking (see Section 3.2, Table 6), problem-based learning (see Section 3.2, Table 11) and collaborative learning help learners to develop strategies to identify specific problems that habitually confront interpretation students and to suggest appropriate pedagogical strategies to remedy them. In addition, learners develop a thorough understanding of the progressive stages of skill acquisition. In terms of the skills and knowledge to be built up and acquired, by the end of the module, learners will have gained an in-depth understanding of how skills in consecutive interpreting progressively develop, in other words, how novices become experts. They will also have learned to identify the source of problems at various stages in skill acquisition and developed problem-specific didactic remedies.

Design goals

This module is based on the pedagogical models already encountered in previous modules: inductive thinking, problem-based learning and collaborative work. In Case Study 1, the teacher designed two activities. During the first activity, learners have to read resources and extract particular information in order to design a CI course for beginners. With this information in hand, learners must create exercises that fit with the previous framework they designed. The second activity is problem-based: learners must identify recurrent difficulties that students learning CI typically complain about, formulate hypothesis concerning these difficulties, and suggest pedagogical strategies to overcome them. The face-to-face session is intended to reinforce what has been done online and confirm the acquisition of transfer capabilities (Figure 56 for Case Study 1).

In Case Study 2, the teacher designed similar activities but introduced templates and described them differently. The first activity involves scanning the literature, and then, with the help of a template, identifying and sequencing the tasks normally performed by consecutive interpreters and suggesting exercises to train them. The second activity also makes use of a template and involves analysing the most common learning difficulties, identifying their causes and suggesting remedies. The third activity consists in a mixed

individual-collaborative-individual activity and aims at identifying the main characteristics of speeches suitable for training beginners, intermediate and advanced students respectively. Learners have to post different texts and judge whether they are appropriate for training beginners, intermediate or advanced students.

The design of the face-to-face activity differs from the one designed for the first edition of the course. It aims at consolidating the work done online with respect to three dimensions: 1) the sequence in which to teach skills of consecutive interpreting, 2) the possible causes and cures for a range of commonly encountered learning difficulties, and 3) the main characteristics that make teaching materials progressively more demanding (Figure 57 for Case Study 2).

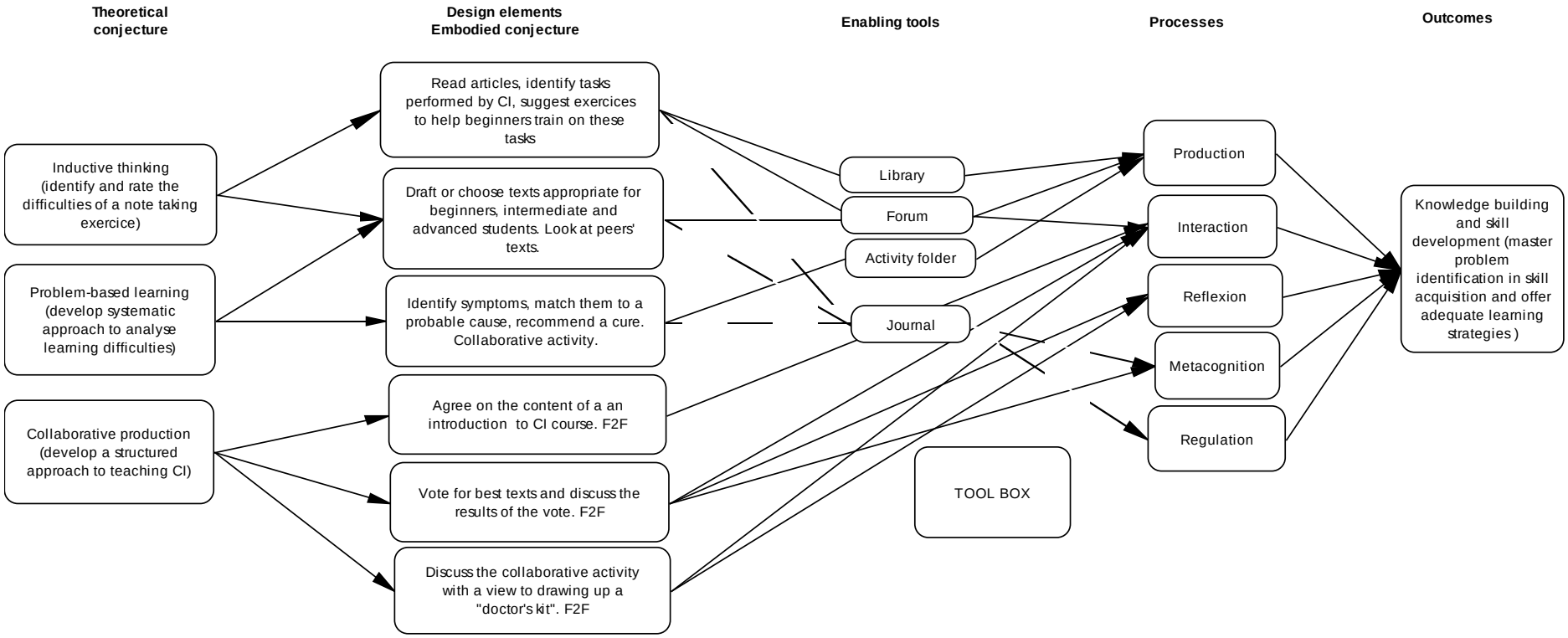


Figure 56: Conjecture map, Module 4, Case Study 1

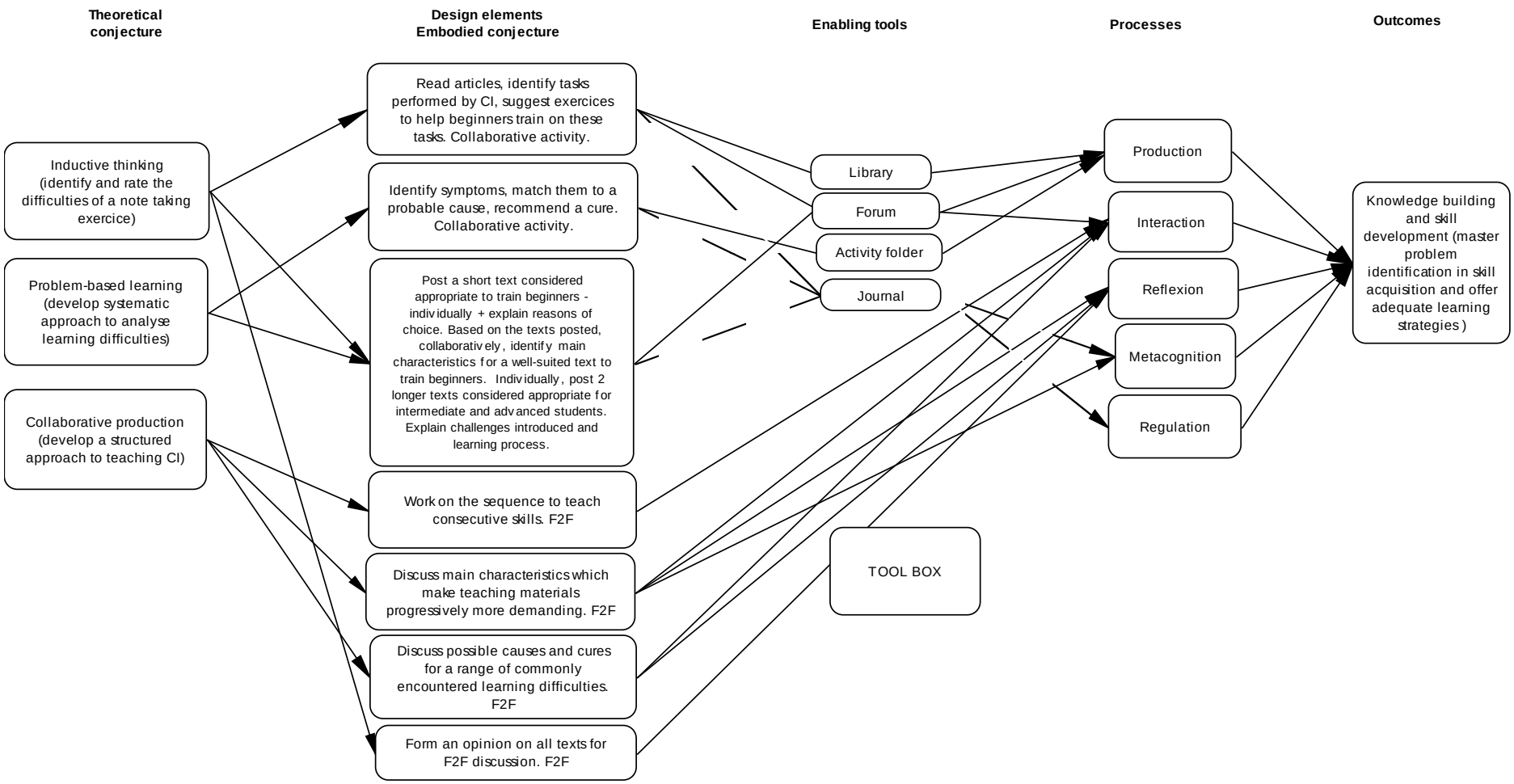


Figure 57: Conjecture map, Module 5, Case Study 2

Enactment

In Case Study 1, during the *access and motivation* phase, the teacher introduces learners to the module, focusing on the complementary relation between the online and face-to-face components. This is the first time the teacher teaches online, and she has been following the preceding modules attentively. In her welcome message, she reminds learners of organisational issues, such as naming files properly and respecting deadlines. Learners access this information and read the course description. During the *online socialisation* phase, learners form groups with their peers to prepare for the upcoming collaborative activities. The teacher supervises the formation of the groups. During the *information exchange* phase, learners acquire a thorough understanding of all the learning tasks and develop strategies with the proactive support of the teaching staff. During the *knowledge construction* phase, learners engage in activities in interaction with the teacher. Most of the interactions take place in the forum. The tutor is in charge of organising chat sessions. Both learners and teacher try to keep their journals up-to-date. In the *development* phase, the teacher provides feedback and learners must understand it, integrate it and react to it if they wish to. The tutor helps the teacher organise the face-to-face session and will be part of the show. During the *consolidation* phase, learners engage in face-to-face activities and the teaching staff regulates the activities, making sure that the module goals are reached. Finally, a summary of the module is included in the wrap-up book, available for future reference (Figure 58).

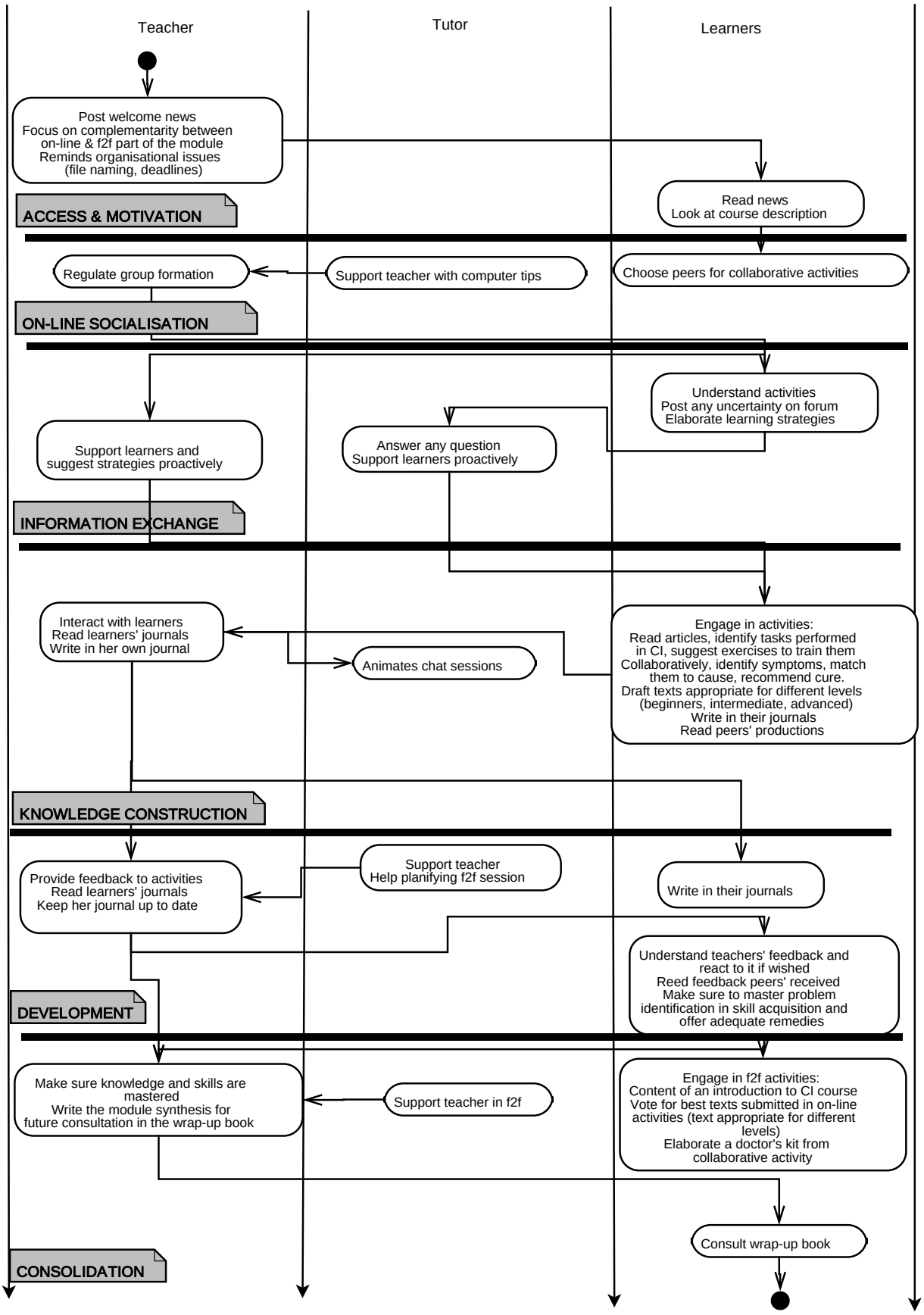


Figure 58: Pedagogical scenario, Module 4, Case Study 1

In Case Study 2, the teacher welcomes learners to her module, presents the activities and indicates which ones are to be done collaboratively and which are individual. She then emphasises the richness of collaborative learning, especially in an international course, and encourages learners who have persisted in working in the same group to be open to the idea of working with new peers. She adds that no chat is scheduled, that journal entries are a "very good temperature gauge and a treasure trove of ideas" and ends by thanking learners for naming their files correctly. During the *access and motivation* phase and the *online socialisation* phase, there is no difference from Case Study 1. During the *information exchange* phase, the *development* phase and the *consolidation* phase, again, the major difference from Case Study 1 consists in the fact that the tutor is now entrusted with the same responsibilities as the teacher. The tutor interacts with learners on content, provides feedback, grades learners and is ready to respond to any potential reaction on the part of the learners to the feedback provided (Figure 59).

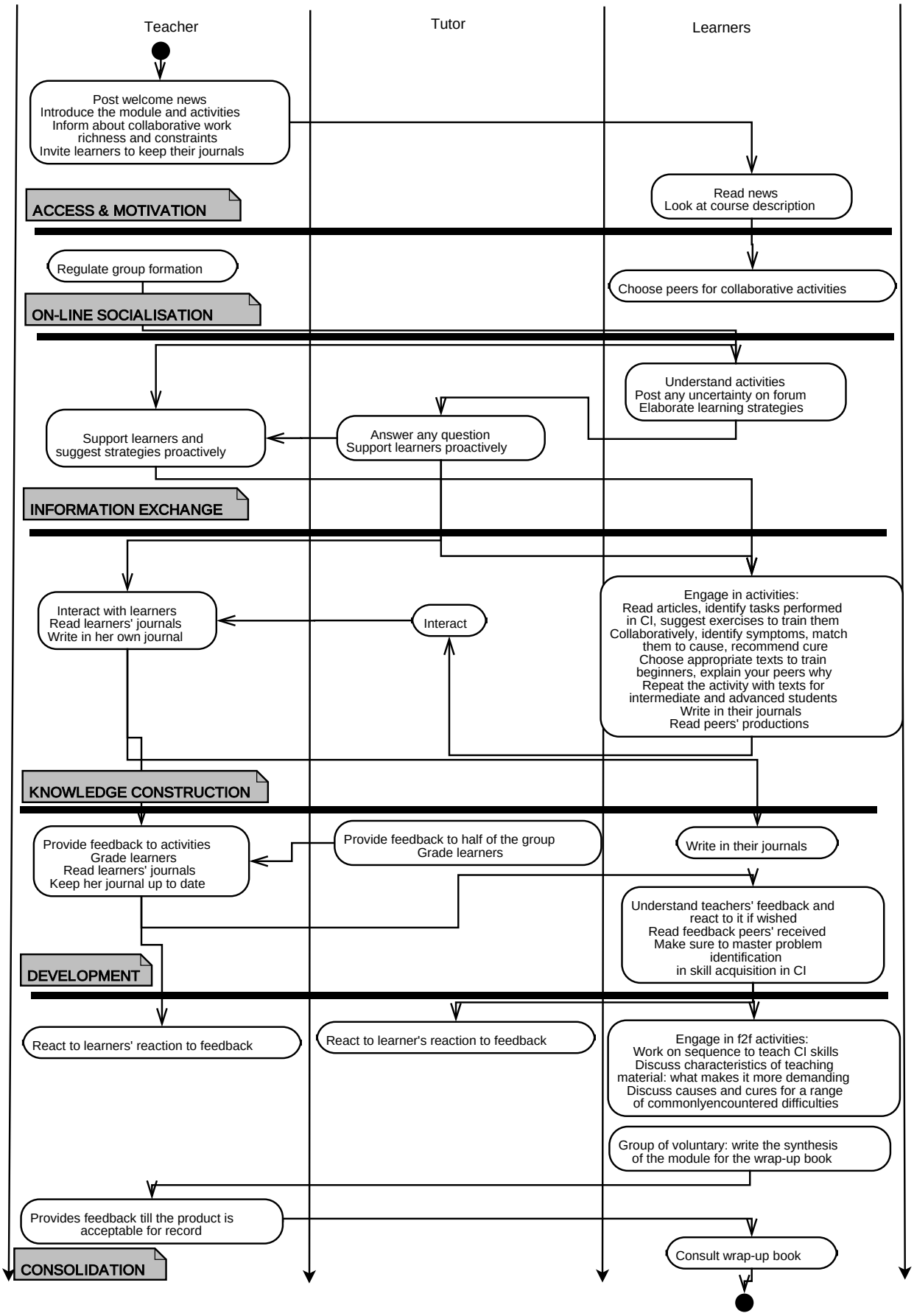


Figure 59: Pedagogical scenario, Module 5, Case Study 2

Comments

In Case Study 1, this is the first module that is not completely online but rather has a face-to-face component intended to allow learners to further exploit the work done at a distance and reorganise their knowledge around it. During this module, we observe a change in the work the teacher delegates to the tutor, slowly integrating him into the scenario. The teacher mentions this explicitly:

> It was more this time about discovering. Till you have not taught online, there is no way you can tell what is going to happen. And then, if you want to have an overall view, you have to have a very efficient system of sharing the work to make sure you do not lose part of what is going on in the module. In Module 6 [the next module taught by this teacher] the tutor was part of the show. (T2, interview, CS1)

T2's comment concerning investment is similar to T1's: "Module 4 was exhausting but it was my fault" (T2, interview, CS1). But this investment is considered worthwhile and very rewarding for a teacher. The time factor, the fact that one has time to produce structured written texts, is greatly appreciated: "I loved working on the portal. It is also a good opportunity of sitting back, thinking of your answer and then formulating. In our profession, all we do is talk and never leave any trace" (T2, interview, CS1).

In Case Study 2, despite the fact that the tutor was entrusted with the same responsibilities as the teacher, the teacher's workload remained very high and demanding.

> I mean there were two days where I spent something like ten and eleven hours giving feedback, solid. I think it was over a weekend or something. And then, the other days where I was also… you know there were a number of hours. So if you add, to those other days, three/four hours in addition to your normal working day or teaching at the school it is just… it becomes too much, even though it was the second time round. And there I had to read also Tutor2's feedback and he had to read mine so that we knew more or less… it was the first time I was working on equal footing with the tutor in that way, to know where we were going, and there were some complaints about contradictory feedback, so that was also… you had to invest quite a lot of time to make sure it worked. (T2, interview, CS2)

In her welcome message, T2 invited learners to collaborate with new peers, and in her journal she reports that the message had been heard and that moreover learners were indicating some curiosity towards their peers.

> Module 5 has seen some interesting developments: not only have we witnessed some partner swapping (for some not an entirely painless experience), but we have also seen a move towards inter-thread visiting (a great way to see how others are tackling the same problems) and chat-visiting (the live version of thread-visiting). And all this while a tremendous amount of work is being done! (T2, journal)

T2 also adds a reflection about the use of templates.

> Be that as it may, progress is tangible: there is a difference between the drafts of Act1 and the drafts I am beginning to see in Act2: more focus, more precision, an awareness of the way in which different aspects of the CI process hang together. (T2, journal)

Concerning the link between the online part of the module and its face-to-face component, T2 writes in her journal, just as she was completing the online portion:

> Logging off on 22 Dec. just after midnight. The online portion of Module 5 is officially over, but I suspect it will be with me for quite a while yet. Need time to think about what went well and what needs fixing. Need time to let things sink in to prepare our F2F in March. But just now, its time to unwind. Maybe a few days away from the computer will do the trick. Withdrawal symptoms? Did anyone say withdrawal symptoms? (T2, journal)

In the interview, she confessed that for this module, she almost enjoyed the online component more than the face-to-face one.

> To tell you the truth, I almost enjoyed the online stuff more than the face-to-face. I found the face-to-face very stressful this time… I was probably not prepared exactly the way I would have wanted to be. [...] In face-to-face, 34 is quite a lot. Putting names and faces together and managing a discussion. I did manage to finish on time though this time, contrary to last time. (T2, interview, CS2)

For Module 4/5, the activities remained essentially the same in both case studies, but the scenario changed, particularly as a result of the introduction of templates. These were used to scaffold answers and resulted in greater focus and precision in Case Study 2. This module had a face-to-face component, which, in Case Study 2, with a large group of 34 learners, was found very difficult to manage.

10.4.5. Module 5 / 6

Description

In Case Study 1, this module corresponds to Module 5; in Case Study 2, it corresponds to Module 6. The module, *Teaching simultaneous interpreting*, is devoted to simultaneous interpretation. Its pedagogical goals are very similar to those of the previous module on consecutive interpretation, but the content focuses on simultaneous interpretation. In terms of the skills and knowledge to be built and acquired, by the end of the module, learners will have gained an in-depth understanding of how a skill can be progressively taught and acquired so that novices can eventually become experts. They will also have learned to identify the source of problems in various phases of skill acquisition and developed problem-specific didactic remedies. Activities designed to support this learning curve are based on cognitive apprenticeship (see Section 3.2) and problem-based learning (see Section 3.2, Table 11).

Design goals

Cognitive apprenticeship in this module is based on cognitive scaffolding and involves the use of templates. The teacher provides learners with five learning scenarios; learners have to identify the source of the learning problem and develop appropriate solutions, appealing to specific resources from the literature. In a second round, learners select one of the above scenarios in order to develop a systematic approach to analysing difficulties. The teacher recommends that, when using the second template, learners should be very specific in terms of the source of the problem, their analysis of the problem, and their proposed solutions. The face-to-face component of this module involves the integration of scenarios. The goal is to develop an acceptable scenario for teaching simultaneous interpreting (SI) from the novice stage up to the expert stage (Figure 60).

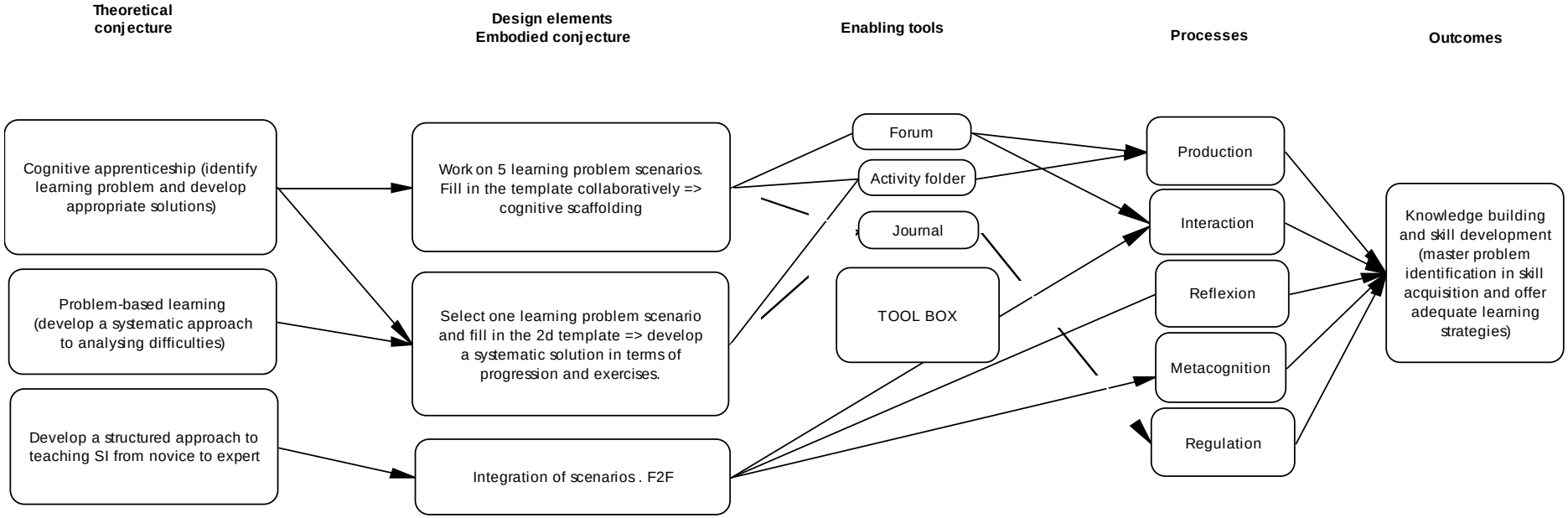


Figure 60: Conjecture map, Module 5 / 6, Case Studies 1 and 2

Enactment

In Case Study 1, during the *access and motivation* phase, the teacher welcomes learners to the module, focusing on the complementary relation between online and face-to-face activities. Learners read the welcome message and the course description. During the *online socialisation* phase, while learners and teacher interact on group formation, the tutor interacts with the pedagogical advisor to channel the flow of information on the forum. During the *information exchange* phase, learners develop learning strategies with the proactive support of the teaching staff. During the *knowledge construction* phase, learners engage in activities, interacting both with the teacher and the tutor on the forum. Journal writing and reading are carried out at the same time. In the *development* phase, both the teacher and the tutor provide learners with feedback. They also organise the debriefing chat and face-to-face session together. Learners appropriate the feedback provided, integrate it and react to it. During the *consolidation* phase, the face-to-face session is devoted to the integration of scenarios, and the teaching staff ensures that cognitive scaffolding has facilitated learners' transfer capabilities. A summary of the module is included in the wrap-up book for future reference (Figure 61).

In Case Study 2, the enactment is very similar to that of Case Study 1. As a matter of fact, it was during this module in Case Study 1 that the tutor's role began to take the shape it has in Case Study 2 (Figure 62).

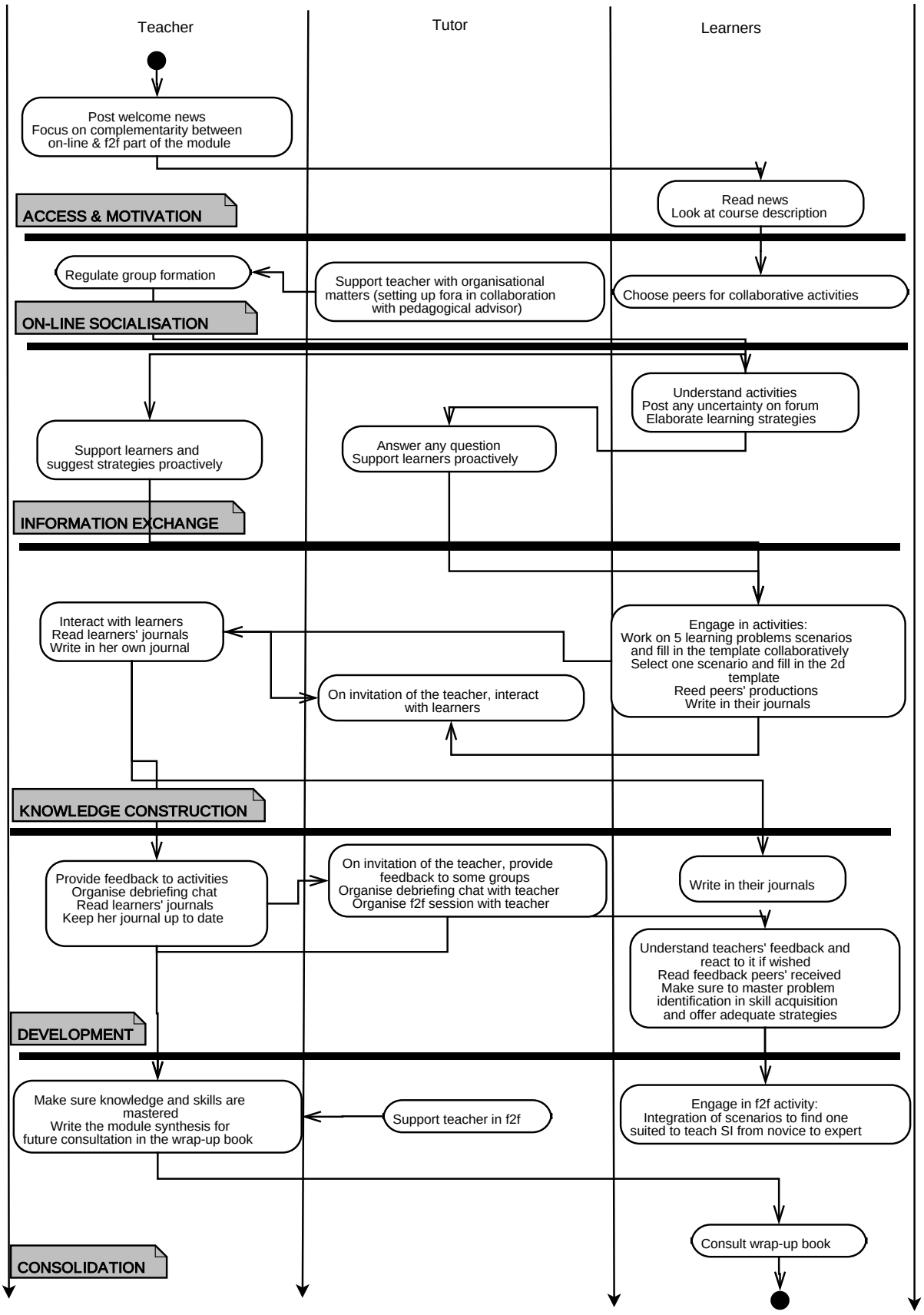


Figure 61: Pedagogical scenario, Module 5, Case Study 1

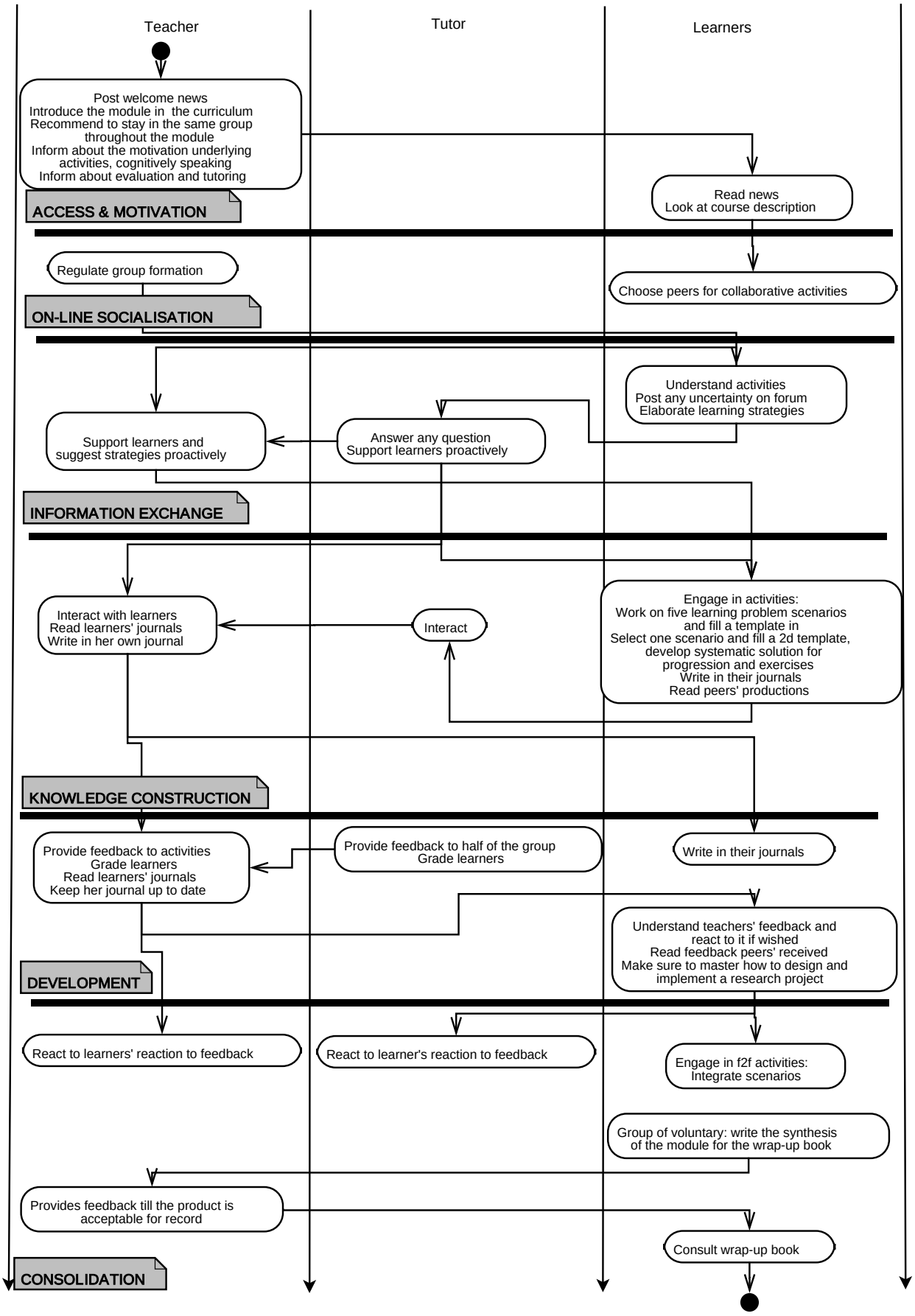


Figure 62: Pedagogical scenario, Module 6, Case Study 2

Comments

With the teacher becoming more expert in the domain of distant socio-constructivist teaching and learning, this module witnessed the introduction of the fading process. The tutor says that it was during this module that an important change was introduced, namely the practice of fading during the overall scaffolding process.

> I think during the first edition the modules more or less followed the same structure and I'll tell you what I mean by that. This time around, I think we managed to reflect the progression that we expect of students in the way that we handle the individual modules. At the beginning we were very present, we were very proactively taking them by their hands and guiding them and pampering them and patting them on the back and as the course unfolded, much less of that was done. I don't know whether it was a coincidence having to do with the fact that we got tired, whether it was intentional, but I remember that with T1's module, she started giving people less feedback or much more concise feedback allowing them to discover things on their own and then also with the thing we did together with T2 and T3, we reduced it really to a minimum. Also I think as a reflection of the participants coming of age, if you want, growing up, no longer needing the hand to hold on to at all times but rather conveying to them indirectly that okay, they've learned the basics, they've been given the tools, now it's up to them to use their brains and stand up for what they say and what they think without having to ask "Is it correct? Is it incorrect?". There may not be a correct and incorrect. And that is quite different, I think, from the first time around. I felt as though if you were to draw a graph with the different modules, it would be a horizontal line, the way in which we interacted with them. Whereas this time around, it would be a curve, and I don't know if the curve should be going up or down, it depends on what you want to plot. If it is their independence, it would certainly be a curve that slopes up towards the end. (Tutor1, interview, CS2)

T1 comments also on the scaffolding/fading process it in relation to the seminar paper:

> On the whole, I would say that participants performed extremely well. And I could kind of reap the benefits when I had the seminar paper discussions during the face-to-face week. In forty minutes, we did a lot. You could really sense how much knowledge they had built up. That's how it should be. I think that the seminar paper should indeed be that culmination, where they should prove to me what they have learned. And I should step out of the picture, which is what I am increasingly doing now, so that's good. (T1, interview, CS2)

Regarding the face-to-face session, T1 complains that it did not work well and tries to understand why.

> In the face-to-face, I told them, "Well, I am going over this again because I realise it is one of the things that I was not happy with in your deliveries and it seems you have not quite grasped the importance of this," so that was my justification for doing something vaguely more similar. Another problem with the face-to-face was I was alone. And I should not have sent Tutor1 off. And I will not do it again alone with such a large group. It is not just handling the group, it is also what you can do in terms of role playing and just bringing to life, which is essential… I think I'd like to see an analysis of the overall blending. […] we are like 90 percent online and there is this measly 10 percent face-to-face. It is kind of difficult to see how can you exploit the face-to-face

situation, which is very contradictory in a way. We are all coming from face-to-face and all of a sudden, we become 100% online and although I think what T2 and Tutor1 and T3 did, that was excellent. They love the role playing and all of that. So that, we could develop guidelines based on that. We can exploit the little time we have for face-to-face, we can really capitalise on that by doing purely face-to-face stuff. The students are tired of doing group work at that point. They do not really want to do that; but if group work means they are going to put on a role play thing, then, we are capitalising on them being present and then the group work does not matter, but if it is more searching for knowledge and constructing knowledge, that, no. (T1, interview, CS2)

T1 also reflects back on collaborative learning, echoing the difficulty learners had during the first modules and how they are enjoying it at this stage.

The truth is I am on my third venti latte to plough through all the collaborative detective work on the Module 6 forum. Did anyone say collaborative work wasn't fun? Well, I do remember those debriefing chats where participants weren't all that happy with it. So, what happened over the break? Did Santa leave some collaborative decoders in the stockings? And then there is all this cross-thread reading and commenting - this is like a study in collaborative learning and it is so much fun to read how the groups are cracking the code. Well, Santa brought me a new book (one, I am afraid, too many) about the geography of thought, and going through it while reading the forum for Module 6 is most illuminating. (T1, journal)

For Module 5/6, again, the scenario was the same in both case studies but the enactment very different. The major difference consists in fading support at this point of the course in order to help learners become increasingly autonomous. This module has a face-to-face component, which led the teacher to reflect about the role of a face-to-face session in a blended course, which is obviously very different from its role in a traditional face-to-face only curriculum.

10.4.6. Module 6 / 8

Description

In Case Study 1, this module corresponds to Module 6; in Case Study 2, it corresponds to Module 8. The module, *Feedback* (Case Study 1) / *Evaluating classroom performance: Providing feedback to students* (Case Study 2) concentrates on the practice of delivering feedback to support learners' progress. A first activity aims at clarifying the concept of feedback. Activities based on the pedagogical models of scientific inquiry (see Section 3.3, Table 8) and cognitive apprenticeship (see Section 3.3) help learners to better understand the practice of delivering constructive feedback. With respect to the skills and knowledge to be built and acquired, by the end of the module learners will have gained a thorough understanding of feedback and how to deliver it in an academic context in order to enhance its effectiveness. Learners also examine a range of different feedback instruments and different ways of keeping track of students' progress.

Design goals

In Case Study 1, the first activity is designed to help learners ground their understanding of feedback. To achieve this, learners have to report on a skill they learnt, remembering particularly how they were corrected and how they reacted to and integrated this feedback. They also have to report how they were corrected while learning interpreting. And finally, they have to describe the way they correct others and the results of this feedback. Then, collaboratively, learners undertake a scientific inquiry, examining their own institution for example, to understand the repercussion of this feedback process both inside and outside the institution. Cognitive scaffolding with the help of templates is used both for this and the next activity. The last online activity focuses on feedback culture and how to prepare students to be receptive (Figure 63).

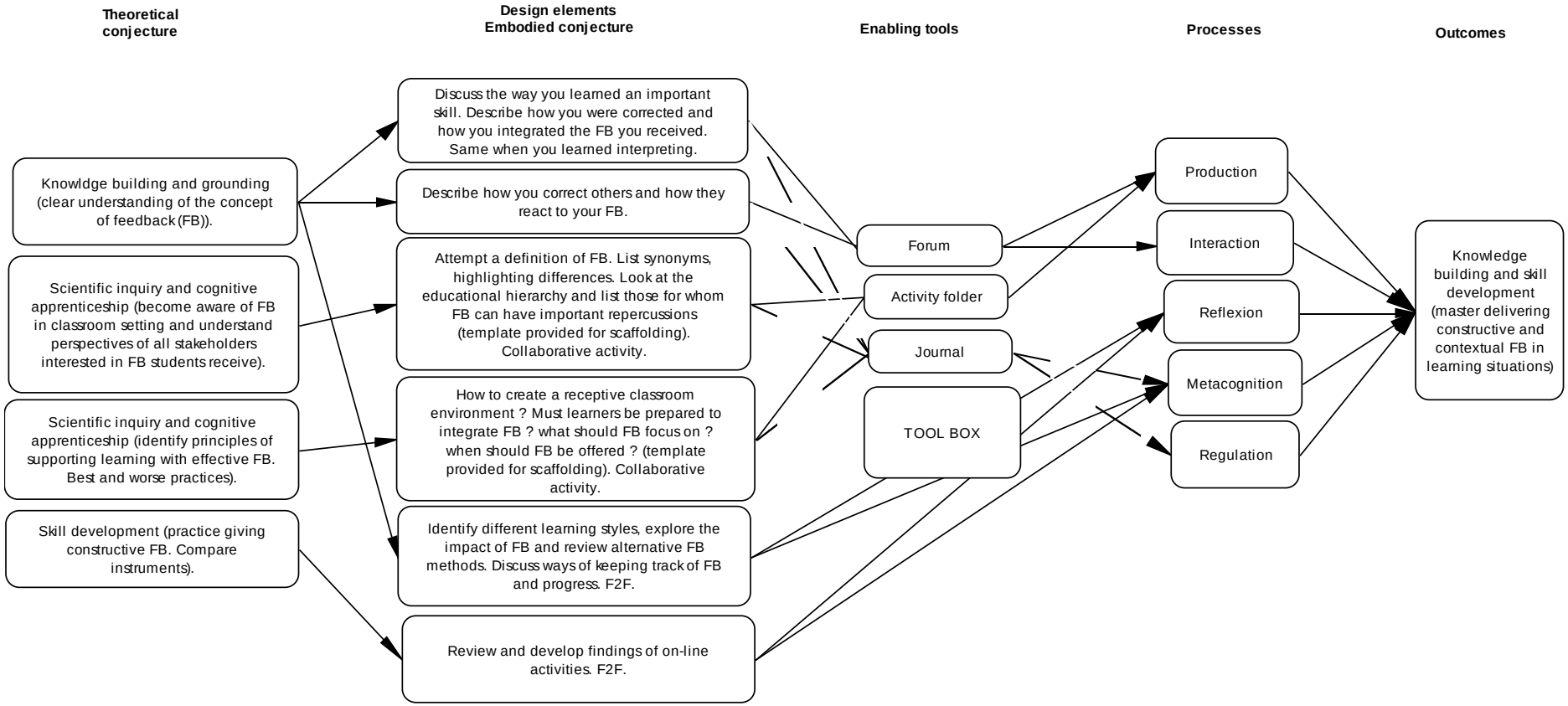


Figure 63: Conjecture map, Module 6/8, Case Studies 1 and 2

Enactment

In Case Studies 1 and 2, all the enactment phases of this module unfolded in a similar way. The same three actors — T2, T3 and Tutor1 — were involved in both editions. Since it worked out well the first time around, they did not change anything, and it worked out well the second time also. The only change concerned how the groups were formed: while learners were free to choose their groups in Case Study 1, in Case Study 2 the composition of the groups was decided and imposed by the teaching staff beforehand. During the *access and motivation* phase, the teacher welcomes learners to the module, explains how the work will be distributed among the two teachers and the tutor, calls attention to diverse organisational matters and informs them that there will be no chats at all in this module. Learners read the news and the course description. During the *online socialisation* phase, learners plan the upcoming collaborative activity with their peers, while teachers supervise group formation and the tutor develops an instrument to track learners' progress through the various activities. During the *information exchange* phase, learners develop learning strategies with the proactive support of the teaching staff. During the *knowledge construction* phase, learners engage in activities and the teachers and tutor interact with them. At the same time, they continue reading and writing journals. In the *development* phase, the teaching staff provides feedback and learners are expected to understand it, react to it and integrate it. The *consolidation* phase engages learners in face-to-face activities, with a view to ensuring that they have built a sound understanding of feedback and how to practice it in a learning context. Finally, a summary of the module is entered in the wrap-up book for future reference (Figure 64 for Case Study 1 and Figure 65 for Case Study 2).

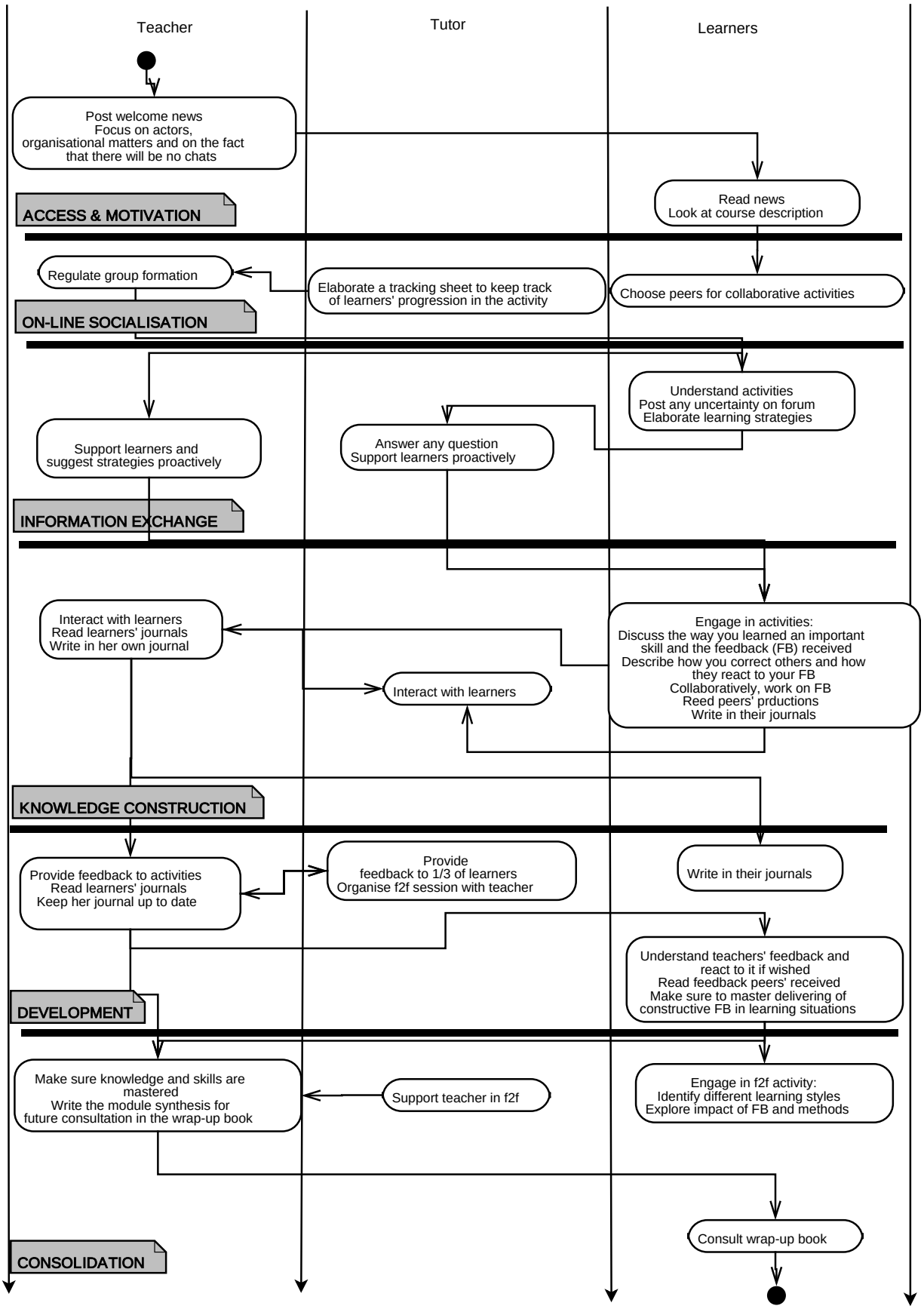


Figure 64: Pedagogical scenario, Module 6, Case Study 1

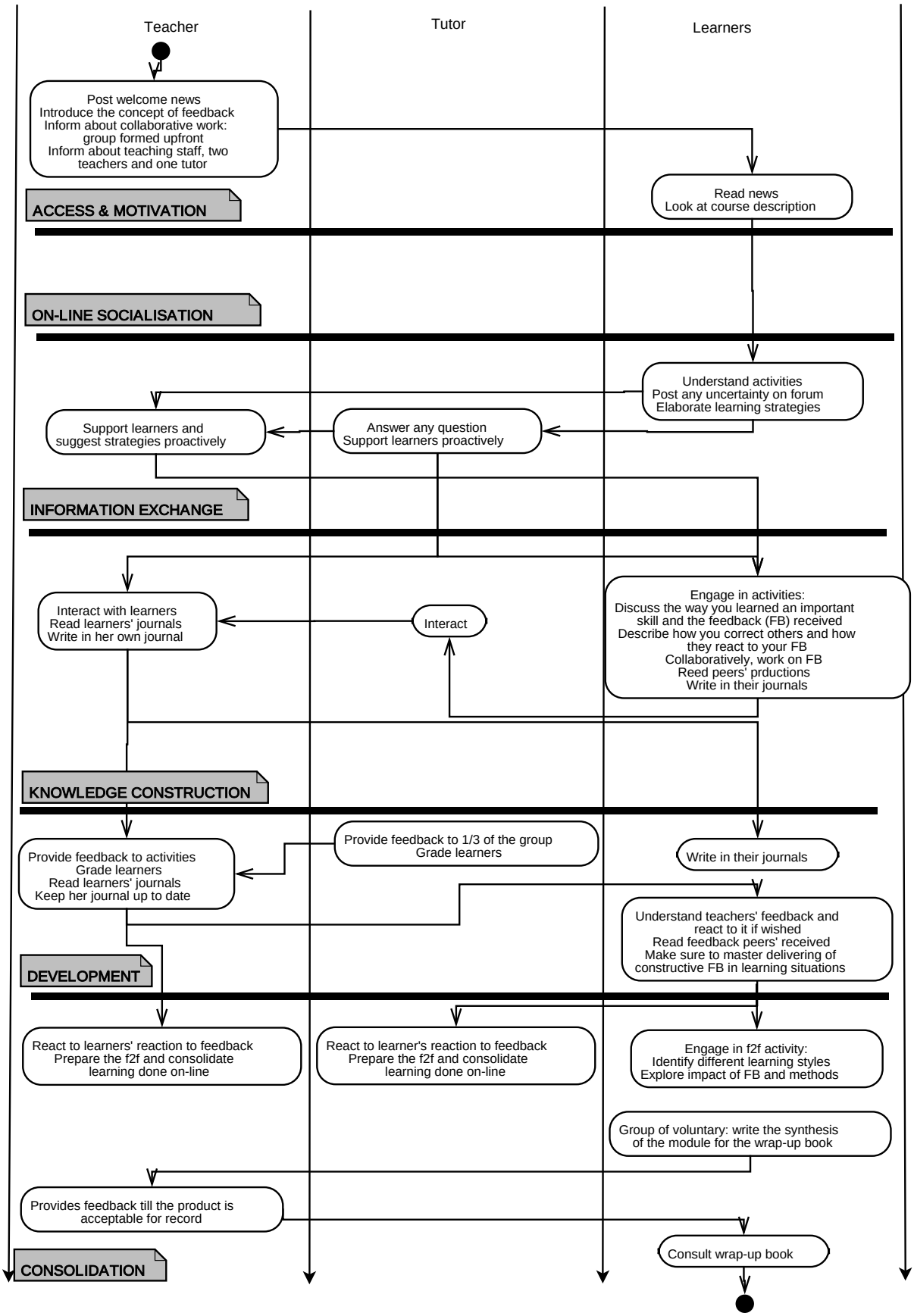


Figure 65: Pedagogical scenario, Module 8, Case Study 2

Comments

In Case Study 1, during this module, we witness a dramatic change in the tutor's role. It is as if the teacher had seen enough of how teaching online unfolds to be able to delegate responsibility without fearing that she would lose control of the overall situation. This module is the first time the tutor is really part of the show and shares centre stage with the teacher in delivering content. He summarises the situation very well:

> It is one thing having the theoretical idea of what the tutor's role should be and then implementing that within a framework that is entirely new to the teachers as well. And not really knowing how the whole thing unfolds made that implementation quite difficult. I think it started kicking into gear by the time the feedback module [module 6] was around and we said, okay, there are the three of us, we break the work up among us. Then the distribution of labour worked quite well. But at the beginning, I, as much as the teachers, were a bit lost: I could not really propose myself to do much and they could not really designate me to do much because every so often we didn't know how we were going to do things. That's why in the beginning my task was of a clerical nature. (Tutor1, interview, CS1)

Concerning the distribution of work, he adds:

> Maybe it comes from either me not wanting to interfere with the teacher's domain or the teachers not readily giving it up… Had we taught together in face-to-face, I think the situation would be quite different. Then that would put both the teacher and the tutor at ease in trusting each other. They know the game plan, and they know "Oh yes, Tutor1 can take care of that, we have done it several times, he is fine with that." And by doing so, we do not double up the effort, because if I take on a responsibility but the teacher still feels as though she has to be there all the time to look over my shoulder and make sure the things go the way she wants to, then we have no resources saved. Perhaps have a better-prepared script to know what they do and then simply look at the outcomes. (Tutor1, interview, CS1)

During Case Study 2, the tutor says he has developed tutoring strategies, learning from "past mistakes," particularly in delivering feedback.

> Past mistakes: trying to provide a comprehensive feedback on everybody's contribution. As though the contributions had been made in a vacuum, so every contribution was looked at individually without allowing myself to benefit from the fact that people posted similar things and I could just reply on one. Which again, in turn, will only work, provided they look at each other's threads and at the feedback that was provided to their threads, which they did this time much more so than during the last edition, I felt. They looked far beyond their own threads. (Tutor1, interview, CS2)

Regarding his strategy, he adds:

> I really think that I was going in there consciously looking for certain things, whereas the first time around I would just go in there and read and let it sink in and then think oh, and really give a really contemplative answer. And this time, it was really okay, let's pull it through the grid and see what the most salient or the

most important points are and not worry too much about the non-important things or the things that could have perhaps been reformulated from a stylistic point of view. That I just let go. (Tutor1, interview, CS2)

Also, this module is team-taught by two teachers. The tutor supports them by taking on the same tasks and in addition he is responsible for all technology-based tasks. Using templates to scaffold and streamline answers was a new experience for both teachers. Both found it useful.

I think it gave probably more focused answers and you could pinpoint those cases when people were giving you answers which were not answers to the questions. Visually it is easier to integrate also. From a cognitive point of view, I do not know. (T2, interview, CS1)

The feedback module was a lot of fun actually. The first couple of questions we asked them, I really enjoyed that. And the other thing that made it doable and manageable was the templates. Somehow, I found it very easy to go to the template, to that particular point and write my replies. (T3, interview, CS1)

In the module that T3 taught alone, she liked to control the group formation process and already did it in Case Study 1. Tutor1 comments on this change, from groups formed by free choice to pre-established groups, in the context of a serious problem that had arisen: the behaviour of a few learners was threatening to interfere with the collaborative dynamics of the group, which indicated that it might be preferable to impose pre-established groups on them.

Well, I think we were all confronted with quite strong personalities who… I don't think I am the only one who had thought they could have threatened the overall dynamics of the group with very negative attitudes from the get-go. I think there were two of those in particular. And I am sure that it had its repercussions on group work as well. I know of some people who made sure that … they would really anticipate any group work to make sure that they would not be grouped in with those people. And then we turned it around and said we will establish the groups, you don't get to choose… which by the way, I think, was a very smart move. (Tutor1, interview, CS2)

Concerning the effects of accrued experience on teacher development, T3 says that the three of them have become much more efficient in this second edition and indicates how much she appreciated working with T2 and how much she has developed.

Actually, I think we are much more efficient, the three of us, this time. We did change things in our module. The face-to-face is tomorrow, and I think it will be all right. We met for maybe, I don't know, a certain number of hours and we just took one thing after the other whereas last time, I think, we met for 2 days and it was very difficult putting things together. I love working with T2 because I think we are very complementary. I really like her thoughtfulness and her attention to detail. I mean I am not supposed to talk about the people perhaps but T2 developed so much since last time in how she answers my questions. It is incredible to see how she has changed, I think. […] I am not even sure if she is aware of it, I would ask her advice on how to do this, no hesitation. She is very thoughtful and her answers are quite different to last year. (T3, interview, CS2)

None of the three members of the teaching staff wrote any entries in their journals, and no other issues arose in their interviews.

Module 6/8: During Case Study 1, this module witnessed a dramatic change in the tutor's role, which shifted from performing clerical, background tasks to providing feedback and answering learners' questions in the same way as the teacher. The working model experimented during this module was subsequently adopted throughout Case Study 2.

10.4.7. Module 7

Description

Module 7 in both case studies is entitled *Curriculum, syllabus design and lesson planning*. During Case Study 1, a major activity, based on the pedagogical model of scientific inquiry (see Section 3.2, Table 8), is intended to help learners develop skills in course design. In terms of the skills and knowledge that are targeted, by the end of the module learners will have gained skills in classroom management and in applying the principles of instructional design to create pedagogical documents, in this case, lesson plans. A second activity, in the form of a role play (Section 3.2, Table 10) that involves designing a draft curriculum, has been added to Case Study 2. The face-to-face session is devoted to discussing curriculum issues and the use of instructional design documents, such as syllabus design templates.

Design goals

In both case studies, the first activity is inquiry-based in the sense that learners must collaborate to identify a case for study (a curriculum), answer a set of questions, defend arguments, and deliver a collaborative product. They must come to a consensus and formulate hypotheses to answer the questions, which will be reported by the group reporter (Figure 66 for Case Study 1, Figure 67 for Case Study 2). In Case Study 2, the second activity is also collaborative and takes the shape of a role play that involves the head of a school, two instructors and a group of students. The activity is to be completed within the same groups as activity1. Learners must draft a curriculum in which they include a description of the facilities, the prerequisites for entry into the program, and an outline of the curriculum itself, along with a timeline and the number of hours per class. They must also indicate the number of students (by language) required to make the program financially viable and provide an estimate of their budget requirements.

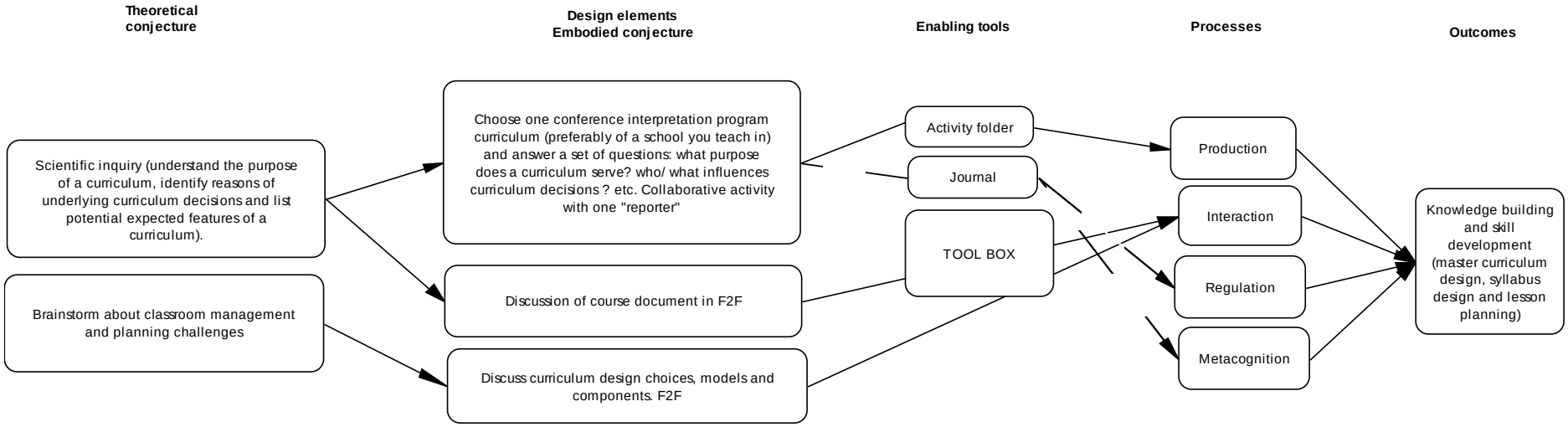


Figure 66: Conjecture map, module Module 7, Case Study 1

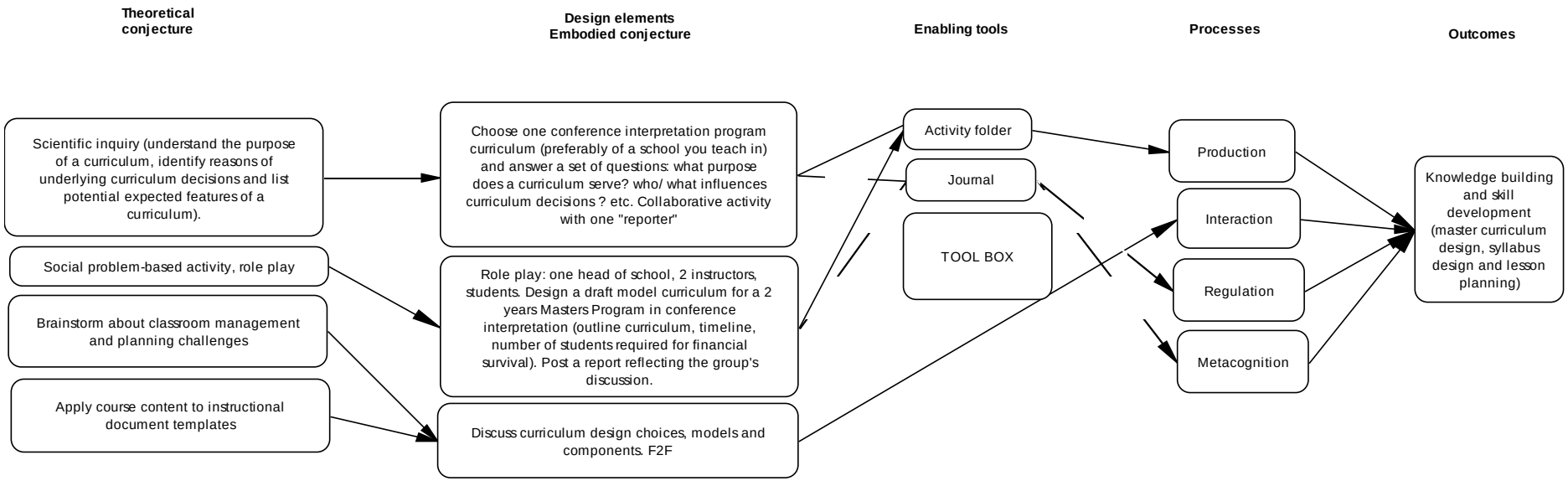


Figure 67: Conjecture map, Module 7, Case Study 2

Enactment

In Case Study 1, during the *access and motivation* phase, the teacher welcomes learners to the new module and highlights the complementary relation between the online and face-to-face components. She also informs them that they will be paired up for the collaborative activity in order to ensure a proper balance between those with prior teaching experience and those without. Learners read the message and the course description. In this context, the *online socialisation* phase does not have any place *per se*. During the *information exchange* phase, learners develop learning strategies with the support of the teacher. During the *knowledge construction* phase, learners engage in activities and interact with the teacher. In the *development* phase, the teacher provides feedback and learners are expected to understand and appropriate it. Finally, during the *consolidation* phase, learners engage in face-to-face activities and the teacher, with the tutor's help, monitors the discussion. A summary of the module is entered in the wrap-up book for future reference (Figure 68).

In Case Study 2, during the *access and motivation* phase, the teacher welcomes learners, situating the content of the module within the entire course. She announces that groups have been formed on the basis of learners' teaching experience, with a view to achieving a balance between experienced and inexperienced participants. She informs them that she and Tutor2 will be responsible for the final feedback, and provides some additional organisational details. Finally, she asks for a group of volunteers to write the portfolio. As in Case Study 1, there is no real place for the *online socialisation* phase at this stage of the course, given the fact that learners have already been assigned to groups. During the *information exchange* phase, both teacher and tutor help learners to understand the activity and to develop strategies to complete it. During the *knowledge construction* and *development* phases, the teacher concentrates on content, interacting with the learners and providing feedback on their productions. In this instance, the tutor felt ill-at-ease with the content, and so decided to withdraw from providing help on content issues, but continued to support the teacher in all other areas. During the *consolidation* phase, the teacher responds to any reactions the learners may have had to her feedback. She also leads the face-to-face session. Since the tutor was not comfortable with the content, she was not involved in this final phase (Figure 69).

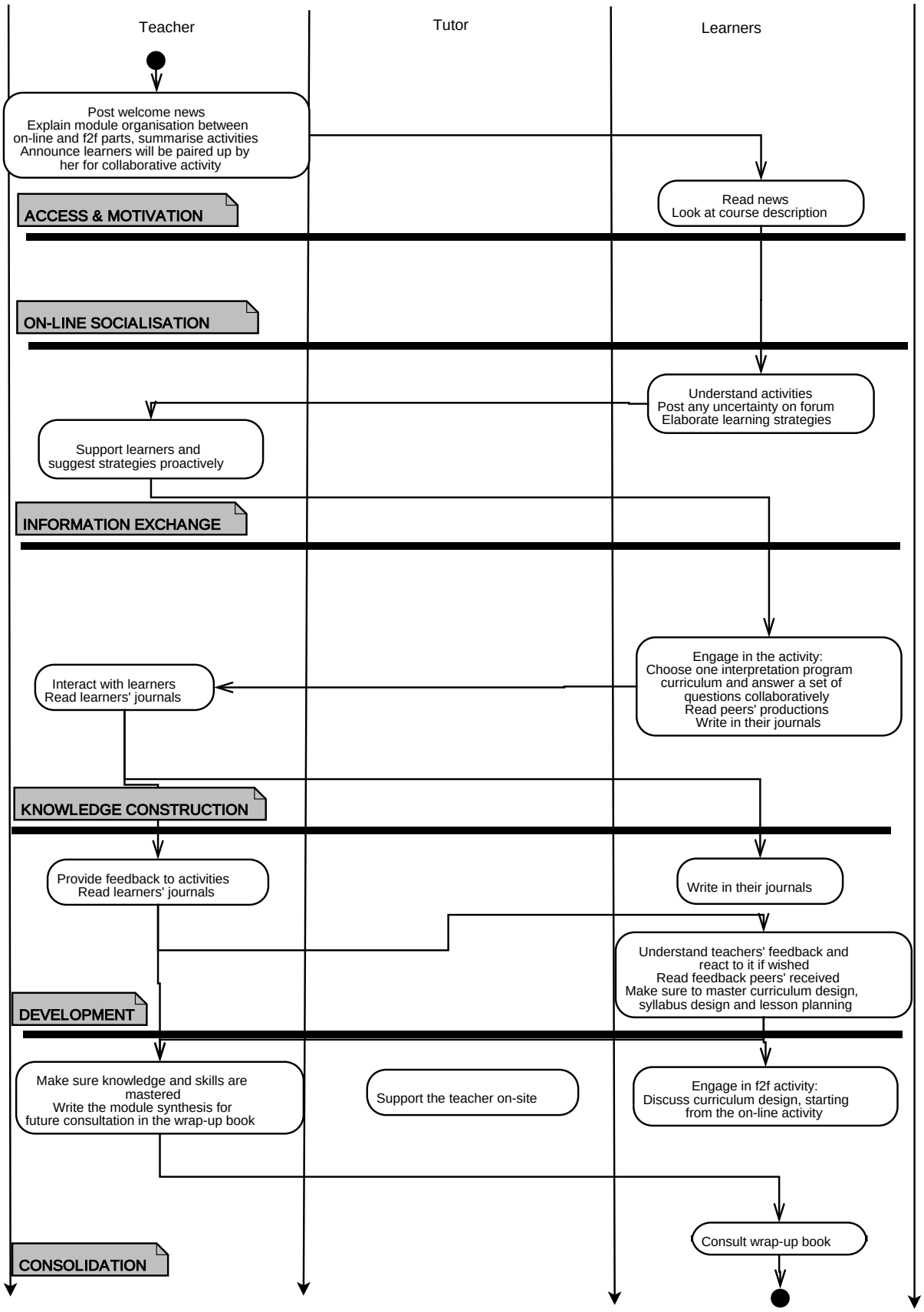


Figure 68: Pedagogical scenario, Module 7, Case Study 1

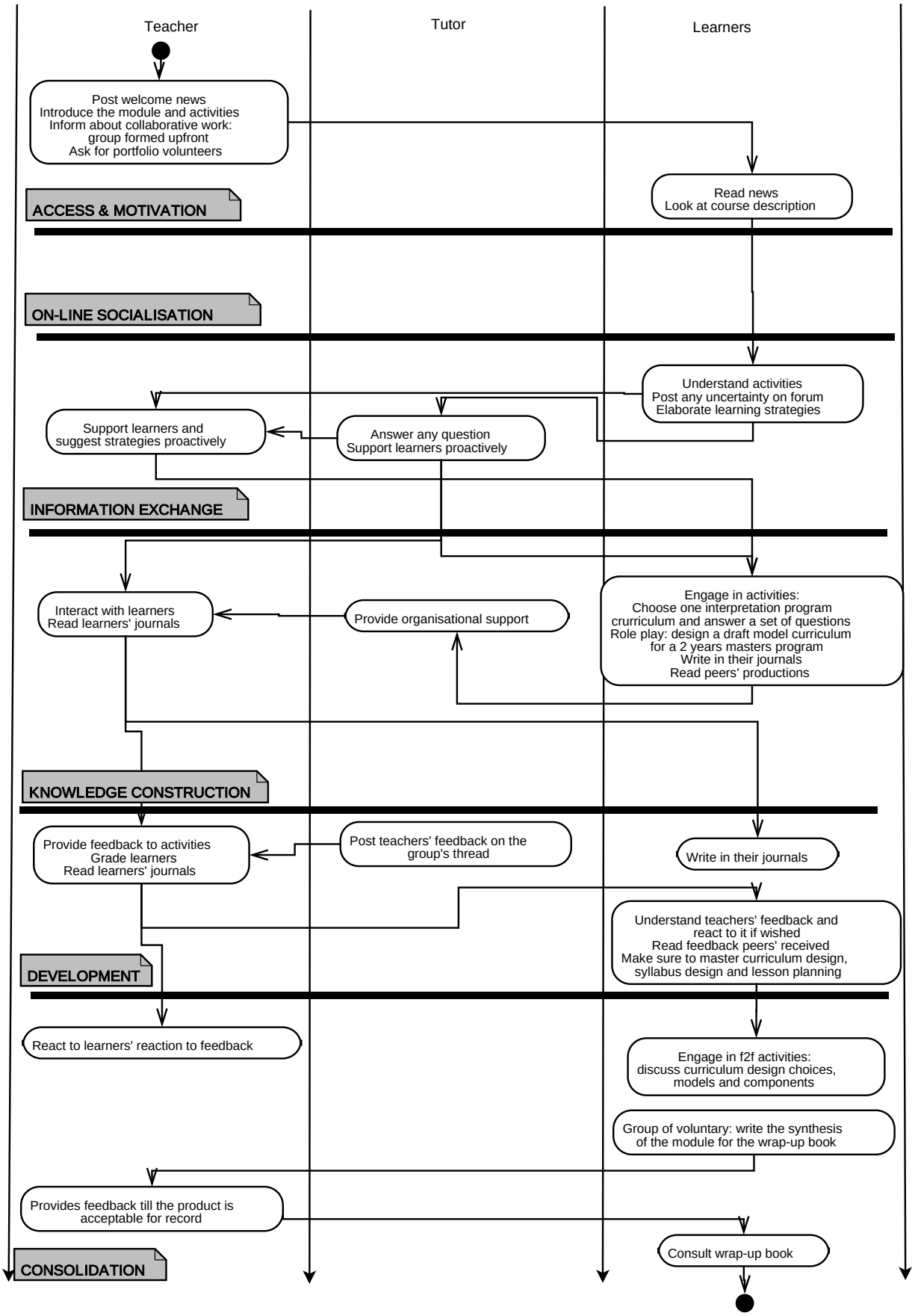


Figure 69: Pedagogical scenario, Module 7, Case Study 2

Comments

During Case Study 1, in this module, even though the teacher had team-taught the preceding module with another teacher, she did not make use of the tutor.

> The tutor has a kind of funny role, because either I team-teach or I do not and he is in the middle. I should have given him some more guidance: “Perhaps you can do this.” In the curriculum module, somehow, we did not manage to have a good talk about how to do it. In the future, I have to think about redesigning the module and then it might be clearer. (T3, interview, CS1)

This particular teacher was the most hesitant about the idea of teaching online, but in the end she recognised the added value of portal-based teaching.

> I really enjoy the face-to-face more than the online. But not to argue the opposite, there’s never been such a stack of records of discussions, workshop activities and outcomes. So that is a big plus. Some of the minuses are also pluses: when I ask a question, the minus side is to answer but on the other hand we have 20 examples. The time expands like this but I would go the same way [socio-constructivist learning]. (T3, interview, CS1)

On the teacher forum during Module 7, she reported that she missed the human contact with her peers, the other teachers. It is true that she was one of the teachers who was not based in Geneva but got involved more in the overall course than the other two, who were at a distance and focused exclusively on their module.

> Well, (to me) distance does seem to matter in one respect. The thing that is different for me is that I don't (can't) bump into any of YOU in seminars or parking lots....It is contact with YOU I miss, not with the course participants. Otherwise, I don't mind the computer interface with them as much as I thought I would... (T3, interview, CS1)

There is no information to be gleaned from the teacher’s journal, since she did not make any entries. She was used to using journals in another way and the idea of a public journal did not make any sense to her. In the interview, the tutor does not talk about this module in particular either.

In Case Study 2, the teacher said her major problem was having to deal with such large numbers without the help of a content tutor, due the fact that Tutor2 was not skilled enough to be able to support her on content.

> On Module 7, Tutor2 was a big help on logisitics but he could not help me on reading papers because it’s not a field that he’s very familiar with” (T3, interview, CS2).

She also reports that the role play she designed for activity 2 worked fabulously in a face-to face-context, but did not yield the expected outcomes in the distant context.

> What they gave me was the product. It was the curriculum and there was one group that I had also posted a message that said if you want to send me a fly-on-the-wall report of your conversations, that would be great. One group did and that was the best bit of the whole thing, because they were talking about [how] there was so much tension in the group, and we could not agree on this and the administration people said that, etc. and that's what I am interested in them seeing that you do not just sit down and write a curriculum. (T3, interview, CS2)

The tutor acknowledges the fact that he could not help with the content:

> And in Module 7, on the contrary, I did not feel prepared to give real feedback so I was a sort of backup for T3 and I would do all the practical stuff, posting the grades, posting the feedback, etc. I answered questions but I was never really sure I was going in the right direction because we had not talked about it a lot before and it is something new for me. [...] I really felt a bit shaky so I suggested to T3 I would do all the practical stuff, I would be online all the time to answer practical question and those questions were evident, like budget. Other questions I could not answer, I would send T3 a message and tell her please come in that thread because I am really not sure what they are asking for. (Tutor2, interview, CS2)

Module 7: In Case Study 1, the teacher did not make use of the tutor because she needed to fully grasp the mechanics of online teaching and learning first. She reports a preference for the face-to-face part of the module. In Case Study 2, the tutor that was assigned to her module was not a content expert and the teacher was left to deal with an even larger group of learners on her own. She also reports on an activity she implemented to gather information on process but that only resulted in a product, and wonders how it could be done on the portal to yield the outcomes she wanted.

10.4.8. Module 8

Description

Module 8 is an introduction to legal interpreting and occurs only in the first edition of the course. From a pedagogical point of view, it is based largely on a transmission model. Concept acquisition (see Section 3.2, Table 7) and face-to face lectures are the main components of this module. By the end of the module, learners are expected to build and acquire the following skills and knowledge: they should be familiar with the different settings in which legal interpreters work and the relevant procedures and protocols; they should be familiar with the resources available for developing teaching materials for a course in legal interpreting; they should know about the laws governing legal interpreting and current issues in the profession; they should be aware of the ethical principles that apply to legal interpreting; they should be familiar with the language of the law and the resources available for legal terminology; and they should be able to choose an appropriate methodology for teaching legal interpreting.

Design goals

The content of this module is very specific. The design of the module reflects an orientation that equates teaching with the transmission of information. Learners receive information according to the concept acquisition model and in face-to-face lectures (Figure 70).

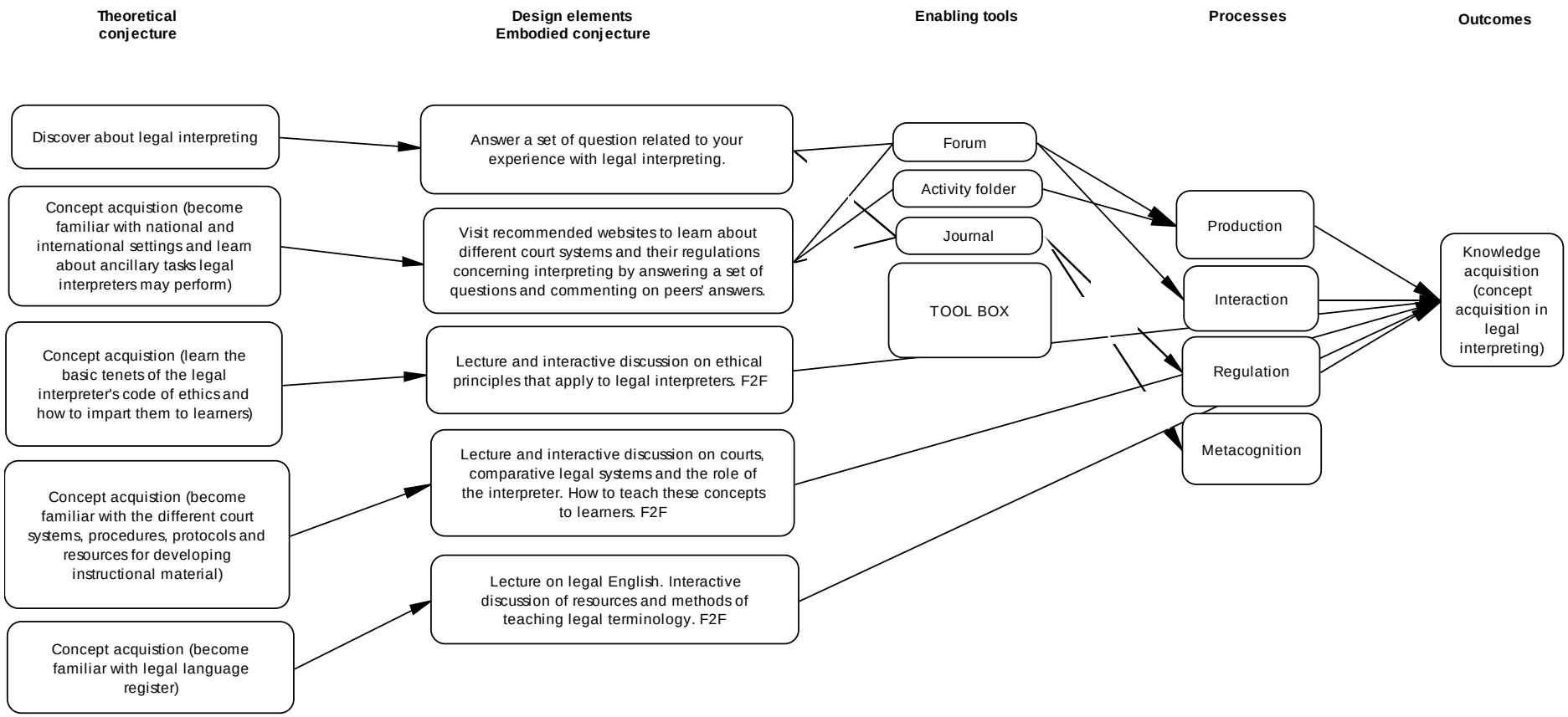


Figure 70: Conjecture map, Module 8, Case Study 1

Enactment

During the *access and motivation* phase, the teacher welcomes learners. They read the course description and her welcome message. During the *information exchange* phase, they develop learning strategies with the support of the teacher. During the *knowledge construction* phase, they engage in activities, interacting with the teacher. In the *development* phase, the teacher provides formative feedback on activities and learners have to appropriate it. During the *consolidation* phase, learners participate in discussions and attend face-to-face lectures. A summary of the module is included the wrap-up book for future reference (Figure 71).

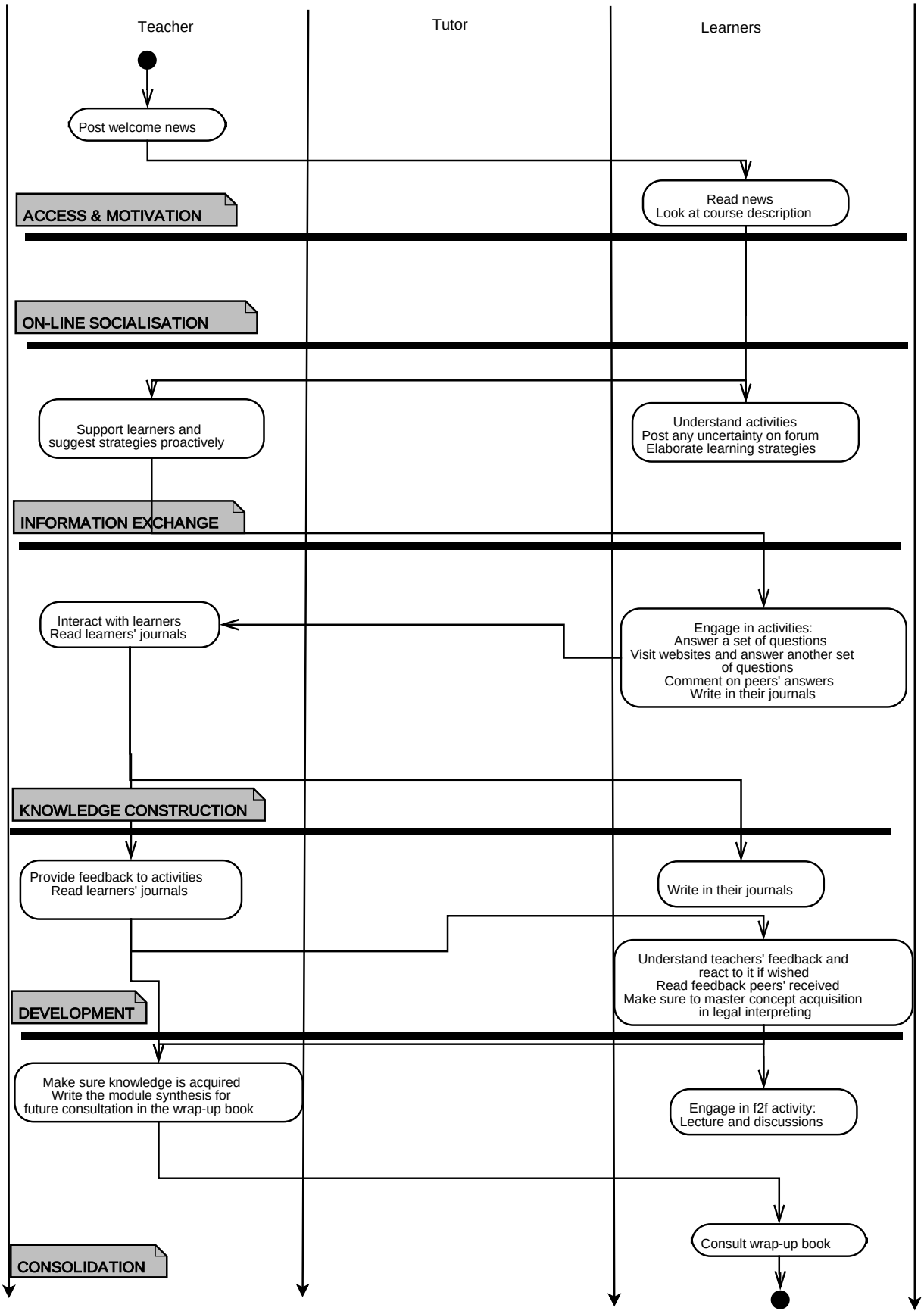


Figure 71: Pedagogical scenario, Module 8, Case Study 1

Comments

At the end of the course, the teacher said she was not convinced this module really belonged in this curriculum, because some learners participated, others less so and still others not at all. In addition, she felt that since this was the last online module before the face-to-face week, learners were exhausted.

She did not make use of the tutor:

> I did not use the tutor because I did not feel the need for him. I felt that participants were so tired when they arrived to my module that I kept it all straightforward. The workload for me was what I expected. (T6, interview, CS1)

This module was removed from the course in the second edition and offered on a stand-alone basis.

Module 8: At the end of the course, it was decided that this module was too specific for this curriculum and would be offered on a stand-alone basis.

10.4.9. Module 9 / 4

Description

In Case Study 1, this module corresponds to Module 9 and is entitled *Research methodology*; in Case Study 2, it corresponds to Module 4 and is entitled *Design and implementation of research projects*. In Case Study 1, the module constitutes a bridge between the instruction component of the course and the practical, research component. It is offered online, but after the face-to-face week. It provides learners with the necessary foundations for conducting research. Activities based on inductive thinking and scientific inquiry (see Section 3.2, Table 6 and Table 8) support learners in their discovery of how to research the literature, choose a research topic and conduct the research. In terms of the skills and knowledge to be built and acquired, by the end of the module learners will be familiar with the means and methods of conducting research in interpretation studies; they will have developed the skills and confidence required for formulating research questions and hypotheses; and they will be able to identify the methodological issues involved in designing empirical research projects.

Design goals

Learners must learn how and where to look for resources in the library during the face-to-face session. In Case Study 1, they start by reading one of the resources, either collaboratively or individually, after which they propose research topics and formulate research questions or hypotheses for these topics. Then, starting with another reading resource, they are asked to think about how to replicate the experiment reported in the resource (Figure 72).

In Case Study 2, learners carry out different activities. First they read two articles and generate a research question of interest to them. In the second activity, they appropriate the basic concepts underlying empirical and non-empirical research. Starting from the topic they chose in activity 1, they work collaboratively to formulate research questions or hypotheses and outline the procedure for carrying out the research project. In the third activity, they learn how to search for appropriate documentation. During the face-to-face week, learners visit the ETI library and become more familiar with the available resources (Figure 73).

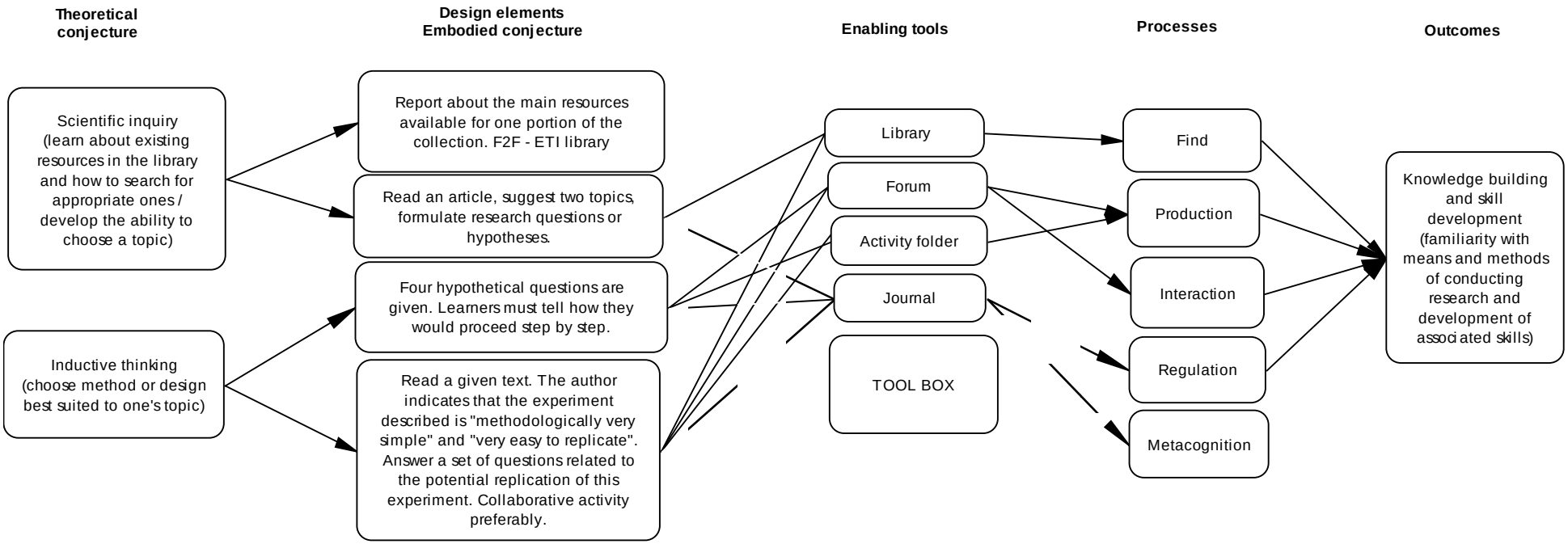


Figure 72: Conjecture map Module 9, Case Study 1

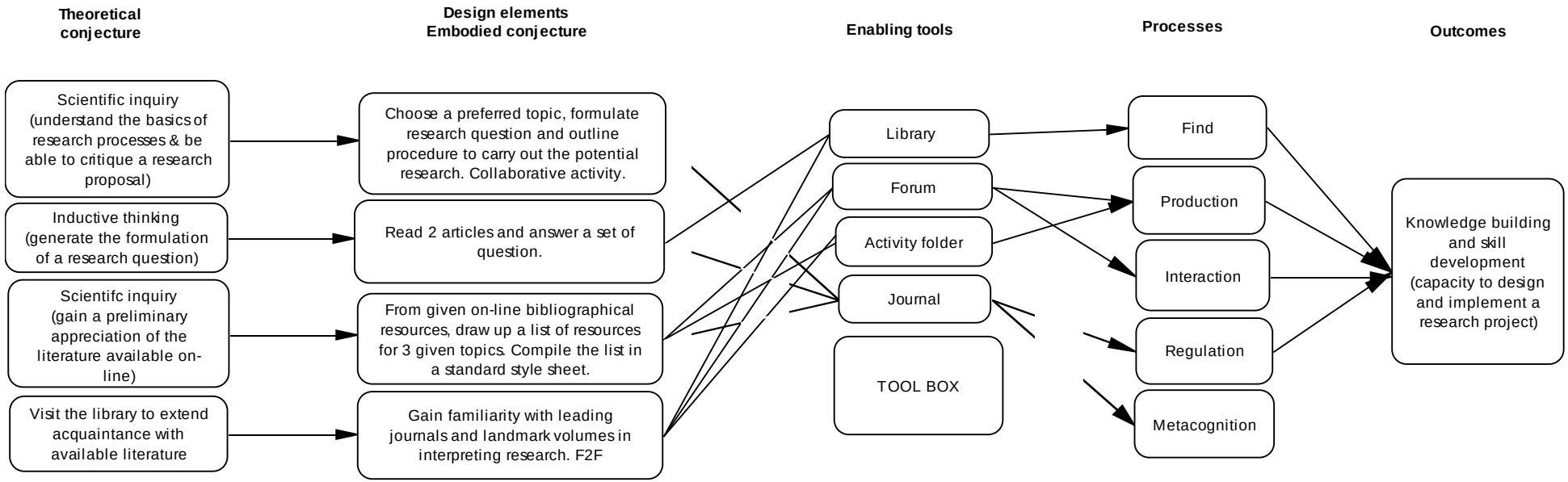


Figure 73: Conjecture map, Module 4, Case Study 2

Enactment

In Case Study 1, during the *access and motivation* phase, the teacher welcomes learners, reminds them that activity 1 was done during the face-to-face week and encourages them to work collaboratively. They read the course description and the welcome message. During the *online socialisation* phase, learners prepare for the upcoming collaborative activity and the teacher regulates the formation of the groups. During the *information exchange* phase, learners develop learning strategies and the teacher supports them in this process. During the *knowledge construction* phase, learners engage in activities, interacting with the teacher. In the *development* phase, the teacher provides feedback and learners integrate it. The *consolidation* phase involves writing the summary of the module for the wrap-up book for future reference. The teacher did not make use of the tutor during the entire module (Figure 74).

In Case Study 2, during the *access and motivation* phase, the teacher welcomes learners, focusing on what they will be doing during the module and giving details about the upcoming activities. She expresses her hope that collaboration will be a successful experience and gives details about how the feedback will be provided: she and the tutors will provide intermediate and final feedback to different groups. During the *online socialisation* phase, learners prepare for the upcoming collaborative work, with the teacher supervising the formation of the groups. During the *information exchange* phase, learners develop learning strategies and the teacher and tutors support them in this process. During the *knowledge construction* phase, learners engage in activities, interacting with the teacher and tutors. In the *development* phase, the teacher and tutors provide intermediate and final feedback and learners integrate it. They can respond to the feedback received during the *consolidation phase* and continue the online discussion with the teacher and tutors. A group of volunteers write the summary of the module for future reference (Figure 75).

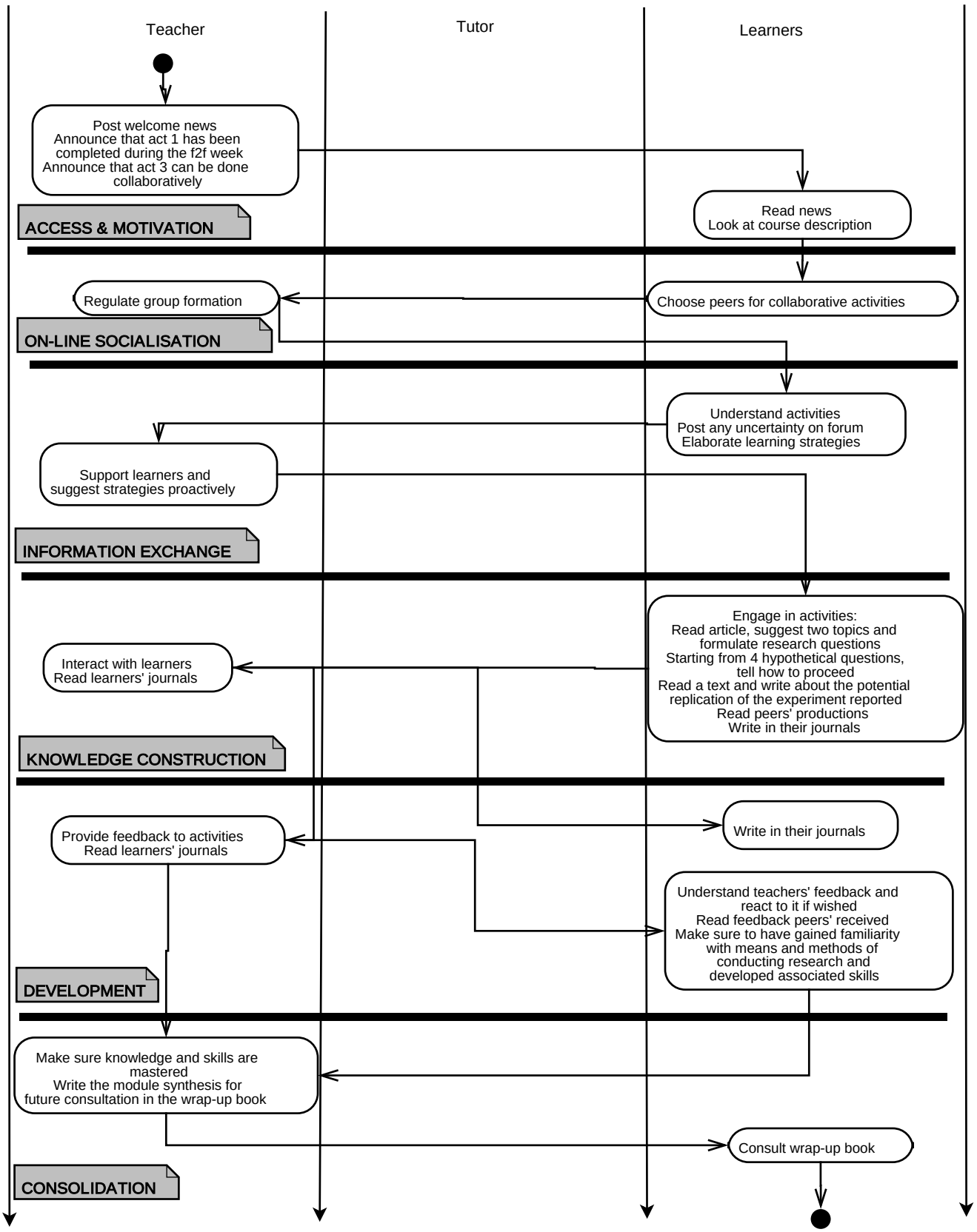


Figure 74: Pedagogical scenario, Module 9, Case Study 1

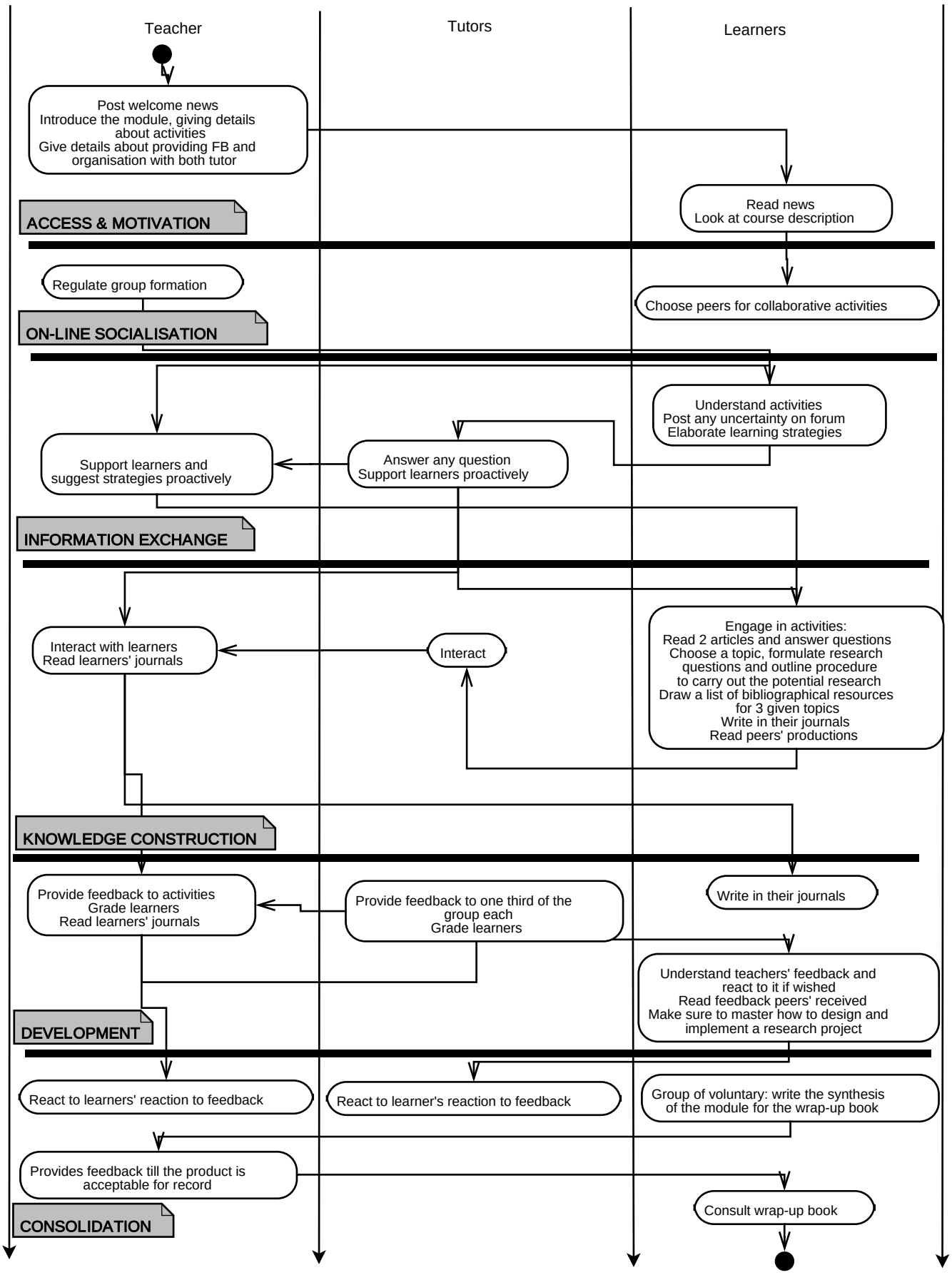


Figure 75: Pedagogical scenario, Module 4, Case Study 2

Comments

During Case Study 1, the researcher did not have a chance to interview this teacher and she did not write a single entry in her journal. This post face-to-face module was very problematic: learners did not meet deadlines and went straight to their seminar papers without completing the module activities. The fact that the module was entirely redesigned in Case Study 2 shows how problematic it was in this first edition.

During Case Study 2, the teacher did not use her journal either. In the interview she says how important it was to shift the module in the curriculum and the place of her face-to-face day in the face-to-face week.

> The advantage this time, and I am glad that it's been fixed, it's very important, is that my module came first so that now I have given them the tools, how to go to the library, what to look for, which we consider trivial but is very important, so that they have the whole week while they are here to go up and search and find, download from e-journals, etc. this is crucial information, especially for the ones who don't have a good university library. So the greatest drawback has been corrected, namely that my module came at the end last time. (T4, Interview, CS2)

This second edition, with the assistance of two tutors worked fine.

> They (Tutor1 and Tutor2) went over assignments. We had 34 assignments and we divided it in half, I did half and each of them did a quarter, and then the other assignments we switched people, but although I did half and they did a quarter, it was okay. (T4, Interview, CS2)

Regarding the learners' performance, the teacher seems satisfied this time around.

> In the previous edition, they did not have such structured assignments as I recall last time. Now, everything is very structured and also we kind of choose the topics for them because of the sheer numbers and also for their convenience and mainly for our convenience. They were not allowed to choose topics, whereas last time each one chose whatever topic they wanted, which in a sense was more difficult because you had to grade individual papers and individual topics. In that respect it is easier this time. In terms of their performance, on the whole, they were good, given the fact that many of them came with zero background. So they did use the research that we gave them. I uploaded articles and gave them various things and other people did of course as well and I think they used the material. Their performance was reasonably good. (T4, Interview, CS2)

At the end of the module, this teacher said that, because of the workload, she would not do it a third time.

> It was too much, really, for me. I did what had to be done because once I am in it, I am in it, but as it is now it was just too much, because the whole month of November, when I was heading my own department, teaching my own students, supervising theses and dissertations and doing a lot of other things, I had this on top of everything and it was just too much, so the stress is not worth it. (T4, Interview, CS2)

Tutor2 comments on her professional relationship with T4:

> T4 was very dependent on us for everything that was practical. She would not look for the portal for the information she needed. She would just say, "I need that, can you help?" And well, I tried, once or twice, to send her back to the portal, the right section, the right thing, and after the second time, I understood she would not look for it, so I just answered and posted and did whatever needed to be done because it took less time in the end. (Tutor2, Interview, CS2)

Tutor1 comments that all the other teachers have some link other than through the portal, except T4: "T4 is very removed from things and really only gets what she gets through the portal" (Tutor1, Interview, CS2).

In Module 9/4, the most significant change between Case Study 1 and Case Study 2 involved shifting the place of the module in the curriculum and the place of the face-to-face day in the face-to-face week. A second change involved providing learners with a list of seminar topics to work on collaboratively rather than allowing them to choose any topic to work on individually. Both changes led to positive outcomes.

Section 10.5. Summary

This chapter has presented the curriculum of both case studies. Each of the modules has been presented according to the same pattern: the *description* section focuses on the learning goals and describes the module in broad terms; the *design goals* section describes the underlying pedagogical models and how they have been implemented in the particular situation of the module; the *enactment* section provides information about how the pedagogical scenario unfolds; and finally, the *comments* section highlights some major features that emerged from either the interviews with teachers or the learners' journals. A conjecture map for the entire module supports the *design goals* section and an activity diagram represents the *enactment* of the module. Activity diagrams are designed using Salmon's (2000) framework, and represent the flow of activity among the teacher, the tutor and the learners at six different stages: access and motivation, online socialisation, information exchange, knowledge construction, development and consolidation.

Module 1 introduces learners to the learning environment, the use and functionality of the tools and the underlying approach to learning that supports it. Module 2 is a theoretical module and is always difficult for learners who are no longer used to academic reading and writing. In Module 3, the same pedagogical scenario was used in both case studies but its enactment differed a lot. For Module 4/5, the activities remained essentially the same in both

case studies, but the scenario changed, particularly as a result of the introduction of cognitive scaffolding. For Module 5/6, the scenario was the same in both case studies but the enactment very different. The major difference consisted in fading support at this point of the course in order to help learners become increasingly autonomous. During Case Study 1, Module 6/8 witnessed a dramatic change in the tutor's role, which shifted from performing clerical, background tasks to providing feedback and answering learners' questions in the same way as the teacher. The working model experimented during this module was subsequently adopted throughout Case Study 2. For Module 7, in Case Study 1, the teacher reports a preference for the face-to-face part of the module. She also reports on an activity she implemented to gather information on process but that only resulted in a product, and wonders how it could be done on the portal to yield the outcomes she wanted. In Module 9/4, the most significant change between Case Study 1 and Case Study 2 involved shifting the place of the module in the curriculum and the place of the face-to-face day in the face-to-face week. A second change involved providing learners with a list of seminar topics to work on collaboratively rather than allowing them to choose any topic to work on individually.

Chapter 11. Findings

This chapter provides answers to the research questions identified in Chapter 8, pertaining respectively to the learning design (questions A to E), to how different learners enacted activities (question F) and to how the variables are related to each other (question G). Let us recall that the research addresses seven major questions, each of which includes a certain number of issues: A) To what extent did we implement a socio-constructivist learning design? B) What are the effects of the design on skill acquisition and knowledge building? C) To what extent is the portal an effective learning environment and in what ways did tools support pedagogical goals? D) To what extent did the TSS framework help to create an effective socio-constructivist learning design? E) How did faculty perceive the implementation of the blended format of the course? For each issue associated with these first five research questions, data collected from each of the case studies is presented and interpreted, and in most cases, design conjectures are formulated, based on the results. For question F), What do the individual differences among learners consist in?, we begin by presenting the three learner profiles and then analyse how learners from each profile enacted two activities, one at the beginning of the course and one at the end. To answer question G), What are the relations among variables that we used to answer the previous questions?, we looked at the correlations among variables in order to gain a better understanding of the relationship among design elements.

Section 11.1. Findings for question A: To what extent did we implement a socio-constructivist learning design?

This question addresses socio-constructivist issues, rooted in the following five theoretical conjectures: achieving self-directed learning is part of constructivist objectives (issue 1), peers and the community stimulate individual and group work (issues 2 and 3), reflection on one's own practices is part of a teacher's practice (issue 4), authentic activities enable higher-order learning (issues 5 and 6), and tutor support enhances learning (issues 1, 6 and 7).

1- Did teaching staff support active learning?

To address this issue, two indices are taken into account: the first – *tutor support* – is related to learner support, which is considered to enhance social participation in the community while enhancing motivation on the cognitive level and representing a way to learn based on models provided by the teaching staff. The second – *constructive/active learning* – is related to

learner support viewed as an opportunity to support active learning. We recall that for Mayer (1999), for instance, constructive learning "is active learning in which the learner possesses and uses a variety of cognitive processes during the learning process. The major cognitive processes include paying attention to relevant information, organising that information into coherent representations, and integrating these representations with existing knowledge" (p. 146). "Constructive learning implies that students fully participate in their own learning and actively construct their own knowledge (Harris and Alexander 1998)" (Dolmans *et al.*, 2003, p. 432).

Regarding the *tutor support* index (Figure 76, Table 49), in Case Study 1, the distribution is wide, varying between 2.50 (halfway between disagree and somewhat agree) and 5 (totally agree). The typical learner agrees (median = 4) that the teaching staff stimulated and encouraged him/her in the learning enterprise while also modelling cognitive apprenticeship. In Case Study 2, the general shape of the boxplot is the same, but the distribution is less significant. For both case studies, whiskers are dissymetrical, the lower whisker being much longer than the upper one, and observations are negatively skewed. These findings show that 25% of learners somewhat disagree, 25% totally agree and 50% agree that teaching staff stimulated and encouraged them in their learning enterprise while also modelling cognitive apprenticeship.

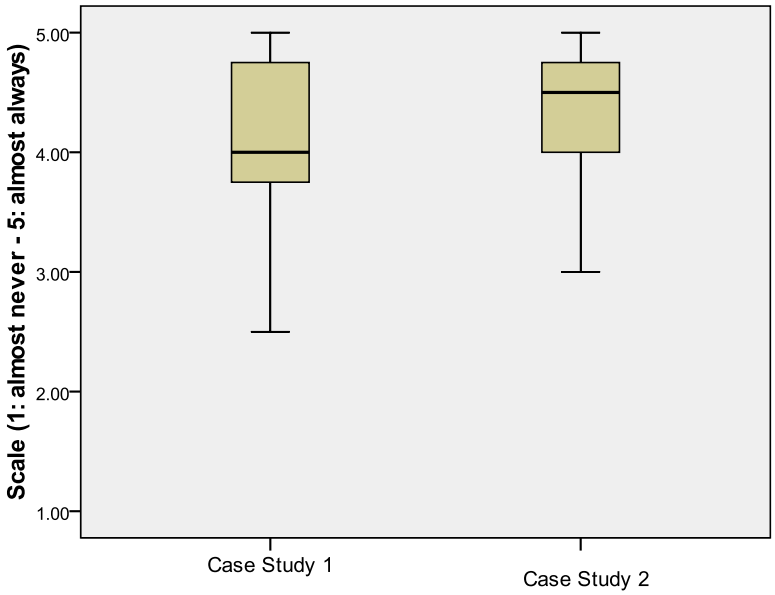


Figure 76: Learners' opinion about tutor support

Case Studies		1	2
N	Valid	21	29
	Missing	0	0
Minimum		2.50	3.00
Maximum		5.00	5.00
Percentiles	25	3.75	3.88
	50	4.00	4.50
	75	4.75	4.75

Table 49: Frequencies, Tutor support indice (1: almost never - 5: almost always)

Regarding the *constructive/active learning* index (Figure 77, Table 50), both boxplots tend to have an overall symmetrical shape, ranging between 3 (somewhat agree) and 5 (totally agree).

Two groups of learners can be distinguished, with observations equally positively and negatively skewed. The typical learner in both case studies agrees (median of 4 and 4.20) that teaching staff encouraged him/her to actively construct his/her knowledge. These findings show that 50% of learners are situated between somewhat agree and agree. The remaining 50% agree or totally agree that teaching staff stimulated them to understand, look for, process and create relevant information.

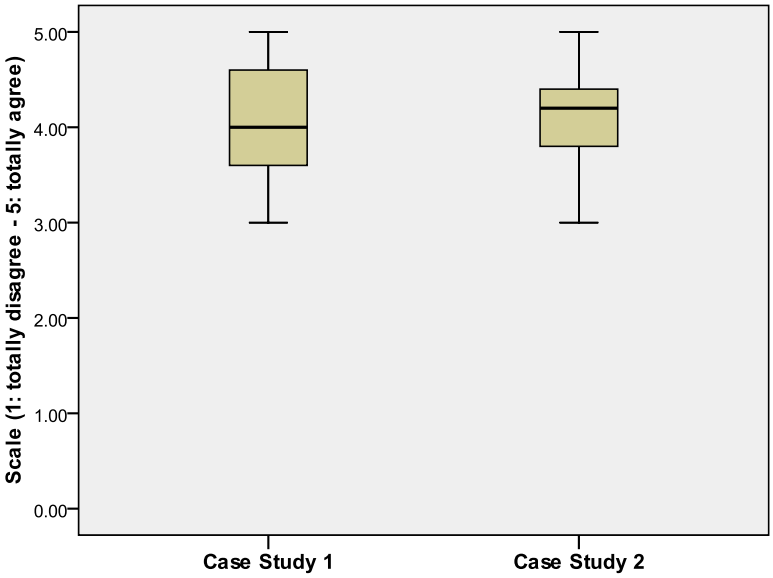


Figure 77: Learners' opinion about constructive / active learning

Case Studies		1	2
N	Valid	21	29
	Missing	0	0
Minimum		3.00	3.00
Maximum		5.00	5.00
Percentiles	25	3.60	3.80
	50	4.00	4.20
	75	4.60	4.50

Table 50: Frequencies, constructive/active learning indice (1: totally disagree – 5: totally agree)

The two indices – *tutor support* and *constructive/active learning* – are well correlated (r=0.62, $p < 0.001$). In addition to the high level of agreement obtained for both indices, these findings confirm that learners' perceptions of actively constructing their own knowledge is related to their perceptions of tutor support.

The design of many of the activities was based on the scientific inquiry model (Table 8), which is a pedagogical model that promotes strategies of inquiry along with those values and attitudes that are necessary for an inquiring mind: process skills, active learning, perseverance, logical thinking and an orientation that views all knowledge as tentative. Beyond confirming the immediate support of teachers, these findings indicate that the choice of pedagogical models for the design of activities was appropriate and did in fact lead to the expected outcomes, that is, constructive, active learning.

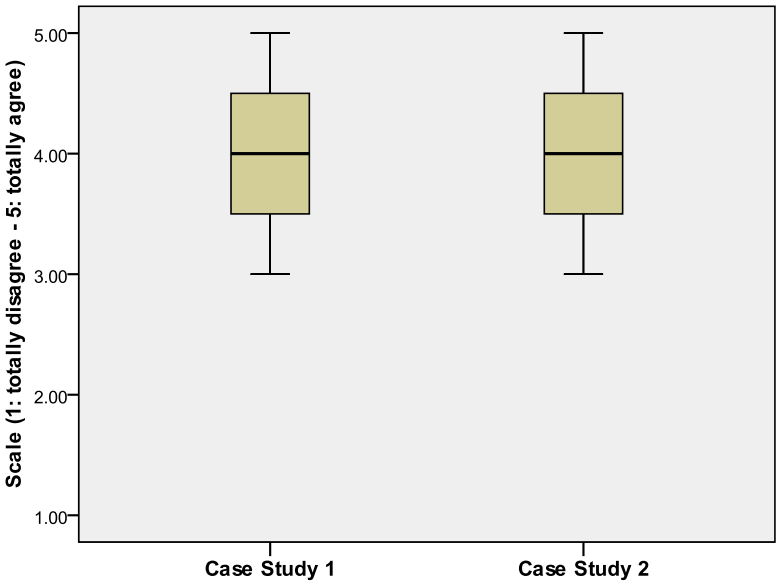
These findings confirm that the design of activities favoured active learning and that the teaching staff supported learners. Additionally, analysis of the data shows a correlation between learners' perception of tutor support and their active engagement in knowledge construction. We can therefore formulate the conjecture that tutor support is an important

vector influencing the type of learning provided, which in this particular context is constructive and active learning.

2- Did learners work on authentic activities embedded in professional practice?

To address this issue, two indices, one from the Dolmans *et al.* (2003) instrument – *contextual learning* - and one from the Taylor and Maor (2000) questionnaire – *relevance* - are used to investigate this very important aspect of the course. Contextual learning is reality-based: the context of activities should reflect the nature of activities in the real world. Beyond the challenge of direct, meaningful experience, contextual learning requires reflection in order to forge lasting cognitive connections. Relevance refers to concepts of pertinence and applicability. In this context, we are talking about professional relevance, namely, the extent to which activities correspond and can be applied to learners' professional practices.

Regarding the *contextual learning* index (Figure 78, Table 51), for both case studies, the distribution is between 3 (somewhat agree) and 5 (totally agree). The typical learner agrees (median = 4) that teaching staff stimulated him/her to apply knowledge to the problems discussed and to ask questions and reconsider earlier explanations. Both boxplots are very symmetrical, showing equally distributed observations on both sides. These findings show that 50% of learners opted for somewhat agree or agree. The remaining 50% agree or totally agree that teaching staff supported contextual learning.



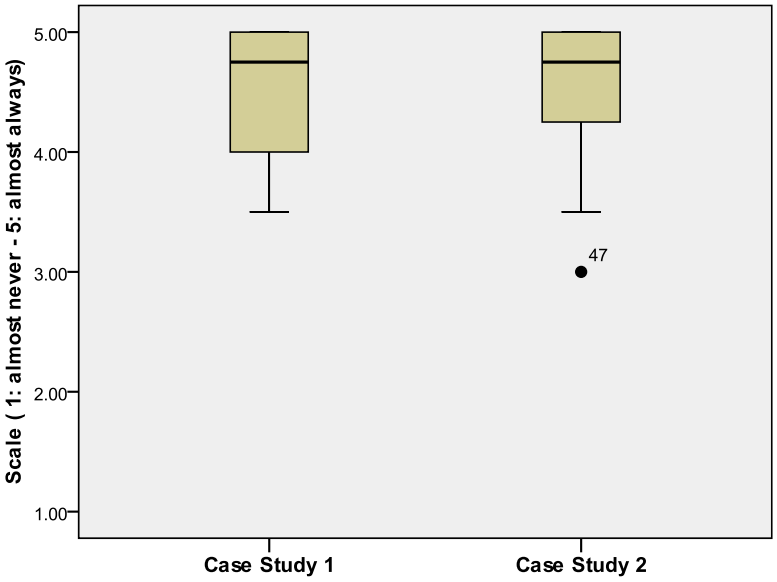
Case Studies		1	2
N	Valid	21	29
	Missing	0	0
Minimum		3.00	3.00
Maximum		5.00	5.00
Percentiles	25	3.38	3.50
	50	4.00	4.00
	75	4.50	4.50

Table 51: Frequencies, contextual learning indice (1: totally disagree – 5: totally agree)

Figure 78: Learners' opinion about contextual learning

Regarding the *relevance* index (Figure 79, Table 52), for both case studies, the distribution is between 3.50 (between sometimes and often) and 5 (almost always) with one outlier in Case Study 2 who indicated that activities were only sometimes (3) professionally relevant. The

typical learner thinks that in almost all instances (median = 4.75) a) learning focused on issues that interest him/her, b) what s/he has learned is important for his/her professional practice c) s/he has learned how to improve his/her professional practice as a trainer and d) what s/he has learned connects well with his/her professional practice. Only 25% of learners indicated that activities were sometimes or often professionally relevant; the remaining 75% indicated that they were almost always relevant.



Case Studies		1	2
N	Valid	21	29
	Missing	0	0
Minimum		3.50	3.00
Maximum		5.00	5.00
Percentiles	25	4.00	4.25
	50	4.75	4.75
	75	5.00	5.00

Table 52: Frequencies, relevance indice (1: almost never - 5: almost always)

Figure 79: Learners' opinion about relevance

The two indices – *contextual learning* and *relevance* – are well correlated (r=0.43, $p < 0.001$). The finding of this analysis confirm that learners' perception of professional relevance is related to transferring and applying the knowledge and skills constructed during activities to their professional practice as trainers.

As the findings indicate, learners agree they were exposed to professionally relevant learning activities throughout the course. The findings confirm a balance of structure, complexity and authenticity within tasks. With the inclusion of authentic activities, learners must have developed strategies for analysing, searching for and selecting appropriate information, and constructing and testing possible solutions (Berge *et al.*, 2004). This is in fact what they did, judging from their performance on formative and summative evaluations (see issue 13 Section 11.2).

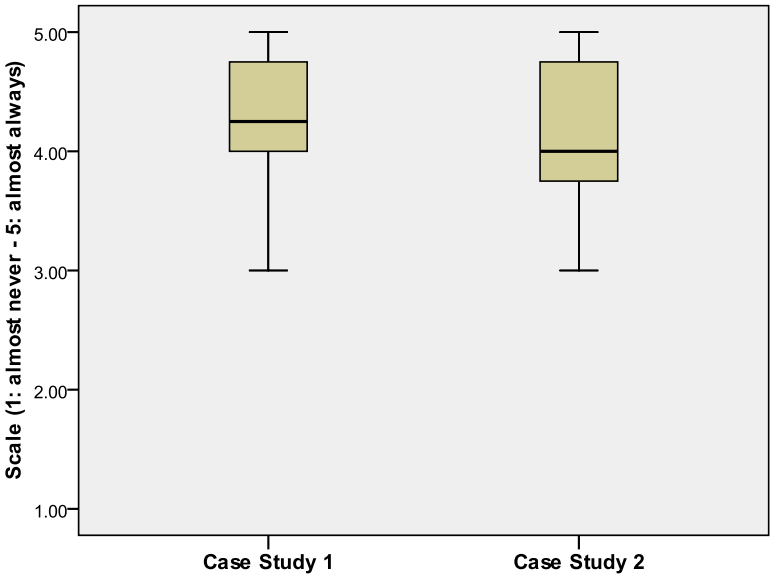
Findings from the data analysis confirm that learners were exposed to authentic, professionally embedded activities in a context of active learning. In a socio-constructivist learning context, designers choose to expose learners to authentic activities because of their

real life characteristics (relevance, complexity, ill-structuredness). These kinds of activities help learners develop skills of analysis and critical reflection, as well as skills in selecting information and testing potential solutions. We can therefore formulate the conjecture that learners generate knowledge and skills within authentic activities that interest them and that they can value and transfer to their professional practice.

3- Did the course train reflective practice?

To address this issue, one index from the Taylor and Maor (2000) questionnaire was used. It comprises four questions related to thinking critically about the learning process and the content of the course. This process of pausing before/during/after an activity to explore one's progress throughout the activity involves learners in active exploration. Reflective practice promotes the development of expert learning processes and capacities to monitor and regulate learning strategies.

In both case studies (Figure 80, Table 53), the distribution oscillates between learners who think they sometimes (minimum = 3) practise reflection and learners who think they practise it almost always (maximum = 5). In Case Study 1, the typical learner thinks s/he was often or almost always (median = 4.25) encouraged to think critically about his/her own learning processes and ideas as well as the ideas of his/her peers'. This was also true for Case Study 2 (median = 4). In both case studies, 50% of learners indicated that they were sometimes or often encouraged to practise reflection, while the remaining 50% indicated that they were often or almost always encouraged to do so.



Case Studies		1	2
N	Valid	21	29
	Missing	0	0
Minimum		3.00	3.00
Maximum		5.00	5.00
Percentiles	25	4.00	3.75
	50	4.25	4.00
	75	4.88	4.75

Table 53: Frequencies, reflection indice (1: almost never - 5: almost always)

Figure 80: Learners' opinion about reflection

In the course design, the tool that most significantly called for reflection was the journal. Different learners used this tool in very different ways (see Section 11.5) and at very different frequencies (see issue 15 in Section 11.3). While designing activities and then coaching learners throughout these activities, teachers required learners to make links between their professional practice (authentic activities), what they were learning (knowledge building) and how the teaching staff was performing as teaching staff (cognitive apprenticeship). Learners kept navigating between these three spaces of expertise, which may explain their tendency to claim that they practised reflection a lot.

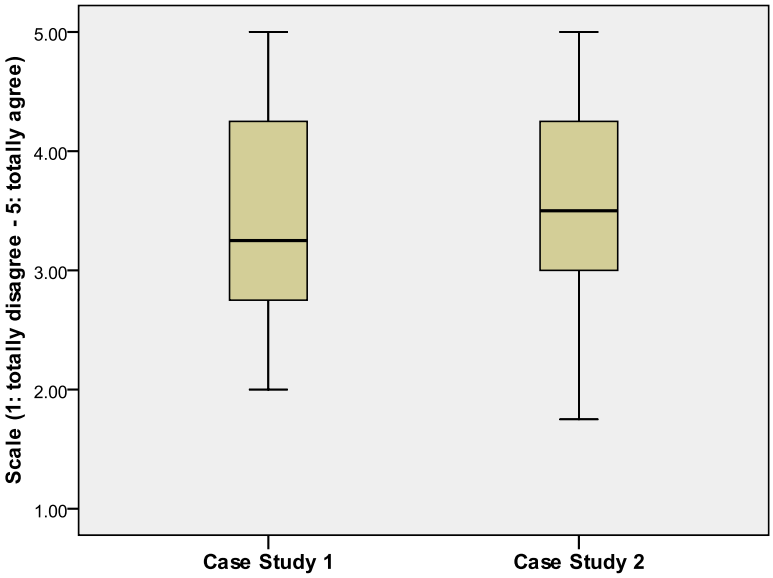
The findings confirm that within this course, learners were trained to engage in reflective practice. Based on an analysis of the data collected for issues 1 and 2, we can formulate the conjecture that when learners appreciate the design of authentic, constructivist activities, they do practice reflection. The *reflection* index is positively correlated with the three indices considered in issues 1 and 2, namely, *constructive/active learning* (r=0.40, $p < 0.001$), *tutor support* (r=0.45, $p < 0.001$), and *contextual learning* (r=0.50, $p < 0.001$).

4- Did teaching staff and peers support collaborative learning?

To address this issue, three indices were taken into account. The first – *collaborative learning* – is related to learners' sharing a common goal, sharing responsibilities, being mutually dependent, and reaching agreement through open interaction (Van der Linden *et al.*, 2000 cited by Dolmans *et al.*, 2003, p. 433). The second – *making sense* – is related to the interpretation of meaning and the extent to which learners "and tutor co-construct meaning in a congruent and connected manner" (Taylor & Maor, 2000). The third – *interaction* – is

related to “the extent to which communicative interactivity is occurring on-line between students and between students and tutors” (Taylor & Maor, 2000). Collaborative learning involves a group of learners interacting with each other in a learning situation with a view to producing something unique that reflects the participation of all members of the group. “Promoting collaboration with others leads to students becoming better able to articulate their own understandings and seeing multiple perspectives, which guides them towards conceptual reframing or learning” (Ertmer and Newby, 1993, cited by Dolmans *et al.*, 2003, p. 433). In the socio-constructivist design, collaboration invokes the social dimension.

Regarding the *collaborative learning* index (Figure 81, Table 54), in both Case Study 1 and Case Study 2, the distribution is very high, varying respectively between 2 (disagree) and 5 (totally agree) and between 1.75 (between totally disagree and disagree) and 5 (totally agree). The typical learner either somewhat agrees or agrees (median = 3.25 and 3.50) that teaching staff stimulated him/her a) to reflect on and evaluate the group’s functioning, b) to provide constructive feedback on peers’ contributions, and c) to discuss how to improve the group’s functioning. In both case studies, boxplots have the same shape and are quasi-symmetrical, reflecting a high distribution: 25% of learners agree or totally agree, while 25% disagree or somewhat agree, and 50% somewhat agree or agree, with respect to the above three items (a, b, c). To summarise, learners are very divided on the issue of whether the teaching staff supported all parameters of collaborative learning.



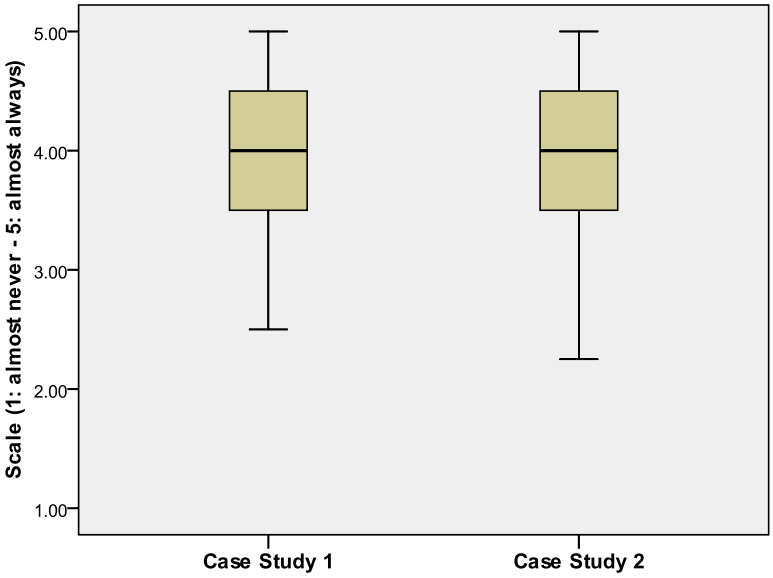
Case Studies		1	2
N	Valid	21	29
	Missing	0	0
Minimum		2.00	1.75
Maximum		5.00	5.00
Percentiles	25	2.63	2.75
	50	3.25	3.50
	75	4.25	4.25

Table 54: Frequencies, collaborative learning indice (1: totally disagree – 5: totally agree)

Figure 81: Learners’ opinion about collaborative learning

Regarding the *making sense* index (Figure 82, Table 55), in both case studies, the distribution is also very high, varying between 2.25 (between seldom and sometimes) and 5 (almost

always). The typical learner, as well as 50% of the learners, think they often or almost always made good sense of peers' and teaching staff's messages and vice-versa, while the other 50% think they sometimes or seldom did. Again, learners are very divided on the question of making sense.

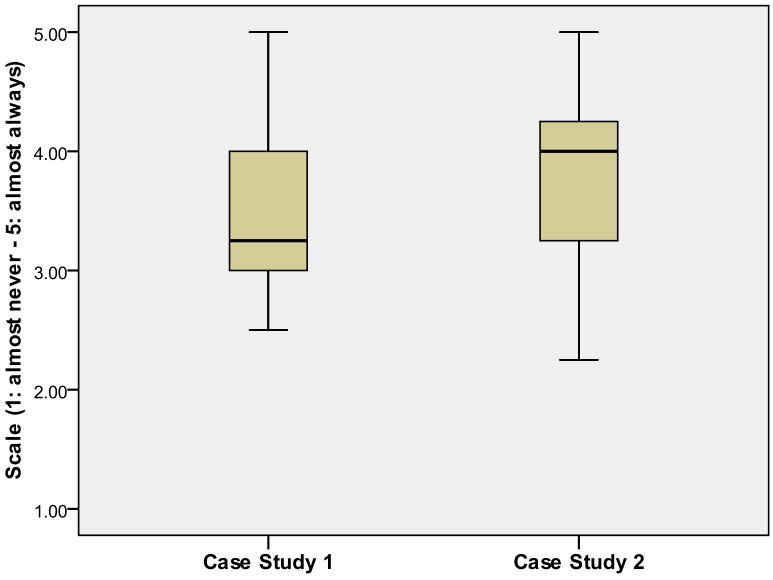


Case Studies		1	2
N	Valid	21	29
	Missing	0	0
Minimum		2.50	2.25
Maximum		5.00	5.00
Percentiles	25	3.50	3.50
	50	4.00	4.00
	75	4.50	4.50

Table 55: Frequencies, making sense indice (1: almost never - 5: almost always)

Figure 82: Learners' opinion about making sense

Regarding the *interaction* index (Figure 83, Table 56), in both case studies, the distribution is again very high, varying between 2.25 (between seldom and sometimes) and 5 (almost always). In Case Study 1, the upper whisker is longer, skewing observations positively, while the opposite holds in Case Study 2. In Case Study 1, the typical learner thinks s/he sometimes (median of 3.25) explained his/her ideas to peers and vice-versa and responded to peers' ideas, while in Case Study 2, s/he thinks s/he often (median of 4) did. In Case Study 1, 75% of learners think they seldom or sometimes interacted, and the remaining 25% think they often or almost always did. In Case Study 2, 50% of learners think they seldom or sometimes interacted, while the remaining 50% think they often or almost always did. Again, learners have very contrasting opinions on the issue of interaction.



Case Studies		1	2
N	Valid	21	29
	Missing	0	0
Minimum		2.50	2.25
Maximum		5.00	5.00
Percentiles	25	3.00	3.13
	50	3.25	4.00
	75	4.00	4.38

Table 56: Frequencies, interaction indice (1: almost never - 5: almost always)

Figure 83: Learners' opinion about interaction

The *collaborative learning* index is correlated with the other two indices, *making sense* (r=0.43, $p < 0.001$) and *interaction* (r=0.40, $p < 0.001$). In addition, these last two indices are correlated with one another (r=0.41, $p < 0.001$). These results confirm that learners' perception of collaborative learning is related to their perception of co-constructing meaning and interacting.

To understand the contrasting opinions regarding the teaching staff's support for collaborative learning, we examined how learners from different profiles enacted activities (Figure 84, Figure 85). As the activity diagrams illustrate, individual learners vary considerably in how much of themselves they invested in an activity, and hence collaboration varies across groups accordingly. It follows that learners' opinions on collaborative learning are a function of the composition of the group and vary according to whether they consider that collaboration actually took place (see sub-section *"Average" profile: Case Study 1, Case Study 2 and comparison* in Section 11.6) or not (see sub-section *"Few" profile: Case Study 1, Case Study 2 and comparison* in Section 11.6). Here it behoves us to ask whether or not the seven conditions outlined in the literature review (see Section 2.5) were present within a group and how learners perceived them. These seven conditions, it will be recalled, consist in a common understanding of the task (grounding), agreement on a horizontal division of labour, awareness of the symmetry of action, knowledge and status, information processing from a knowledge building perspective, appeal to metacognitive capabilities and regulation of the learning process.

The findings for the three indices show that opinions are widely distributed. Since typical learners, for the three indices, fluctuate between somewhat agree/sometimes (3) and agree/often (4), it is reasonable to suppose that learners' opinions about support for collaborative learning on the part of teaching staff and peers vary as a function of their own experience throughout the course. To further pursue this line of thought, we performed an ANOVA test. When we used it with profiles defined in terms of real use, the test tends to be significant but the score is higher than .05. When we used it with profiles defined according to opinion, though, there is a statistical difference between the "few" profile and the "average" profile for the two indices, *making sense* (F: 4.00 (df 2/47 p .02)) and *interaction* (F: 4.06 (df 2/47 p .02)). Figure 84 and Figure 85 show that the "average" profile, for both indices, has a median higher than the two other profiles. The typical learner with the "average" profile thinks that s/he often interacted with other learners and that s/he made good sense of peers' messages often or almost always. For learners with the "few" and "a lot" profiles, both the median and the majority of learners think that interaction and making sense occurred less often.

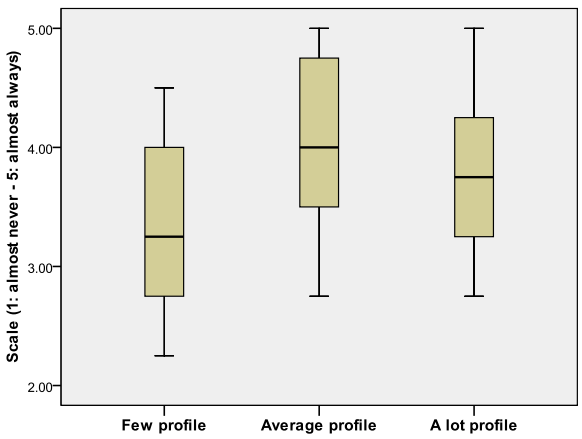


Figure 84: Interaction per profile according to opinion

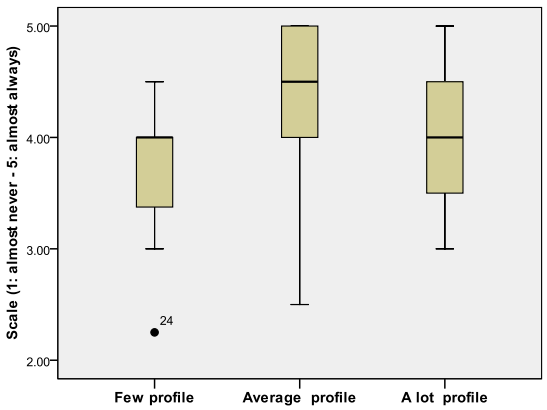


Figure 85: Making sense per profile according to opinion

The findings also show that learners had different perceptions of how the teaching staff guided small collaborative groups, with a few indicating they were not adequately supported. Guiding small groups has indeed proved to be difficult.

> Several contextual circumstances have been shown to influence teachers' behaviour in guiding small groups. For example, if the group is confronted with some students who let others do the work, group members who are initially motivated start to contribute less to the group's activities. This is a very difficult situation for teachers to deal with. In these groups, no team spirit is developed which encourages the group members to care about the group. Instead of social cohesion, the group's atmosphere has become social "loafing" (Slavin (1996). In a study conducted by Dolmans *et al.* (1999), it was demonstrated that small groups with relatively

> low levels of motivation require much more input from a teacher than highly motivated groups. (Dolmans *et al.*, 2003, p. 432)

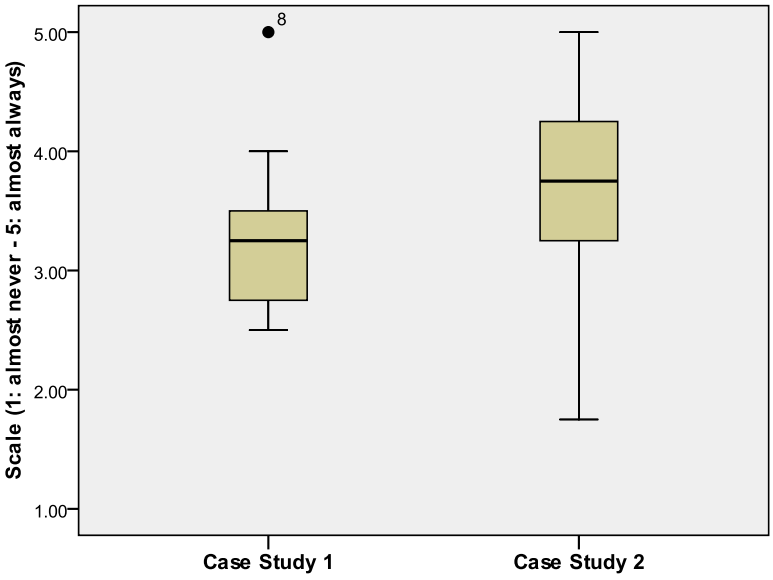
Interviews with the teaching staff attest to the difficulty, in Case Study 2, of getting learners to accept collaborative learning (please refer to *Comments* in sub-section 10.4.2. for details).

Findings from the data analysis show very divided opinions: the typical learner falls between somewhat agreeing and agreeing that teaching staff and peers supported collaborative learning. They also show that perceptions of collaborative learning, making sense and interaction are correlated. We can formulate the conjecture that both the way a learner interacts and the peers with whom s/he interacts have an influence on his/her perceptions of the support provided by teaching staff and peers for collaborative learning. Regarding guiding small groups, we can formulate the conjecture that additional training in this area may be necessary, since guiding small groups has proved to be quite difficult, particularly when a learner in the group is less motivated.

5- Did peers stimulate individual participation to the community?

To address this issue, one index from the Taylor and Maor (2000) questionnaire was used. It comprises four questions related to the extent to which peers encourage learners' participation, praise and value their contributions and empathise with their struggle to learn.

For Case Study 1 (Figure 86, Table 57), the distribution is rather small, between 2.5 (between seldom and sometimes) and 4 (often) with one outlier at 5 (almost always). The typical learner thinks peers encouraged his/her participation and praised his/her contributions sometimes (median = 3.25). Fifty percent of learners think their peers seldom or sometimes did and the remaining 50% think they sometimes or often did. In Case Study 2, the distribution is wide, ranging from 1.75 (between almost never and never) to 5 (almost always). The typical learner thinks peers encouraged his/her participation and praised his/her contributions sometimes or often (median = 3.75). Fifty percent of learners think their peers supported them often or almost always, while the remaining 50% think they seldom or sometimes did. In Case Study 1, learners' perceptions of their peers' encouragement, praise or appreciation of their contributions are not very positive. In Case Study 2, learners' perceptions are divided.



Case Studies		1	2
N	Valid	21	29
	Missing	0	0
Minimum		2.50	1.75
Maximum		5.00	5.00
Percentiles	25	2.75	3.25
	50	3.25	3.75
	75	3.63	4.38

Table 57: Frequencies, peer support indice (1: almost never - 5: almost always)

Figure 86: Learners' opinion about peer support

To go back to Wenger's (1998) conception of a community of practice, these findings may reflect an imbalance between action and situated experience on the one hand and community on the other hand (Figure 13). Reasons that support this conjecture are: 1) learners agree they acquire skills within authentic activities (see issues 9, 10 and 11 in Section 11.2); and 2) teachers confirm that the pace of the course is very intense ("if the whole thing is stretched out too much, it'll loose momentum and they will start, you know… here they kept working" (T2, interview, CS2). Since learners are rushed from one activity to another, from one module to another, they have little time for their peers and the group, focusing exclusively on the activity at-hand. If we follow this line of reasoning, it may be useful to redesign collaborative activities, cultivating the development of meta-awareness about collaboration itself. Collaboration within a group has to be nurtured by all the members of the group. It may be useful, in the future, to raise learners' awareness of the different tensions that govern a group, especially the tension between theories that give primacy to social structure and those that give primacy to action (see Section 6.2, on communities of practice, for further details). In these case studies, learners seem to have given primacy to everyday life and improvisation over norms that should govern collaborative group work.

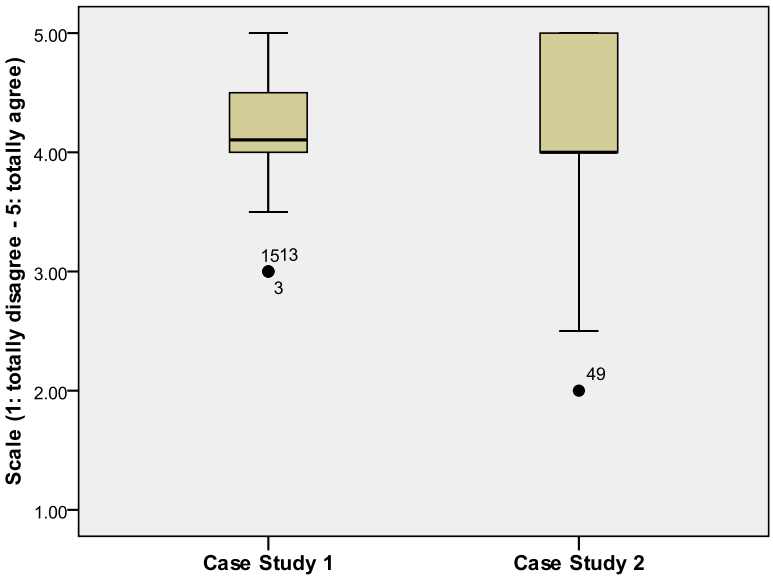
The findings fail to confirm that learners perceived their peers as encouraging their participation in the community. Due to the fast pace of the course and the fact that learners agree that they acquired skills within a professionally relevant context – indices of *relevance* and *peer support* are well correlated (r=0.49, $p < 0.001$), and indices of *contextual learning* and *peer support* are also well correlated (r=0.50, $p < 0.001$)) – we can formulate the

conjecture that a better balance between action and situated experience on the one hand and collectivity on the other hand has an influence on learners' perceptions of their peers' encouragement to participate in the community.

6- To what extent were learners supported in achieving self-directed learning?

To address this issue, one index from the Dolmans *et al.* (2003) questionnaire was used. It comprises two questions concerned with becoming an expert learner who is able to seek needed information and to monitor, evaluate and reflect on his/her own learning process.

In both case studies (Figure 87, Table 58), 50% of learners agree or strongly agree, and the typical learner agrees (median = 4.10 and 4), that they were supported in achieving self-directed learning. In Case Study 1, the distribution is symmetrical, with a range between 3.50 (between somewhat agree and agree) and 5 (totally agree), with one outlier who somewhat agrees. In Case Study 2, the distribution is much higher, between 2.50 (between disagree and somewhat agree) and 5 (totally agree), with one outlier who disagrees that teaching staff helped them to generate clear learning issues and evaluate their understanding of the subject matter by themselves. There is no upper whisker, and observations are negatively skewed.



Case Studies		1	2
N	Valid	21	29
	Missing	0	0
Minimum		3.00	2.00
Maximum		5.00	5.00
Percentiles	25	3.75	4.00
	50	4.10	4.00
	75	4.50	5.00

Table 58: Frequencies, self-directed learning indice (1: totally disagree – 5: totally agree)

Figure 87: Learners' opinion about self-directed learning

This finding can be interpreted as an outcome of the overall scaffolding-fading process that teaching staff implemented to support learners. At the beginning of the curriculum, learners are provided with a lot of support from teachers and tutors (i.e. intermediate and final feedback on their productions) and are encouraged to learn by modelling. From the halfway point of the curriculum onwards, learners are given more autonomy and are asked to do part of the evaluation and reflection work on their own (the teaching staff provide only final

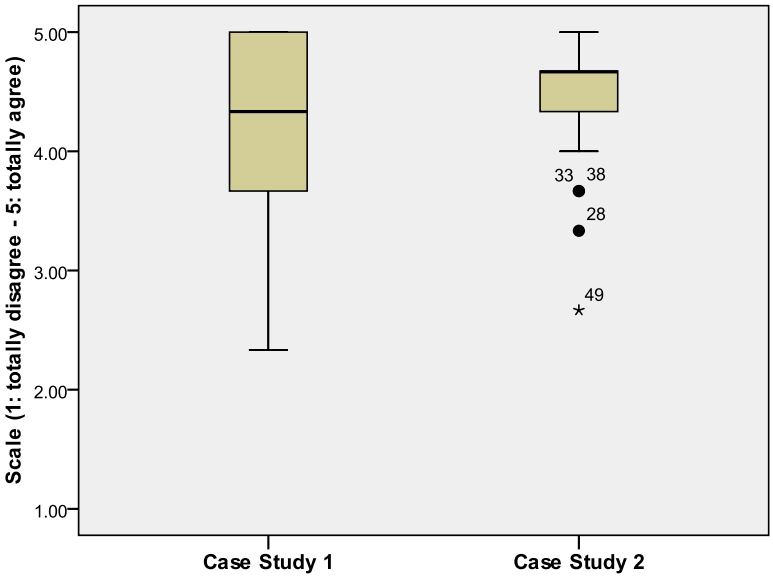
feedback on learners' productions). This is part of the pedagogical strategies associated with tutoring, namely the modelling-scaffolding-fading method (Collins, Brown & Newman, 1989; Rogoff, 1990, cited by Graesser *et al.*, 1997; see Section 5.2 for more details.)

Findings from the data analysis confirm that learners think teaching staff supported them in their process of becoming expert, self-regulated learners. Since self-directed learning and constructive/active learning are two indices that are well correlated (r=0.48, $p < 0.001$), we formulate the conjecture that becoming an expert, self-regulated learner is a skill acquired through active learning when the latter is successful and well supported.

7- Issue pertaining to the organisation of human resources, from the learners' perspective: did it support their learning?

To address this issue, one index, which includes three dimensions, is taken into account. The three dimensions are: 1) the actual organisation of human resources with respect to a) the director, b) the teachers and tutors, c) the pedagogical advisor, and d) the technical support staff; 2) the training of the teaching staff and its effectiveness in supporting learners in their learning process; and 3) the roles of teachers' and tutors and how clearly defined they were.

In Case Study 1 (Figure 88, Table 59), the distribution is high and varies between 2.33 (between disagree and somewhat agree) and 5 (totally agree). The typical learner agrees (median = 4.33) that the organisation of human resources was facilitative. While 25% of learners disagree or somewhat agree, the remaining 75% agree or totally agree that it was supportive of their learning. In Case Study 2, the distribution is very small and all learners agree or totally agree that it supported them, with the exception of three outliers who think the opposite.

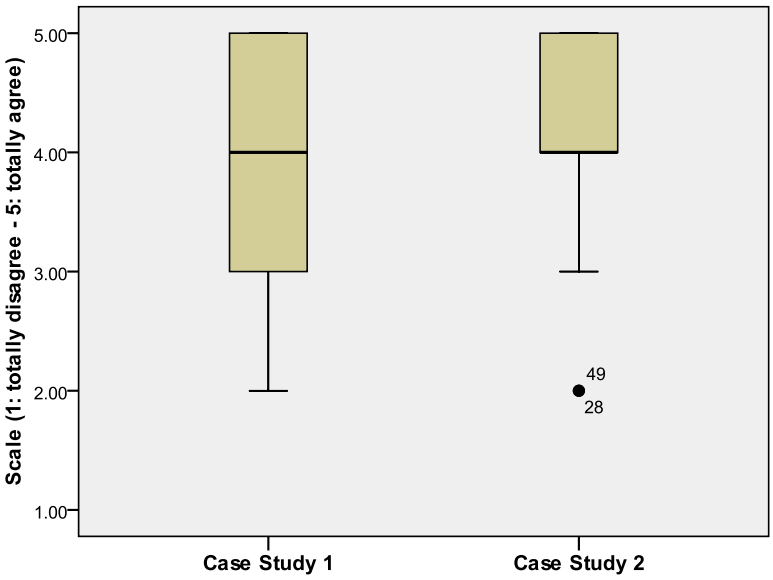


Case Studies		1	2
N	Valid	21	29
	Missing	0	0
Minimum		2.33	2.67
Maximum		5.00	5.00
Percentiles	25	3.67	4.33
	50	4.33	4.67
	75	5.00	4.84

Table 59: Frequencies, human resources indice (1: totally disagree – 5: totally agree)

Figure 88: Learners' opinion about human resources

In both case studies, learners acknowledge that the organisation of human resources was effective in the context of this course and did in fact facilitate their learning. They also think that the teaching staff was trained in an appropriate way to support their learning and that the respective roles of tutors and teachers were clear to them. This last point is interesting because, in the interviews, teachers wonder how learners actually perceive the respective roles of teachers and tutors, since for the teachers themselves, there is no difference: they both perform the same tasks. If we take a closer look at that particular variable (Figure 89), we can see that in both case studies, the typical learner (median = 4) agrees that the roles were clearly defined. In Case Study 1, however, the distribution is wide and 50% of learners' responses range between disagree (2) and agree (4). In Case Study 2, 75% of learners agree (4) or totally agree (5) that the roles were clearly defined. These findings are coherent with what emerged during the interviews with teaching staff, to the effect that even if roles were clear theoretically speaking, it took five modules in Case Study 1 to clarify them on a practical level. And in Case Study 2, T1 expresses appreciation for the new organisation with the tutors, which served to further clarify their respective roles. (Please refer to issue 22, Section 11.4, for more details about the teaching staff's perceptions of teacher-tutor roles.)



Case Studies		1	2
N	Valid	21	28
	Missing	0	1
Minimum		2.00	2.00
Maximum		5.00	5.00
Percentiles	25	3.00	4.00
	50	4.00	4.00
	75	5.00	5.00

Table 60: Frequencies, teacher and tutor roles variable (1: totally disagree - 5: totally agree)

Figure 89: Teacher and tutor roles clearly defined

The findings confirm that the organisation of human resources did support learners in their learning. This applies to the actual organisation of the different actors involved, the training of the teaching staff, and the respective roles of teachers and tutors, which are considered appropriate. We can therefore formulate two conjectures. The first conjecture is stated as follows: The organisation of human resources must involve at least three dimensions if it is to be supportive: 1) the actual organisation between the actors involved, 2) the training provided to the teaching staff, and 3) the definition of teacher-tutor roles. The second conjecture is the following: There is a relationship between the organisation of human resources perceived as supportive and socio-constructivist features of learning perceived as successful. Indices of human resources are well correlated with indices of constructive/active learning (r=.064, $p < 0.001$), self-directed learning (r=.061, $p < 0.001$), contextual learning (r=.038, $p < 0.001$), collaborative learning (r=.047, $p < 0.001$), and tutor support (r=.042, $p < 0.001$).

11.1.1. Summary: Findings for question A

To the question of whether we implemented a socio-constructivist learning design, the findings pertaining to the different issues indicate a clearly positive answer. As a matter of fact, findings confirm that the design of activities encouraged active learning and that the teaching staff supported learners. Additionally, the findings show that learners' perception of

tutor support is correlated with their engagement in actively constructing their own knowledge. Regarding authentic activities, learners strongly agree that they were exposed to professionally relevant activities embodying real life features (relevance, complexity, ill-structuredness). A corollary result is the acquisition of skills pertaining to analysis, critical reflection, selecting information and testing potential solutions, all of which are developed by engaging in authentic activities. Regarding reflective practice, learners agree that reflection was supported and encouraged by teaching staff. Reflective practice was realised in two ways: the first, associated with cognitive apprenticeship, involves modelling, that is, the teaching staff acted as a model and invited learners to reflect on that model. The second is associated with the notion of the 'reflective practitioner', and refers to improving one's practices by regularly looking back on the work accomplished and the work process. Regarding the social dimension of socio-constructivism, namely collaborative learning, findings show very diverse opinions: the typical learner navigates between somewhat agreeing and agreeing that teaching staff and peers supported collaborative learning. Learners' perceptions of collaborative learning, making sense and interaction are correlated, and vary according to the three learner profiles. Regarding self-regulation, the findings show that learners' generally agreed that the teaching staff helped them to become expert, self-regulated learners. Finally, the organisation of human resources was perceived to be appropriate and supportive of the learning process.

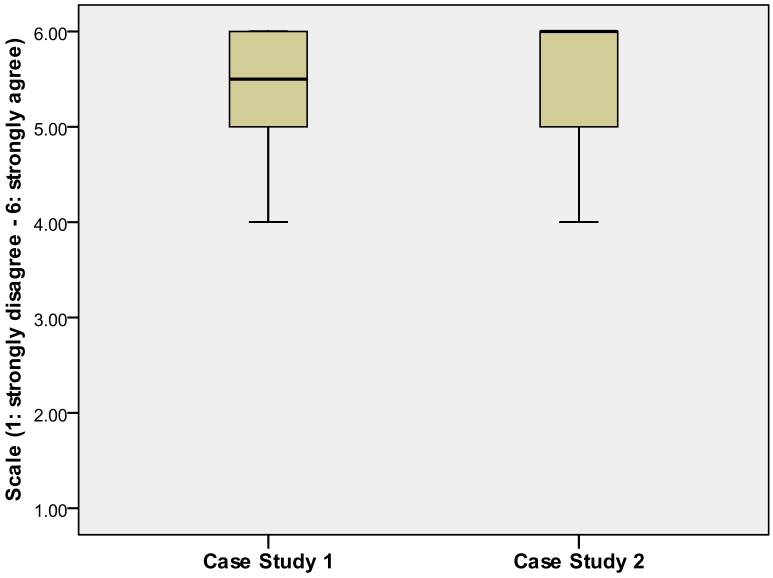
Section 11.2. Findings for question B: What are the effects of the design on skill acquisition and knowledge building?

This question addresses issues of skill acquisition and knowledge building. The first five issues (9, 10, 11, 12 and 13) address knowledge building and skill acquisition, with the presupposition that the entire learning process evolves through writing, producing and interacting with peers and experts on the portal. Issue 14 focuses on implementing an activity-based course within which learners are active knowledge and skill builders in constant interaction with peers and experts.

9- Did learners acquire techniques to train students of interpretation?

To address this issue, a simple variable is taken into account: learners who are also teaching while taking the course as well as learners who are not, had to indicate whether they acquired many techniques for training student interpreters.

For those learners who were not teaching, the boxplot has the same shape in both case studies (Figure 90, Table 61), but the median is lower in Case Study 1 than in Case Study 2. While 25% of learners range between somewhat agreeing and agreeing, the remaining 75% of learners agree or strongly agree they did acquire skills.



Case Studies		1	2
N	Valid	21	29
	Missing	0	0
Minimum		4.00	4.00
Maximum		6.00	6.00
Percentiles	25	4.75	5.00
	50	5.50	6.00
	75	6.00	6.00

Table 61: Frequencies, skill acquisition, non teaching learners (1: strongly disagree - 6: strongly agree)

Figure 90: Non teaching learners' opinion about skill acquisition

For those learners who are also teachers, the boxplot is exactly the same in both case studies (Figure 91, Table 62). There is no upper whisker, the median and the upper quartile being equal to 6 (strongly agree). While 25% of learners agree that they acquired skills, the remaining 75% strongly agree.

Case Studies		1	2
N	Valid	21	29
	Missing	0	0
Minimum		4.00	4.00
Maximum		6.00	6.00
Percentiles	25	5.00	5.00
	50	6.00	6.00
	75	6.00	6.00

Table 62: Frequencies, skill acquisition, teaching learners (1: strongly disagree - 6: strongly agree)

Figure 91: Teaching learners' opinion about skill acquisition

If both groups whole-heartedly agree that they acquired many skills to train student interpreters, it is interesting to note that the teaching learners do so even more strongly than the non-teaching learners. These findings confirm that the course was indeed professionally relevant.

Findings from the data analysis confirm that both learners who are also teaching and learners who are not teaching agree that they acquired many techniques of training student interpreters, with the teaching learners agreeing even more strongly.

10- Are they confident about conducting a face-to-face course?

To address this issue, a simple variable was taken into account: learners who are also teaching while taking the course as well as learners who are not had to indicate whether they felt confident about conducting a face-to-face course.

In Case Study 1 (Figure 92, Table 63), the typical non-teaching learner agrees that s/he feels confident about conducting a face-to-face course. Seventy-five percent of learners somewhat agree or agree that they are confident, while the remaining 25% strongly agree. In Case Study 2, the distribution is much wider, ranging between 3 (somewhat disagree) and 6 (strongly agree). The typical non-teaching learner also agrees that s/he feels confident about conducting a face-to-face course, but 25% vary between somewhat disagreeing and somewhat agreeing. Another 25%, on the opposite end, strongly agree, and the remaining 50% range between somewhat agreeing and agreeing.

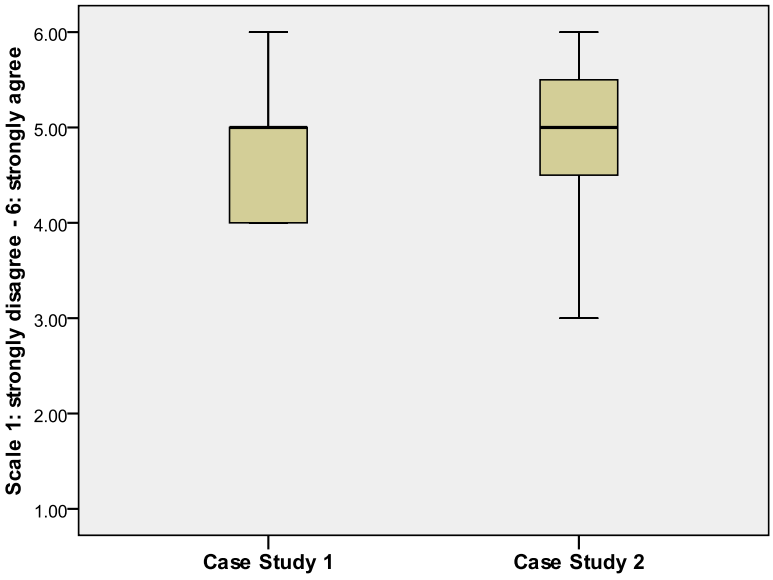
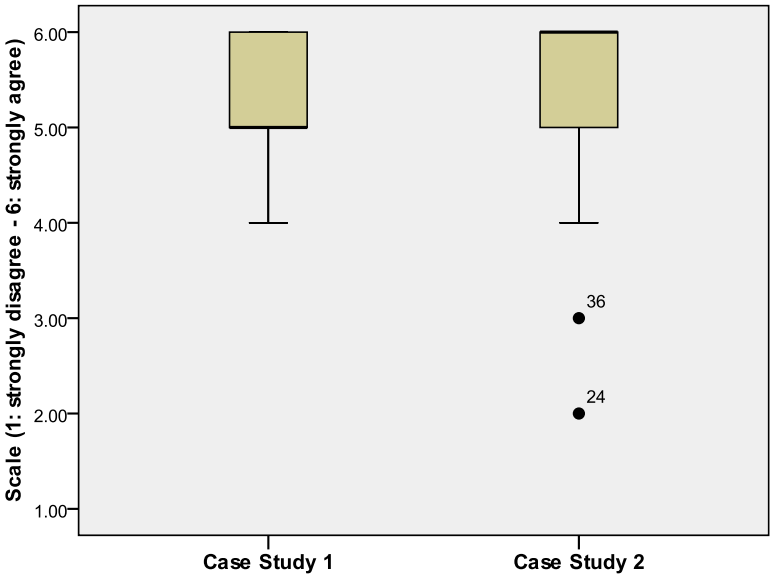


Figure 92: Confidence in leading a face-to-face course, non teaching learners

Case Studies		1	2
N	Valid	21	29
	Missing	0	0
Minimum		4.00	3.00
Maximum		6.00	6.00
Percentiles	25	4.00	4.00
	50	5.00	5.00
	75	5.00	6.00

Table 63: Frequencies, confidence in leading a face-to-face course, non teaching learners (1: strongly disagree - 6: strongly agree)

For those learners who are also teachers, in Case Study 1 (Figure 93, Table 64), the typical learner agrees s/he feels confident about conducting a face-to-face course, and 75% of the learners also agree or strongly agree. Only 25% fall between somewhat agree and agree. In Case Study 2, the general distribution is the same, but the typical teaching learner strongly agrees that s/he feels confident about conducting a face-to-face course. Two outliers indicated that they disagree or somewhat disagree.



Case Studies		1	2
N	Valid	21	29
	Missing	0	0
Minimum		4.00	2.00
Maximum		6.00	6.00
Percentiles	25	5.00	5.00
	50	5.00	6.00
	75	6.00	6.00

Table 64: Frequencies, confidence in leading a face-to-face course, teaching learners (1: strongly disagree - 6: strongly agree)

Figure 93: Confidence in leading a face-to-face course, teaching learners

Both groups agree that they feel confident about conducting a face-to-face course, but again, learners who are also teaching while taking the course agree more strongly.

The findings confirm that learners who are also teaching while taking the course as well as learners who are not teaching agree that they are confident about conducting a face-to-face course for student interpreters, with those learners who are also teachers agreeing even more.

11- Are they confident about introducing distant learning tools in their course?

To address this issue, a simple variable is taken into account: learners who are also teaching while taking the course as well as learners who are not had to indicate whether they felt confident about introducing distant learning tools in their course.

In Case Study 1 (Figure 94, Table 65), the typical non-teaching learner somewhat agrees that s/he feels confident about introducing distant learning tools in his/her course. Fifty percent of learners somewhat agree or agree that they are confident, while the remaining 25% strongly agree. One outlier disagrees. In Case Study 2, 75% of the non-teaching learners somewhat agree or agree that they are confident about introducing distant learning tools in their course, while the remaining 25% somewhat disagree or somewhat agree. One outlier disagrees and the typical learner agrees.

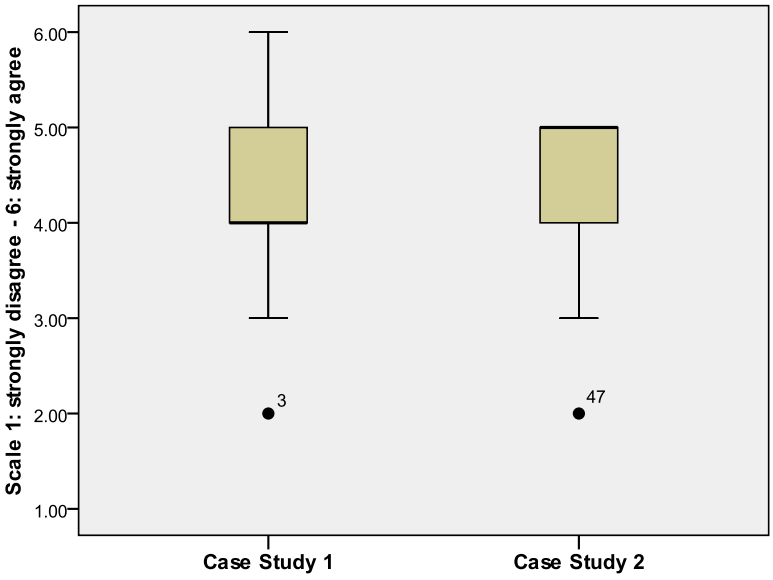


Figure 94: Confidence in introducing distant learning tools in courses, non teaching learners

Case Studies		1	2
N	Valid	21	29
	Missing	0	0
Minimum		2.00	2.00
Maximum		6.00	5.00
Percentiles	25	3.75	4.00
	50	4.00	5.00
	75	5.00	5.00

Table 65: Frequencies, confidence in introducing distant learning tools, non teaching learners (1: strongly disagree - 6: strongly agree)

For those learners who are also teachers, in Case Study 1 (Figure 95, Table 66), the distribution is between 4 (somewhat agree) and 5 (agree), with two outliers, one on the positive end, strongly agreeing, and one on the opposite end, disagreeing. The typical learner somewhat agrees (median = 4) that s/he feels confident about introducing distant learning tools in his/her course. In Case Study 2, the distribution is wide, between 3 (somewhat disagree) and 6 (strongly agree), but the typical learner agrees that s/he feels confident about introducing distant learning tools in his/her course. Seventy-five percent of learners somewhat agree or strongly agree that they are confident in this area, and 25% of learners range between somewhat disagreeing and somewhat agreeing.

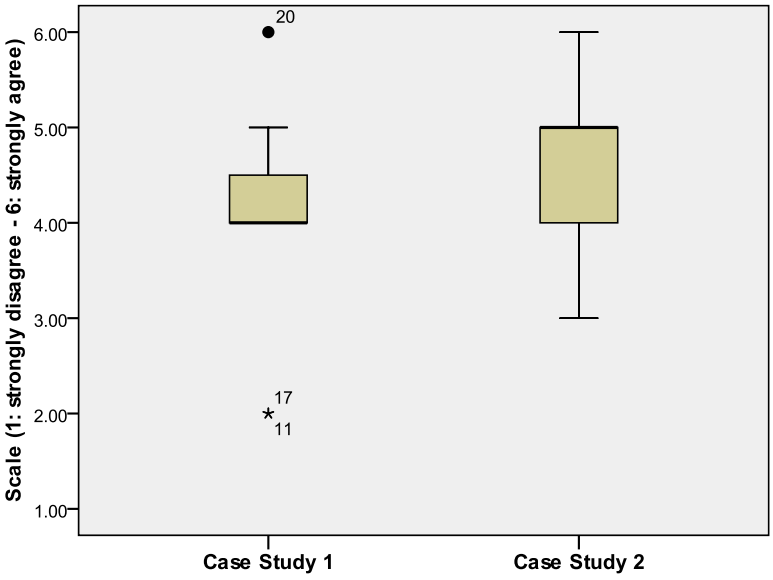


Figure 95: Confidence in introducing distant learning tools in courses, teaching learners

Case Studies		1	2
N	Valid	21	29
	Missing	0	0
Minimum		2.00	3.00
Maximum		6.00	6.00
Percentiles	25	4.00	4.00
	50	4.00	5.00
	75	5.00	5.00

Table 66: Frequencies, confidence in introducing distant learning tools, teaching learners (1: strongly disagree - 6: strongly agree)

Both groups somewhat agree or agree that they feel confident about introducing distant learning tools in their course.

The findings show that learners who are also teaching while taking the course as well as learners who are not teaching somewhat agree or agree that they are confident about introducing distant learning tools in their course.

12- Would they like to learn more about how to teach in a blended mode?

To address this issue, a simple variable was taken into account: learners who are also teaching while taking the course as well as learners who are not had to indicate whether they were interested in learning more about teaching in a blended or distant mode.

In Case Study 1 (Figure 96, Table 67), for non-teaching learners, there is no distribution whatsoever: all learners strongly agree that they want to learn more about teaching online, with the exception of two outliers, one of whom somewhat disagrees and the other who somewhat agrees. In Case Study 2, the typical non-teaching learner agrees (median = 5) that s/he would like to learn more about teaching online. All learners either agree or strongly agree, except for two outliers who disagree or somewhat disagree.

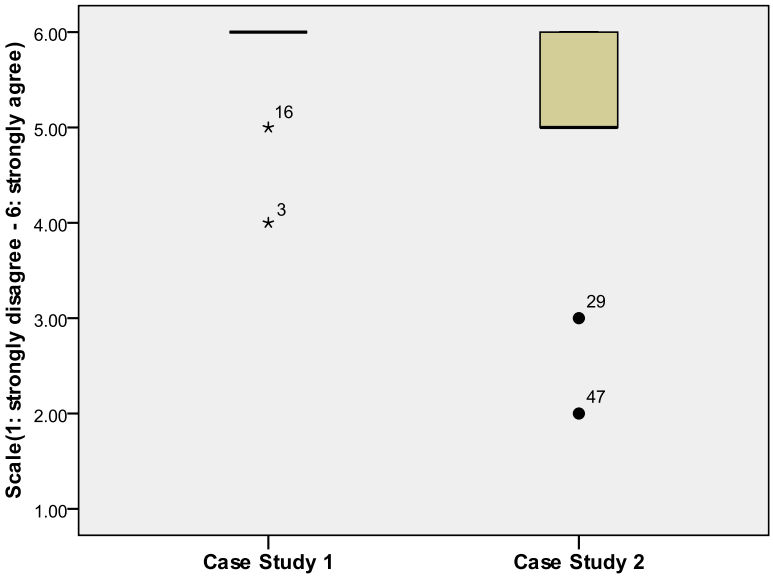


Figure 96: Wish to know more about how to teach in distant modalities, non teaching learners

Case Studies		1	2
N	Valid	21	29
	Missing	0	0
Minimum		4.00	2.00
Maximum		6.00	6.00
Percentiles	25	5.75	5.00
	50	6.00	5.00
	75	6.00	6.00

Table 67: Frequencies, wish to know more about how to teach in distant modalities, non teaching learners (1: strongly disagree - 6: strongly agree)

In Case Study 1 (Figure 97, Table 68), the distribution for learners who are already teachers is between 4 (somewhat agree) and 5 (agree), with two outliers, one on the positive end, strongly agreeing, and one on the opposite end, disagreeing. The typical learner agrees (median = 5) that s/he would like to learn more about teaching online. In Case Study 2, the distribution is wider, ranging between 4 (somewhat agree) and 6 (strongly agree), with the typical learner strongly agreeing. Seventy-five percent of learners agree or strongly agree and 25% vary between agreeing and somewhat agreeing.

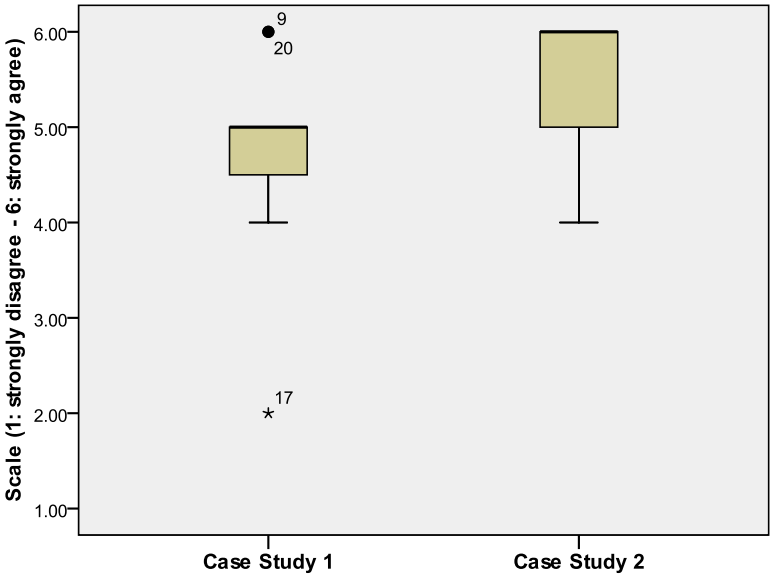


Figure 97: Wish to know more about how to teach in distant modalities, teaching learners

Case Studies		1	2
N	Valid	21	29
	Missing	0	0
Minimum		2.00	4.00
Maximum		6.00	6.00
Percentiles	25	4.00	5.00
	50	5.00	6.00
	75	5.00	6.00

Table 68: Frequencies, wish to know more about how to teach in distant modalities, teaching learners (1: strongly disagree - 6: strongly agree)

Interestingly enough, in Case Study 1, the typical non-teaching learner strongly agrees that s/he would like to know more about how to teach online, while the typical teaching learner only agrees. In Case Study 2, the trend is reversed: the typical non-teaching learner agrees, while the typical teaching learner strongly agrees.

This finding can be explained by the concept of modelling. Just like their MAS teachers who use the Internet, the idea of using it themselves to teach their own students is, from the learners' perspective, something very concrete and realistic, given the increasingly widespread use of the Internet. This could be why the learners who are also teachers in Case Study 2 reverse the tendency of the findings for Case Study 1, which took place two years earlier, when the Internet was less widely used. Both variables, skill acquisition and interest in learning more about teaching in a blended mode, when these apply to learners who are also teachers, are well correlated ($r=0.46$ $p < 0.001$) and confirm this conjecture.

Findings from the data analysis show that, in Case Study 1, non-teaching learners are more interested in learning more about teaching in a blended mode, while in Case Study 2, it is the teaching learners who show the most interest. We formulate the conjecture that, as Internet use becomes increasingly widespread, it is perceived more and more as a complementary skill that could be useful for training students to become interpreters.

13- In terms of profiles identified, is there a difference of performance?

To address this issue, we look at the grades learners received for two identical modules in both case studies. Because Case Study 1 was subject to the regulations of the Certificate programme and Case Study 2 was subject to the regulations of the MAS programme, there are no other summative evaluations that are exactly the same. In both case studies, learners were assessed in a similar way by the same teachers for two modules, namely the consecutive and simultaneous interpretation modules (Modules 4 and 5 in Case Study 1, and Modules 5 and 6 in Case Study 2). We look at the marks learners obtained for these modules, consider them as indicators of performance, and cross them with the learner profiles that are classified according to the real use of tools (Table 79).

Generally speaking, the typical learner from the "average" profile received higher grades than typical learners from the two remaining groups (Figure 98 / Table 69, Figure 99 / Table 70, Figure 100 / Table 71). The medians for the "average" profile for Module 4/5 (CS1/CS2), Module 5/6 (CS1/CS2), and for the two modules taken together (i.e. Module 4/5 and Module 5/6) are 5.45, 5.16 and 5.23 respectively[36]. All learners from the three profiles received passing marks except one outlier from the "few" profile in Module 5. The higher minimum mark is always for a learner from the "average" profile. The higher maximum mark is equally distributed among the three profiles. This finding is coherent with the profile analysis of enacted activities (Section 11.5), where we see that learners from the "average" profile use tools thoughtfully to complete the activity. These learners also use their journals to engage in reflection, which differentiates them from the learners in the "a lot" profile.

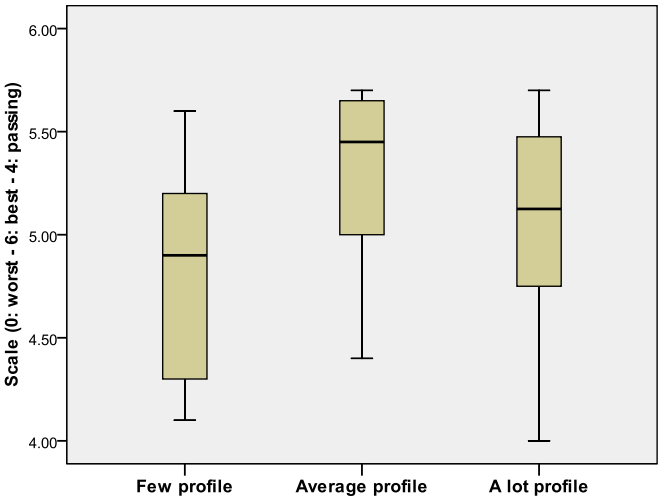


Figure 98: Marks obtained for Module 4 per learner profile

Profiles		Few	Average	A lot
N	Valid	14	16	13
	Missing	0	1	1
Minimum		4.10	4.40	4.00
Maximum		5.60	5.70	5.70
Percentiles	25	4.90	4.75	4.25
	50	5.45	5.13	4.90
	75	5.65	5.49	5.35

Table 69: Frequencies, marks obtained per profile for Module 4

[36] In the MAS grading system, 0 is the minimum, 4 the passing grade and 6 the maximum.

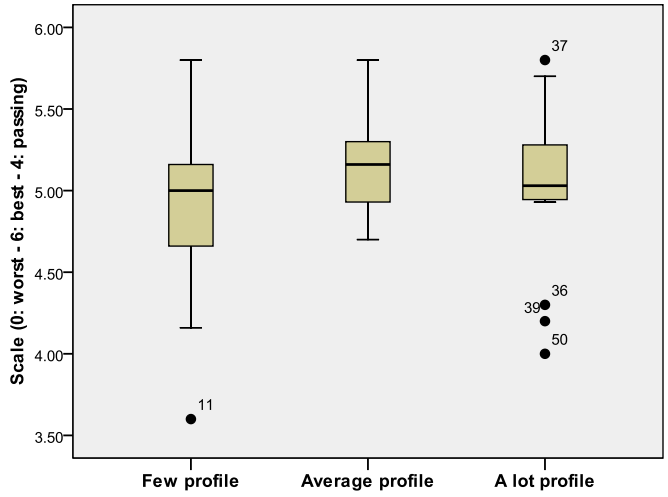


Figure 99: Marks obtained for Module 5 per learner profile

Case Studies		Few	Average	A lot
N	Valid	14	16	13
	Missing	0	1	1
Minimum		3.60	4.70	4.00
Maximum		5.80	5.80	5.80
Percentiles	25	4.93	4.94	4.43
	50	5.16	5.03	5.00
	75	5.37	5.29	5.36

Table 70: Frequencies, marks obtained per profile for Module 5

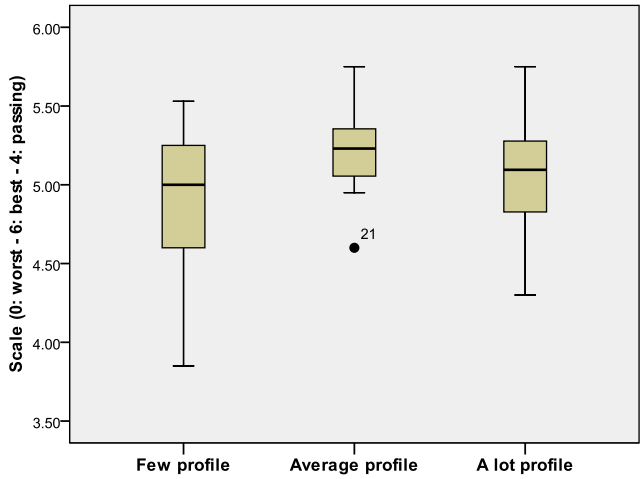


Figure 100: Mean obtained for Modules 4 and 5 per learner profile

Case Studies		Few	Average	A lot
N	Valid	14	16	13
	Missing	0	1	1
Minimum		3.85	4.60	4.30
Maximum		5.53	5.75	5.75
Percentiles	25	5.03	4.81	4.47
	50	5.23	5.10	5.00
	75	5.39	5.28	5.25

Table 71: Frequencies, marks obtained per profile for Modules 4 and 5

Although the analysis of variance does not show significance, the ANOVA test tends to be significant when we look at the mean for both modules (F: 2.86 (df 40 p .07)). Given what is said in the literature about reflection, namely that it involves three central processes - monitoring, regulating and controlling one's thinking about thinking – that are essential for creating expert knowledge (Section 2.7), the fact that learners from the group that uses their journals get better results is not surprising. Teachers confirm this tendency on the part of learners from the "average" profile. For instance, T1 says about Emily, who represents the "average" profile in Case Study 2:

> [...] for others, like Emily for example, who used it [journal] very much for her own personal reflections, very thoughtful, throwing things out that were not central to the course but were important pieces of information or just thinking from somebody who was just generally a very thoughtful person. I mean everything that she

> mentioned about being a course leader, was very thoughtful. And you know, all of a sudden, there was knowledge being dispatched in the journal to all others who read it and she would get reactions and then we ended up discussing it in the chat at one time. (T1, interview, CS2)

The findings show that learners from the "average" profile received better grades than learners from the two remaining profiles. We recall that one of the characteristics of learners from the "average" profile is a greater use of their journals. Since the literature attests that reflective practice is centred on the processes of monitoring, regulating and controlling one's thinking about thinking with a view to enhancing understanding and creating expert knowledge, the results are not surprising. We therefore formulate the conjecture that reflective practice should be further developed and encouraged.

14- Is blended learning, as it was set up in the context of this research, pedagogically enriching?

The issue is addressed by the qualitative data collected from interviews with the teaching staff. It is approached from two perspectives: the impact of blended learning on teacher organisation and the effects of the blend on learning.

It might be useful to recall that, except for the first two modules dealing with general course content and the last one on voice, the remaining modules are composed of both an online and a face-to-face component. The online component comes first and the entire face-to-face component represents five days following the seven months of online work.

As far as teacher organisation is concerned, teachers had different strategies for preparing the face-to-face component and improved them between Case Study 1 and Case Study 2. One teacher, for instance, in Case Study 1, explains that she developed her face-to-face session by reviewing the feedback she had previously provided. "For the face-to-face preparation, I went back to my feedback and I included things that were not so well understood, and it was easier to prepare it that way with everything printed out" (T1, inteview, CS1). In Case Study 2, another teacher describes how, together with the tutor, they designed the face-to-face activities.

> Actually, I think we are much more efficient, the 3 of us [T2, Tutor1, T3] this time. We did change things in our module. The face-to-face is tomorrow, and I think it will be alright. We met for maybe, I don't know, a certain number of hours and we just took one thing after the other, whereas last time, I think, we met for two days and it was very difficult putting things together. (T3, interview, CS2)

Regarding coordination among teachers, one teacher in Case Study 1 says she would like to see more coordination for the face-to-face component, similar to the kind of coordination they shared for the online component:

> There is something that I miss probably and that is probably knowing what people are going to do in their face-to-face. If I knew what T1 was doing and she knew what I was covering we might have… it's worked out very well in fact but I somehow have a feeling it happened by chance. (T2, interview, CS1)

From the tutors' perspective, it is as important for them to be involved in the design of the face-to-face week as it is in the design of online activities. The issue of learners' perception of the tutor is also important and depends on the kind of activities assigned to the tutor in the face-to-face component.

> I feel the first time around we did this, at the beginning of the week I felt like I was just sitting there, but then I just got myself more space, I elbowed my way in and said, "Listen, if I am here I want to contribute." And perhaps Tutor2 was affected by that same phenomenon. I know he was here all the time, I have my doubts as to the extent that he was actually included in activities, and that is also tricky from another point of view, which is the perception that students will then get of the tutors. The tutor just sits there and runs to get coffee; you know that's not right because, hey, this is the guy who a few weeks ago criticised my whatever theory / approach… so it is a question of credibility. And I am not saying that anybody is doing this with malice. But you cannot all of a sudden be downgraded to the little assistant. And I think that worked really well in my case this time around. First of all, I did not drop by during the modules that were not mine. Second, with T2 and T3, we sat down on Monday all day and planned it and that was necessary. (Tutor1, interview, CS2)

With respect to the effects of the blend on learning, it is important to ensure that the online and face-to-face components are complementary if the course is to be worthwhile for the learners. In this regard, T1 recommends that the face-to-face component focus on consolidating knowledge acquired online rather than on imparting new knowledge:

> We were able to build on what we had done online, which we were not in the past, and still the students say it is too much. I think there are no limits to what you can do and the danger for us is more one of overshooting the target. […] The face-to-face, we need to revisit, taking the best of what we had this time and paring it down, not trying to impart even more knowledge but seeing how we can consolidate what we have done online to make it really worth their while. (T1, interview, CS2)

T4, for her part, notices that learners make connections between the online and face-to-face components and at the same time show signs of being overwhelmed. She wonders what the outcome of the blend really is in the long run.

> Well, on the one hand, I saw for example that certain things that I mention, they said, "Ah, yes, on the module, number 4, we learned, this and this and this," so I was very pleased to see that they were synthesising things they had learned in November in the module and things that I was saying now, which is excellent. On the other hand, of course, in one day of presentation, in which I was supposed to do a tremendous amount with them, it is difficult to know how much they really took in. I mean at 4:30 in the afternoon they were asking me questions about things that I had said at 10:30 in the morning, but they were so overwhelmed that they did not really remember. And of course they did not take notes because I gave

them the materials, so hopefully they manage to do a good synthesis of it later but I don't know. (T4, interview, CS2)

Findings from the qualitative data analysis indicate that coordination among the teaching staff in preparing the face-to-face component of the course needs to be improved. From the tutors' perspective, it is important for them to be involved in the design of the face-to-face week right from the start. Learners' perceptions of the tutor are partly determined by the kind of activities assigned to the tutor during the face-to-face week. We thus formulate the conjecture that it is important to ensure consistency between roles entrusted online and those adopted in the face-to-face sessions.

Regarding the content of the face-to-face sessions, teachers recommend consolidating what has been learned online rather than presenting new knowledge. Furthermore, even if learners do draw links between online and face-to-face activities, the long-term effects of the blending remain unknown and merit further investigation. We formulate the conjecture that learners make links between their online and face-to-face learning, suggesting the acquisition of transfer capabilities.

11.2.1. Summary: Findings for question B

The findings for the different issues related to the effects of the design on skill acquisition and knowledge building indicate that learners did in fact acquire skills. Both learners who are also teachers as well as non-teaching learners overwhelmingly agree that they have acquired many techniques for training student interpreters and are confident in their ability to conduct a face-to-face course for student interpreters. Again, both groups agree or somewhat agree that they are confident about introducing distant learning tools in their course. Regarding interest in learning more about distance teaching, in Case Study 1, non-teaching learners indicated more interest, while in Case Study 2, it was the teaching learners who were most interested. Regarding grades, learners in the "average" profile performed better than learners in the other two profiles. We recall that one of the characteristics of learners in the "average" profile is that they used their journals more than the learners in the other profiles. This finding is consistent with what the literature claims about reflective practice, namely that it involves a process of monitoring, regulating and controlling one's thinking about thinking with a view to enhancing one's understanding and creating expert knowledge. Regarding the blended aspect of the design, even if the long-term effects of the blending remain unknown, learners did make links between online and face-to-face activities, and this is considered a first step in grounding knowledge and skills and developing transfer capabilities.

Section 11.3. Findings for question C: To what extent is the portal an effective learning environment and in what ways did tools support pedagogical goals?

This question involves issues pertaining to portalware and tools. Tools are considered as "mediating artefacts" between the subject and the social world, and the issues concern, on the one hand, aspects of the portal's tools (issues 15, 16, 17) and on the other hand, aspects of the pedagogical philosophy the portal is intended to support (issues 18, 19, 20).

15- Tools issues: which tools did learners use most often?

To address this issue, we looked at each tool variable for each case study separately. Here we do not give an exhaustive account of the details, but instead focus our attention on those aspects that are outstanding or considered most important in the design.

For Case Study 1 (Figure 101, Table 74), the typical learner claims that the tools s/he used most often are the forum, the module description, the social awareness tool, the forum awareness tool and the personal messages awareness tool (median = 4). For Case Study 2 (Figure 102, Table 75), the tools used most often by the typical learner are the same, but an additional one – the news – is included (median = 4).

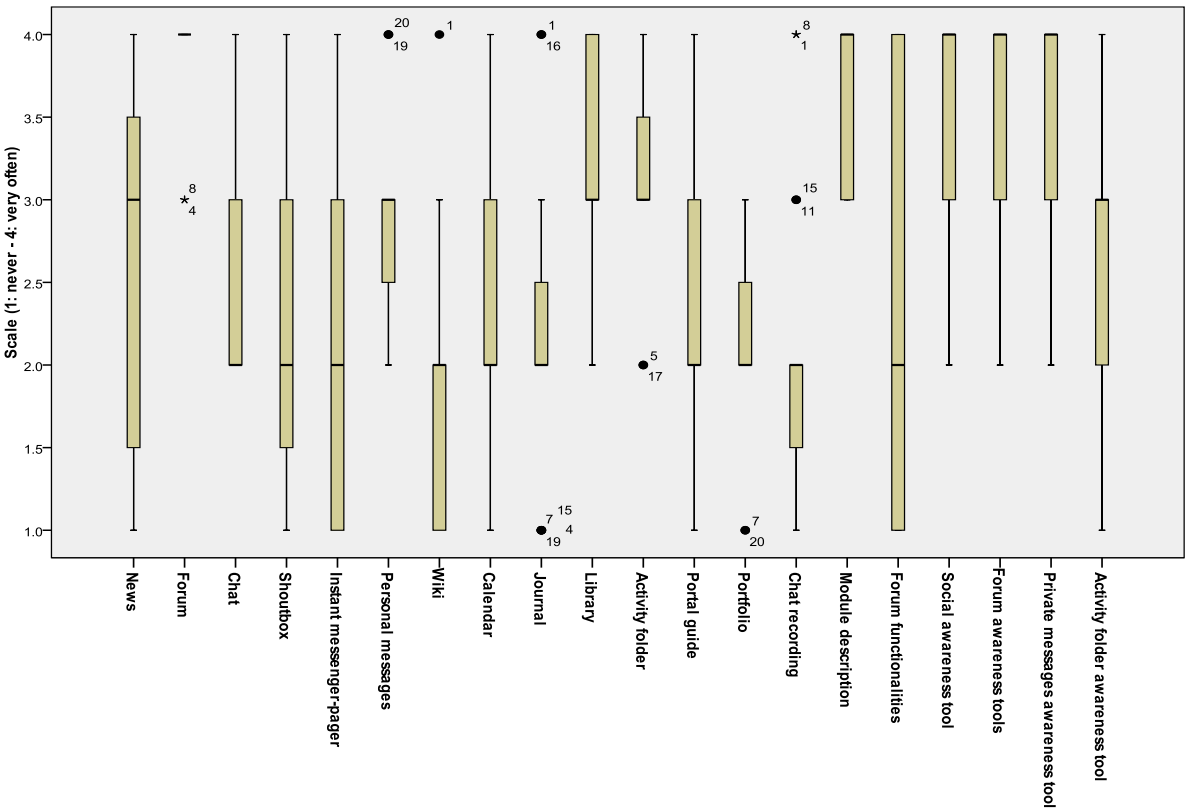


Figure 101: Use of tools, Case Study 1

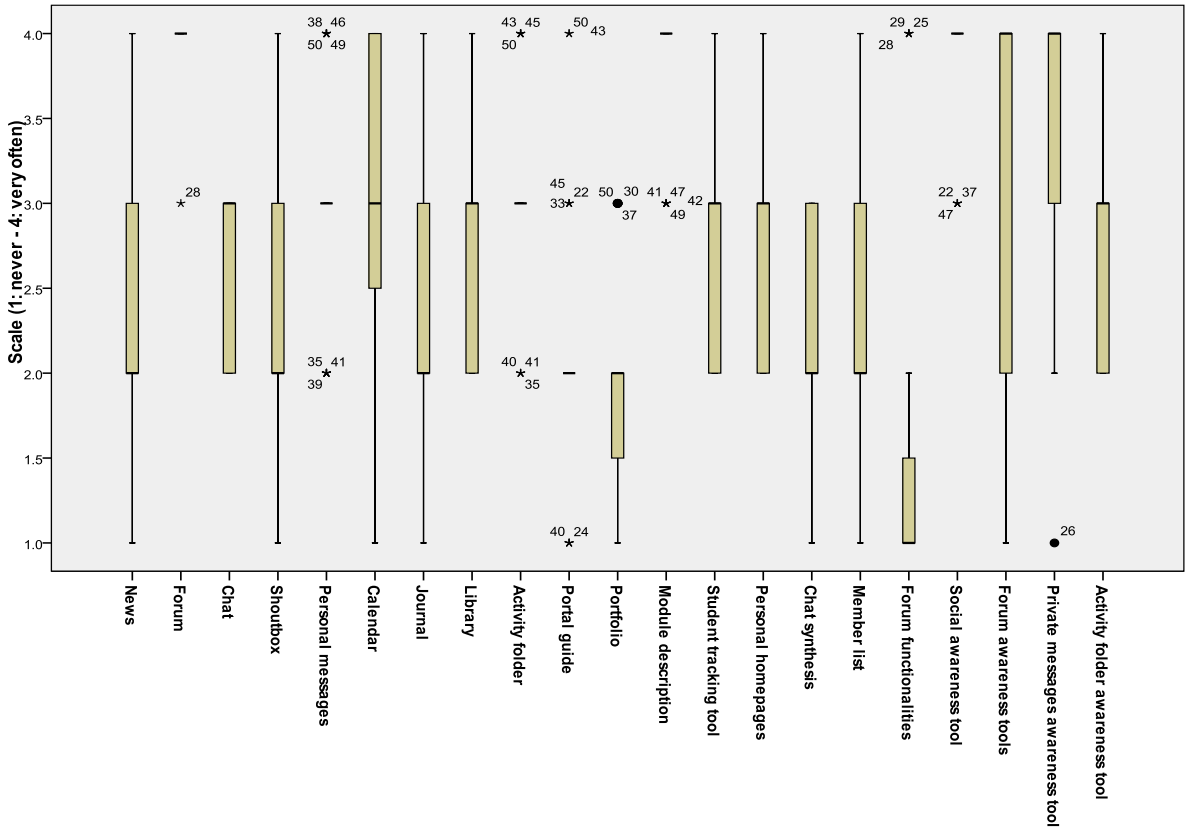


Figure 102: Use of tools, Case Study 2

Tools		News	Forum	Chat	Shoutbox	Instant messages	Personal messages	Wiki	Calendar	Journal	Library	Activity folder	Portal guide	Portfollio	Chat recording	Module descrip-tion	Forum functional-ities	Social aware-ness	Forum aware-ness	Private message aware-ness	Activity folder aware-ness
N	Valid	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	21	21	21
	Missing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Minimum		1.00	3.00		1.00	1.00	2.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	3.00	1.00	2.00	2.00	2.00	1.00
Maximum		4.00	4.00		4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	3.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Percentiles	25	1.50	4.00		1.50	1.00	2.50	1.00	2.00	2.00	3.00	3.00	2.00	2.00	1.50	3.00	1.00	3.00	3.00	3.00	2.00
	50	3.00	4.00		2.00	2.00	3.00	2.00	2.00	2.00	3.00	3.00	2.00	2.00	2.00	4.00	2.00	4.00	4.00	4.00	2.00
	75	4.00	4.00		3.00	3.00	3.00	2.00	3.00	3.00	4.00	3.50	3.00	3.00	3.00	4.00	4.00	4.00	4.00	4.00	3.00

Table 72: Frequencies, use of tools (1: never – 4: very often), Case Study 1

Tools		News	Forum	Chat	Shoutbox	Instant messages	Personal messages	Wiki	Calendar	Journal	Library	Activity folder	Portal guide	Portfolio	Chat recording	Module descrip-tion	Forum functional-ities	Social aware-ness	Forum aware-ness	Private message aware-ness	Activity folder aware-ness
N	Valid	29	29	28	29	0	29	0	29	29	29	29	29	29	0	29	28	29	29	29	29
	Missing	0	0	1	0	29	0	29	0	0	0	0	0	0	29	0	1	0	0	0	0
Minimum		1.00	3.00	2.00	1.00		2.00		1.00	1.00	2.00	2.00	1.00	1.00		3.00	1.00	3.00	1.00	1.00	2.00
Maximum		4.00	4.00	3.00	4.00		4.00		4.00	4.00	4.00	4.00	4.00	3.00		4.00	4.00	4.00	4.00	4.00	4.00
Percentiles	25	4.00	4.00	2.00	2.00		3.00		2.00	2.00	2.00	3.00	2.00	1.50		4.00	1.00	4.00	2.00	3.00	2.00
	50	4.00	4.00	3.00	2.00		3.00		3.00	2.00	3.00	3.00	2.00	2.00		4.00	1.00	4.00	4.00	4.00	3.00
	75	4.00	4.00	3.00	3.00		3.50		4.00	3.00	3.50	3.00	2.00	2.00		4.00	2.00	4.00	4.00	4.00	4.00

Table 73: Frequencies, use of tools (1: never – 4: very often), Case Study 2

It is interesting to note that in both case studies, the most frequently used tools are those that fulfil essential functions: the forum, to build knowledge and interact with peers; the module description, to find out what has to be done and when; the social awareness tool, to ascertain the social dimension of distance learning; and the awareness tools of the forum and private messages, which immediately inform learners of new messages posted with a push e-mail alert system.

Use of the other tools is distributed across the entire scale, from never to very often. How the tools are used is customised according to each learner and each learner profile (Section 11.6). If we study the profiles defined according to how learners think they use tools, there is a statistical difference in the use of the following tools: the chat (F: 10.71 (df 2 p .00)), the shoutbox (F: 29.07 (df 2 p . 00)), the journal (F: 27.58 (df 2 p .00)), and the personal messages tool (F: 8.27 (df 2 p .01)). Learners from the "average" profile are distinguished by their greater use of the journal. Learners from the "a lot" profile use the chat, the shoutbox and the personal messages tool more often than learners from the other two profiles.

The journal plays a decisive role, first because, as a tool for reflective practice, it contributes to the overall socio-constructivist design, and second because it is the tool that distinguishes the two profiles – "average" and "a lot" – in the analysis of enacted activities. It is thus important to understand what learners say about how they used it. In Case Study 1, all learners claim to have used the journal either often or not very often, except for three outliers, two of whom claim to have used it very often and one to have never used it. In Case Study 2, the distribution for journal use is much wider, from never to very often. Fifty percent of the learners claim to have used it often or not very often, 25% said they used it often or very often and the remaining 25% said they never used it.

In light of the findings uncovered for issue 3 above, the fact that most learners claim they did not use the journal might be surprising, since they also claim they habitually engage in reflective practice. According to the overall course design, the journal should mediate learners' reflective processes. In the context of the course, however, this tool has a very particular identity: it is a journal, but accessible to the community, something like the "learning journal" described by Varner and Peck, 2003 (Figure 3). It is very likely that learners did not use it, or did not perceive it as a tool that could actually mediate their reflective process, simply because they had a different understanding of what a journal is. Teacher T3 expresses this *malaise* associated with the concept of the journal:

> I was trying to work out what it was that was bothering me and then I realised that it seemed like what we call journals is the letters' page in the newspaper. So it's people venting or saying what they think or a little personal message or a memo or something. So I realised, okay, it's not a journal. One learner said it was like a wall newspaper and that's a good idea. But it's not what I call a journal. (T3, interview, CS2)

In the future, especially since learners come from different parts of the world with different learning cultures, course designers need to ensure that the term and the concept of "journal" are firmly grounded. Once this is achieved, further research comparing the actual use of the journal and opinions about whether the course promotes reflective practice should be undertaken.

Another tool that merits attention is the student tracking tool, introduced in Case Study 2. With the change in regulations and the shift from the Certificate to the MAS programme, the student tracking tool was introduced in Case Study 2 in order to track learners' performances. The typical learner claims to have used this tool often (median = 3); 75% of the learners say they used it often or not very often, and the remaining 25% say they used it very often.

The findings indicate that the tools learners use most often are the forum, the module description tool, the social awareness tool and the awareness tools of the forum and private messages. These tools constitute the basics for learning and "surviving" in the learning environment: a production/communication tool for building knowledge and interacting, an organisational tool for finding out which activities need to be completed and when, a social awareness tool that facilitates links with the distant community, and private messages and forum awareness tools that indicate when a new message of interest is posted.

Uses of the other tools are very diverse. Course designers need to pay special attention to the understanding and use of the journal, since it is supposed to mediate an essential process of constructive learning, namely reflection.

Based on these results, we formulate the conjecture that learners were able to identify the most important tools, and then developed personalised ways of working with the other tools, alternating in their preferences for the journal, the chat, the shoutbox or the personal messages tools. The section on learner profiles (Section 11.6) supports this conjecture.

16- Tools issue: which tools did teachers and tutors use most often?

This issue is addressed by the qualitative data collected from the interviews with the teaching staff. We examine one case study at a time in order to determine if any change occurred between Case Study 1 and Case Study 2.

In Case Study 1, T1 says that the tools she used most often were the forum and the journal. She found the activity folder was useful for grouping all the work in a specific place. She used the shoutbox to gain someone's attention and the social awareness tool to discuss specific issues with specific learners. Templates are a way of organising knowledge, and are particularly useful for learners with no experience.

> The forum remained the most important tool for the 1st module and then for the other modules, I tried to broaden up. As manager of the course, I found it extremely useful to have access to journals […].The activity folders were great, so that all the work was in a specific space and not all over the place. The shoutbox is a valuable tool to grasp someone's attention, urgent thing. I liked the fact that I knew who was online, also for discussion purposes: "Ah, so and so is online, I can send private messages." [...] The template is a scaffolding tool to organise knowledge, especially for those who have no teaching experience. In a distant environment it can be very useful. (T1, interview, CS1)

T2 used the forum and the journals most often. She also used the activity folder, the shoutbox and private messages. She avoided chats. The portfolio did not work well. Templates gave more focused answers.

> The tool I used most was the forum. I appreciated it also. This is my first experience with a forum. I cannot tell you in what way it was better or worse. It was easy to get around with. The journals were very interesting elements that helped teachers. It's a bit of a shame people did not use it systematically, because it's very revealing of people's thoughts. I used the activity folder, the shoutbox, and private messages. Chats I don't like. I would not base my teaching on chats. The portfolio: I went back to them but many people completed them late. In another edition, this should be mandatory. I used templates in the feedback module. I think it gave probably more focused answers and you could pinpoint those cases when people were giving you answers which were not answers to the questions. Visually it is easier to integrate also. From a cognitive point of view, I do not know. (T2, interview, CS1)

T3 said she used the forum most often and hated chats: "The way the chat was set up, I was glad there was no camera so you could not see me sobbing. I hated the chats! They went too quickly. I used the forum all the time" (T3, interview, CS1).

Tutor1 says he used the forum most, in quantitative terms. He found the calendar to be very useful. He also liked chats and used the portfolio and the instant messaging tool. He explains why he did not use the portal journal.

> Like everybody else, in pure quantitative terms, I used the forum most. In qualitative terms, I am certainly happy the calendar was there to remind me of events and maybe we can improve it and put everything in it. I am a big fan of chat rooms. I do believe you can do a lot of sensible stuff with chat rooms. In the future, I will use perhaps individual chat sessions rather than using e-mails, for laggards for instance. If they have to come to a chat room, they feel as though they have to come to the office and have to interact live. It puts a bit of pressure. Oh, the portfolio is a great thing and if you do not restrain me, I will be taking over the portfolio

> section for my own little agenda. I would really like to elaborate my portfolio. I could see myself putting a lot of stuff that I feel interesting for the participants in that portfolio. By keeping it updated, you show that it is alive. Now the faculty page is static and it is a bit sad. The wiki, we could have used it as well because there are some documents we uploaded, changed, uploaded, etc. We, as teachers, could use it for all the drafting. The shoutbox tool I left mainly to the participants. The instant messaging tool [Call someone tool] I used quite a lot. A bit tricky because every so often I forget to shut down the window so sometimes people think they are shouting at me but they are shouting at an empty seat. I used it mainly to prompt people, for portal-related stuff. The journal, I made an effort at putting notes and I made some entries. The most recent one dates before Christmas. I do not know, that sort of thing, I prefer to have in my own journal. I have a paper journal and it is not so much reflection and contemplation, it is notes to myself, little prompts: "reminder: do not do this next time in a chat," "reminder: forget about that, it never works." These sorts of notes, I do not want to share in the public space, they do not need to know how stupid I am and I do not have so many of them, I have 3 pages. I wrote them down once and here they are. I have not really gone back to them because I know pretty well what they are. (Tutor1, interview, CS1)

In Case Study 2, T1 is reluctant to single out a particular tool, since she perceives the portal as a whole, but she assigns a privileged place to the forum.

> I don't have any particular tool that stands out. I think, each one of them has a very specific function and I appreciate the function that it fulfils and I think all of them fulfil their function very well, so it is not a question for me to say "I prefer this over the other". It is more like the forum has a very specific function of allowing participants to develop their report, to construct their knowledge, and I recognise that for me at least, a forum for the more theoretical modules is better than a chat tool, because it really formalises thought and you need to write it down. The chat tool is too immediate, you cannot really think. So the asynchronous dimension of the forum is essential, I think. You know, if really there was one tool that needs to be singled out, I think it is the forum and the many different functions it can fulfil, but then I think it is the blend of everything, starting with the course description, to the library, to the forum, to the shoutbox, when they all have their very specific function, and I would not see anyone being more important than any other. The media gallery could be more developed. We could do a little more. (T1, interview, CS2)

She also grants a special status to the journal.

> I would say that the journal this time was much more important than last time because it was used heavily and I think the journal in this particular course would merit a study in its own right. It really fulfilled very interesting functions and I never thought how much I would get out of the journal, but that, just like T2, you know, we go to the journal first to see further if there is any fires we have to put out. If there are no major fires, ok, you can go to business as usual. […] The function the journal fulfilled for them was, I think, psychologically an interesting one, in the sense that they could complain and vent and it was not as if they were writing it to me directly, and it was, you know, in this cyberspace, but they still knew that somebody was going to read it. (T1, interview, CS2)

This time around, the template did not produce the desired outcomes for T1.

> I found it very difficult this time to get structured. There were some who really had a hard time and it is interesting, now that I am looking into different ways of thinking. I may have some explanations for why the sole idea of getting down, of distinguishing between symptoms and causes and this whole idea of progression, despite the fact we had the module on expertise development where progression was a main feature, they still had a difficult time. In the face-to-face, I told them, "Well, I am going over this again because I realise it is one of the things that I was not happy with in your deliveries and it seems you have not quite grasped the importance of this." (T1, interview, CS2)

T2 used the forum most, and also used journals and templates.

> Yes, the [tool I used most is the] forum, definitely. And I think it is good when they work on the forum. You can see what's happening. I find the journals very interesting – journals, blogs, whatever you want to call them. Some people really took the trouble to go into details about certain considerations, which I found very interesting. I think it [the structure used with templates has long-term effects on learners' way of doing things] probably has, because putting precise questions in a template is already a guidance as to what you expect them to look at. They sometimes still want to go back in history and sort of expand, but you can always tell them that's not the question. So if you pose a sufficiently precise question, you will be already giving them an indication of the way you want them to approach the problem. (T2, interview, CS2)

T3 also used the forum most. She had a problem with the concept and term used for the "journal", and used templates as well to elicit more focused answers.

> The forum. I sent a few private messages but not many. What I did most of all was on the forum. […] I really like the templates in module 8 and I think it really helps them to focus. I like the way the answers came in and it helped me focus on their answers. (T3, interview, CS2)

T4 used the forum most and also used templates.

> The thing that I used the most were the threads on the forum. That was very easily accessible. […] As far as the usefulness of the templates, I think they are very useful because they give a very thorough structure, objectives, and method, timeframe, etc. The fact that students did an integration between what was in the template and what they were learning yesterday is a positive result. Yes, definitely [there was a transfer]. (T4, interview, CS2)

Tutor1 says that the second time, everything was centred on the forum. He actually made use of the chat, but not in the way he imagined in Case Study 1.

> I think it was really, this time around, centred around the portal. Of course, we also used the activity folder, but this was just the place where they uploaded the finished product. I mean forum, sorry, not portal. But I think it fits the bill. It worked well, also, when you look at the threads, they respond… I did not use any chat. We did have a debriefing chat with the theoretical module, Module 2, which actually went quite well. What I did do, is I peeked into people's chats. And I did not make myself invisible. So as a visitor I just popped in. I checked the portal, saw "Ah! Somebody is in the chat room," and so I just popped in and said "Hello, just continue, pretend I am not here." "Oh, no, we have a question, could you answer this and that?" And then I

> did, but then I made sure to leave very quickly because I realised that they would be very forthcoming with the questions, they would basically put the burden on me to answer, instead of just doing it themselves. (Tutor1, interview, CS2)

Tutor2 used the forum and journals most.

> I can tell you which tools I never use: the chat, I think I have been on it once or twice. I love the forum and the journals. I have to say, I see the activity folder as a repository, not… I mean I know there is something up there, because it is stocked up there, but I do not think I can interact with the activity folders. I used the shoutbox either for very important messages I want them to see or I know that once I was online at 1:00 at night and a learner was online also and we shouted at each other in the box, but I would not spam it with hellos. (Tutor2, interview, CS2)

The findings show that in Case Study 1, the tools teachers used most often were the forum, the journal – reading learners' entries – the activity folder, the shoutbox, the social awareness tool and the templates. Some used chats; others disliked them. The portfolio did not work as it was expected to and teachers were disappointed. The tutor in Case Study 1 used the forum, the chat and the instant messaging tool ("Call someone") most often.

In Case Study 2, teachers and tutors do not single out specific tools. They view the portal and its tools as an integrated whole. Nevertheless, they give priority to the forum as well as to the journals (reading learners entries). Templates, intended to help learners develop their productions in the direction expected, were used, sometimes with and sometimes without the anticipated cognitive scaffolding outcomes.

We thus formulate the conjecture that, with experience, teaching staff acquire a more integrated view of the portal as a learning environment, with tools complementing one another. In this setting, some tools occupy a more prominent place because they serve a pedagogical function, such as the forum, which is the central place for negotiating meaning and building knowledge.

17- Tools issues: did tools support pedagogical goals?

To address this issue, we looked at each tool variable for each case study separately. In Case Study 1 (Figure 103, Table 74), the tools that best fulfilled their pedagogical function are the forum, the personal messages, the module description, and the social awareness tool (median = 6). In Case Study 2 (Figure 104, Table 75), in addition to these four tools, the library, the activity folder and the student tracking tool complete the list. For all these tools, the typical learner strongly agrees that the tools fulfilled their pedagogical role.

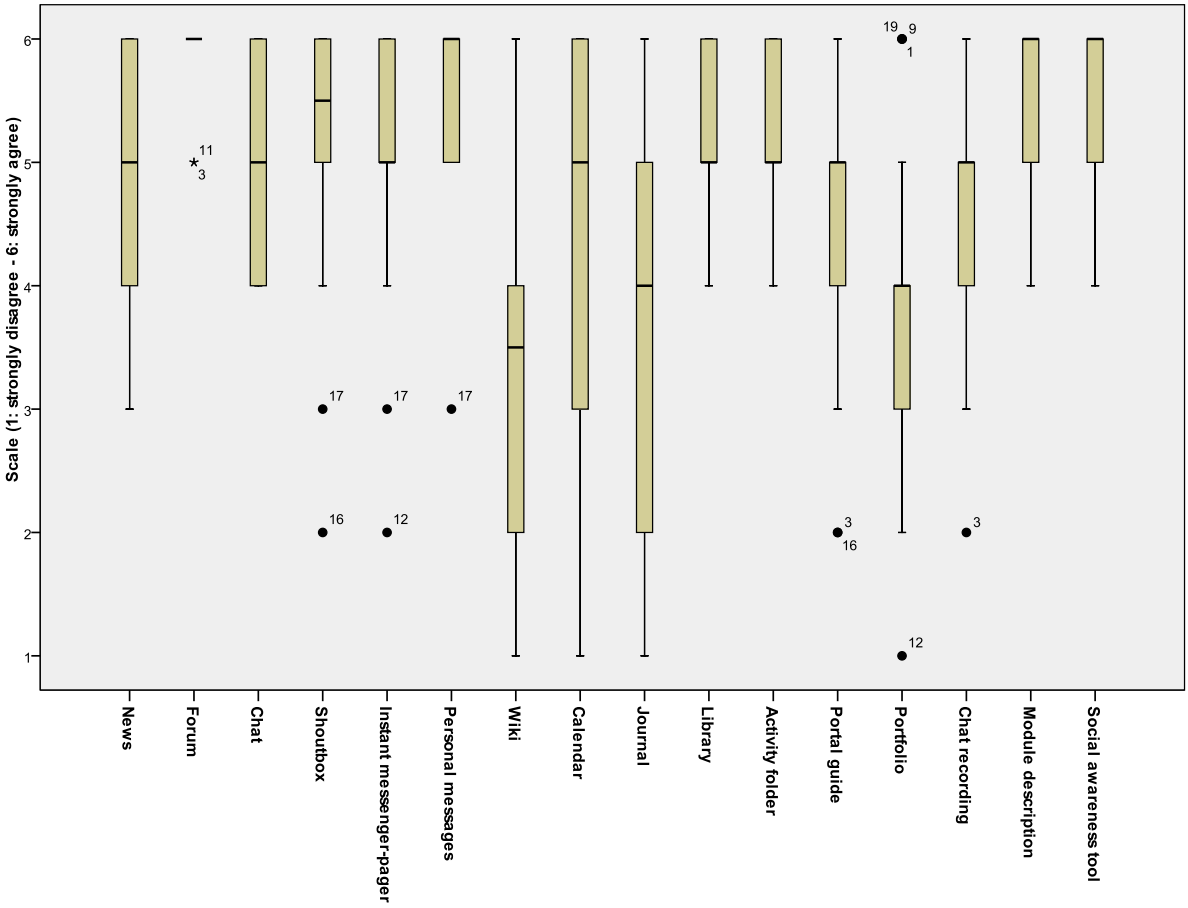


Figure 103: Pedagogical functionality of tools (1: strongly disagree - 6: strongly agree), Case Study 1

Tools		News	Forum	Chat	Shout-box	Instant messen-ger	Personal messages	Wiki	Calendar	Journal	Library	Activity folder	Portal guide	Portfollio	Chat recording	Module descript-ion	Social aware-ness
N	Valid	20	21	21	20	21	21	21	21	20	21	21	21	21	21	20	21
	Missing	10	0	0	1	0	0	0	0	1	0	0	0	0	0	1	0
Minimum		3.00	5.00	4.00	2.00	2.00	3.00	1.00	1.00	1.00	4.00	4.00	2.00	1.00	2.00	4.00	4.00
Maximum		6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
Percentiles	25	4.00	6.00	4.00	4.00	5.00	5.00	2.00	3.50	2.25	5.00	5.00	4.00	3.00	3.50	5.00	5.00
	50	5.00	6.00	5.00	5.00	5.00	6.00	3.00	5.00	4.00	5.00	5.00	5.00	4.00	5.00	6.00	6.00
	75	6.00	6.00	6.00	6.00	6.00	6.00	4.50	6.00	5.00	6.00	6.00	5.50	5.00	5.00	6.00	6.00

Table 74: Frequencies, pedagogical use of tools (1: strongly disagree – 6: strongly agree), Case Study 1

Tools		News	Forum	Chat	Shout-box	Personal messages	Calendar	Journal	Library	Activity folder	Portal guide	Portfolio	Module descript-ion	Social aware-ness	Student tracking tool
N	Valid	29	29	28	28	29	28	29	29	29	29	29	29	29	28
	Missing	0	0	1	1	0	1	0	0	0	0	0	0	0	1
Minimum		2.00	5.00	2.00	2.00	3.00	2.00	2.00	4.00	4.00	2.00	2.00	5.00	4.00	4.00
Maximum		6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
Percentiles	25	4.00	6.00	4.00	4.00	5.00	5.00	4.00	5.00	5.00	5.00	4.00	6.00	5.50	5.25
	50	5.00	6.00	4.00	5.00	5.50	5.00	5.00	6.00	6.00	5.00	5.00	6.00	6.00	6.00
	75	6.00	6.00	6.00	5.75	6.00	6.00	5.50	6.00	6.00	6.00	5.00	6.00	6.00	6.00

Table 75: Frequencies, pedagogical use of tools (1: strongly disagree – 6: strongly agree), Case Study 2

In Case Study 1, the typical learner varies between somewhat disagreeing and somewhat agreeing that the wiki fulfils its pedagogical function (median = 3). For the journal and the portfolio, the typical learner somewhat agrees (median = 4) that they also fulfilled their pedagogical function. For the remaining tools – news, chat, shoutbox, instant messenger, calendar, library, activity folder, portal guide and chat recording – the typical learner agrees (median = 5) that they supported the pedagogical goal they were designed for. In Case Study 2, it is only for the chat tool that the typical learner somewhat agrees (median = 4); for all the other tools, s/he agrees (median = 5).

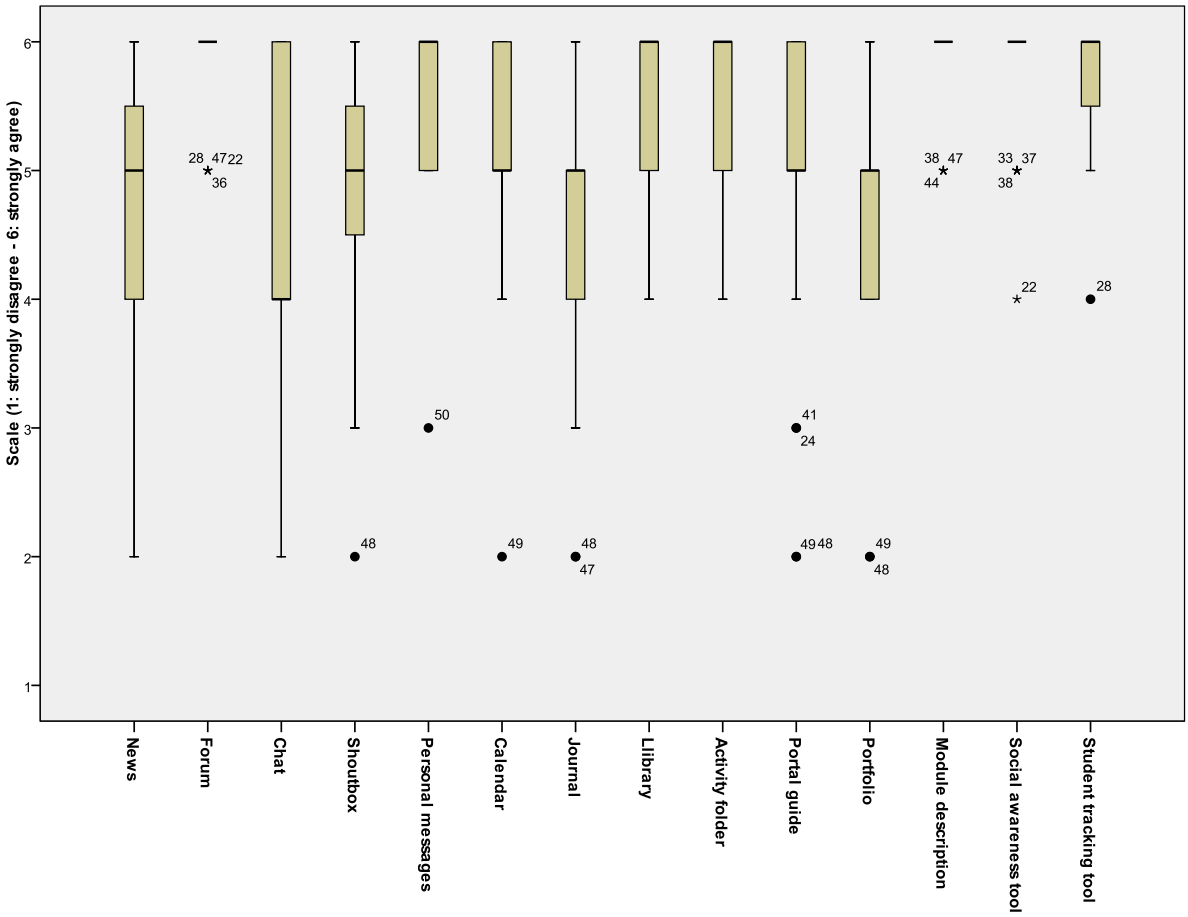


Figure 104: Pedagogical functionality of tools (1: strongly disagree - 6: strongly agree), Case Study 2

While specific design features related to the wiki and the portfolio were revised between Case Study 1 and Case Study 2, it is surprising that nothing more elaborate was developed for the journal. The wiki was discarded because we could not find a WYSIWYG[37] wiki that could be integrated into the PostNuke platform, and learners complained about having to learn a new syntax. The perspective on the portfolio changed, and the tool itself was transformed from an individual portfolio to a collective one. The calendar's function was also extended to include

[37] What you see is what you get

information not only about chat meetings and the beginning and end of modules, but also about all meetings and deadlines for all activities.

We can thus conclude that the most important tools for distance learning, in the context of this course, did in fact fulfil the pedagogical purpose they were designed for. It is evident that the design of the journal, the news, the chat, the portfolio and the wiki requires further attention. The tool could be changed into one that is either easier to use or has extended functions, the concept needs to be more firmly grounded and the scenario for which the tool is intended needs to be better clarified. For example, a news idem needs to be validated by the technical staff: this extra step, which cannot be done by teachers, must have an influence on their perception and use of the tool and thus on learners' perceptions of the effectiveness of this tool for their learning.

It may be useful to recall the pedagogical functions of the tools that worked especially well (see Section 6.4 for more details). The forum is a content and production tool used by learners and teaching staff to build knowledge, exchange with each other about course content, and interact with the community. The module description tool is an organisation tool used by learners to get information about activities, resources, deadlines, and evaluation. The social awareness tool is an awareness tool used by learners and teaching staff to check who is connected to the portal at the same time as they are. The activity folder is a content depository tool used by learners to deposit final productions required for activities. The library is a resource tool used by teaching staff to store all compulsory readings and by learners to download them. The private messages tool is a communication tool used by learners and teaching staff for private communication. The student tracking tool is an evaluation tool used by learners to find out their grades and obtain feedback when the latter was not provided on the forum. These seven tools cater to learners' basic needs related to content and production, organisation, social awareness, access to resources, communication and evaluation. The fact that learners rated these tools very highly indicates that they perceive the overall design of the distance learning environment as pedagogically effective, even if some areas still need improvement.

Findings confirm that the tools fulfilled the pedagogical function they were designed for. If we relate these findings to those found for the first question, we can formulate the conjecture that the design of tools has an impact on the success of the overall course design. If tools allow learners and teaching staff to accomplish what they need to do, in accordance with a certain approach to learning, the overall design will be perceived as successful and effective in empowering learning and teaching.

18 - Is the C3MS learning portal an effective socio-constructive learning environment?

To address this issue, we consider one index that pertains to different aspects of a socio-constructivist learning environment, namely the portal's effectiveness as an activity-based learning environment, the effectiveness for one's learning of being able to access peers' productions, and the effectiveness of using cognitive scaffolding. We recall that activity-based learning environments include a set of technological tools to support socio-pedagogical goals. Psycho-pedagogical values underlying such learning environments are related to situated learning, metacognitive monitoring, and progressively refined higher-order learning. (Please refer to Section 3.3 for more details.)

The typical learner in Case Study 1 agrees (median = 4) and in Case Study 2 totally agrees (median = 5) that: 1) the community portal is an effective learning environment; 2) accessing and using peer learners' productions was effective for his/her learning; and 3) using templates for specific activities was effective for his/her learning (Figure 105, Table 76).

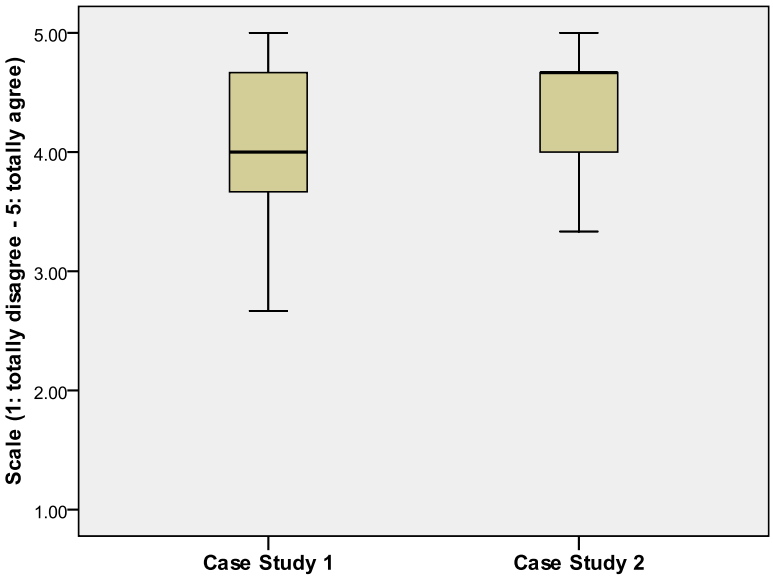


Figure 105: Learners' opinion about the learning environment, peers' productions and cognitive scaffolding

Case Studies		1	2
N	Valid	21	29
	Missing	0	0
Minimum		2.67	3.33
Maximum		5.00	5.00
Percentiles	25	3.67	4.00
	50	4.00	4.67
	75	4.83	4.83

Table 76: Frequencies, learning environment, peers' productions, cognitive scaffolding (1: totally disagree - 5: totally agree)

This issue is concerned with two indices: the C3MS portal and socio-constructivist learning. With respect to the first index, a well designed C3MS portal has the advantage of potentially representing a "collaborative place," a pedagogical place that is co-created in accordance with the dynamics of the group while at the same time providing focused learning objectives (Schneider *et al.*, 2003). The second index, a socio-constructivist approach to learning, highlights the idea that learning occurs through a process of making meaning, in interaction with a given cultural environment, and in the learners' Zone of Proximal Development.

Learners are in a constant process of cognitive development, structuring and reorganizing previously and newly acquired skills and knowledge. This is the reason why accessing peers' productions and cognitive scaffolding are crucial.

The findings confirm that the C3MS portal is an effective socio-constructive learning environment. Designed as part of a course for interpreter trainers, it provided a socio-technological place for learners to interact and co-construct meaning. We therefore formulate the conjecture that a portal of the C3MS type has the potential to support a socio-constructivist pedagogy, but this depends on the design.

19- Issue pertaining to the C3MS learning portal and teaching: did the portal support the teaching staff?

This issue is addressed by the qualitative data collected from interviews with the teaching staff. We examine each case study separately in order to determine if any change occurred between Case Study 1 and Case Study 2.

In Case Study 1, T1 and T2 claim that the portal supported their teaching. T3 asserts that they could not have taught without it: "Personally, it is the first time I have done anything like this except for a course on online teaching, which was taught very badly, so I was negatively predisposed to do this" (T3, interview, CS1). T1 highlights the necessity of getting used to the portal and becoming progressively more comfortable with using the tools.

> It took some time in the beginning to get used to the arrangements tools, but once I got used to them, I used the forum most, in addition to the library. The forum remained the most important tool for the first module and then for the other modules, I tried to broaden up. (T1, interview, CS1)

T1 refers to the teacher forum as an "extremely valuable tool to discuss any issue. As the course was going on, everyone valued this tool to get feedback from everyone" (T1, interview, CS1). T2 focuses on the time dimension: "I loved working on the portal. It is also a good opportunity of sitting back, thinking of your answer and then formulating. In our profession, all we do is talk and never leave any trace" (T2, interview, CS1). As far as tutoring is concerned, Tutor1 claims the portal supported his tutoring "because I availed myself of the tools on the portal to tutor as best as I could" (Tutor1, interview, CS1).

In Case Study 2, T1 comments on how difficult it was to use a socio-constructivist portal with such a large number of learners, while T2 notes the flexibility of the system:

> I enjoyed teaching with the portal, but not with that numbers, it's too massive. Not with that learning philosophy again. I think it would be okay to have 34 for a stand-alone module for 3 weeks, but not for 8 months non-stop. (T1, interview, CS2)

> Pedagogically, yes I think it did [support my teaching]… but it ties in with the technical possibilities we had. I mean, the creation of threads, for example, as we wanted to create them for each module, was a very good advantage. We had enough flexibility there to adapt to the sort of activities we wanted to do. (T2, interview, CS2)

T3 questions the entire issue of whether the portal supports teaching. In her view, it is a matter of adapting one's teaching to the portal and not of the portal supporting one's teaching. Her reflection is also pertinent to issue 20.

> Actually, that's a very interesting way of asking the question; I think what happens is the other way around, that we teach through the portal, so I have to adapt my teaching to the portal. I don't think it is the other way around, I don't think the portal supports my teaching. I think the way I joined the team is "Here is the portal, would you like to teach through the portal? Okay, now, figure out how to adapt your classes to this new environment." (T3, interview, CS2)

According to T4, "On the whole yes [the portal did support my teaching]. I don't think there was anything missing. The thing that I used the most were the threads on the forum. That was very easily accessible" (T4, interview, CS2). Regarding tutoring, Tutor1 compares his experience with the portal in Case Study 2 with his previous experience in Case Study 1, and notices that he has acquired more expertise and knows which tools support him best.

> I feel though the portal has changed slightly as compared to the portal we used for the first edition and having had the first experience, I think I knew from the get-go what tools I would be relying on the most. (Tutor1, interview, CS2)

Findings show that in Case Study 1, teachers recognized the teacher forum as a valuable tool for discussing issues and also appreciated the written and reflective dimension of the portal. Teachers learned to use the tools by progressively integrating them into their repertoire one at a time. In Case Study 2, teachers appreciated the easy accessibility of certain tools and the flexibility afforded by the system to adapt activities. The number of learners affects the degree to which the portal is supportive: 34 learners are too many for such a learning environment and for a one-year course. One tutor also reports gaining expertise and a better understanding of which tools to rely on in his practice.

We therefore formulate the conjecture that for a long-term socio-constructivist course, design is scale-dependent.

20- Issue pertaining to the C3MS learning portal and teaching: did the media influence teaching?

This issue is addressed by the qualitative data collected from interviews with the teaching staff during both case studies.

In Case Study 1, T1 affirms that the journal and the chat influenced her teaching and the way she managed the course.

> It took some time to get around to the chats. I found in the beginning that it was too disorganised, too many people, some were fast, some were slow. I found it a bit disturbing to wait until someone would react. Afterwards, I set up a structure and discussed it exactly with Tutor1. The first chat I did all by myself, I found extremely demanding. (T1, interview, CS1)

T2 says she appreciated the opportunity for prolonged constructive discussion afforded by online teaching:

> Online you can prompt someone to react more than you can do in a classroom. So online you can have longish discussions that you cannot have in a classroom setting because of time limitations, and this is very valuable. (T2, interview, CS1)

T3 maintains that the media promoted collaboration among teachers: "The fact that we were online influenced our collaboration. We collaborated more" (T3, interview, CS1).

During Case Study 2, the influence of the media on teaching is reflected in a changing attitude towards chats on the part of T1:

> I did enjoy the chats. On one chat, I think we were 14, it worked well. I did like the chats. Yes, you have to be on the ball, and one time I was all alone and it worked very well. I had my agenda and posted my questions, thanks to your good recommendations. (T1, interview, CS2)

T1 also claims she likes the structure of the portal. T2 emphasises this aspect of the portal as well: "I think you are forced to be more clear and to have clearer categories. It is a very good exercise from that point of view. It suits me, as I like structure" (T2, interview, CS2). T3 reports on a role play she used in a face-to-face setting that worked out fabulously. When she used it on the portal, she realised that she would not get out of it what she was most interested in, namely the process. Because of the learning environment and the way the role play was set up, she would only get the product. So yes, the media – i.e. technical affordances – definitely influenced her teaching.

Findings from the analysis of the qualitative data indicate consensus among teachers that the media definitely have an influence on teaching. Teachers agree that the portal requires them to be very clear and structured. It also encourages them to collaborate more. In addition, it provides teachers with an opportunity to keep track of learners' progress, in an unobtrusive way, by reading their journals. Finally, it allows teachers to have more in-depth, constructive discussions with learners about course content. We therefore formulate the conjecture that the written component of distance learning and the framework provided by the portal do have an influence on teaching and learning.

11.3.1. Summary: Findings for question C

On the question of whether the portal is an effective learning environment and whether tools supported pedagogical goals, the findings pertaining to the different issues indicate that the C3MS portal is an effective socio-constructivist learning environment. Designed as part of a course for interpreter trainers, it provided a socio-technological place for learners to interact and co-construct meaning. Teachers all agree that the portal definitely influenced their teaching. The portal requires them to be very clear and structured and encourages them to collaborate more. It provides them with an opportunity to keep track of learners' progress, in an unobtrusive way, by reading their journals, and it allows them to have more in-depth, constructive discussions with learners about course content.

In both case studies, the tools most frequently used by learners were the forum, the module description tool, the social awareness tool, and the awareness tools of the forum and private messages. These tools represent the basic necessities for learners to produce, communicate, get organised and connect with the distant community. The other tools were used in different ways. In the future, designers need to be particularly attentive to learners' understanding and use of the journal, since its role is to mediate an essential process of constructive learning, namely reflection. As far as teachers are concerned, their use of tools evolved from Case Study 1 to Case Study 2. In Case Study 1, they report that the tools they used most frequently were the forum, the journal – reading learners entries – the activity folder, the shoutbox, the social awareness tool and the templates. In Case Study 2, the discourse of both teachers and tutors testifies to a more integrated view of the portal as a whole, even if the forum and the journal retain their privileged places. Findings confirm that tools did fulfil the pedagogical function they were designed for.

Section 11.4. Findings for question D: To what extent did the TSS framework help to create an effective socio-constructivist learning design?

This question in concerned with design issues and is related to the TSS framework from a more global perspective (issues 24, 25 and 26). It also focuses on two aspects of the design: the organisation of human resources (issues 21, 22, 23) on one hand and activity and cognitive design on the other (issue 27).

21- Issue pertaining to the organisation of human resources, from the teaching staff's perspective: did teachers and tutors receive adequate training prior to encountering the learners?

This issue is addressed by the qualitative data collected from interviews with the teaching staff, and focuses primarily on Case Study 1, as there was no teacher training during Case Study 2.

After Case Study 1, T1 indicated she would have liked more training in materials development, that is,

> a little more about how to create activities that work online and what you should avoid. That is independent of the field you are studying. The medium is the message: you are not just training them to be interpreting teachers, you do it in a way that you want to pass on as a good model. So that puts more pressure. (T1, interview, CS1)

T2 mentions some technical adjustments:

> When it was my turn to teach, I was sufficiently at ease to teach. Maybe completing some of the templates: how to put my feedback on templates. It took me time also to figure out how attachments work. I lost text one time on the forum and I liked your suggestion to copy in a wordpad. (T2, interview, CS1)

T3 did not remember the training, but did not complain about lacking information.

> Well, I cannot remember it! I read the guide but I did not find it very useful. It was useful as a general introduction but afterwards… It depends also on people's characters – I was never good at reading users' manuals. When I have it in front of me and the manual next to me, it worked better. For my level, I was not lacking information. (T3, interview, CS1)

Tutor1 talks about his tutor training experience, focusing on the situated aspect of tutoring and the necessity of engaging in practice if one is to fully understand what tutoring is about.

> From the technical point of view, most of the questions were answered or answered along the way when they popped up. The content of training: in retrospect, of course, I can say "You could have shown me that," but I suppose certain things you have to find out by yourself and they must depend on how the teacher and the tutor interact that will then bring about a certain dynamics that cannot be reproduced. (Tutor1, interview, CS1)

> But let's say a tutor x comes in, we cannot transplant that kind of working relationship we have. All we can do is show what the tutor can do with the teacher together, what the tutor can do for the teacher and what they both can do for the participants. You cannot cut and paste, all you can do is show and tell and let them find their way. (Tutor1, interview, CS1)

He suggests including teachers in the tutor training:

> Perhaps for the future and depending on who will be teaching, we should consider convening the people and having a brief session to explain the tutoring system, giving them examples that we could perhaps take from a scrapbook or we could have our own little scrapbook from behind the scene. (Tutor1, interview, CS1)

He also discusses his transition from novice to expert during his experience of tutoring online.

> Of course in the equation, there is this unknown factor at the beginning. You say "Okay, I read some stuff, I have been told some stuff but what will it look like?" And having done the exercise once now, I feel that the factor of the unknown has become really small, and even if I worked with teachers I never worked with [before], I could be more assertive, proactive in the shaping of the whole tutor-teacher relationship. (Tutor1, interview, CS1)

During Case Study 2, there was no teacher training on the portal. Teachers were asked whether they missed this kind of training. In her answer, T1 focuses on the tutor training:

> We had to meet on the portal or in person and that comes on top of everything else. And to me, you know, training the tutors is an essential part of what one should do. For them, it is, you know, training them to become trainers in a way, an extension of their training, so that's good. But it's just not something we had anticipated to take as much time as it does. (T1, interview, CS2)

T2 refers to her own strategy: "I've decided that if I don't have to do it, there are plenty of other things I have to do, so … otherwise, I was quite comfortable using the portal" (T2, interview, CS2).

T3 reports that she took a course to fill in the gaps she experienced during the first edition:

> Last time, I was a bit uncomfortable and I managed to find locally a course on teaching online. I realised I needed some help in understanding there is really a new environment and you cannot transfer something that works in the classroom into a portal environment. And having done all that and knowing it cognitively, I still made a mistake [reference to the transposition of the role play, process and product]. (T3, interview, CS2)

After Case Study 2, Tutor1 discusses the tutor training issue in the context of training Tutor 2:

> There was not too much exchange between and among the tutors. I do know that Tutor2 looked very carefully at my first module that I tutored to get some pointers, but he did not explicitly ask for many of those pointers. I think it was gleaned from what was happening online. [At some point I did feel the need to intervene.] His feedback was very self-centred. I felt that I should say something, because it just fell a bit off the mark and I sent him an e-mail to that effect. I just said… he took it quite well actually. (Tutor1, interview, CS2)

Tutor2 also mentions relying on Tutor1's experience as well as his own in another context: "You posted the articles on the portal and Tutor1's reactions to it from the previous edition. So I had a look at that and I talked to Tutor1. I suppose the fact that I am tutoring on the MA helps" (Tutor2, interview, CS2).

Findings from the analysis of the qualitative data indicate that in Case Study 1, teachers found the training to be appropriate when they remembered it, but would have liked to have more training on materials development and on how to create online activities. The portal

guide was helpful for basic technical questions only. The tutor highlights the necessity of engaging in authentic practice in order to fully understand what tutoring is about. The tutor also understands what situated tutoring involves and recommends that teachers be included in future tutor training sessions. Finally, the tutor discusses the unknown factor, which is more salient in the first edition of the course, and its impact on the overall tutor-teacher relationship. In Case Study 2, tutors were trained on the job and one teacher in particular reports on how time-consuming this process was. In addition, the expert tutor was informally coaching the novice tutor. One teacher describes her strategy of consciously ignoring certain aspects of the portal that she does not use in order to concentrate on those she does. Finally, the third teacher reports that she took a course on online teaching to fill in the gaps she experienced during the first edition of the course.

We therefore formulate the conjecture that training tutors without training teachers about tutoring is not effective. Both tutors and teachers need specific training plus training on how to work together. We also formulate the conjecture that learning to use the portal is a gradual process, and adaptive training should be available to support teaching staff as they evolve from novice users to expert users of the portal.

22- Issue pertaining to the organisation of human resources, from the teaching staff's perspective: how effective was the organisation of human resources? Were the respective roles of teacher and tutor clearly defined?

This issue is addressed by the qualitative data collected from interviews with the teaching staff. We examine each case study separately in order to determine if any change occurred between Case Study 1 and Case Study 2.

In Case Study 1, T1 thinks the organisation was effective: "I think it was effective, I am not quite sure we were terribly efficient all the time, but I did not expect us to be terribly efficient the first time. Each of us was finding our slot" (T1, interview, CS1). T1 insists on the importance of the forum: "The forum really helped in making optimal use of human resources as well" (T1, interview, CS1). She also comments on the roles of the teachers and the pedagogical advisor:

> Our roles were pretty well defined. You [pedagogical advisor] were gently but definitely pushing to a certain way of teaching that none of us ever experienced, so it was good to have you there. It was also good that almost everyone reacted to your suggestions, either saying "No we cannot do that" and then coming around anyway, or else saying right away "That is a good suggestion and let me try and incorporate it." (T1, interview, CS1)

T2 says she has not given much thought to the structure, but finds that it supported her:

> I have not given that much thought and thought of another model, but we certainly needed someone who headed the whole thing, T1, having an overall view of what we are going to achieve, how this Certificate fits in with her relationship with the school hierarchy, with other institutions. And having someone like you [pedagogical advisor] who has the technical know-how and some answers to questions. And someone like Tutor1 who was really very good and very present. I do not see how we could do it another way. It definitely supported me. (T2, interview, CS1)

T3 complains about being too far away from the teaching team and states that she would like to have a closer relationship with the other members of the team:

> I remember writing that, and T1 said "Well, the students are all over the place," and I wrote back, "It is not the students I want to feel close to, it is the teaching team." So I want to feel that if I have a problem, I can come in, and have you brainstorm with me. Ninety-seven percent of the time I did get support, but I did not always get answers. I just think everybody was so busy and could not attend to everybody else's questions. (T3, interview, CS1)

Tutor1 reminds us that this was a new experience for teachers, tutors and learners alike, and that if it worked out well, it was also due to the personal effort invested by every member of team:

> It is difficult to answer straightforward. It was new for everybody and nobody knew who was qualified to perform. Yes, I found this [organisation of human resources] worked out quite well, certainly also because of the personal effort everyone seems to be making. You were always quick in replying, giving the answers or the pointers where I can find answers. The same for T1 and with T2. It worked out well. (Tutor1, interview, CS1)

On the other hand, he does not think that the roles were very clearly defined, practically speaking, from the start as we have already reported in the *comments* of Module 6 / 8, sub-section 10.4.6.

In Case Study 2, T1 focuses on the teacher-tutor relationship:

> I think we've learned a thing with the tutors. it was a welcome experience, although it added to the workload, but I think it is good that we did it the way we did it. I do not think I would add any more tutors. I would find it very difficult to work with even more people. I think it was just the right number. (T1, interview, CS2)

T2 remarks that the second edition of the course used a more top-down approach than the first edition:

> That [the organisation of human resources] was good. I found there was a bit of… we improvised a bit on certain things, did we not? Portfolios for example. And I had the impression, this time, things were organised in the beginning without our being… we did not have the sort of meeting we had the first time around. A certain number of things were decided and I had the impression, you know "Hey, when did that happen?" (T2, interview, CS2)

T3 did not comment on this question except to mention the fact that a new technical person came on board, which did not affect her.

In Tutor1's opinion, the organisation of teachers and tutors was better coordinated than during Case Study 1:

> I think it worked better than last time around simply because everybody was used to having a tutor around, first of all. Secondly, we had already gotten a bit used to sharing the workload, allowing the tutor to do his thing and perhaps not feeling the need to look over the tutor's shoulder at all times. And yes, accepting them as a full-fledged member of the team, which at the very beginning was difficult because nobody had experience with tutoring. So, this time around, I felt that it really worked well. (Tutor1, interview, CS2)

Tutor2 suggests that knowing each other enhances the interactions:

> Yes, I think [the organisation of human resources supported me]. First of all, we know each other very well, so this of course helps. I knew T4 and T3 also before. I knew everybody, some of them of course better than the others. But the fact of having met them before is helpful, because you know them, you have a face to put on a name, you know how you can interact with the people. I think the roles of everyone are very clear to everyone and that is very important. (Tutor2, interview, CS1)

Findings from the analysis of the qualitative data indicate that, on the whole, the organisation of human resources supported the teaching staff. During Case Study 1, teachers as well as tutors were finding their place within the structure, trying to be as effective as possible. However, T3 disliked feeling far away from the teaching team. Regarding roles, T1 focuses on the respective roles of the teachers and the pedagogical advisor; T2 focuses on T1's managing role, on the pedagogical advisor's – interestingly referred to as the "technical advisor" – role and on the tutor's role; Tutor1 feels that the roles were clear theoretically speaking but not at all practically speaking: members of the teaching staff needed to complete five modules before fully comprehending each other's roles.

In Case Study 2, tutors and teachers were integrated from the start, and the additional coordination that this entailed added to the teachers' workload. The tutors themselves felt positively about being fully integrated with the teaching team. Tutor2 emphasises the human aspect, claiming that interaction is facilitated when people already know each other.

Finally, due to time constraints, some decisions were made rapidly, in small committees, and the fact that not all teachers were involved in the decision-making process meant that there was less consensus than during the first edition.

We therefore formulate three conjectures: 1) no matter how well trained teachers are, they need to grasp the essentials of how distance teaching works before they are ready to delegate tasks to tutors; 2) rapid decision-making in small committees can interfere with the cohesion

of the teaching team; 3) appropriate mechanisms to support rapid dynamic planning need to be incorporated into the design.

23- Teacher-tutor relationship: to what extent was the organisation of teachers and tutors appropriate? To what extent was the distribution of work between them appropriate?

This issue is addressed by the qualitative data collected from interviews with the teaching staff. We examine each case study separately in order to determine if any change occurred between Case Study 1 and Case Study 2.

In Case Study 1, T1 says she is not good at delegating: the fact that she wanted to read everybody's contribution and her tendency to size up the situation 'on the spot' made it difficult for her to work with a tutor:

> I am not good at using tutors and I still have a way to go, simply because I am somebody who constantly adjust to how things are going. I size up the situation. The way I deliver my course is very much determined by the class environment. And that does not make it easy for anyone to work with me. To me, at least, in a distant environment, this is a bit difficult; there you cannot change everything, you have your activities. I could have made more use of him, but in the end, I wanted to read everyone's contribution! (T1, interview, CS1)

T2 claims the coordination with the tutor was excellent. She also points out how situated the teacher-tutor relationship is:

> The tutor worked very well, very quickly, always ready to give a hand. He also gave part of the feedback for Module 6: very good. And during the days in Geneva, it would have been very different without him. He was tying things up immediately, showing them on the screen. He did tremendous work, supported very well. Organisation and coordination with Tutor1 was good. In the future, it will much more depend on the tutor in question, on what sort of role you entrust that person, his pedagogical experience. (T2, interview, CS1)

T3 perceives the tutor's role as unusual, lying somewhere between that of a teacher and some other role:

> Tutor1 deserves a Nobel prize anyway. It was a bit clearer in the feedback module, how we divided things up. But in the curriculum module, somehow, we did not manage to have a good talk about how to do it. In the future, I have to think about redesigning the module and then it might be clearer. He has a kind of funny role, because either I team teach or I do not, and he is in the middle. I should have given him some more guidance: "Perhaps you can do this." (T3, interview, CS1)

In Case Study 2, T1 welcomes the increased collaboration entailed by the new way of coordinating the teacher-tutor relationship:

> Having the tutors there was an excellent change. That gives more chances for feedback and it enlarges the teaching team, and it really becomes a group effort on our side too. And I think participants really sensed that we were a solid group, not all thinking exactly the same way, but all reading exactly from the same script; and they could not play one against the other, and that was really, really wonderful. I did not have that feeling as

much last time. This time, despite the fact that we had grown in numbers, there was much more collaboration going on at our end, in the teacher/tutor section; this is really a very welcome change. (T1, interview, CS2)

T2 comments on how the work was distributed between her and the tutor:

The way we divided up the work? Tutors were quasi on equal footing with us. It worked well. We split the groups in half and for one activity I take the first half and the tutor would take the second and then we'd split it that way. I would not read all the tutor's intermediary feedback because at that stage we were still giving intermediary feedback, but I read some of it, and I then read all the tutor's final reports and students' final reports with the tutor's comments. I did not make the comments, but I actually read them, so I knew what the tutor had said. (T2, interview, CS2)

T3 did not have a content expert tutor for her module, which made it very difficult for her to deal with 34 learners:

I am not sure how to get the most out of a tutor. The tutor I had is very supportive and responsive for logistical things. Maybe it is my fault that I did not give him enough responsibility, but I did not know how to. (T3, interview, CS2)

T3 adds an interesting reflection on learners' perceptions of the teacher-tutor relationship:

I am still not sure about… I mean, whether it is cheating or not, because, I've never worked with a tutor, so I do not really have a good feel for how the participants feel about it: if they feel it is complementary, or I have to do more, or how they perceive something that is offered by one person and another person. I just do not have any experience. Tutor1 was more than a tutor really. […] So also where I work, I do not know how to delegate very well, because I have never had that experience. (T3, interview, CS2)

T4 also explains how she divided up the work with the tutors:

I generally had to ask tutors to do it and once I asked them to do it, they did it, so it was okay. Tutors went over assignments. We had 34 assignments and we divided it in half, I did half and each of them did a quarter, and then the other assignments we switched people, but also I did half and they did a quarter. It was okay. (T4, interview, CS2)

The idea of providing two layers of feedback originated with Tutor1:

I suggested a break-up of who would be in charge of whom and to shuffle the participants. So if I did *a* through *m*, for activity 1, and T1 did the second part, then we would swap groups, so everybody would get feedback from both tutors at some point. Everybody would have received a feedback from me by the end of the module. (Tutor1, interview, CS2)

Tutor1 discusses two basic tasks he performed: designing the activity beforehand with the teacher and providing feedback.

The first one [task] would be contribute to brainstorming about the best way of implementing the portal description. So the portal description, the first draft, was, in all cases, posted by the teachers. They said, "This is what I want to cover." And then, together with either a second teacher, or just myself, I provided

> feedback, my comments. That's the first task, because, after all, that is the blueprint of the house I will be then living in with the teacher for the duration of the module. That gives the tutor the opportunity to bring in his own view and by doing so feel more at home and more comfortable with what's being done. And the teachers were quite open to suggestions. They never said, "No that's the way it needs to be done," because then you would feel like a stranger being there, like a mercenary just being hired to be there for a few hours a day and then that's it. Another task is what tutors do online, which is basically the same thing, it's really the same thing as the teachers do. It mirrors what the teacher does and it was nice that the feedback received from participants reflected that they looked at the tutor as an equal of the teacher. Now perhaps that means that this one facet of the tutor being closer to the participants got lost. (Tutor1, interview, CS2)

Tutor1 goes on discussing these tasks in greater detail:

- Everything from welcoming the students and making them feel at ease, so at the social interactional level, break the ice and the ice was broken as much by the teachers as by the tutors.
- Communicate to them that at all times they can ask questions and at no point was it said "If you have questions, first ask the tutor and only then ask the teacher" or "Only ask the teacher because the tutor would not know." So no hierarchy established.
- Certainly in terms of providing real feedback, the feedback on their contributions.
- And the grading, where again the grades were suggested, and in a few instances, not too often discussed, only for thorny issues.
- Of course the task of contributing to the face-to-face, where I was not there, as I said, for the other modules. (Tutor1, interview, CS2)

Tutor2 talks about his roles as a tutor: providing feedback, acting as backup and forming groups:

> And in Module 7, on the contrary, I did not feel prepared to give real feedback, so I was a sort of backup for T3 and I would do all the practical stuff, posting the grades, posting the feedback, etc. One other role: trying to split up the groups so that those who had problems in the previous module would not work [together] again in the following. (Tutor2, interview, CS2)

Findings emerging from the qualitative data indicate that the coordination and distribution of work between teachers and tutors, from the teachers' perspective, concern issues related to 1) wanting to delegate, knowing how to delegate and what to delegate to the tutor, 2) coordinating and sharing responsibilities with the tutor according to how the course unfolds, 3) reacting rapidly, 4) involving the tutor in the design from the very beginning, 5) providing the tutor with training and guidance, and 6) the learners' perceptions of the respective contributions of the teacher and the tutor to their own learning.

From the tutors' perspective, their tasks were the same as those of the teachers and involve designing the activity and then supporting learners. More specifically, these tasks consist in: 1) designing the activity, 2) forming groups when this was not a matter of free choice, 3) welcoming, breaking the ice at the social level, 4) encouraging learners to ask any question,

any time, 5) providing feedback, 6) grading, 7) contributing to the face-to-face session.

Regarding the distribution of the workload, tutors performed the same tasks as teachers: the learners were divided into two groups and the teacher and tutor would alternate in providing feedback to one of the groups. This way of organising the work, which was the tutor's suggestion, was adopted for all the modules and was found to be effective when the tutor was a content expert. We therefore formulate the conjecture that if the tutor takes on similar tasks as the teacher (i.e. provides feedback), he needs to be a content expert.

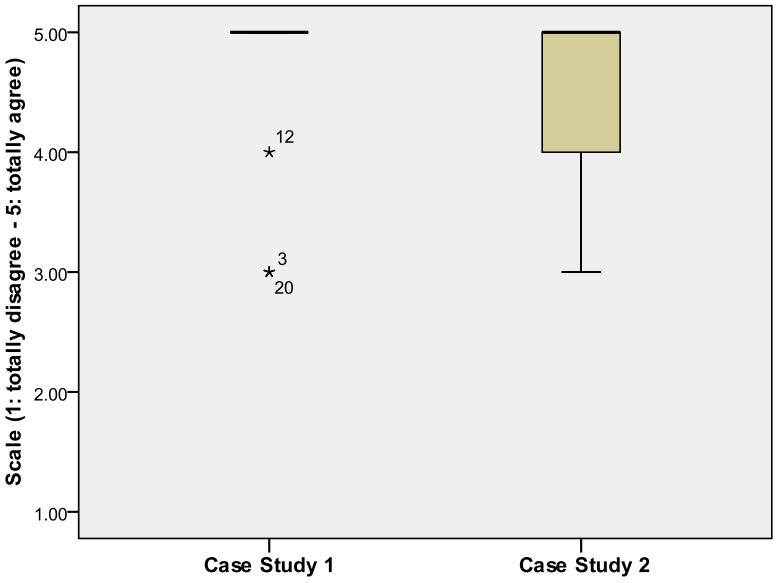
24- To what extent did the TSS framework help to create an effective learning design?

To address this issue, we look at four variables, two of which are indices. All four comprise dimensions of the TSS framework, namely, the organisation of human resources (already dealt with in issue 7), the learning environment (already dealt with in issue 18), the presence of the director (Figure 106, Table 77), and the presence of the teaching staff (Figure 107, Table 78).

Case Studies		1	2
N	Valid	21	29
	Missing	0	0
Minimum		4.00	3.00
Maximum		5.00	5.00
Percentiles	25	5.00	4.00
	50	5.00	5.00
	75	5.00	5.00

Table 77: Frequencies, presence of director (1: totally disagree - 5: totally agree)

Figure 106: Learners' opinion about the director's presence



Case Studies		1	2
N	Valid	21	29
	Missing	0	0
Minimum		3.00	3.00
Maximum		5.00	5.00
Percentiles	25	5.00	4.00
	50	5.00	5.00
	75	5.00	5.00

Table 78: Frequencies, presence of teachers and tutors (1: totally disagree - 5: totally agree)

Figure 107: Learners' opinion about the teachers' and tutors' presence

For all variables, the typical learner either agrees (median = 4) or totally agrees (median = 5) on all dimensions. S/he thus agrees that the TSS framework was helpful in creating an effective learning design. These variables and indices are not correlated, except for two pairs: the organisation of human resources index correlates with the presence of the teaching staff, and the presence of the director correlates with the presence of the teaching staff. It is not surprising that these variables are not correlated, since the TSS addresses very different issues.

Findings confirm that the TSS framework facilitated the design of an effective learning environment by providing a supportive structure in which the director and the teaching staff were perceived to be highly present.

25- What design-related aspects worked out well?

Based on the findings from the questionnaire and interviews presented above, the strong points that we observed about the design are related to constructivist learning, skill acquisition, human resources and the portalware learning environment.

As far as constructivist learning is concerned, the course and activities were designed specifically to develop active learning, that is, to encourage learners to take responsibility for their learning and actively construct their own knowledge and skills. Learners engaged in professionally embedded activities that were highly motivating precisely because of their similarity with the kinds of situations learners actually confront in their professional life. Finally, learning how to manage one's learning, take responsibility for it, develop knowledge

building skills, and find and select appropriate information was strongly supported by teaching staff, with the result that learners were not only trained as interpreter trainers but also as expert self-regulated learners.

As far as skill acquisition is concerned, there is no doubt that learners acquired many skills for training student interpreters. In addition, the blended format of the course served to stimulate learners' curiosity and willingness to find out more about how to teach online.

The organisation of human resources and the different actors involved in the design, setting up and running of the course constituted a supportive team for learners. It should be recalled that the actors involved include the director of the course, the teachers and tutors, the pedagogical advisor and the technical support staff.

Finally, the design of the learning environment was effective and fostered socio-constructivist learning and teaching. Core tools were chosen, adapted, and designed and a scenario was created for them based on sound pedagogical principles that were indeed supportive for learners.

The strong design-related aspects of the course include the promotion of constructive learning and skill acquisition, the supportive and effective organisation of human resources and the creation of a supportive learning environment.

26- What did not work out well and could be possibly changed through the design?

Based on the findings from the questionnaire and interviews presented above, the weak points that we observed about the design are related to collaborative learning, the journal as a tool for reflection, teacher training, the organisation of the face-to-face component, and the fall-back scenario for rapid decision-making.

As far as collaborative learning is concerned, in other words, the social aspect of socio-constructivism, it needs to be better supported by the design. The design should provide for the development of a full range of collaborative scenarios, from highly scripted collaborative activities to fading the script. At the same time, faculty need to be trained to adapt and fine-tune activities in accordance with each group's enactment of the collaborative scenario. In addition, a culture of collaborative learning, in which learners truly encourage and support one another, needs to be fostered.

The journal tool, as we have seen, was found to be wanting. The tool, the concept and the scenario need to be revised if the journal is to fulfil its proper function in a socio-constructivist learning design. Also, as already mentioned, the design of the journal tool needs to fit in with the overall culture of the "reflective practitioner."

As far as teacher training is concerned, it was designed to respond to local, selected aspects and needs to be more integrated. Regarding the technological environment as well as pedagogical practices within such environments, teacher training should begin with the basics and then be adapted to target increasingly advanced functions and scenarios as teachers gradually progress towards expertise in their mastery of pedagogical principles and the technological environment. Furthermore, it is important not only to train tutors, but also to familiarise teachers with tutoring and to support the teacher-tutor duo by encouraging them to explore different perspectives on how to work together in a creative way.

Regarding the organisation of the face-to-face component, it is important that teachers coordinate with each other as they do for the online portion of the course. It is important to understand that when a course is composed of two parts – an on-line and a face-to-face part – the face-to-face component does not have the same status as the face-to-face courses that teachers are used to. In such a context, sharing information among teaching staff and integrating what has been done online become all the more important.

Finally, it is important to design a fall-back scenario for cases requiring rapid decision-making in small committees; otherwise, the cohesion of the teaching team may be threatened.

The weak design-related aspects of the course concern collaborative learning, support for which needs to be enhanced; the journal as a tool for reflection, which requires conceptual grounding and needs to be entirely redesigned; teacher training, which needs further development; the organisation of the face-to-face component of the course, which needs to be scaffolded; and the absence of a fall-back scenario, which needs to be put in place for situations that call for rapid decision-making.

11.4.1. Summary: Findings for question D

With regard to the question of whether the TSS framework helped to create an effective socio-constructivist learning design, the analysis of the quantitative and qualitative data collected for the different issues indicate that it did. Detailed findings are summarised as follows: Regarding teacher training, teachers expressed diverse opinions but generally agree that it gave them the basics. Regarding the organisation of human resources, teachers and tutors agree that it supported them. Regarding teacher and tutor roles, respondents agree that they were clear in principle, but since this was the first experience of distance teaching for both teachers and tutors, it took five modules before the roles were clarified on a practical level. In Case Study 2, tutors were integrated in the training from the start, and while tutors relieved teachers in some of their tasks, having to coordinate with the tutors added to teachers'

workloads. For their part, the tutors felt positively about being fully integrated with the teaching team. During Case Study 2, some decisions about design issues had to be made rapidly, in small committees, and the fact that not all teachers were involved in the decision-making process meant that there was less consensus than during the first edition. This resulted in less positive perceptions of the organisation of human resources than what was found in Case Study 1.

The coordination and distribution of work between teachers and tutors, from the teachers' perspective, concern issues related to 1) wanting to delegate, knowing how to delegate and what to delegate to the tutor, 2) coordinating and sharing responsibilities with the tutor according to how the course unfolds, 3) reacting rapidly, 4) involving the tutor in the design from the very beginning, 5) providing the tutor with training and guidance, and 6) the learners' perceptions of the respective contributions of the teacher and the tutor to their own learning. From the tutors' perspective, their tasks were the same as those of the teachers and involve designing the activity and then supporting learners.

Finally, the TSS framework helped in designing an effective learning environment facilitated and supported by an equally effective organisation of human resources.

Section 11.5. Findings for question E: How did faculty perceive the implementation of the blended format of the course?

This question addresses change and innovation. After the fourth face-to-face edition of the course in 2002, even if the course was very successful, the teaching team agreed that the format needed to be changed in order to keep up with the demand. Two weeks were definitely too short for the amount of knowledge and skills that had to be acquired. This was the motivation behind introducing technology into the course, under the leadership of the course director. Issues associated with this question all concern the teaching staff's perceptions of the implementation of the course in its blended format.

28- How did teaching staff perceive and experience the implementation of the course as it was conducted in Case Study 1?

Answers to this question are based on the findings for issues 19, 21, 22, 30, and 31, as well as on the qualitative data collected from interviews with the teaching staff in Case Study 1.

The findings gathered for issue 19 – Did the portal support the teaching staff? – indicate that most teachers are rather positive. With respect to issue 21 – Did teachers and tutors receive

adequate training prior to encountering the learners? – teaching staff claim that training was appropriate for the basics but could have been more developed. The findings for issue 22 – the organisation of human resources from the teaching staff's perspective – indicate that the Geneva-based teaching staff agree that the organisation was effective and supported them; teachers who were further away geographically are also positive, but experienced some negative consequences as a result of the distance. With respect to issue 30 – From the perspective of the teaching staff, what were the outstanding strengths and drawbacks of the blended editions? – teachers cite more advantages (the volume of knowledge shared, the collaboration among learners, the activity and reactivity of learners, the on-going discussion in the teacher forum, and the freedom to organise one's own time) than drawbacks (not knowing enough about creating online resources, slow connections during travel, having to assess large numbers of answers). As regards issue 31 – Did teaching staff enjoy teaching with the portal? – the teaching staff responded affirmatively.

Based on these findings and on the few remarks in the interviews, we can conclude that teaching staff are rather positive about the implementation of the first blended edition of the course for interpreter trainers. With the first blended edition of the course, T2 says that teaching with the portal raised her awareness and suggested possibilities for implementing it elsewhere at ETI.

> A forum for ETI would be useful. The Certificate has created an awareness but also a need for communication like that. It would be very good for brainstorming about various pedagogical problems we have. It could also be used probably for content. I think with an ETI forum that is well explained, there will be more willingness than just following the idea of one staff member, which is a) an initiative the other people have not had and therefore they will be reluctant to change their teaching because they think s/he had a bad idea and b) it is a way where the idea can be discussed. (T2, interview, CS1)

Findings indicate that teaching staff consider the implementation of the first blended edition of the course as a positive experience and suggest expanding some of its use at ETI.

29- How did teaching staff perceive and experience the implementation of the course as it was conducted in Case Study 2?

Answers to this question are based on the findings for issues 19, 21, 22, 30, and 31, as well as on the qualitative data collected from interviews with the teaching staff in Case Study 2.

With respect to issue 19 – Did the portal support the teaching staff? – one teacher, T3, raises concerns about having had the portal imposed upon her. With regard to issue 21– Did teachers and tutors receive adequate training prior to encountering the learners? – teaching staff describe strategies they adopted this time around, including taking a course on online teaching to fill in gaps they experienced in the first edition. With respect to issue 22 – the organisation

of human resources from the teaching staff's perspective – T2 reports that certain decisions were taken in a top-down fashion that she did not experience the first time around. Findings for issue 30 – From the perspective of the teaching staff, what were the outstanding strengths and drawbacks of the blended editions? – indicate that the major drawback is the number of learners. Findings pertaining to issue 31 – Did teaching staff enjoy teaching with the portal? – show that, on the whole, the teaching staff enjoyed using the portal, but the number of learners had a negative impact on their experience of it.

These findings, including the comments of the teaching staff during the Case Study 2 interviews about the top-down approach, are related to the fact that, during the second edition of the course, decisions seem to have been taken a number of times without consulting the teaching team. This change can be explained by the fact that, due to the large number of learners, some aspects of the design had to be adapted, and decisions had to be made very quickly in small committees. What T2 and T3 say below corroborates this hypothesis.

> No, nothing against improvising, but it is also good to know this is the way we are going to go. [...] Yes, we also improvised about how much feedback we were going to give participants online: for a certain amount of time we gave them intermediary feedback and then, all of a sudden, T1, for one of her modules, said, "From now on, we are no longer going to give intermediary feedback, you've reached an autonomous stage, but we will be there to answer questions." Fine, but there again, I had not been warned, I did not know this was the way it was going to happen. So I had the impression we were adapting our teaching methods to other circumstances… […] Yes, yes. Not that I would have necessarily gone against the decision, but it would have been nice to discuss it. We also, for example, there are a number of cases still outstanding of students who have not finished an activity. I still don't know how we are going to treat them. There are two who have missed an activity. They have not produced anything. If they don't produce, they loose the module. If they do produce, that means, somebody is going to have to give them feedback and take care of it after they've come to Geneva and all that. And that is still pending. (T2, interview, CS2)

> Because, since I co-taught the assessment module with T1 and I am always talking about integrated assessment, I felt the assessment was imposed on me without me being able to integrate it into what we are going to do. So when it came round to actually assessing them, I did not have any criteria, so that's what I was kind of grumbling about. Because I did all their answers, I gave their responses and everything and I thought, well they were all good, they all did their best and then, I discovered that there was no inter-rater consistency in the modules I shared with T2 and Tutor1, that their grades were consistently much lower than mine. (T3, interview, CS2)

> You see, one of the difference is instead of being reactive, I can be particular about what I don't like and ask for something different. Whereas before I could not ask for anything different because I did not feel what it is that was bothering me. But now, I think, I can say, "We need to do that differently." I am not very comfortable with learning on the job, so that was bothering me last time. (T3, interview, CS2)

Findings show that in Case Study 2, some decisions were made in small committees,

suggesting a top-down approach to management that was different from Case Study 1. This might be explained by the need to adapt to the increased number of learners and to take decisions rapidly. Better communication might have mitigated this sense that some decisions were being imposed from the top on the entire teaching team. We can thus formulate the conjecture that one has to be cautious about changing scales when a design works, and conversely, that one should expect that certain design changes will be required to accommodate different student numbers (an advantage of agile designs), and finally that it is important to ensure continuity and inform the community when decisions are made without their participation in the decision-making process.

30- From the perspective of the teaching staff, what were the outstanding strengths and drawbacks of the blended editions?

This issue is addressed by the qualitative data collected from interviews with the teaching staff. We examine each case study separately in order to determine if any change occurred between Case Study 1 and Case Study 2.

According to T1, in Case Study 1, the outstanding strengths of the blended edition are the volume of knowledge shared, the collaboration among learners, the reactivity of learners, the on-going discussions on the teacher forum, and the flexibility to organise one's time. The drawbacks include not knowing enough about how to create online resources and slow connections during travel.

- The amount of, the volume of knowledge we were able to share. It shifted entirely from the teacher to the student and this is the most outstanding feature. We have not had any exams yet, but in the group activity, they were really good at giving the answers out. It had taken a lot longer in previous editions, a) to work in groups and b) to wrap their heads around specific questions. So, more active, more reactive and a sense of independence, which then leads to more self-confidence rather than just sitting there and being talked to. The two versions, for me, it is night and day. For me, as a teacher, I would never ever go back to the other mode.
- The very positive aspect for me, of course, was the freedom of organising time and responding at any odd time of day and night.
- An other positive feature: the ongoing discussion on the teacher forum allowed us to go way beyond what we are able to do in our department in face-to-face. The fact that discussion is going on is very good for pedagogical issues.
- Pitfalls: ignorance of producing online resources. I would like to know more about creating online resources. I am very conscious I do not know enough about that. What kind of resources exist? How to do it best?
- Other pitfall: slow connection when I travelled. (T1, interview, CS1)

T2 cites activities as the main advantage of the blended edition. She does not mention any drawbacks.

> It is different because there are activities. It was more talking to them in the previous edition. Here they have the tremendous advantage of all the work they did. I would say these students have had more thorough training than those of the previous edition because of what they did. (T2, interview, CS1)

T3 was a learner in the first face-to-face edition of the Certificate and cannot understand why it had to change. At the same time, she highlights what she feels to be the advantages and disadvantages of the blended edition.

> T1 says we do not want people to be here for fourteen days, it is too long. I really think the opposite, I did the first edition of the Certificate; it was exhausting but I loved every minute of it. There were real people in front of you. Again, it is different learning styles, but I cannot understand one person who does not want to take out two or three weeks for that. I really enjoyed the face-to-face more than the online. But not to argue the opposite, there has never been such a stack of records of discussions, workshop activities and outcomes. So that is a big plus. Some of the minuses are also pluses: when I ask a question, the minus side is to answer, but on the other hand we have twenty examples. The time expands like this, but I would go the same way [socio-constructivist]. For our module, we had a lot of scenarios and we were thinking of cutting that a bit down. (T3, interview, CS1)

During Case Study 2, T1 mentions that the big drawback in the second edition was the large number of learners. “This time I think everything is kind of coloured by just the mass of people we had. I did not really see a whole lot of difference for me other than my role as a course leader” (T1, interview, CS2).

T2 agrees that the number of learners was a problem. In her opinion, the advantage of the blended edition lies in the possibility it affords of following learners and their evolution more closely and over a longer period of time.

> Well, I think the blended edition is an improvement over the face-to-face, precisely because you see both aspects of people. You see them over a long period at a distance and you really see their work, the process which they engage in to do their work. Whereas when we only saw them face-to-face, you saw them admittedly for two weeks, but you were never there from one end to the other, so you saw them for a very short period and the interaction was much less deep. I prefer this system. This being said, it is a tremendous amount of work. Is this where I can say “Thirty-four, never again?” Thirty-four is far too many. (T2, interview, CS2)

T3 also agrees that the number was far too high. The second problem she sees is the rhythm.

> There are two problems with this group. One is it is far too big and I don’t think I want to do this again with numbers like this. Maybe 20 to 25 maximum, but it means you are forced to produce group work and it took me a long, long time. The second thing is there is no rest in-between modules, so I was doing Module 7 and Module 8 at the same time, and I got very kind of fed up doing that because I did not have a rest, and they had not finished 7 and I had not finished 7 and we were beginning 8. The only thing that made it possible is that three people were working on 8. (T3, interview, CS2)

For T4, the drawback was the length of her face-to-face session.

> Yes, the only drawback is that the face-to-face in the blended now is too short. At least my module is too short. I think that one day for what I was trying to achieve, is not enough. […] The greatest drawback has been corrected, namely that my module came at the end last time, so that two days later they were packing and leaving and they really could not integrate it. (T4, interview, CS2)

The tutor sees both advantages and disadvantages in the number of learners. Another advantage that he points out is the technological stability of the system.

> I think everything got blown up with 34 and perhaps we feel it most when it comes to the mistakes, or the errors or the drawbacks or the problems, because those get exacerbated. Much like, at the very same time, bringing the scale back into balance, that also contributed a lot to their interaction and made it much more rewarding, I am sure, because you have more points of view. It did however make collaborative work difficult. […] The good thing is, I don't think the portal was ever down when I tried to access it. I cannot remember it being down, so the stable technical infrastructure, that was really good. (Tutor1, interview, CS2)

During Case Study 1, teachers cite the following strengths of the blended edition: 1) the volume of knowledge shared, 2) the collaboration among learners, 3) the activity and reactivity of learners, 4) the on-going discussion on the teacher forum, and 5) the flexibility to organise one's time. The drawbacks are related to not knowing enough about creating online resources, the slow connections during travel, and having to assess a large number of answers.

During Case Study 2, teachers focused on one major drawback: the number of learners. Two other drawbacks are mentioned: having modules back-to-back with no break in-between, and the length of the face-to-face portion of a module. One advantage resides in the fact that teachers can closely monitor the learning process over a long period of time.

The tutor cites the technological stability of the system as an important advantage. He also views the number of learners not only as a drawback but also as an advantage in terms of the quantity and quality of interactions.

We therefore formulate two conjectures: 1) a transformative blend – according to Graham's (2005) terminology – affects both the teaching team and the content and format of the course; 2) the number of learners is a determining factor in the success of the overall design.

31- Did teaching staff enjoy teaching with the portal?

This issue is addressed by the qualitative data collected from interviews with the teaching staff. We examine each case study separately in order to determine if any change occurred between Case Study 1 and Case Study 2.

In Case Study 1, T1 said she would never want to return to teaching the course just in a face-to-face format.

T2, enjoys teaching with the portal because of the bond it creates with learners and among members of the teaching team.

> In fact, I would not say, I prefer, but I enjoy teaching in this way rather than coming in, not knowing students' reactions. There is a much stronger bond with each participant. But I think you need the face-to-face; I am not sure that only online is as satisfying as finally discovering people that have been revealing one facet of their character. I would also say that this kind of teaching has created the opportunity to work as a team, for us as teachers, that we do not have in our regular work. (T2, interview, CS1)

T3 says she really enjoyed team-teaching the feedback module: "The feedback module was a lot of fun, actually. The first couple of questions we asked them, I really enjoyed that" (T3, interview, CS1).

One aspect of the portal that the tutor found to be especially rewarding was the feeling he had of being helpful.

> I did enjoy tutoring. It was completely new and it was quite rewarding, because you have the straightforward thank you messages, which are nice to get, but also you feel as though you've been able to help them a bit, to give them a pointer, and this is really rewarding. (Tutor1, interview, CS1)

In Case Study 2, T1 returns to the issue of the large number of participants, which affected how she enjoyed teaching with the portal.

> Well, I am so familiar with it now, obviously, I really think... I am not saying that it has been uniquely an enjoyable experience to have 34. Anyway, I enjoyed teaching with the portal, but not with that numbers, it's too massive, not with that learning philosophy. (T1, interview, CS2)

T2 highlights the distance and reflective dimensions that the written medium of the portal affords.

> Yes, [I enjoyed it] very much. I find it is very interesting. I find it gives you the distance to the people and to the problems, which allows you to think things over quietly, and as I tend to be someone rather slow, when it comes to finding solutions, when I am faced with people, I tend to say, say something but without really thinking it over, and I always have other thoughts later, so this is very good, I find, as a teaching tool I enjoyed. And I find also that this distance teaching where you don't see the person means you concentrate more on what they say, how they say it, and it is amazing how people's personality comes through in the way they respond in writing. […] I think so, I enjoyed… to tell you the truth, I almost enjoyed the online stuff more than the face-to-face. (T2, interview, CS2)

T3 simply said that it was okay that time around.

T4 enjoyed teaching with the portal but found it very time-consuming.

> If I did or did not, it is not because of the portal. Basically, yes. I mean the whole issue about this teaching is that it is much more time-consuming than I would have expected and that is a problem, but it is not because of the problem. It's just because teaching 34 people is time-consuming. But the portal in itself was fine. So you could say that the short answer is yes. (T4, interview, CS2)

Tutors enjoyed tutoring and Tutor1 thinks the dynamics and sharing the workload really worked well. "I did enjoy. […] The dynamics worked well, the way we split up the workload worked well" (Tutor1, interview, CS2). Tutor2 simply said, "I really enjoyed it" (Tutor2, interview, CS2).

The findings indicate that, during Case Study 1, teachers enjoyed teaching with the portal for two reasons. First, it helped them establish bonds with the learners and with the other members of the teaching team. Second, the written medium of the portal allowed for richer answers on the part of the learners. One teacher was less enthusiastic, but in one module in particular, she really enjoyed teaching with the portal. In Case Study 2, the large number of participants had a negative impact on how much teachers enjoyed using the portal. One of them enjoyed the distance and reflective dimensions that the written medium of the portal afforded.

The tutor says he enjoyed using the portal, particularly because he found it rewarding to help learners in their process of knowledge construction. In Case Study 2, he enjoyed tutoring because of the improved dynamics between teachers and tutors.

Between Case Study 1 and Case Study 2, the teachers and the tutor were eager to launch another blended edition, which they did. After Case Study 2, with the exception of T4, they were all ready to jump into a third blended edition, which they also did.

We therefore formulate the conjecture that the social and written dimensions of a socio-constructivist portal enhance the teaching process because they elicit positive emotions.

11.5.1. Summary: Findings for question E

To the question of faculty's perception of the implementation of the blended format of the course, findings for the different issues show that globally, teaching staff consider it a positive experience and suggest to widen it up at ETI.

During Case Study 1, teachers consider the following outstanding points of the blended edition: 1) the volume of knowledge shared, 2) the collaboration among learners, 3) the activity and reactivity of learners, 4) the on-going discussion in the teacher forum, and 5) the freedom of organising time. The drawbacks are related to not knowing enough about creating on-line resources, slow connection during travels, and having to assess a large number of answers.

During Case Study 2, teachers focused on one major drawback, the number of learners. Two other drawbacks are mentioned: having modules back-to-back without any pause in between and the length of the face-to-face portion of a module. One advantage of the blended format is

put forward and resides in the fact that teachers can follow closely the learning process of learners over a long period. The tutor reports the technical stability of the system as an important advantage. He also sees the number not only as a drawback but also as an advantage in terms of quantity and quality of interactions.

During Case Study 1, teachers said they enjoyed teaching with the portal because of the bond it creates with learners and within the teaching team and for the kind of answers they can get from learners. In Case Study 2, the large number of participants had a negative influence on how much teachers enjoyed teaching with the portal.

Section 11.6. Findings for question F: What do the individual differences among learners consist in?

To answer this question, we begin by identifying the different learner profiles on the basis of the statistics obtained on the actual use of four tools and learners' perceptions of their use of the same four tools. We then study how six learners (three from each case study, one per profile) enacted two activities, one at the beginning and one at the end of the course.

Identification of learners profiles

Concerning learners' actual use of tools, the four tools for which we have quantitative data from the portal database are the forum, the shoutbox, the personal messages and the journal. The different frequencies of use of these four tools yields three different profiles: a first group (14 learners) who used the four tools only a few times, but used the personal messages tool most often; a second group (14 learners) who used these tools an average number of times, but the journal most often (in fact, even more than the "a lot" group); and a third group (17 learners) who used the tools a lot, but the shoutbox the most (Table 79).

Frequency of use	Cluster		
	Few	Average	A lot
Forum	1.14	2.21	2.59
Shoutbox	1.43	1.43	2.71
Personal messages	1.50	2.36	2.41
Journal	1.21	2.50	1.82

Table 79: Real use of tools split in 3 categories (1: few, 2: average, 3: a lot)

According to the data gathered from the questionnaire – use according to learners' perceptions – we can also identify three profiles: a first group (19 learners) who think they used these tools just a few number of times; a second group (13 learners) who think they used the tools

an average number of times, except for the journal, which they think they used a lot; a third group (18 learners) who think they used the tools a lot, except for the journal (Table 80).

Frequency of use	Cluster		
	Few	Average	A lot
Forum	3.95	4.00	3.89
Shoutbox	1.74	2.15	3.17
Personal messages	2.74	2.69	3.39
Journal	1.84	3.15	2.11

Table 80: Frequency of use of tools – perception of use (1: never, 4: very often)

If we cross the two categories of use – real use and perceptions of use – we see that there is a relationship (chi-square test < .003). It is a linear correspondence: the three groups' perceptions of how they used tools correspond to their actual use of tools (Table 81).

			Real use			
			Few	Average	A lot	Total
Use according to opinion	Few	Count	10	4	4	18
		% within real use	**71.4%**	28.6%	23.5%	40.0%
	Average	Count	1	8	4	13
		% within real use	7.1%	**57.1%**	23.5%	28.9%
	A lot	Count	3	2	9	14
		% within real use	21.4%	14.3%	**52.9%**	31.1%
Total		Count	14	14	17	45
		% within real use	100.0%	100.0%	100.0%	100.0%

Table 81: Relationship between real use and perception of use

Sommer's *d* test confirms that there is a relationship between opinion and use (< .006).

Three profiles have been identified: a first group of learners who used the four tools only a few times; a second group who used the tools an average number of times and the journal most of all; and a third group who used them a lot, especially the shoutbox. In the learner profiles, there is a relationship between real use and perceptions of use.

How did learners from different profiles enact activities?

Having clearly identified three different learner profiles that became apparent in the learning environment, we now consider how learners enacted and performed activities.

The methodology section (sub-section 9.1.3) provided details about the activities learners engaged in and how these enacted activities would be analysed. Let us recall that, in both case studies, learners engaged in the same activities. Learners' interactions are analysed within two activities involving two different teachers, one at the beginning of the curriculum – Module 2, activity 2, *Modelling the interpreting process* – and one at the end of the curriculum – Module

7, activity 1, *Curriculum design and decisions*. For both activities, learners had to work collaboratively in groups of four.

For the analysis of each profile, there are two activity diagrams: one reflecting the entire group's actions in the forum, and the other reflecting only the learner's actions; each diagram categorises the kind of action performed (participative, social, interactive, cognitive, metacognitive, organisational) and the tool used (forum, chat, wiki, private messages, shoutbox). In the analysis, we begin with the diagram for the entire group, highlighting the most interesting aspects (who leads, who takes decisions, etc.) and determining the impact of the "observed" learner's actions on the group. We then focus on the "observed" learner and identify his/her activities and the tools s/he used to perform activities. Since we examine learners across two different activities, one at the beginning and one at the end of the course, we comment on the changes in behaviour that occurred between these two activities. We conclude by comparing learners from the same profile across case studies and finally by comparing all profiles.

The first activity required learners to select a common difficulty in simultaneous or consecutive interpreting, identify the cognitive processes most likely responsible for the cognitive constraints, and remodel the process to address the constraints. The second activity involved choosing and reviewing one graduate or undergraduate curriculum for conference interpretation posted on the internet, with particular attention to the following four questions. 1) Why should a training establishment develop and publish a curriculum? In other words: What purpose(s) does a curriculum serve? 2) Who or what may directly or indirectly influence curriculum decisions? 3) Who should be responsible for designing a curriculum and why? 4) What important things might a potential student want to see in a curriculum?

Reminder of learners per profile (Table 82):

	Few (0)	Few (1)	Average (0)	Average (1)	A lot (0)	A lot (1)
CS1	Roman		Marina		Richard	
CS2		Alex		Emily		Vicky

Table 82: Learners for each profile, Case Studies 1 and 2

"Few" profile: Case Study 1, Case Study 2 and comparison

In Case Study 1, in the first activity analysed, the learner in the "few" profile (Roman) did not contribute at all.

In the second activity (Appendix 5), Richard – representing the "a lot" profile – before the official start of the activity, posts the curriculum of the school he is teaching in. He leads the group throughout the activity, providing content information, organising the group, volunteering to assemble all the answers and finally posting the group's report. Roman

contributes once, on day 2, after Richard asked where the remaining members of the group were, to say he has little experience so he will let the others decide. This was done on the forum with one posting (Appendix 6).

In Case Study 2, the “few” profile is represented by Alex (Appendix 7). In the first activity, LearnerE is the group leader, both for content and organisation. LearnerE works closely with LearnerF and they often have face-to-face interactions. Alex asks to join the other three members of the group before the official start, and posts comments, on day 6, to a draft report posted by LearnerE. On day 5, the teacher invites Alex and LearnerD to participate. In the interactions on the forum, Alex’s participation is really minor. When we look closer (Appendix 8), we see that he worked with LearnerD, mainly with the private messaging tool, and that he participated in one chat discussion with his peers. This group was clearly divided internally, between LearnerF and LearnerE who undertook the hardest part of the work and LearnerD and Alex reacting to their productions.

In the second activity (Appendix 9), Emily shares the leadership of the group with LearnerH, with respect to both content and organisation. (Emily is studied in greater detail below, because she represents the “average” profile.) Alex comes in on day 1 and states his preferences. On day 2, he thanks the other members for their contributions, agrees on the work process and the selected curriculum and says he will read and come back the next day. On day 3, he adds some examples to previous contributions and supports LearnerH’s suggestion that LearnerG be responsible for putting the ideas together in a report. In this activity, these three interventions on the forum are Alex’s only contributions (Appendix 10).

It is interesting to note that, when learners from the “few” profile are prompted to participate by someone from the group or the teaching staff, they do so immediately. This seems to indicate that they follow what is going on in their group, but participate only when prompted. Would more visible means of prompting stimulate this kind of learner to participate more actively?

The learner from the “few” profile is clearly not sufficiently involved in either the learning process or the collaborative process. This is a learner who is carried by the group. From the preceding, we formulate three conjectures.

Based on the difference in degree of involvement between activity 1 and activity 2, which was much greater in activity 1, the first conjecture is formulated as follows: It is important that, from the very start, ALL learners participate actively, and teaching staff should be very attentive to this, especially at the beginning of the course.

Based on the fact that learners from the “few” profile react immediately when prompted, the

second conjecture is as follows: Visibility plays an important role in learners' degree of participation. Would a workflow diagram, visible and available to the community, indicating the participation of each learner and/or comparing the participation of a learner with his/her expected participation (according to the scenario) be an effective way of motivating learners to contribute?

Based on the fact that a group is divided internally between members working at a distance and members working face-to-face, we formulate a third conjecture: the modality (distance or face-to-face) of working among group members has an influence on the dynamics of the entire group, be it positive or negative. Teaching staff should be attentive to this parameter.

"Average" profile: Case Study 1, Case Study 2 and comparison

In Case Study 1, Marina represents the "average" profile. In the first activity, she is part of a group that is very late. Marina asks to join the group the first day after the official closure of the activity. Between days 5 and 6, after the official closure, the group works on content in an interesting synergy (Appendix 11). They work with the wiki, and the first version of the report is modified alternatively by the different members of the group, until Marina uploads the final version after these two days of intensive interaction. If we examine what she did more closely, we see that she used the private messages tool to invite LearnerJ to join the group; she used the shoutbox to communicate with her group peers on organisational matters when all of them were online; she used the chat to discuss content, and the wiki to write the report (Appendix 12).

In the second activity, before the official start, she asks for a chat meeting. On the basis of her peers' availability, she suggests that they work on the forum on day 1. She has a chat with LearnerM and on that day they choose the curriculum and decide how to organise the work. On day 2, Marina posts her contribution to the task and informs the others that she will be travelling. On day 4, she thanks LearnerM for his efforts at assembling and uploading the final report, and apologises for not having been of great help this time (Appendix 13).

If we compare Marina's contributions before travelling and while travelling (Appendix 14), it becomes obvious that travelling affects group work. The other major difference observed between activity 1 and activity 2 is that, while in the first activity Marina gets organised very late, in the second, she is more proactive and begins to prepare even before the official start.

In Case Study 2, Emily represents the "average" profile. In the first activity, she works in a very dynamic group, with the tutor and teachers interacting a lot. This is an example of how

collaborative work unfolds when all members of the group actively contribute, and the work is scaffolded by experienced teaching staff (Appendix 15).

Before the official start of the activity, members of the group come to an agreement on the topic they will be working on, and the teacher encourages them to continue. They also agree on how to organise the work. From days 1 to 3, they concentrate on the readings and then write the draft report. From days 4 to 8 and even after the official closure when they receive feedback, intensive knowledge building takes place. The outstanding characteristics of this collaborative group are: quick reactions, listening to peers and respecting each other's decisions, absence of a group leader, and quick supportive reactions on the part of the teaching staff. Except for one chat, the group worked exclusively on the forum. On two occasions, LearnerR and LearnerP worked together over the telephone. If we take a closer look at Emily's individual contributions (Appendix 16), we see that, besides her many contributions on the forum, she also posted entries in her journal with reflections on content-related issues.

In the second activity (Appendix 9), Emily and LearnerH share the leadership of the group: LearnerH takes responsibility at the beginning and Emily at the end. On day 1, Emily mentions that she has no experience with curriculum and will let others choose which one they want to work on. LearnerH proposes a curriculum and a way of organising the group work, and Emily expresses her agreement. On day 3, Emily posts a compilation of all the answers. On day 4, in response to LearnerH's comments, Emily tells LearnerH about some journal entries that might interest her. On day 7, LearnerG, Emily and LearnerH interact on content. Emily reports being worried about the status of examples and says she looked for that information in the general Q&A thread. On day 8, Emily works on the final version and uploads it. Again, apart from the many posts on the forum, Emily continues to reflect in her journal and reads her peers' journals (Appendix 17).

If we take Emily as representative of the "average" profile, we see that this profile is characterised by a respectable number of entries on the forum that contribute qualitatively to the activity, some journal entries, which indicates that reflection is taking place alongside task accomplishment, and knowledge of where to look for needed information (that is, the general course forum). Compared with the first activity, the big difference in the second activity is the total absence of teaching staff. This is due to the fact that activity 2 occurred at the end of the course, and is consistent with the planned fading. The group seems to be comfortable with this, having gained sufficient autonomy to function without the interventions of the teaching staff.

The learner from the “average” profile is an active knowledge builder who engages in reflection and knows where to look for information and how to regulate his/her work. S/he takes his/her learning in-hand, is well organised and plans his/her learning programme before the official start of the activity.

Based on a comparison of Marina’s contributions before and during travel, we formulate the conjecture that travelling affects group work and some advance planning and coordination is required to ensure favourable conditions for completing the activity.

If we take the enactment of activity 2 as it actually unfolded (Appendix 15) as the exemplar of what designers would like to achieve in an early stage of the course, we formulate the conjecture that advance planning of the learning enterprise has an influence on learning outcomes. We formulate an additional conjecture based on that same enactment: When all members of the group are really engaged, a group leader does not seem to be necessary, since individuals have acquired a sense of responsibility towards the group, thus freeing the group from regulation tasks pertaining to organisational matters (i.e. deadline reminders).

Based on the change observed with respect to the starting time in activity 1 and activity 2, we formulate the conjecture that the course helped learners to acquire self-directed learning skills.

Based on how learners react when they lack information, we formulate the conjecture that, by the end of the course, they have gained autonomy and know where to look for information and how to regulate their own work by comparing it with the information provided.

“A lot” profile: Case Study 1, Case Study 2 and comparison

In Case Study 1, Richard represents the “a lot” profile. In the first activity, Richard is part of a group that is very late (Appendix 18). They form their group on day 2 and organise a first chat meeting on day 3. On day 4, LearnerA posts a first draft on the wiki, which other members, including Richard, modify. Then, on days 4 and 5, LearnerS and Richard modify the draft and LearnerS posts the final report on day 5. An interesting synergy of real co-writing takes place during days 4 and 5. If we look more carefully at Richard’s interventions (Appendix 19), we see that he used the wiki for most interventions and the journal on one occasion after the official close of the activity, where he talks about the difficulties of the report-writing process.

In the second activity (Appendix 5), before the official start, Richard posts the curriculum of his school. On day 1, he posts answers to the task. On day 2, he inquires as to the whereabouts of the other members of the group, who eventually make their appearance later on the same day. On the same day, he initiates a reflection on the distinction between a curriculum and a

syllabus. On day 3, Richard suggests a way to organise the work and volunteers to assemble all the answers. On day 4, Richard uploads the curriculum from his school. On day 5, having failed to receive feedback on his synthesis, he uploads the report. In this activity, he acts as group leader both on content and organisation. His individual activity diagram (Appendix 20) shows several attempts to involve his peers by sending private messages, but these remained unanswered.

One difference between activities 1 and 2 resides in the start of the activity. The second difference is the shift in the tool used, from the wiki to the forum. Also, Richard completes the second activity almost entirely on his own.

In Case Study 2, Vicky represents the "a lot" profile. In the first activity, the workflow of this group (Appendix 21), composed of Vicky, LearnerU, LearnerV and LearnerH, is similar in some ways to the one we observed for activity 1, Case Study 2, "average" profile. Except for LearnerV, who contributes very little, and only in reaction to prompts, the three other members interact throughout the activity, among each other and with the teacher and tutor. Vicky, LearnerH and LearnerU share responsibilities and no one in particular leads the others. Before the official start of the activity, the group is set up and ready to choose a topic. On day 2, LearnerH suggests two topics, which Vicky rejects on day 3, basing her explanation on what is going on in other threads. Vicky then suggests a new topic and explains why. On day 3, LearnerU and Vicky have a chat on content-related matters, which is summarised by LearnerU. It is decided that LearnerU will be the reporter. On day 4, LearnerH and Vicky have another fruitful discussion on content, which is reported by LearnerH. They decide on the structure of the report and suggest a way to distribute the work. The teacher provides feedback on this structure. On day 5, Vicky integrates the teacher's feedback and asks her peers for comments. The teacher intervenes to encourage the group to pursue that track. The tutor also contributes proactively with some suggestions. On day 6, Vicky asks the tutor to clarify his intervention, and receives a response on the same day. LearnerU posts a draft. On day 7, a lot of interaction takes place between Vicky and LearnerU. LearnerU prompts LearnerV to participate, which she does. However, LearnerU disagrees with LearnerV's input. On day 8, Vicky tries to alleviate the situation, but it results in no further participation from LearnerV. LearnerU posts the final report that day.

Vicky and LearnerU work several times together, over the chat or the telephone. LearnerV is travelling and LearnerH contributes throughout the activity. On an individual basis (Appendix 22), Vicky used both the forum and the chat and, on one occasion at the beginning, the journal, where she expresses her concerns that the activity is not being carried out.

During the second activity (Appendix 23), the situation is quite similar: Vicky, LearnerD and LearnerR interact throughout the activity, and LearnerW interacts much less than the others. On day 2, LearnerD suggests a way to plan and distribute the work. Vicky agrees with her, but expresses uncertainty about what a curriculum is. On day 3, she reports that, after a discussion with colleagues about curriculum, she now has a better understanding of the issue. On day 4, the tutor intervenes, which only serves to confuse the group! On day 5, Vicky reports having posted a request for clarification on the general Q&A thread. Contributions to the task are submitted on days 6 and 8. On day 8, LearnerD posts a compilation constituting the final report and they all agree to upload it as it stands. On day 9, Vicky uploads it. From her individual activity diagram (Appendix 24), we see that Vicky has used the forum exclusively, for social, cognitive, interactive and organisational purposes. In activity 2, Vicky demonstrates explicit knowledge of where to look for information. With respect to the curriculum issue, she also demonstrates a real process of knowledge building.

The difference between activities 1 and 2 with respect to the use of tools is characterised by a trend towards using the forum exclusively.

The learner from the “a lot” profile is also an active knowledge builder who knows where to look for information. However, s/he does not practise reflection, and this needs be encouraged. Regarding the use of tools, we note a shift towards exclusive use of the forum.

Richard’s failure to elicit reactions from his peers by prompting them through private messages corroborates the conjecture originally formulated for the “few” profile that visibility plays an important role in stimulating learners’ participation.

Based on LearnerV’s degree of participation and LearnerU’s reaction to it, we formulate the conjecture that there is a relationship between the degree of engagement in a group and the implicitly acknowledged legitimacy to suggest ideas (that is, being listened to, being able to make suggestions that are not immediately rejected out-of-hand). Another related conjecture can also be drawn: The extent to which the experience of a total rejection of one’s ideas at an early stage of the course affects the entire learning path depends on the personality of the learner.

Based on the interactions that took place in these groups of four, we formulate the conjecture that the size of the group has an effect on learners’ participation.

Based on the shift towards exclusive use of the forum, we formulate the conjecture that learners have managed to fully appropriate the tool as an effective means for their own learning.

11.6.1. Summary: Findings for question F

To the question of the differences among learners, a statistical analysis uncovered three profiles: a first group that uses the four tools only a few times, a second group that uses the tools an average number of times and the journal most frequently, and a third group that uses the tools a lot and the shoutbox most frequently. Also, it is important to note that there is a relationship between real use and perception of use: in other words, a learner who actually uses tools only a few times also thinks s/he does so.

Regarding the differences in the enactment of activities and in the way learners conduct their learning enterprise, the three profiles show different behaviours. Learners from the "few" profile are definitely not sufficiently involved and depend on the group to carry them along. In comparison, learners from the "average" profile are active knowledge builders, practise reflection, and know where to look for information and how to regulate their work. Finally, learners from the "a lot" profile are also active knowledge builders and know where to look for information; however, they do not engage in reflection.

Section 11.7. Findings for Question G - What are the relations among variables that we used to answer the previous questions?

This question does not have the same status as the previous ones. Since we had data, we thought it would be interesting to investigate the relationships among the indices used to answer the other research questions. Analyses reported below are superficial and would merit more in-depth study, but they are already a good gauge. Data presented here should be interpreted strictly in terms of an exploratory analysis. Some of our variables do not have normal distributions (i.e. they show little variance and/or are skewed), others (i.e. the real use of tools) are ordinal. In other words, they do not necessarily lend themselves to correlation analysis. Nevertheless, our analysis generates some hypotheses regarding the interaction among variables, which could be investigated through further research and with different survey instruments.

We have conducted factor, correlation and cluster analyses on the variables. The first type of analysis aims at grouping variables according to shared variance in order to identify underlying variables. The second looks at some interesting bi-variate correlations between chosen variables. The third analysis involves clustering variables according to similarity for the entire group of variables.

11.7.1. Factor analysis

From the exploratory rotated principal component analysis (Table 83), we derived four different independent dimensions. The first one is defined by high loadings for the Dolmans *et al.* (2003) and the Taylor and Maor (2000) variables, except one – peer support, from the Taylor and Maor (2000) survey – plus two of our own variables – the organisation of human resources and the presence of the teaching staff. This first factor is clearly associated with active, authentic and collaborative learning. The second factor has high loadings for the four tools for which we have information concerning real use, plus the Taylor and Maor (2000) peer support variable, plus the learning environment variable from our own set of variables. This second factor is clearly associated with tools and the learning environment. The fact that the Taylor and Maor (2000) peer support variable is heavily loaded indicates that peers really do influence the extent to which learners actually use the tools and the learning environment in general. The third factor indicates that, in a learner's opinion, the frequency of his/her use of each of the tools like the chat, the shoutbox, the calendar, the library and the module description is similar. These tools can all be categorised as peripheral, responding to different learner preferences, except for the library and the module description tools, which are central. Finally, the last factor has high negative loadings for frequency of use, according to opinion, of the forum and the personal messages tool plus the actual use of personal messages. This factor has positive loadings for the constructivism variable from our own set of variables, plus the Taylor and Maor (2000) reflection variable. Since the forum is *the* tool used for knowledge building and interacting meaningfully with peers and teaching staff, the fact that the tool side and the conceptual side of the same coin are loaded inversely in the same dimension in the same group is highly interesting. In addition, the fact that the reflection variable is also highly loaded – the same loading value as in the first factor – and coupled with the forum variable might indicate that learners who agree that the course encourages reflection also feel that they did not sufficiently exploit the tool that was designed specifically for it – the journal. It should also be pointed out that the real use of the forum is not correlated with the learners' perceptions of its use.

Rotated Component Matrix[a]	Component			
	1	2	3	4
Frequency of use of the news	.388	-.136	.421	-.003
Frequency of use of the forum	.197	.088	-.133	-.674
Frequency of use of the chat	.127	-.143	.742	-.148
Frequency of use of the shoutbox	.129	.047	.693	-.093
Frequency of use of personal messages	-.128	.079	.383	-.409
Frequency of use of the calendar	-.108	-.061	.644	.150
Frequency of use of the journal	.146	.468	-.186	.134
Frequency of use of the library	.005	.005	.555	.307
Frequency of use of the module description	.123	.189	.493	-.040
Actual number of journal entries	-.069	.809	-.255	-.045
Actual number of forum messages	.014	.822	.088	-.169
Actual number of private messages	-.076	.570	.224	-.539
Actual number of shoutbox messages	.004	.555	.422	-.289
Constructive/ active learning	.840	.010	.126	-.124
Self-directed learning	.679	.020	-.243	-.130
Contextual learning	.691	.274	.009	.174
Collaborative learning	.694	-.061	.196	.144
Relevance	.517	.343	.321	.100
Reflection	.526	.106	-.124	.526
Interaction	.612	.390	.037	.329
Tutor support	.720	.247	.136	.274
Peer support	.466	.559	-.024	.245
Making Sense	.742	.246	-.041	-.061
Constructivism	.247	.402	.174	.504
Human resources organisation	.752	-.021	.075	-.027
Learning environment	.302	.527	.240	.086
Presence of teaching staff	.550	-.345	.171	-.114

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 8 iterations.

Table 83: Factor analysis (4 rotated factors) conducted on all variables

As we can see in Table 84, in the rotated solution, the first factor explains about 21% of the variance, the second 13.5%, the third, 11% and the fourth 8%. We forced a four-factor solution in order to maximize the explained variance of the first four factors.

Total Variance Explained

	Initial Eigenvalues			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.581	24.374	24.374	5.648	20.918	20.918
2	3.100	11.483	35.857	3.628	13.438	34.356
3	2.920	10.816	46.673	3.050	11.295	45.650
4	1.808	6.697	53.370	2.084	7.720	53.370
5	1.430	5.295	58.665			
6	1.342	4.972	63.637			
7	1.231	4.558	68.194			
8	1.105	4.094	72.288			
9	1.094	4.053	76.342			

Extraction Method: Principal Component Analysis.

Table 84: Variance explained among the four factors

We could extract nine significant factors (Eigenvalues > 1) in an unrotated solution and they explain 76% of the variance. The first four factors identify similar latent dimensions as in the

rotation four-factor solution. Each of the additional factors only explains between 4% and 5% of the total variance. They are "dominated" by isolated variables, that is, factor 5 by *frequency of use of the journal*, factor 6 by *frequency of use of the shoutbox*, *frequency of use of the library* and *presence of teaching staff*, factor 7 by *frequency of use* of *the module description*, factor 8 by *frequency of use of the news* and *frequency of use of the forum*, and factor 9 by *relevance*. It is also interesting to note which variables are loaded negatively, namely *use of the shoutbox* in factor 6 and *relevance* in factor 9.

This exploratory dimension reduction shows that only "socio-constructivist" and "real tool use" variables can be reduced to a single latent variable. Variables pertaining to the *perception* of how tools are used are correlated in intriguing ways among themselves and also with some conceptual variables. We shall discuss some bi-variate correlations in the following section.

The factor analysis has uncovered four major underlying variables among all the variables we have used. The first one measures all the conceptual dimensions of socio-constructivist learning (self-directed learning, collaborative learning, relevance, etc.). The second one measures the real use of tools and the learning environment. The third one measures how learners perceive their use of peripheral tools. And the last one identifies a dimension that includes negative perceptions of forum use and perceptions of constructivism and relevance. It is somewhat puzzling that the perception of tool use defines orthogonal (independent) factors with respect to the first factor that has high loadings for conceptual variables. The fact that learners' perception of their use of tools is independent of their conceptual understanding of the environment can probably be best explained by the fact that perception (as formulated in the questionnaire in terms of "never" to "very often") is a highly subjective matter.

11.7.2. Correlations

Let us now look at some bi-variate correlations. However, we should exercise some caution here. A bi-variate correlation only measures linear relationships and it can be influenced by other variables such as learner characteristics for which we have no data.

Since the factor analysis is a synthesis of the correlation matrix (Appendix 4), it is not surprising to observe a similar trend as the one observed in the factor analysis: all variables from the Dolmans *et al.* (2003) and Taylor and Maor (2000) surveys are correlated. They are also all correlated with our own variables, namely, constructivism, human resources organisation, learning environment and presence of teaching staff. Exceptions include: constructive/active learning, which is not correlated with constructivism; self-directed

learning, collaborative learning and making sense, which are not correlated with learning environment; relevance, reflection, interaction, tutor support, peer support and making sense, which are not correlated with presence of teaching staff; and interaction, which is not correlated with human resources organisation.

What is surprising here is the fact that Dolmans *et al.*'s (2003) constructive/active learning variable is not correlated with our own variable of constructivism. At first we concluded that our own construct was inappropriate, that it measured something else, but since the constructivism variable is highly correlated with relevance, reflection, interaction, tutor support and peer support, we changed our conjecture. It might simply be the definition of constructivism that varies. Dolmans *et al.*'s (2003) dimension of constructive/active learning emphasises the role of elaboration in the construction of knowledge, which they describe as follows: "Elaboration plays an important role in constructive learning. Elaboration can take several forms, such as discussion, note-taking or answering questions" (p. 432). By contrast, our own variable labelled "constructivism" is based on questions that emphasise the responsibility of the learner considered as a researcher in interaction with peers and teaching staff.

The other striking result is the lack of correlation between the learning environment variable - which mainly consists in measuring its collaborative and cognitive dimensions – and Dolmans *et al.*'s (2003) self-directed variable and Taylor and Maor's (2000) collaborative learning and making sense variables. Our conjecture regarding the absence of correlation between the actual implementation and the conceptual dimension of the learning philosophy is related to other findings reported in the design chapter (sub-sections12.2.2 and 12.2.3). These findings indicate that collaborating and becoming an expert learner represent another kind of learning that must be acquired besides building the knowledge and skills required to become interpreter trainers. In both case studies, the design must have been too weak to really support and sustain this dimension of learning, which would explain why these variables are not correlated as one would expect. The same conjecture can be made about tutor support and reflection. How can it be that reflection and especially tutor support are not correlated with the presence of teaching staff? The lack of correlation might be due to the fact that the meaning of "presence of teaching staff" was not clear to the respondents or else it might indicate that the design was not strong enough for learners to fully understand these two dimensions of learning.

Regarding the use of tools, whether we are considering learners' opinions about their use or their actual use, we notice the following correlations. In terms of learners' perceptions, the frequency of use of the chat and the shoutbox are correlated; the same holds for the shoutbox

and the calendar. In addition, learners' perceptions of how often they used the private messages tool is correlated with the actual number of private messages, and learners' opinions of their use of the journal is correlated with the actual number of journal entries. The actual number of forum posts is correlated with the actual number of journal entries, the actual number of private messages and the actual number of shoutbox messages. The actual number of journal entries is only correlated with the actual number of forum posts. There are only three correlations between tools and conceptual variables. Learners' opinions about how frequently they used the library are correlated with constructivism; their opinions about how frequently they used the module description tool are correlated with relevance; and the actual number of forum posts is correlated with peer support.

All these correlations reveal certain types of behaviour that make sense in the context of this study. The chat and the shoutbox are indeed often used in parallel. Typically, when two learners are going to have a chat meeting, the first who arrives on the portal logs onto a given chatroom and shouts in the shoutbox something to the effect of "Emily, I am in room 2 waiting for you!" The shoutbox is also used to reinforce the role of the calendar, particularly when deadlines are approaching, in which case learners tend to shout things like "the activity ends tomorrow, check our thread!" The high correlations between opinion and actual use for the journal and the private messages is discussed elsewhere, namely in Question F, and has served to identify different learner profiles. Correlations between the actual use of the forum and the other tools for which we have data of actual use confirm that knowledge building is related on the one hand to reflecting and on the other hand to communicating. Typically, learners will post a content-related message in the forum and then use either a private message or the shoutbox to inform their peers that they have done so. At the same time, they write something related to this post in their journal. The fact that the actual use of the journal is only correlated with the actual use of the forum confirms this tendency: cognition and metacognition go together hand in hand. Turning to the relationship between tools and conceptual variables, it is particularly interesting that the library and constructivism are correlated. This confirms the conjecture mentioned above that the constructivism variable from our own set of variables focuses on the learner considered as a researcher. As a matter of fact, it is in the library that learners find all the mandatory and supplementary readings for an activity.

The relationship between module description and relevance must reside in the fact that all activities, which refer to real life contexts, are described in the module description tool. Finally, it is interesting to note that the real use of the forum is correlated with peer support. Since the forum represents *the* place for knowledge building and meaningful interactions,

peer support must be understood as a way of reacting to peers' posts and building knowledge collaboratively. The fact that these two variables are correlated might shed a more positive light on our interpretation of the findings for issue 5 (Section 11.1), namely, Did peers stimulate individual participation in the community?

Two major groups of variables, highly correlated with each other within each of the two groups, have been identified by factor analysis. The first group includes variables measuring conceptual dimensions of learning and the second one is tool-oriented. The few variables that correlate between the two groups confirm that 1) the constructivism variable measures the learner considered as a researcher and 2) peer support and collaborative knowledge building are interdependent.

11.7.3. Cluster analysis

Finally, we carried out an exploratory hierarchical cluster analysis (cluster method = between groups linking of squared euclidean distances of z.scores) on the same variables to identify distances between variables and groupings. We can observe a similar pattern as the one uncovered by the factor analysis, i.e. a rotated component analysis (Figure 108).

```
                C A S E                    0         5        10        15        20        25
    Label                            Num   +---------+---------+---------+---------+---------+

CLUSTER 1: Conceptual dimensions and learning environment
   Contextual learning                   16   -+--------------+
   Interaction                           20   -+              +---------+
   Peer support                          22   ---------------+         |
   Constructive/active learning          14   -------+---------+       +-+
   Human resources organisation          25   -------+         +---+   | |
   Collaborative learning                17   ---------+-------+   +---+ |
   Tutor support                         21   ---------+           |     +---+
   Self-directed learning                15   -----------------+---+     |   |
   Making sense                          23   -----------------+         |   +-------+
   Reflection                            19   ---------------------------+   |       |
   Relevance                             18   -----------------+-------------+       +---+
   Learning environment                  26   -----------------+                     |   |
ISOLATED
   Frequency of use of the news          1    ----------------------------------+-----+   +-----+
   Presence of teaching staff            27   ----------------------------------+         |     |
CLUSTER 2: Use of library and constructivism
   Frequency of use of the library       8    -------------------------+-----------------+     |
   Constructivism                        24   -------------------------+                       |
CLUSTER 3: Actual use of tools
   Actual number of private messages     12   -----------+-----------+                         |
   Actual number of shoutbox messages    13   -----------+           +--------------------+     |
   Actual number of journal entries      10   -----------+-----------+                   +-----+
   Actual number of forum posts          11   -----------+                               |     |
ISOLATED
   Frequency of use of the forum         2    ----------------------------------------+---+     |
   Frequency of use of the journal       7    ----------------------------------------+         |
CLUSTER 4: Use of peripheral tools
   Frequency of use of the chat          3    -----------+---------------+                     |
   Frequency of use of the shoutbox      4    -----------+               +-----+               |
   Frequency of use of the calendar      6    ---------------------------+     +-------+       |
ISOLATED
   Frequency of use of the module description 9  ---------------------------------+       +-------+
   Frequency of use of private messages  5    ----------------------------------------+
```

Figure 108: Dendrogram using average linkage (between groups). Rescaled distance cluster combine.

If we choose a cut-off point at 15, we can identify four rather loosely related groups of variables. If we choose a more stringent cut-off point below ten, we wind up with a high number of clusters. “Rescaled distances” on the horizontal axis represent (dis)similarities between variables on a scale from 0 to 25. We labelled the first cluster *conceptual dimensions and learning environment* because it includes all the variables measuring conceptual dimensions from the Dolmans *et al.* (2003) and Taylor and Maor (2000) surveys, plus the learning environment. This grouping is consistent with the correlations reported above. The second group, *use of library and constructivism*, includes the two variables so-named and corroborates the conjecture reported above in the correlations section that in a constructivist perspective, learners are viewed as researchers. The third cluster, *actual use of tools*, groups together the four tools for which we have information regarding their real use. In the factor analysis as well, there was one factor that was highly loaded with these four variables and most of them are correlated. And finally, the fourth group, *use of peripheral tools*, includes variables measuring the use, in learners’ opinions, of three peripheral tools, namely the chat, the shoutbox and the calendar. Again, in the factor analysis, these three variables were loaded in the same factor and they proved to be correlated.

With a cut-off point at 15, we can identify four groups of variables that correspond more or less to the ones found in the factor analysis: 1) conceptual dimensions and learning environment, 2) use of library and constructivism, 3) actual use of tools and, finally, 4) use of peripheral tools.

11.7.4. Summary

This research question does not have the same status as the others and must be considered as an “additional question” that we wanted to address because we were interested in how the variables used to answer the main research questions were related. The three types of analysis reveal that there are four rather independent groups of underlying variables: the first one measures the conceptual dimension of socio-constructivist learning, the second one measures the actual use of tools, the third one measures learners’ opinions about their use of tools, and the fourth one measures a mixture of conceptual dimensions and perceptions of tool use. This analysis also revealed that some variables (such as perception of forum use) are weakly correlated with most of the others. In other words, while we can find dominant underlying latent variables and clustered variables, individuals seem to perceive and to use parts of the environment according to quite different “logics”, something that also became apparent from the cluster analysis performed for Question F (Section 11.6), i.e. the “average” group used

tools in a different combination (active use of the journal) than the “a lot” group, and showed differences in performance as well.

Chapter 12. Design rules

Section 12.1. The component model of activity-based training

This chapter aims at listing the design rules that have been derived from the conjectures identified in the findings to research questions. It also presents the design model that replaces the TSS framework.

Based on the findings reported in Chapter 11, it is obvious that the design of a tutoring support structure must be tightly coupled with other design issues. The TSS framework was replaced by a new, more comprehensive design model: The component model of activity-based training. This new model addresses issues related to five domains: learning design, actors involved, technology, design and innovation (Figure 109). It is contextually grounded and takes into account both initial conditions (constraints' analysis) and outcomes (evaluation of the entire training), leading to new decisions and changes in the design.

Design rules are organised by topic, classified according to the five domains of the component model of activity-based training. Each design rule is presented as follows: first comes the conjecture – in italics – that constitutes the basis of the design rule. The conjecture is a kind of hypothesis, grounded both in theory and in the findings of our empirical design studies. Second comes an explanation of the context of the design rule and how it could be implemented. Finally, the design rule is formulated - in a grey box. Design rules formulate recommendations about the design of blended group activity-based teaching-learning scenarios in higher adult education. As a whole, they represent a kind of pedagogical design theory that could be "implemented and experimented" in other similar blended course contexts.

Before actually listing the design rules, it may also be useful to consider who can adopt the role of course designer when it comes to choosing among these design rules and implementing them in a course design. Typically, there are two configurations. The first one consists in using a professional course designer, one with expertise in educational technologies but not necessarily in course content. In such a configuration, the technologies expert has to be paired up with a content expert, i.e. a teacher who is responsible for the course, to actually design the activities. Another configuration consists in having the teachers design their course, with or without the help of a professional from educational technologies.

In either configuration, either a person has both skills – educational technologies and content – or the "designer" is in fact a design team that embodies both skills.

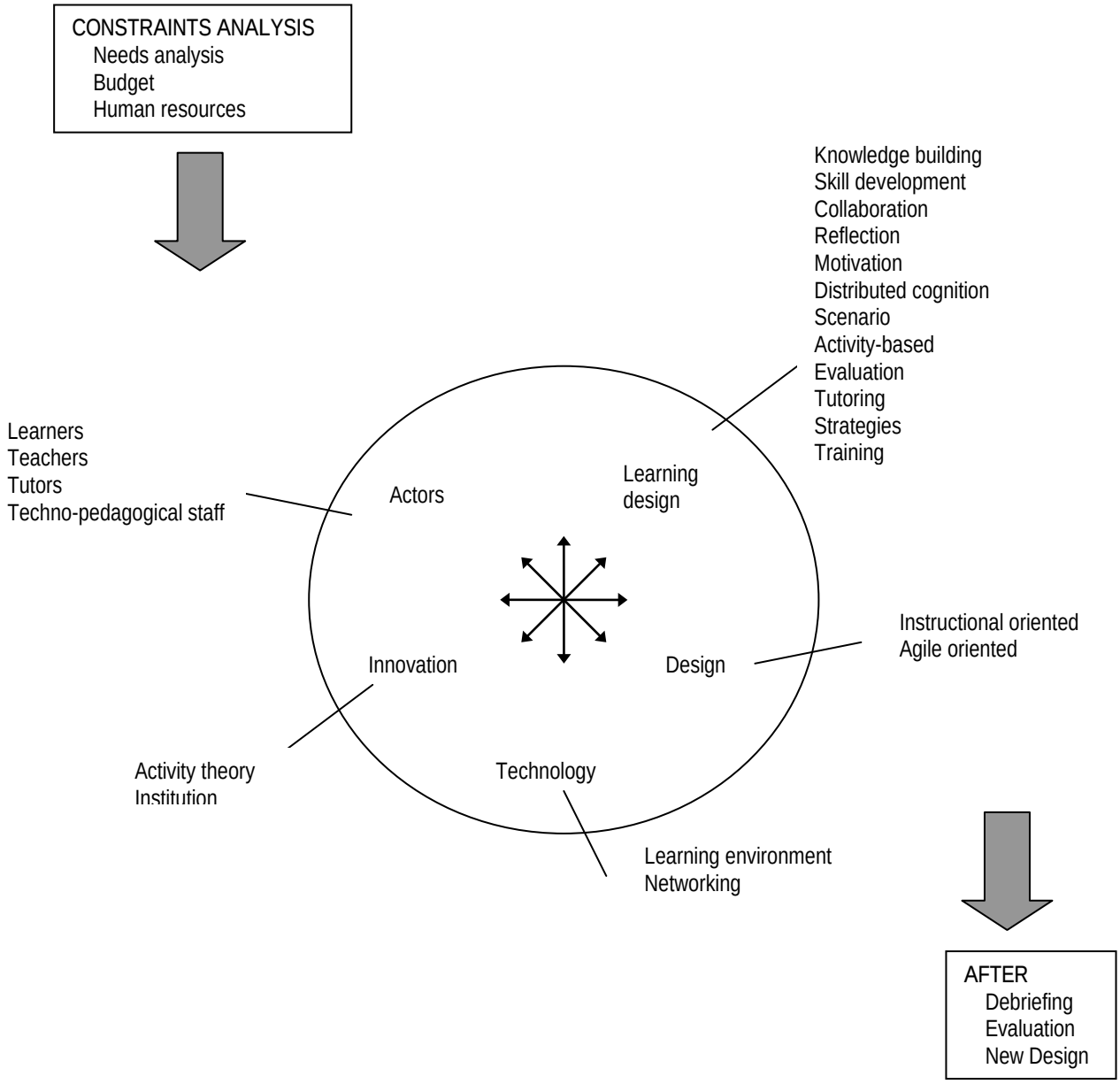


Figure 109: The component model of activity-based training

Section 12.2. Design rules pertaining to *Learning design*

The learning design domain refers to both learning and pedagogical issues. In a socio-constructivist context, learners are considered active knowledge builders in constant interaction with their environment and with the world, transforming both – themselves and the environment - in the process. The design rules we develop below are related to reflection, expert learning, collaborative learning, evaluation, tutor support, authentic activities and

training. These actually represent seven critical issues for the type of learning design we have implemented.

12.2.1. Reflection

When learners appreciate the design of authentic, constructivist activities, they do practise reflection.

One important dimension of learning is reflection, that is, a metacognitive activity that engages learners in thinking about processes and content. In order to promote reflective practice in the sense of the "reflective practitioner" when such practice is not already anchored in the culture, it must be scaffolded within the activity. Designers might start with some explicit constraining reflective practice exercise, such as having learners write a brief report focusing on specific aspects of an activity they have just finished. To ensure that learners complete this part of the activity (since they often consider it to be superfluous and see no reason to do it), it could count as part of their evaluation. General guiding questions, in addition to more contextual ones, could include: How did you organise your work? What would you do differently? What did you learn about both process and content?

Once learners become used to reflecting on their learning after-the-fact, it might be interesting to introduce reflective practice before and during action (Boud, 2001). How can you plan and regulate your learning? Once the practice of reflection has been implemented on an assignment basis and is firmly anchored in the learners' culture, it can be transformed into a "structured" journal (Varner & Peck, 2003). Such a journal would be guided by certain leading questions that would have to be addressed at particular moments, that is, at the beginning, in the middle and at the end of an activity. The reflective dimension cannot be considered as an "add on" but has to be carefully woven into the design of the activity.

Reflection must be scaffolded within the activity and considered part of the activity. Designers might start with some explicit guiding questions that will be addressed at the end of the activity. They can then progressively introduce reflection, along with guiding questions, at the beginning and in the midst of action, on an assignment basis. Once learners have recognised the added value of reflective practice, it no longer needs to be evaluated.

Reflection should be further developed and encouraged during the entire learning process in order to ensure that learners have fully incorporated it into their practice.

To promote reflective practice on the learners' part as described above, it might be interesting to have teaching staff undergo a similar reflective process. This mirroring experience can be

useful, first, for fully grasping how much time and effort structured reflective practice involves and second, for making connections between what is going on at the faculty's end and what is going on at the learners' end for the same activity. During the design of the activity and at the three key moments – beginning, middle, end – teachers and tutors could be asked to keep a journal addressing certain leading questions. Examples of questions could be: Did the kick-off of the activity work well? Did learners have difficulties starting the activity? If so, what is the source of the difficulty: formulation of recommendations, background culture, etc.? Leading questions for faculty should be related to the leading questions designed to guide learners' reflective practice. It might be good for members of the teaching staff to share their journals so that they can follow what is going on in their colleagues' activities and may even change the design of their own activities accordingly.

While designing the reflective architecture to be developed for the learners, designers can also develop a similar reflective architecture for the teaching staff. This reflective practice can take the form of a journal with leading questions to guide the reflective process at the beginning, in the middle and at the end of the activity.

12.2.2. Expert, self-directed learning

Becoming an expert self-directed learner can be achieved through active learning when the latter is successful and well supported.

Becoming an expert self-directed learner depends on developing certain learning skills. These skills allow learners to plan, monitor and evaluate the learning process so that they can find and select the resources and information they need to complete a given activity (Dolmans *et al.*, 2003). Activity-based learning creates a learning culture in which learners are responsible for their own learning, and thus constitutes a fertile ground for developing expert learners (Hannafin *et al.*, 1999). Activity-based learning needs to be combined with learner support mechanisms and reflective practice if it is to be successful in developing their capacities for regulation and self-direction (De Lièvre et *al.*, 2006). At first, it might be necessary to scaffold the process, showing learners how to plan the learning enterprise realistically (by, for instance, putting work packages together, taking into account external and personal constraints, etc.) and how to monitor the entire learning process.

If designers want to create a learning culture in which learners are responsible for their own learning and are able to plan, monitor and evaluate the learning process, then developing activity-based learning activities, such as authentic activities, is a good way to go about it.

12.2.3. Collaborative learning

The way a learner interacts as well as the peers with whom s/he interacts influence the learner's perception of faculty's and peers' support for collaborative learning.

The perception of peers' and faculty's support during collaborative learning depends on the quality of the interactions, which is person-dependent.

In designing collaborative activities, it is important to 1) script the interactions (Dillenbourg & Tchounikine, 2007) so that learners can follow a pattern that will lead to favourable collaborative learning, 2) structure the interactions so that they are meaningful (Woo & Reeves, 2007). In the context of more open-ended loosely scripted designs for advanced adult training, it is very difficult to predict if a script will be enacted effectively, but it can be used as a blueprint for desired interactions. This blueprint might be a necessary guide for learners who are not familiar with collaborative learning and/or not sufficiently aware of the importance of equal participation among members of the group. Equal participation here refers to sharing the responsibilities that the group is accountable for (management, meeting deadlines, producing content, etc.). Additionally, on the social and content levels, participating within a group entails encouraging the other members to produce, regulate and react to their peers' productions. To make groups fully aware of this repertoire of accountabilities, it might be useful to suggest a "collaborative script" that makes this repertoire visible so that learners can enter the activity in the same way as they enter a role play. As the activity unfolds and depending on the degree of maturity of the learners with respect to the group, they can decide to leave the script out (i.e. to fade the script) or to play it out to the end.

To design collaborative activities that promote positive feelings among learners, structuring interactions and scripting the activity are necessary steps, even if learners only use the script as an example and/or fade it out.

The relationship between action, interaction and the group affects how learners perceive their peers' stimulation of individual participation in the community.

Designers need to conceive the collaborative activity as a meeting point of several tensions. Based on Wenger (1998) and the findings of this research, it is important to achieve a balance between the four points summarised in Figure 110.

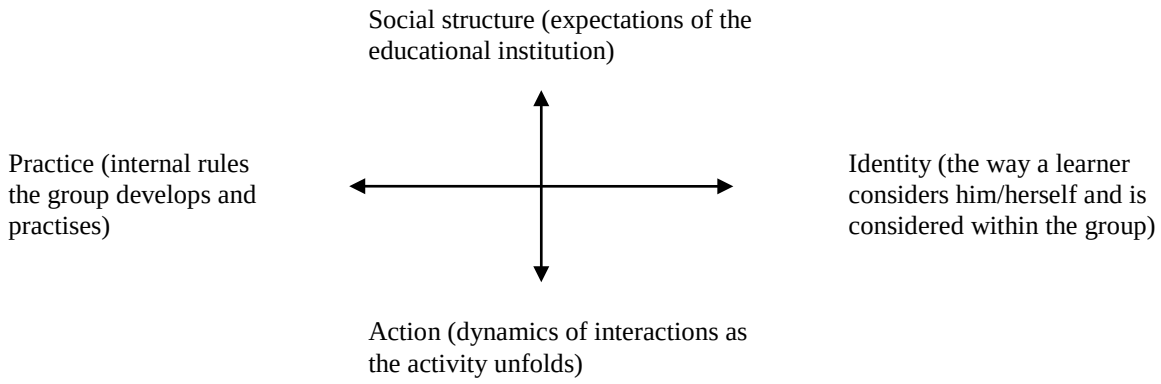


Figure 110: Balance between different forces within a group

If there is a disequilibrium between social structure and action, this might lead either to overemphasising action, forgetting about the institutional goal, or conversely, overemphasising the expectations of the institution without being sufficiently creative and active. Similarly, overemphasising identity to the detriment of practice may result in uneven participation; at the same time, if practice is not grounded and shared mutually by all members of the group, this will also have an influence on participation. It is thus important to be attentive to the four dimensions and to be ready to have a mediator intervene if necessary; such an intervention would help the group to become aware of the disequilibrium and remediate it so as to be able to focus on the activity and not be hindered by a defect in the group structure and process. Since creating groups and working with new peers is very laborious, it might be a good idea either to pre-establish groups that will work together for, say, two modules, or to allow learners to form their own groups but for a longer period than just one activity or one module.

Designers must at the same time facilitate processes of collaborative learning and optimise its' productive potential. To form a group that is up and running, backed by solid internal rules, designers should 1) emphasise that within a group there must be a balance between four forces (social structure – action – identity – practice), and 2) recommend retaining the same group for a certain period of time, which would allow participants to take advantage of the stability in the group's organisation and concentrate on action.

Learners must participate actively from the very start if faculty want to ensure equal opportunity in the knowledge building enterprise.

In order for all learners within a group to have the same legitimacy to suggest ideas, the level of engagement of the members should be more or less equal.

To ensure that learners participate actively, it is important to offer them different ways of participating, according to their own learning preferences.

Visibility plays an important role in learners' participation. It is thus important to find some artefact to make a learner's participation visible to the community.

When all members of the group are highly involved, a group leader does not seem to be necessary, since the sense of responsibility towards the group is shared by all.

In order to have all learners invest equally in a collaborative activity and thus acquire more or less as much knowledge and skills as any other learner involved in the course, it is important for the entire community to know how much a learner is involved within his/her group. If, for instance, a learner remains inactive for 48 hours without having forewarned others, or intervenes just to say something like "You have done a great job; I will react to it in the coming days," somehow the system should communicate this to the community. Also, in order for learners to start on an equal footing within the group, it is fundamental for them to contribute actively. Contributing actively is also a way for a learner to build an identity within the group that is respected by all, and as a result his/her suggestions and ideas for managing an activity acquire a certain legitimacy in the eyes of the other members of the group. If a learner does not contribute from the very start to his/her group, this legitimacy might be challenged and his/her suggestions might be rejected.

The creation of an artifact to provide feedback on learners' participation could be a determining factor. The artifact could take the shape and role of a barometer that learners could access to see how they are doing. The artifact would display where learners are situated, based on the number and quality of their interventions (Figure 111). This regulation/feedback system should be beneficial for both reflection and self-regulation. It is also a source of pressure on each group member, so that no single learner can avoid participating or be carried by the other members of the group. If a learner observes the "normal collaborative rules", s/he will not feel any pressure, and if a learner thinks s/he will be able to do the activity with minimum effort, s/he will very soon discover that this is not feasible.

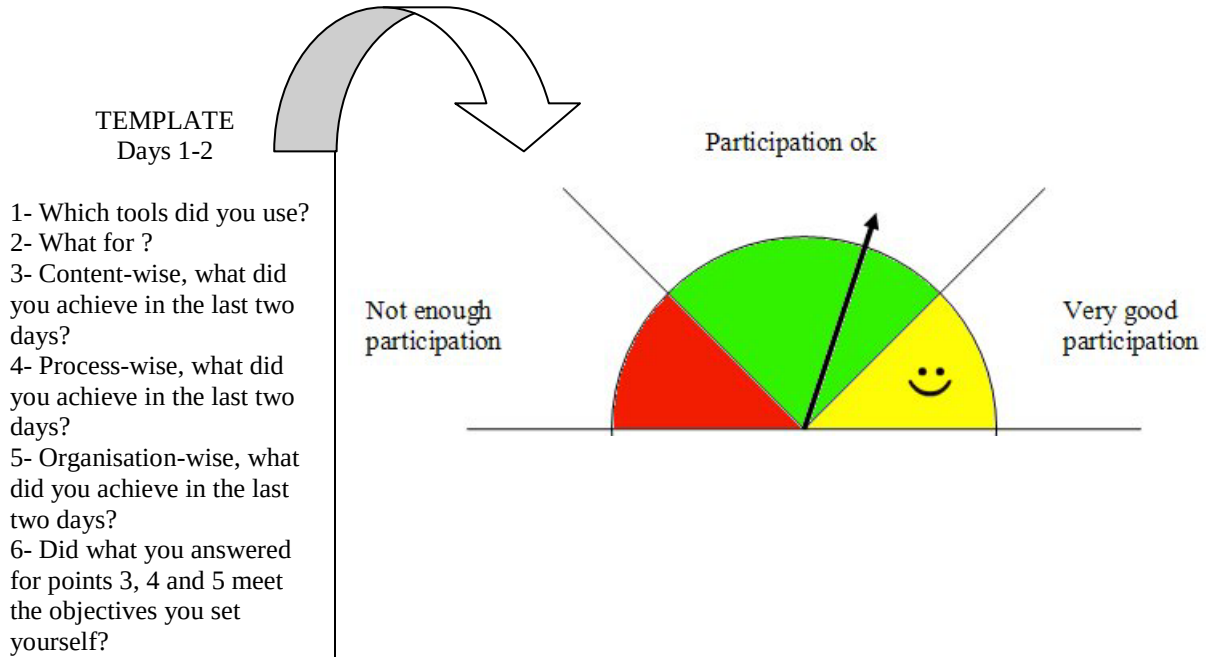


Figure 111: Visibility of learners' participation in collaborative activities

The artifact should take into account learners' use of different tools, be it synchronous or asynchronous. The artifact could be based on a report filled out at regular intervals (i.e. every two days for an activity that lasts 6 to 8 days). Learners would be asked to respond to questions on a template (Which tools did you use in the last two days? What did you do with them? What did you achieve in terms of content? What did you achieve in terms of process? What did you achieve in terms of organisation?). Answers would be processed semi-automatically and the results for individual learners on those two days would be displayed on the barometer. This system would combine reflection and self-regulation and would allow faculty to track how learners are evolving in the activity. It could thus be closely related to tutoring.

To ensure active participation, sharing of responsibilities, self-regulation and reflection, designers could set up a scenario in which learners have to fill in a template at regular intervals during an activity. The responses to this template would be processed semi-automatically and would allow all learners to see where a particular learner stands within the activity.

The modality (distance or face-to-face) in which group members work together has an influence on the group dynamics, be it positive or negative.

In a distant learning program, it rarely happens that all learners are "alone" somewhere on the planet. Often there are two or more learners who reside in the same area, and the temptation to work together during a collaborative activity is very strong. While it is important to encourage learners in the same geographical area to share experiences and interact with each other, it

might not be advisable to have them work in the same collaborative group, especially if the group includes other members who are scattered over different areas. As a matter of fact, when some members of the group work face-to-face, it might pull the entire group forward, but it might also split the group into two smaller groups with different paces. Thus, designers should have faculty form the groups beforehand, making sure that the distant/face-to-face parameter is appropriate to the activity at hand. Alternatively, designers can allow learners to form their own groups, but only within certain limitations. For instance, one limitation would be "Do not pair up with a peer that you can normally talk to in a face-to-face exchange. You are encouraged to share and work with this peer, but not in the same collaborative learning group."

Designers must pay attention to group formation, either by encouraging faculty to form the groups ahead of time or by establishing certain limitations on learners' choice of peer group. In forming groups, it is important to ensure that none of the members have the possibility of working face-to-face with another member.

The size of the group has an effect on learners' participation. A group of four might not be ideal for a high level of participation on the part of all members of the group.

Regarding collaborative activities, designers must decide how many learners a group should include. This is a very difficult task, because the decision has to consider both the optimum learning environment for learners and the optimum teaching/coaching environment for faculty. Thus the group size usually varies between two and four peers. Designers must make their decision in accordance with the learning objectives on the one hand and the available human resources on the other.

Decisions regarding the size of the group have to be made in accordance with 1) the activity, 2) the learning objectives and 3) the coaching possibilities.

Early planning of the learning enterprise, brainstorming how to handle the activity and getting organised within the group before it starts have a positive influence on the learning outcomes.

Travelling affects group work and some advance planning and coordination is needed.

Designers must stress the fact that activities are conceived for expert, self-regulated learners who know in principle how to plan, monitor and evaluate the learning process. They can draw learners' attention to the importance of getting organised very early and deciding as a group how to handle the activity before it actually starts. If a group has already adopted its

procedural rules and has agreed on a plan of action, taking into account professional or other constraints of the group members, it will avoid being late or discovering in the midst of action that one member does not respond for a few days because s/he is en route without access to the Internet, etc. Advance preparation both at the group level and at the activity level has a positive impact on learning. It is thus important for designers to allude to an upcoming module/activity about a week before it starts, reminding learners to prepare for that module and maybe even inserting some sort of buffer in the module learners are currently working on. For example, between two activities, there is usually a day scheduled for faculty to provide feedback. Learners could be asked to use this day to get organised for the next module. After this day, they return to the feedback for the current module and proceed from there on. Learners could be reminded of the advantages of early planning and be asked to use this day to get organized for the next module. After spending the day in the "next activity", learners could return to the activity they were working on, appropriate the feedback received from the teaching staff, and discuss it to consolidate the knowledge and skills they are building. Once this activity is over, they can start the next one without having to bother with planning issues, since they already dealt with such issues beforehand.

Learning has to be viewed as a spiral and not in linear terms. Designers must allow learners to go back and forth in their learning enterprise, navigating across modules and activities. This movement has to be carefully woven into the design and is particularly relevant for advance planning and feedback.

12.2.4. Evaluation

Given the importance of formative feedback in the learning process, it should be better integrated into the design of the activity.

Formative feedback should not come after the activity is over. It is striking that all activity diagrams indicate that final feedback was delivered only after the official closure of the activity. In a constructivist design, learners' knowledge-building should be central (Boud & Falchikov, 2006). In the typical pattern of production, feedback, new production, feedback, and so on, it is particularly important for learners' development to receive feedback and to integrate it in order to produce something that is more focused, more to the point. With two or three feedback "rounds", learners should achieve a satisfactory level of production. The problem in this pattern resides in the final feedback round, which is usually delivered at the end of the activity, when the next one has already started. This last feedback, and particularly the reaction to it, is not given the status it should have in a constructivist learning design. To

ensure that learners take full advantage of the feedback, designers could conceive the following pattern for an activity. First, learners produce and then receive feedback from faculty. They produce again / continue producing in the light of this feedback and receive feedback from a peer group according to a grid that has been specifically designed for this stage of the activity (i.e. Have you taken faculty feedback into consideration and in what respect can you see the results? etc.). In the light of this feedback, learners produce / continue producing and deliver the final product. Then, while waiting for faculty to provide feedback, learners are asked to write a report on how the activity unfolded, addressing some guiding questions (see the section on reflection above). To debrief the activity, a discussion on both the feedback and the report could take place, which would also help learners to make links with the face-to-face part of the activity. A sample scenario of learners' tasks is summarised in Table 85 below. This is only one possible scenario that can be easily adapted and customised.

Learner's tasks	**Day 1-2**	**Day 3**	**Day 4-5**	**Day 6**	**Day 7-8**	**Day 9**	**Day 10**
Production	Read instructions and produce 1st draft.		Integrate faculty's feedback and produce 2nd draft.		Integrate peer group's feedback and produce final version.		Discuss feedback and reflective report. Build a bridge with the face-to-face part of the activity, if any.
Feedback		Wait for faculty's feedback.		Provide a peer group with feedback on its 2nd draft, according to a grid.		Wait for faculty's feedback.	
Reflection	Fill in their journal, addressing guiding questions, i.e. How can you plan the activity? Etc.		How do you organise your work? Does it lead to the expected learning outcomes? Etc.			Write a report addressing guiding questions, i.e. What did you learn about both process and content? Etc.	
Collaboration		Answer "artifact" questions, i.e. Which tools did you use ? What did you do with them? Etc.		Answer "artifact" questions, i.e. Which tools did you use? What did you do with		Answer "artifact" questions, i.e. Which tools did you use? What did you do with them? Etc.	

				them? Etc.			
Organisation		Get organised for the next activity/module. (Grounding the group.)				Get organised for the next activity/module. (Grounding the group.)	

Table 85: Example of the multiple levels of an activity for learners

Feedback is a crucial element for learners' development. It has to be integrated in the activity so that learners can fully exploit it, understand it and build on it. Final feedback and debriefing should occur before the activity officially ends. To free up time to integrate the final feedback in the activity, learners need to develop reflective and monitoring skills. They must not only concentrate on the activity, but also look back on it, with a critical eye, using the skills of a "reflective practitioner". They also need to look ahead, towards the next activity, preparing how they will coordinate their tasks within the group, planning their work, etc., so that they will be ready to plunge into the heart of the activity from the very start.

Summative evaluation, knowledge building and reflective practice should be well coordinated.

The scenario above (Table 85) is an example of how multiple tasks at different levels – cognitive, reflective, collaborative and organisational – can be integrated in the same activity. In this scenario, summative evaluation is missing but can be introduced if needed (Figure 112). If it is needed, it has to be carefully designed to be fully integrated with formative evaluation and reflective practice (Boud & Falchikov, 2006). Of course, a set of criteria needs to be identified and communicated to learners beforehand. Summative evaluation can be carried out in different ways. One possibility would consist in assigning greater weight to the first two levels – cognitive and reflective – and less to the last two levels – collaborative and organisational. For instance, the cognitive and reflective levels could represent two-thirds of the grade and the collaborative and organisational levels only one-third. With this suggestion, grades would be assigned individually rather than collectively, and faculty would have to justify why members of the same group received different grades. If one prefers to give the same grade to all members of the group, the grade could be a combination of two components: the first one would target the cognitive level and would represent two-thirds of the grade; the second one would address the reflective, collaborative and organisational levels and would represent one-third of the grade. Adding the two components would result in individual grades, but the collaborative product would be assigned a single grade for all members of the group.

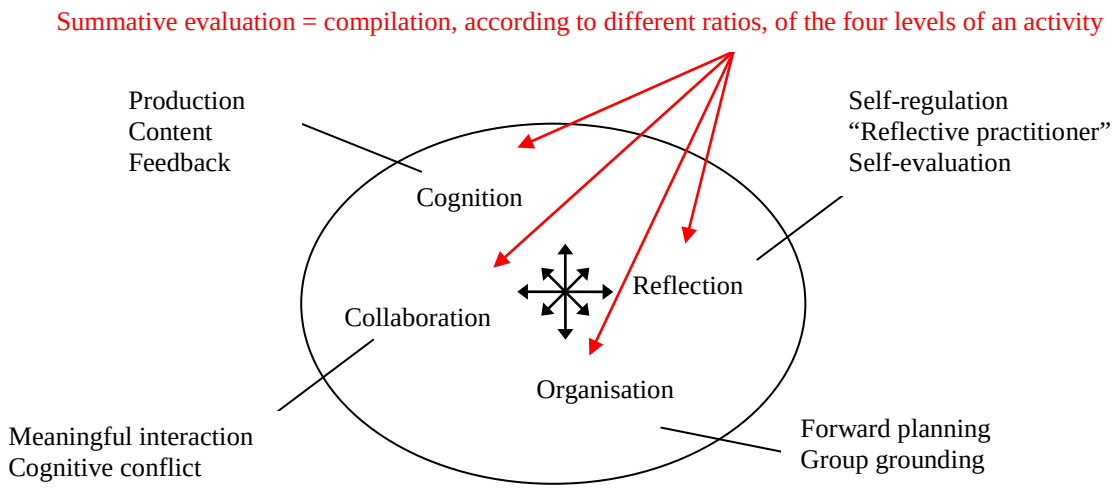


Figure 112: Integration of summative evaluation into the four levels of an activity

Summative evaluation, if required for institutional purposes, must be fully integrated with formative evaluation and must take into account the different levels of an activity: cognitive, reflective, collaborative and organisational. Course-level learning outcomes will determine the ratios to be assigned to these levels in summative evaluation.

12.2.5. Tutor support

Tutor support is a determining factor in learning. It is thus fundamental to give it the place it deserves in the design process.

Learner support must be clearly thought out beforehand, during the design process, if it is to be implemented effectively and efficiently. All sorts of questions need to be addressed: What kind of support will be needed? Mostly for the content level? Or support related to regulating collaborative groups? These are only two very different examples of questions that designers will need to answer. The kind of support, the quantity, in terms of both pedagogy and human resources, and how it will be delivered concretely throughout the course must be determined ahead of time (Thorpe & McAteer, 2001). For instance, if the need for support changes as learners become more familiar with the learning environment, will a fading process be built into the overall learner support architecture (Wood *et al.*, 1976)? Most probably some parameters of learner support will remain the same throughout the course – those referred to as "traditional tutoring features", such as administrative support, etc. – while those related to learning will change in parallel with the learners' development (Packham *et al.*, 2006; Barker, 2002; Tait *et al.*, 2002).

Tutor support for learners has to be thought out and designed in advance, at the same time as the design of activities, and must take into account constraints and choices related to both

pedagogy and human resources. Tutoring has to be fully embedded in the design of the activity.

12.2.6. Authentic activities

By engaging in authentic activities, learners generate knowledge and skills that interest them and that they can value and transfer to their professional practice. In addition, authentic activities are highly motivating.

To motivate learners and to build a bridge between learning and learners' professional context, authentic learning activities, because of their ill-defined, complex and real-life nature, provide a challenging terrain for learning (Herrington *et al.*, 2003). In creating such activities, designers privilege case studies and problem-based learning taken directly from or inspired by the learners' professional reality, after they have clearly defined the subject-specific and transversal skills and knowledge that learners should acquire from the activity. At the end of the activity, the debriefing session should not only confirm whether the previously identified skills have been acquired but also provide an opening onto different but similar professional situations that can stimulate learners' transfer capabilities.

Designers determine the subject-specific and transversal skills and knowledge to be acquired through a given authentic activity. They select a case study that fits the purpose or develop some problem-based learning activity if more appropriate. The debriefing session will determine whether the previously defined skills and knowledge have been constructed and can be considered acquired. It will also stimulate learners' transfer capabilities, by suggesting similar situations where they could use these same skills and knowledge.

12.2.7. Training – Professional development

Facility in using the portal develops gradually and adaptive training should be available to support faculty on their path from novice to expert users of the portal.

As faculty acquire expertise, designers can fine-tune the training and introduce innovations.

It is crucial to train faculty, and particularly teachers, to the learning environment and show them how teaching and learning can be implemented in a distant or blended environment. We suggest that such training be carried out gradually. First, start with some very basic training, focusing on how to USE the learning environment. Once this is fully mastered, provide a second level of training, focusing on how to PRODUCE in the learning environment. And

finally, introduce the third level, focusing on how to CREATE and INNOVATE in a techno-pedagogical environment.

Faculty training should be adaptive and designed in three phases: 1) learn how to use, 2) learn how to produce, and 3) learn how to create and innovate.

Teachers first need to grasp the essentials of distance teaching in order to be able to delegate tasks to tutors.

Since teachers are reluctant to delegate tasks to tutors when they have never taught in a distance setting, it might be useful to train them in blended or distance teaching pedagogy in different steps. Designers could imagine the following training steps: 1) Start with an overview of distance/blended education and the range of possibilities and possible activities that can be implemented. 2) Learn how to choose the learning orientation and how to design activities in accordance with that orientation. 3) Learn how to interact with tutors while designing the activity, during the activity as it unfolds, and during the debriefing session following the activity, with a view to making improvements for the next edition. These three steps must be undertaken both for the face-to-face and the distant parts of the activity. 4) Find some mock learners to try out the activity in a "real setting" with the techno-pedagogical advisor closely observing the interactions between teachers and tutors, faculty and learners, and among learners. 5) Debrief with the techno-pedagogical advisor on how the activity worked, both for the teachers and tutors and for the learners. 6) Revise the activity and the teaching scenario according to the results of the debriefing session, and then implement the activity with the real audience. 7) Debrief again on how the activity worked, both for the teachers and tutors and for the learners, and revise it for the next edition accordingly. While steps 1 to 3 provide an introduction to distance/blended learning from a theoretical perspective, steps 4 to 7 provide field training.

To optimise the work of teachers and tutors, faculty training should be carried out in seven steps, some of which are more theoretical and introductory while others are more practical and field-oriented, thus taking them from the basics of distance/blended learning to actually teaching together with the real audience.

Training tutors without training teachers in tutoring is not effective.

Both tutors and teachers need specific training and on top of that some training on how to work together.

Training faculty in pedagogy is fundamental. As mentioned above, teacher training should contain different steps, ranging from an introduction to distance teaching and learning to creating activities and working with a tutor to "deliver" them. In parallel, tutors should be trained in tutoring. Typically, tutor training would include an introduction to the types of tutor and pedagogical strategies, the different types of roles, and the modality and key moments for intervention.

Then, on top of this specific training, teachers should receive an overview of what is going on in the tutor training sessions and reciprocally, tutors should receive an overview of what is going on in the teacher training sessions. Finally, it is important for both groups to receive training on how to work together and to invent creative scenarios in which they can enact the roles they are going to play.

It is important to provide teachers with a synthesis of what is going on in the tutor training sessions and vice versa. Once both groups have been trained and received a summary of each other's training, they can start developing scenarios of how to work together.

Training in guiding small groups is important for faculty, particularly when a learner in the group proves to be less motivated.

Collaborative learning is recognized to be complex. It is thus important for faculty to be trained in guiding small groups. This training should typically address questions such as: How can one manage a group when one member does not contribute? How can one encourage this member to contribute? How can one manage a group where one member takes too much place and does not let other members express themselves? How can one manage a group with different cultures, when certain attitudes mean different things for the different members of the group? What about the communication protocols within the group? What about the internal rules the group has explicitly or implicitly adopted? Do they constitute a sound basis for working and learning? As the literature attests (Dolmans *et al.*, 2003), guiding small groups is a difficult task and faculty training should be designed and adapted to the specific needs of the target audience (i.e. the learners in the program) and be based on a selection of appropriate resources.

Training faculty in guiding small groups that have to work collaboratively is a determining factor in the quality of the collaborative product. Training should be designed to take into account both the faculty's and the target audience's experience with collaborative learning.

Section 12.3. Design rules pertaining to *Actors*

In a teaching/learning enterprise, many actors are involved, some of whom are more in the foreground, others in the background. The design rules listed below address issues related to the organisation of human resources.

12.3.1. Organisation of human resources

If the organisation of human resources is to be supportive, it must address at least the following three dimensions: 1) the actual organisation of the actors involved, 2) the training of the teaching staff, and 3) the respective roles of the teacher and tutor.

It is important, particularly for tutors, to ensure consistency between the roles entrusted in the online component and the roles in the face-to-face component.

Once designers know the number and the composition of available human resources, they can design a scenario, assigning roles and planning the interventions of the different actors in time. The types of actors identified include, as a minimum, teachers, tutors, a techno-pedagogical advisor, a technical support provider, and, of course, learners. The designer's role can be subsumed under the interactions of the techno-pedagogical advisor, the technical support person and the teachers. The organisation among them can take different forms, depending on the activities and overall learning orientation of the course. To give an example of two different types of organisation among teachers and tutors: one can imagine, in a scenario with content tutors, that the teacher and tutor take on the exact same roles, or alternatively, they could work in a helpdesk-like structure in which the tutor is in the front line and either answers learners' questions or forwards them to the teacher, who is in the second line. Several different scenarios of roles and organisation among actors must be imagined to clearly define a basis on which to work. This basis should stipulate not only who to turn to for a particular type of question, or what each actor is responsible for, but also the maximum wait-time for a response. If a teacher asks a question, for instance, it is important for him/her to receive an answer from the skilled person – i.e. the techno-pedagogical advisor - within the following 24 hours. If the course is composed of an online and a face-to-face part, it is very important to ensure that the roles are consistent across the two modalities. For instance, in a distance mode, the technical support person plays a determining role because s/he maintains the entire system and addresses any technical problem; it is thus important to include him/her in the face-to-face component in one way or another, as, for example, during a social event when all the actors meet. It is also important to ensure consistency in the tutor's

role across both modalities, and not, for example, have him/her work on an equal footing with the teacher during the online component and then just come in for clerical tasks during the face-to-face component.

In designing a human resource support structure, it is important to identify the actors needed, define their roles precisely in both the face-to-face and online components, stipulate what they are accountable for and indicate the time span in which they are supposed to respond to questions or problems. The actor roles should include, at the very least, teachers, tutors, technical support, techno-pedagogical advisor and learners. It is of course possible that a single person could have the skills to perform several roles.

Section 12.4. Design rules pertaining to *Technology*

In an educational context, technology is used to complement pedagogy. Educational technology addresses the question of how technology can be used to serve and enhance learning. The design rules identified below address issues related to the learning environment and how to design both parts of an activity, the face-to-face component and the online part.

12.4.1. A socio-constructivist learning environment

A socio-constructivist portal with its social and written dimensions is a source of enhanced teaching because it evokes positive emotions on the part of faculty. Teaching staff find it motivating to teach with a socio-constructivist portal and thus invest additional personal effort.

In order to have faculty fully involved and interested in a distant socio-constructivist learning environment, it is important that they have positive attitudes towards that environment. The two most valuable features of teaching with the portal are the social and written aspects. While the social aspect facilitates sharing and offers teachers opportunities to discuss any content / process / pedagogical issue with colleagues, it can be a huge innovation for those who are used to teaching on a “stand alone” basis. Sharing one’s insights on teaching with colleagues and discovering other ways of teaching and reacting to learners’ demands are a source of enrichment and professional development. Closely associated with the dimension of reflective practice, this kind of learning environment is undoubtedly a significant source of pedagogical innovation.

Designers must provide spaces dedicated to teachers. The minimum consists in creating a forum where teachers can share their views, ask questions, and exchange with their peers.

Designers can create more elaborate structures (spaces adapted for sharing learning materials, for example) in accordance with the users' needs.

The written dimension of the environment is also a rich source of interest, because it offers a way of structuring interactions, retrieving knowledge, and building from there onwards. Interacting with others in a written format allows participants to access the entire pattern of interactions at any moment, offering a complete view of the constructive/learning process. The possibility of reviewing the interaction, going back and forth through it, is also an excellent basis for reflection. Finally, the asynchronous nature of these written interactions allows participants the time to sit back and think about how to formulate their answers. But even with this "buffer for reflection," interactions occur in rapid succession, which allows participants to keep the ball rolling without loosing momentum.

Faculty should be encouraged to explore the different dimensions of written language as a means of interacting with learners and their learning enterprise. Written interactions promote traceability, structure and reflection.

12.4.2. The learning environment

As teaching staff gain experience in using the portal, they begin to develop a more integrated view of the portal as a learning environment, in which tools are seen as complementary.

The more faculty become used to the portal, the more they tend to view it as a single entity in which tools complement each other. The shift from a perspective that focuses on each tool separately to a perspective that considers the learning environment as a whole has consequences for the way teachers design their activities and interact with tutors and learners. The more experience faculty acquire, the more activities become integrated into different tools, even if some of them, such as the forum, retain a more privileged place and support the most important part of the activity. The forum has this particular privilege because it is the central place for negotiating meaning and building knowledge. To make faculty aware of the difference, it might be interesting to have them compare how an activity is performed from each of the two different perspectives (i.e. when tools are singled out individually versus when the learning environment is considered as a whole) and the consequences of each of these perspectives for teaching and learning. In the first perspective, it is difficult to have learners work on the different levels of the task – cognitive, reflective, collaborative and organisational – because this is not embedded in the design of activities and tools have not been developed from such a perspective.

Designers should help faculty widen their use of tools from the very start so that they will come to see an activity as something that is constructed and unfolds simultaneously at different levels – cognitive, reflective, collaborative and organisational.

Within a given learning philosophy, if the learning environment includes tools that allow faculty and learners to perform activities, the overall design should be considered successful.

In designing a learning environment, the first step is to adopt an orientation to learning, second to create scenarios for activities, and only then to choose the learning environment, adapt it if required and develop appropriate tools. It is important to follow the steps in this order and not to reverse the procedures. The learning environment must serve and empower the chosen learning philosophy (Jonassen *et al.*, 2007). Tools must complement each other in order to favour teaching and learning at the different levels of an activity. The learning environment must support the two communities of practice (faculty's and learners') and facilitate meaningful interaction within and between them.

For the design of a learning environment to be successful, it is important to begin with the choice of a learning philosophy and then to create scenarios for activities. From there on, designers can benchmark existing products, select the most appropriate one and customise it to address the needs of the faculty and learners.

The written aspect of distance learning and the framework provided by the portal do have an influence on teaching and learning.

Some limitations are inherent in the framework. Face-to-face teaching, for instance, is usually associated with a classroom setting, and this is the norm even if a teacher occasionally takes learners out of the classroom. Distance teaching, on the other hand, is normally associated with writing. Most interactions occur in the written mode even if a teacher occasionally immerses learners in a 3D virtual world, an audio world, etc. The norm of using written language has an influence on teaching and learning. Interventions on the part of both the learners' and the faculty require more time and effort because of the permanent aspect of writing. They are more extensive – all learners must participate – more structured, and require more work on the part of the faculty to provide feedback. Hence, while the written mode has a positive influence on learning outcomes and is more enriching in terms of teaching, it is also more time-consuming for both learners and faculty.

Face-to-face teaching is associated with a "traditional" classroom setting and is subject to its

constraints. In the same way, distance teaching is associated with the written mode. Written interactions entail more structure, greater participation and more time spent on the teaching/learning enterprise.

In our study, learners used fundamental tools like the forum, the course description, etc. most extensively, and also demonstrated their learning preferences for more peripheral tools like the journal, the chat, the shoutbox and the personal messages tool.

In an activity-based learning environment, some tools are more central – i.e. the forum in our study, or the wiki in a writing-to-learn design context – and if learners do not use them, they cannot perform the activity. Some tools, on the other hand, are less central and allow learners to choose a personal orientation in how they conduct the activity. Learners may also use some tools outside the environment if the tool fulfils their needs (i.e. talking via skype). Designers must ensure that learners do not all function in the same way and should promote different learning strategies that appeal to different types of tools. Thus it is important to conceive different ways of completing an activity, offering a variety of peripheral tools that learners can combine with central tools to best match their learning preferences and enhance their learning. For example, one learner may use the forum with the chat and the shoutbox while another learner may prefer to use the forum with skype to exchange with his/her peers. Various ways of working with these two different tools can be imagined. One scenario would involve asking for a chat meeting in the shoutbox, then participating in the chat and finally summarizing what has been decided and discussed in the forum. Another scenario would involve posting a draft in the forum and then discussing it in the chat. And so on.

Designers should identify a set of central tools that have to be used to perform the activity. In addition, they should provide learners with a wide variety of peripheral tools that they can combine with central tools in accordance with their needs and preferences.

The potential of a C3MS portal to support a socio-constructivist philosophy of learning has been attested.

A portal of the C3MS type provides all the features – principal tools and peripheral tools – that are needed to conduct an activity-based course. In addition, extensions can be added if needed. The portal also affords the possibility of designing and integrating a tailor-made tool. Of course, this requires programming skills and time, but if a specific tool is needed, one can be developed, and this is a tremendous advantage.

Designers should always give preference to a learning environment that can be further developed and adapted.

Section 12.5. Design rules pertaining to *Design*

The methods used to design instructional sequences may be based on either instructional systems design or agile design. The design rules listed below deal with the complementarity between the online and face-to-face components of an activity, portalware and scale issues.

12.5.1. Integrating the online and face-to-face components of an activity

Learners draw relationships between what is done online and in face-to-face. These relationships can help them to develop and reinforce their transfer capabilities.

When designing activities, it is important to integrate the face-to-face and online dimensions. If the activity is only online, then it might be useful to design it in relation to a face-to-face activity that has similar objectives. Once designers have clearly defined the objectives in terms of the knowledge and skills learners should have acquired by the end of the activity, they can design both parts of the activity to complement each other. If the online component precedes the face-to-face, two main options are available. The first requires learners to build the necessary processes and information online in order to be able to complete the face-to-face part of the activity. The second option involves providing learners with a complete scenario online and then a similar but more complex scenario in the face-to-face session. With these two options, what is done online will be transferred and reinforced during the face-to-face. The debriefing following the face-to-face component of the activity should build a bridge with its online counterpart. This back-and-forth game in two different modalities with one and the same concept/skill should help anchor it firmly in the learners' repertoire of knowledge and skills. To raise learners' awareness of the skills and knowledge they have built online and in face-to-face, designers can integrate some reflective practice in the activity's scenario.

Whenever an activity is conducted in two modalities, online and face-to-face, designers should make sure that what is done online either complements or is transferable to the face-to-face component. The two parts of the activity should reinforce each other in order to enhance the process of knowledge and skill building.

Design is scale-dependent, at least when it comes to a long-term socio-constructivist course.

In a socio-constructivist orientation to learning, the number of learners is a determining factor in the success of the course.

The number of learners plays a determining role in an activity-based course. If there are very few learners, energy, materials and interactions might be lacking, and if there are too many learners, simply throwing in additional tutors to coach them is not sufficient. The appropriate number of learners for any given training can be identified in accordance with the specificities of the course (content, time span, audience, etc.). Often this number happens to fall between 20 and 25 learners. If a course has been conducted successfully with a given number of learners, it is important to leave it as is. If the course has to be delivered with twice the number of learners, a serious needs analysis must be carried out again in order to ensure that the course design addresses the needs of this larger population.

An activity-based course is very demanding in terms of coaching, and it is therefore important to respect the appropriate ratio of learners to teachers/tutors. If the course has been delivered successfully with a given number of learners and has to change scale, the entire course design needs to be reconsidered in the light of this new constraint.

Section 12.6. Design rules pertaining to *Innovation*

Innovation is a matter of transforming an organisation. It is an in-depth process involving major cultural changes. The design rules below address issues related to human resources and to course content and format.

A transformative blend – in Graham's (2005) terminology – affects both the teaching team and the content and format of the course.

One major difference between the course in its earlier, exclusively face-to-face format and its new blended format resides in the cohesion of the teaching team. The "teachers' and tutors' only" forum has created a space for sharing thoughts and asking for colleagues' feedback on particular issues, which was not available in the face-to-face format. Making the course description available and visible to all teachers and tutors before the start of the course was an innovation that allowed for better fine-tuning among the modules and stimulated ideas for incorporating new activities into the modules. The blended format was an occasion for professional development because none of the teachers involved had ever taught in an activity-based distant learning environment. The high visibility of all the modules and activities and the opportunity to either comment freely on a colleague's module or provide

feedback to the author of a particular module upon request also helped to create a solid teaching team. The activity-based and collaborative aspects of the portal's underlying learning philosophy has affected not only teachers' practice but also their attitudes towards their colleagues. The blended format has also affected course content, which has been developed and enhanced since the programme shifted from 10 to 60 credits. Furthermore, many teacher-fronted hours have been replaced by activities that engage the learners more actively. As far as the format is concerned, it has undergone a radical change, shifting from a two-week face-to-face course to a one-year distant course in which one face-to-face week has been incorporated.

Transforming a course from an exclusively face-to-face format to a blended one entails changes in the format, content and way in which members of the teaching team work together. Appropriate support structures need to be provided (i.e. those identified in sub-section 12.2.7).

For faculty to remain a solid team, appropriate mechanisms to support rapid dynamic planning should be integrated beforehand.

Rapid decisions made in small committees can interfere with the cohesion of the teaching team. Sometimes however, rapid decisions that have consequences for the entire course have to be taken by a small committee because it is very difficult to organise a meeting with teachers in different time zones on the spur of the moment. This small committee is often composed of the director of the course and the pedagogical advisor and decisions are made during a face-to-face meeting. Once these kinds of decisions have been taken, it is important to share them with the community, explain why they had to be taken so rapidly and ask for comments. It may be useful to forewarn the teaching team of this possibility and to assure them that they will be informed and consulted in due time. In more concrete terms, a forum restricted to the faculty can be created before the course begins for this express purpose. In parallel, something like an e-mail alert can be built into the design as a way to keep faculty informed as quickly as possible.

Information about the possibility of decisions being made very rapidly in a small committee must be communicated beforehand and should include details on where and how this kind of information will be circulated.

Section 12.7. Summary

The findings of this research led to the design of the component model of activity-based training and address issues related to the following five domains: learning design, actors involved, technology, design and innovation.

The learning design domain concerns how we learn, particularly in a socio-constructive learning context where learners are considered active knowledge builders in constant interaction with their environment and with the world, transforming both in the process. It also concerns the strategies that designers, teachers and tutors rely on. How can we, in terms of design rules, achieve on a practical level what has been described on a more theoretical level? The actors domain addresses the issue of human resources and roles. The technology domain considers how technology can best serve and enhance learning. The design domain provides information on the two major design trends: instructional and agile methodologies. Finally the innovation domain concerns in-depth processes of change management, taking into account institutional constraints.

The design rules derived from this research are formulated as follows:

LEARNING DESIGN:

- Reflection must be scaffolded within an activity and considered an integral part of the activity.
- A reflective architecture similar to the one developed for the learners must be developed for the teachers' and tutors' as well.
- Final feedback and debriefing of an activity must happen before the official close of the activity for learners to take full advantage of it.
- Learning is not linear, jumping from one activity into another. It is a back-and-forth process that has to be woven into the entire scenario.
- Activity-based learning occurs on five levels, namely production, feedback, reflection, collaboration and organisation.
- Summative evaluation must be integrated with formative evaluation and take into account the five different levels of an activity.
- Authentic activities develop expert, self-directed learners.
- For collaborative learning to be successful, scripting the activity and structuring interactions are obligatory steps.

- To alleviate the burden of forming groups while optimising the benefits of collaborative learning, groups must be well balanced and remain stable over a certain period of time.
- Self-regulation and reflection on the collaborative process should be made mandatory to ensure active participation within a group.
- Group composition and group size have to be carefully studied.
- Training faculty in guiding small groups is necessary in an activity-based learning orientation.
- Tutoring has to be fully embedded in the design of activities, taking into account pedagogical and human resources, desires and constraints.
- Authentic activities generate knowledge and skills that interest learners. The debriefing session ensures that objectives are met and reinforces learners' transfer capabilities.
- Faculty training should be adaptive and designed in three stages: 1) learn how to use, 2) learn how to produce, and 3) learn how to create and innovate.
- Both teachers and tutors need to learn how to work together in a distance mode. Teachers must know what the tutor training involves and vice-versa. Only then can they learn how to teach together effectively and efficiently.

ACTORS:

- The actors need to be identified, their roles and responsibilities both in face-to-face and online need to be clearly defined, and a structure to support them needs to be designed.

TECHNOLOGY:

- Spaces dedicated specifically to teachers and tutors must be created.
- Traceability, structure and reflection in the written interactions of a distant learning environment must be promoted.
- All the tools of the learning environment should be used from the very beginning to support and enhance the five levels of an activity (production, feedback, reflection, collaboration and organisation).
- Decisions related to the choice of a learning environment must begin with the adoption of a learning philosophy and only then move to the design of learning scenarios.
- The constraints inherent in the written mode of distance learning must be perceived as added value, providing increased structure, increased participation and increased time devoted on the teaching/learning enterprise.

- Learners must be provided with a set of central and peripheral tools that allow them a degree of flexibility in performing activities.
- Preference must be given to a learning environment that can continue to be developed and adapted as the course unfolds.

DESIGN:

- The online and face-to-face components of an activity must be designed beforehand either to complement each other or to facilitate and reinforce transfer.
- Activity-based learning is scale-dependent and cannot be changed drastically without conducting a new constraint analysis.

INNOVATION:

- When a course is transformed from a face-to-face only format to a blended format, appropriate support structures have to be devised to accommodate the resultant changes in the format, the content and the teaching team.
- When rapid decisions affecting the entire course have to be taken in a small committee, a support structure has to be in place to ensure transparency and cohesion among the teaching team.

Chapter 13. Conclusion

This chapter is divided into three sections. The first section offers a synthesis of the design experiment. The second section reports the findings on the research questions and refers back to the component model of activity-based training to which the research led. The last section presents the limitations of this study, suggests further areas for future investigation and delineates our contribution to the domains of learning design and blended learning.

Section 13.1. Synthesis of the design experiment

The present research is concerned with introducing innovation in the course for conference interpreter trainers, a one-year, multi-cultural and worldwide course representing 60 ECTS credits or approximately 1500 learner hours. Using a design or development research approach, the dissertation describes and analyses the design and implementation of training in an activity-based learning environment with a face-to-face component.

The program consists of nine modules. Each module involves a set of learning activities and is organised according to a pedagogical scenario. In terms of human resources, the course for interpreter trainers involved respectively 21 and 34 learners, four teachers, two tutors, one pedagogical advisor and one technical support person. All actors were involved in designing and supporting the enactment of pedagogical scenarios. A pedagogical scenario contains detailed scenarios of learning activities, a learning environment to enact activities and specific learning materials. Activities addressed in Question F (Section 11.5) are good examples of the type of socio-constructive activities designed within the course. The scenario of one of these activities requires learners to collaborate in 1) selecting a common difficulty in simultaneous or consecutive interpreting, 2) identifying the cognitive processes most likely responsible for the cognitive constraints, and 3) remodelling the process to address the constraints. Learners have to produce a model of the sub-processes in question, sketch the model and write a report, including pedagogical recommendations on how to circumvent cognitive constraints. Before the actual enactment of the activity, the design emerged from the interactions among the teacher, the tutor and the pedagogical advisor. While designing the activity, the teacher and the tutor integrated the intervention part of the scenario, specifying how to coach learners during the enactment of the activity, that is how to provide intermediate and final feedback alternately, respond to questions on the forum impartially, as soon as they come up, etc. Once the activity is deemed satisfactory from a pedagogical point of view and all resources are

gathered, the technical support person is solicited. He customises all the necessary tools (dedicated forum, upload of templates, etc.) to make sure the activity runs properly on the portal. A specific forum to support teacher-tutor interactions is also created to help them to monitor the activity as it unfolds, the creation of groups, their deliveries, and eventually to adapt the scenario if something goes wrong. Finally, after the actual enactment of the activity and the completion of the module, a debriefing session between the teacher and the tutor takes place.

This type of activity and detailed scenario is integrated within the pedagogical scenario of the global module. Activity diagrams have been used to represent the workflow as it passes from one actor to the other, transforming input into output. Based on Salmon's (2000) model, the scenario unfolds in six phases: access and motivation, online socialisation, information exchange, knowledge construction, development and consolidation. Figure 113 indicates that the module starts with the teacher posting the welcome message. Then the task shifts to the learners, who have to read the welcome message and act accordingly. This occurs during the *access and motivation* stage. During the *online socialisation* stage, learners find peers and set up groups in preparation for the upcoming collaborative activities. When needed, the teacher regulates the formation of groups. During the *information exchange* stage, the task moves to the learners: they must develop strategies to carry out the activity. The tutor is available to answer questions or deal with uncertainties, and the teacher helps learners develop their strategies when needed. During the *knowledge construction* stage, learners actively engage in the learning activities, interacting with their peers, the tutor and the teacher until they deliver a final product for the activity concerned. In the *development* stage, the workflow passes to the teacher, whose role is now to provide formative and summative evaluation. The tutor does the same. Both teacher and tutor also conduct a debriefing chat in view of the module's closure. During this stage, the learners' role is to appropriate the evaluation they received and participate in the debriefing session, making sure they have achieved the module's learning goals. During the last stage, *consolidation*, the teacher and tutor respond to whatever reactions learners had to their feedback. For the learners' part, a group of volunteers writes a summary of the module for the wrap-up book. The teacher continues to provide feedback on the summary until it reaches an acceptable form. Inclusion of the summary in the wrap-up book is intended to provide learners with a record that they can refer to in the future, whenever they are confronted with an issue related to the content of the module. This closes the module.

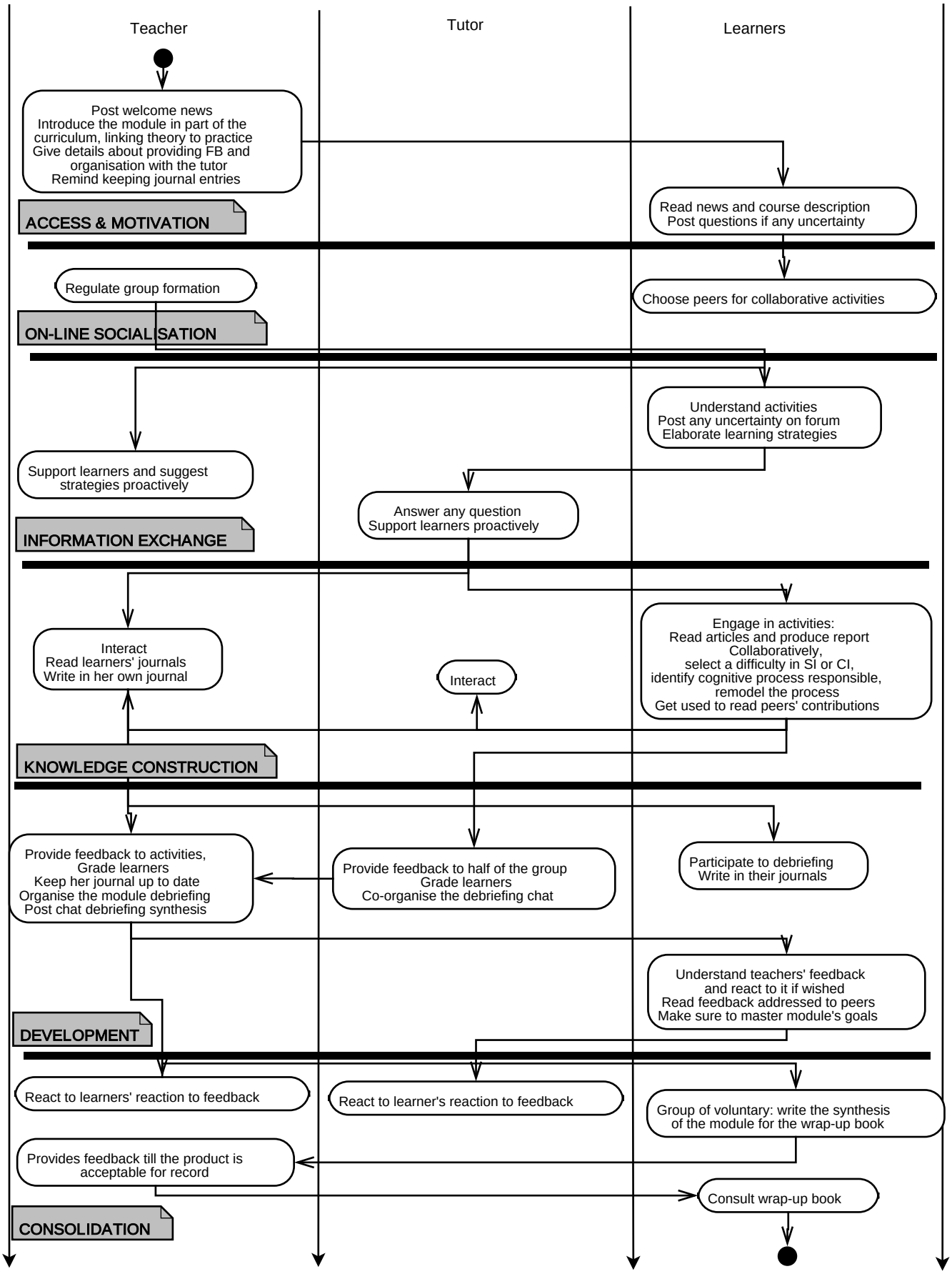


Figure 113: Example of the design of a module

Regarding design methodology, it is true that within both case studies, detailed scenarios of activities were created using a very basic tool, namely the one integrated in the module description tool. It includes five items: objectives, detailed description, time necessary, evaluation and expected results. The different phases reported in the activity diagram were used *a posteriori*. Some pitfalls would have probably been avoided had we used some sort of more structured activity design template beforehand. This experience indicates the need for a more structured way to design the scenario of activities, that is, with a visual learning design language (Botturi *et al.*, 2007) that uses some form of activity diagram. Research on educational design languages is fairly recent and at the present time, several approaches are competing for greater recognition. For example, Open University's Learning Design Initiative is working on CompendiumLD, a promising software tool for designing learning activities using a flexible visual interface (Brasher et al, 2008). In activity diagrams found in other design languages such as coUML (Derntl and Motschnig, 2007), one can assign different places to central actors – i.e. the teacher, tutor and learners – and to more peripheral ones – i.e. pedagogical and technical support personnel. Designing the enactment of the activity, explicitly showing how the workflow is shared among principal actors and designing cases when peripheral actors might come in can be useful. First, it provides an overview of the scenario, indicating whether any actor is isolated, which would negatively affect how the activity works – i.e. the tutor's work in Case Study 1 was not related to the teacher's work. We are reminded of the importance of conceiving the roles of actors at the same time as the design of the activity. The two are interdependent. Second, it gives a good idea of the respective workloads of both the teaching staff and the learners. This allows the activity to be quantified in terms of learner working hours on the one hand and coaching hours on the other. Third, the activity diagram can be distributed to learners as an example of how to enact the activity and what is expected from the activity. As discussed in Chapter 12, design rules, it is often difficult for learners who are not used to working collaboratively to understand what is expected of them. The activity diagram could help in this regard. Finally, from the perspective of the "reflective practitioner", it can serve as a metacognive artifact for both teaching staff and learners – i.e. they can readily observe at what particular point in the activity learners withdraw the scenario, how the teaching staff reacted, etc.

What is particularly important if teachers use activity diagrams beforehand, in the very design of activities, is that they adapt the phases of the activity to the requirements of the pedagogical scenario. For instance, the present research study used phases inspired by Salmon (2000), but more appropriate "tailor-made" phases can prove to be more effective. In retrospect, it might be advisable to use the component model of activity-based training

(Figure 109) as a more general component model to brainstorm and make decisions regarding key issues (learning design, actors involved, technology, design and innovation). To actually design a detailed activity scenario in the context of a component model of activity-based training, the following phases might prove to be more appropriate than Salmon's: 1) organise the group, 2) understand the activity, 3) share the work and outline the enactment, 4) build knowledge and skills / reflect / regulate, 5) consolidate knowledge and skills, 6) transfer and reinforce knowledge and skills (Table 86).

	Organise the group (internal rules, identity, action, social structure)	Understand the activity (objectives, expected results)	Share the work and outline the enactment	Build knowledge and skills / Reflect / Regulate	Consolidate knowledge and skills (build on feedback)	Transfer and reinforce knowledge and skills
Learners	Get to know all peers who will be part of the same group. Clarify and ground the group's rules (i.e. never reject an idea out-of-hand; provide peers with constructive comments; shout whenever there is a problem within the group; if a peer is to travel, make his/her responsibilities explicit, etc.).	Make sure all members share a common understanding of the objectives and expected results. Ask questions if needed. Look for resources.	Clarify the different tasks that have to be accomplished. Try to quantify the workload. Try to distribute tasks and the workload over peers in a workflow (i.e. on day 1, Peer1 chooses a difficulty to address; on day 2, Peer2 and Peer3 say why the difficulty is appropriate or not; etc.)	Complete the activity, enacting or fading the scenario built up in the former phase. Reflect about how the activity is unfolding with the help of guided questions. Regulate collaboration among peers if needed with the help of guided questions.	Appropriate the teaching staff's feedback both on content and process and build knowledge and skills from there on, reacting to and discussing this feedback.	When exposed to similar activities, activate appropriate skills and knowledge to complete it successfully.
Teaching staff	Form groups beforehand or give clear instructions on group formation (i.e. do not put two peers who can work together face-to-face in the same group). Help groups to develop their internal rules if needed.	Verify learners' understanding, making sure they are on the right track. Answer questions.	Help groups to develop their scenario if needed.	Support the knowledge and skills building process. Follow the reflections and regulation processes and intervene if needed. Provide feedback on both content and process,	Discuss the feedback with learners. Answer questions, elaborate on their comments, open up new perspectives, etc.	Provide similar activities. Support transfer capabilities. Go over anything that poses a problem or that remains uncertain.

Table 86: Design phases of a detailed activity scenario

Coming back to the overall picture, what is important for designers when innovating and introducing distance learning in a course, is to ensure that:

- All actors involved, both decision-makers and field actors, agree on the best choices regarding their pedagogical enterprise;
- When making decisions on key issues, they choose appropriate cognitive tools to develop activities and the entire curriculum properly;
- During the enactment, they are mobile, receptive to learners' and teaching staff's feedback and able to readjust and adapt;
- They organise a debriefing session at the end of the course to gather feedback from learners and teaching staff in order to determine what needs to be changed for the next edition of the course.

Section 13.2. Report of findings to research questions

The research questions addressed the following topics: the implementation of a socio-constructivist learning design, the effects of the design on skill acquisition, the effectiveness of the learning environment, the potential of the TSS framework as a tool for designing an effective learning environment, faculty's perception of the innovation, and the differences among learners.

To the question of whether we did implement a socio-constructivist learning design, findings indicate a clearly positive answer. The design of the activities encouraged active learning and teaching staff did support learners on their journey to become expert, self-regulated learners. Learners strongly agree they were exposed to professionally relevant activities embodying authentic, real life aspects. They also agree that reflective practice was supported and encouraged by teaching staff. Learners acknowledge that the organisation of human resources was appropriate and did support them in their learning. As far as the social dimension of socio-constructivism - collaborative learning - is concerned, findings show very contrasting opinions, with the typical learner falling somewhere between somewhat agreeing and agreeing that teaching staff and peers did support collaborative learning. The perception of collaborative learning, making sense and interaction are correlated and vary along the entire continuum from very positive to very negative, depending on the learner's profile.

To the question pertaining to the effects of the design on skill acquisition and knowledge building, findings confirm that learners did acquire skills. Both learners who are already teaching as well as those with no teaching experience whole-heartedly agree that they acquired many techniques to train students of interpretation and are confident about conducting a face-to-face course with these students. Both groups also somewhat agree or agree that they are confident about introducing distance learning tools in their course.

Regarding interest in learning more about how to teach at a distance, in Case Study 1, non-teaching learners indicated more interest, while in Case Study 2, the teaching learners showed the most interest. As far as summative evaluation is concerned, learners with the "average" profile received higher grades than learners with either of the other two profiles. We recall that one of the characteristics of learners from the "average" profile is that they use their journal more often. This result confirms what the literature attests regarding reflective practice: it is centred on the process of monitoring, regulating and controlling one's thinking about thinking with a view to enhancing understanding and creating expert knowledge. Finally, regarding the blended aspect of the design, even if the long-term effects of the blending remain unknown, learners do draw links between online and face-to-face activities and this is considered a first step to grounding knowledge and skills and reinforcing transfer capabilities.

Regarding the question of whether the portal is an effective learning environment and whether tools supported pedagogical goals, findings show that the C3MS portal is an effective socio-constructivist learning environment. It offers a socio-technological place for learners to interact and to co-construct meaning. Teachers all agree that the portal definitely influenced their teaching. The portal forces them to be very clear and structured and encourages them to collaborate more often. It offers teachers an opportunity to keep track of learners in an unobtrusive way through reading their journals, and it allows them to have more in-depth, constructive content discussions with learners. Regarding the most frequently used tools, in both case studies, learners used the forum, the module description tool and the social awareness tool most often. The awareness tools of the forum and private messages were also used. These tools represent the basics for producing, communicating, getting organised and maintaining links with the distant community. Uses of the remaining tools vary considerably, but it is important to note that tools did fulfil the pedagogical functions they were designed for.

To the question of whether the TSS framework helped to create an effective socio-constructivist learning design, findings indicate that it did. With respect to the details, teachers have divergent opinions about training but agree that it gave them the basics to teach. The organisation of human resource as it was set up did support teachers and tutors. In Case Study 2, however, some decisions about design issues were taken rapidly, in a small committee, and the fact that not all teachers were involved in the decision-making process meant that there was less consensus than during the first edition; this resulted in less positive perception of the organisation of human resources than what was found in Case Study 1. As far as roles are

concerned, they were clear in principle, but since it was the first distance teaching experience for both teachers and tutors, it took them five modules to clarify roles on a practical level.

Regarding the faculty's perception of the implementation of the blended format of the course, findings show that on the whole, the teaching staff found it to be a positive experience and are in favour of expanding its use at ETI. If we take both case studies together, the positive points include 1) the volume of knowledge shared, 2) the collaboration among learners, 3) the activity and reactivity of learners, 4) the on-going discussion in the teacher forum, and 5) the freedom of organising one's time, 6) the possibility of closely monitoring the learning process over a long period of time, and 7) the technological stability of the system. The drawbacks are related to 1) not knowing enough about creating online resources, 2) slow connections during travel, 3) having to assess a large number of learners' answers, 4) the large number of learners, 5) teaching modules back-to-back without any pause in-between, 6) the length of the face-to-face portion of one module – which is considered too short. During Case Study 1, teachers said they enjoyed teaching with the portal because of the bond it creates with learners and within the teaching team and because of the kinds of answers they can get from learners. In Case Study 2, the large number of participants had a negative influence on the faculty's enjoyment of teaching with the portal.

Regarding the question of the differences among learners, three profiles were identified by statistical analysis: a first group that rarely uses any of the tools, a second group that uses all the tools an average number of times and the journal most of all, and a third group that uses all the tools a lot but uses the shoutbox most often. Also, it is important to note that there is a correlation between learners' actual use of tools and their perceptions of how they used the tools; in other words, a learner who in fact rarely uses tools also thinks s/he rarely uses them. Regarding the differences in the enactment of activities and in the way learners conduct their learning enterprise, the three profiles indicate different behaviours. Learners from the "few" profile are definitely not sufficiently involved and allow themselves to be carried by the rest of the group. Learners from the "average" profile, on the other hand, are active knowledge builders, practise reflection and know where to look for information and how to regulate their work. Finally, learners from the "a lot" profile are also active knowledge builders, knowing where to look for information; they do not, however, practice reflection.

Regarding the relationship among the variables that we used to answer the previous questions, statistical results show that all variables measure the same thing. The three types of analyses – factor, correlation and cluster analysis - reveal that there are four more or less correlated groups of underlying variables. The first group measures the conceptual dimension of socio-constructivist learning, the second one measures the actual use of tools, the third one

measures opinions about the use of tools and the fourth one measures a mixture of the conceptual dimension and tools.

These findings generated design conjectures from which we have extracted about thirty design rules and have drawn a component model of activity-based training (Figure 109). The model addresses five domains – learning design, actors involved, technology, design and innovation – and is a more comprehensive version of the former TSS design tool. Design rules are classified according to the five domains of the model. They formulate recommendations for the design of blended group activity-based teaching scenarios in higher adult education. As a whole, they represent a kind of pedagogical design theory that could be "implemented and experimented" in other similar blended course contexts. From a practical point of view, they constitute a positive contribution to the two domains of learning design and blended learning.

Section 13.3. Limitations and outlook

One limitation of this research is due to not having had enough data to conduct the entire research as initially planned. In particular, we were unable to investigate two issues of major importance, namely, Does scripting activities enhance learning (question D-27)? and Do authentic activities embedded in a socio-constructive learning environment enable higher-order learning (question A-8)? In future editions of the course, it would be good to track data in order to find answers to these questions.

Another limitation of this study is due to the small number of learners and teaching staff that it was conducted with. In addition, the course is quite unique in that it targets a specific audience of trainers. On the other hand, activity-based courses cannot really accommodate large numbers of learners, so we think that the design rules we have been able to derive from the conjectures are relevant for any adult activity-based course.

While this research was being conducted and design rules were being formulated, we introduced some of them in the third edition of the MAS. For instance, for the first time, a faculty meeting was organised to plan the face-to-face week, making sure who was doing what, discussing the face-to-face parts of blended activities and clarifying roles, particularly those of the tutors, to ensure coherence between their online and face-to-face roles. This resulted in very positive feedback from learners.

Also, during the faculty debriefing session, we decided to make some changes, which will be implemented according to the design rules. For example, collaborative work will be more scripted for the next edition and free-loaders will be tracked.

At the end of the fourth edition of the course, we would like to analyse the effects on the overall course of applying some of the design rules. We would also like to further investigate five issues. The first one concerns cognitive scaffolding of learning activities, and particularly the use of templates. They seemed to help learners to build a solid cognitive architecture. Further investigation should also be conducted in order to better grasp the long-term effects of these scaffolding tools after they have been reused or recalled during the face-to-face sessions.

The second issue concerns the blended aspect of the course. Does this particular feature of the course have an influence on knowledge and skill building? Does it have specific long-term effects, once learners use it for training interpreters?

The third issue concerns the online and face-to-face aspects of an activity. What are the possible ways of combining both aspects of an activity to maximise the learning benefits? Several parameters related to skill and knowledge acquisition, cognitive overload and transfer capabilities should be taken into account when conducting this investigation.

The fourth issue concerns the teacher-tutor relationship. Whether and to what extent learners perceive the teacher-tutor team as supportive of their knowledge and skill building merits further in-depth investigation, particularly with a view to improving tutor support.

The fifth issue concerns the creation of “tailor-made structures” for activity design, as suggested above with Table 86. It is also important to analyse how they are being used both by teaching staff and learners and to identify the resulting outcomes. For instance, do they result in enhanced learning by making processes more explicit?

In conclusion, we believe this research study has contributed to the two domains of learning design and blended training in adult higher education. The meticulous description of the entire course, with the help of tools like activity diagrams, conjecture maps and the activity triangle, already represent a body of knowledge. The design rules and the component model of activity-based training, based on both educational technology theory and the situated empirical findings of this study, represent the second contribution. They constitute the more tangible ready-to-use body of knowledge resulting from this research.

Chapter 14. Bibliography

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Chapter 15. Appendices

Appendix 1. Questionnaire distributed to learners

Introduction

The purpose of this questionnaire is to help us understand how well you liked the on-line delivery of the second blended edition of the Certificate for Interpreter Trainers. Each one of the 120 statements below asks about your experience in the on-line part of the Certificate. Data will be processed and published only statistically.

The following questions will be dealt with: personal information, teachers' behaviour, learning environment, tutoring support structure, tools and skills. Filling in this questionnaire will take you about 20 minutes.

Please be assured that your responses will be treated confidentially, and that they will not affect your assessment.

Thank you very much for your cooperation.

1) Personal information:

1	Name							
2	Sex	Female				Male		
3	Age	20-25	25-30	30-35	35-40	40-45	45-50	50-55

2) Teachers' behaviour

Below you will find general statements about teachers' behaviour. Please indicate to what extent you agree or disagree with them? Please tick the appropriate circle on the scale (totally disagree - totally agree) for each statement.

	Statements: Teachers stimulated us …	**Totally disagree**	**Disagree**	**Somewhat agree**	**Agree**	**Totally agree**
		1	**2**	**3**	**4**	**5**
4	… to search for explanations during discussion	O	O	O	O	O
5	… to summarize what we had learnt in our own words	O	O	O	O	O
6	… to search for links between issues discussed in the group	O	O	O	O	O
7	… to understand underlying mechanisms/theories	O	O	O	O	O

8	… to pay attention to contradictory explanations	O	O	O	O	O
9	… to generate clear learning issues by ourselves	O	O	O	O	O
10	… to evaluate our understanding of the subject matter by ourselves	O	O	O	O	O
11	… to apply knowledge to the problem discussed	O	O	O	O	O
12	… to apply knowledge to other situations/problems	O	O	O	O	O
13	… to ask sophisticated questions	O	O	O	O	O
14	… to reconsider earlier explanations	O	O	O	O	O
15	… to think about our strengths and weaknesses concerning our functioning in the group	O	O	O	O	O
16	… to give constructive feedback about our group work	O	O	O	O	O
17	… to evaluate our group cooperation regularly	O	O	O	O	O
18	… to arrange meetings with him/her to discuss how to improve our functioning as a group	O	O	O	O	O

3) Learning environment

Below you will find statements about the learning environment. Please tick the appropriate circle on the scale (almost never - almost always) for each statement.

Statements: In the Certificate…		**Almost Never** **1**	**Seldom** **2**	**Some-times** **3**	**Often** **4**	**Almost Always** **5**
19	… my learning focuses on issues that interest me.	O	O	O	O	O
20	… what I learn is important for my professional practice as a trainer.	O	O	O	O	O
21	… I learn how to improve my professional practice as a trainer.	O	O	O	O	O
22	… what I learn connects well with my professional practice as a trainer.	O	O	O	O	O
23	… I think critically about how I learn.	O	O	O	O	O
24	… I think critically about my own ideas.	O	O	O	O	O
25	… I think critically about other students' ideas.	O	O	O	O	O
26	… I think critically about ideas in the	O	O	O	O	O

	readings.					
27	… I explain my ideas to other students.	O	O	O	O	O
28	… I ask other students to explain their ideas.	O	O	O	O	O
29	… other students ask me to explain my ideas.	O	O	O	O	O
30	… other students respond to my ideas.	O	O	O	O	O
31	… the tutor/teacher stimulates my thinking.	O	O	O	O	O
32	… the tutor/teacher encourages me to participate.	O	O	O	O	O
33	… the tutor/teacher models appropriate discourse.	O	O	O	O	O
34	… the tutor/teacher models critical self-reflection.	O	O	O	O	O
35	… other students encourage my participation.	O	O	O	O	O
36	… other students praise my contribution.	O	O	O	O	O
37	… other students value my contribution.	O	O	O	O	O
38	… other students empathise with my struggle to learn.	O	O	O	O	O
39	… I make good sense of other students' messages.	O	O	O	O	O
40	… other students make good sense of my messages.	O	O	O	O	O
41	… I make good sense of the tutor's messages.	O	O	O	O	O
42	… the tutor makes good sense of my messages.	O	O	O	O	O

Here are some more statements about the learning environment. Please tick the appropriate circle on the scale (totally disagree - totally agree) for each statement.

Statements: In the Certificate…		**Totally disagree**	**Disagree**	**Somewhat agree**	**Agree**	**Totally agree**
		1	**2**	**3**	**4**	**5**
43	…I actively play around with concepts and learning objects.	O	O	O	O	O
44	… I am responsible for my learning.	O	O	O	O	O
45	… my learning results depend on how much I get engaged in activities.	O	O	O	O	O
46	… I construct my own meaning for concepts and learning objects	O	O	O	O	O

	suggested by the teacher and peer learners.					
47	… I am considered as a researcher and have to look for information.	O	O	O	O	O
48	… information is given to me in an excessively simplistic way.	O	O	O	O	O
49	…there is a good balance between information given, coaching and information I have to look for.	O	O	O	O	O

4) Tutoring Support Structure (TSS)

The Certificate course, the learning environment and the tutoring structure have been implemented using the TSS engineering tool. In terms of benefit and efficiency for the learner, give your opinion about the following statements. Please tick the appropriate circle on the scale (totally disagree - totally agree) for each statement.

	Statements:	**Totally disagree**	**Disagree**	**Somewhat agree**	**Agree**	**Totally agree**
		1	**2**	**3**	**4**	**5**
50	The director of the Certificate has always been very present.	O	O	O	O	O
51	Teachers and tutors were very present during their module.	O	O	O	O	O
52	The human resources organisation : 1) director of the Certificate, 2) teachers and tutors, 3) pedagogical adviser, 4) technical support was appropriate for this Certificate.	O	O	O	O	O
53	The teaching staff seems to have been trained appropriately to support my learning.	O	O	O	O	O
54	Teacher and tutor roles were clearly defined.	O	O	O	O	O
55	The community portal is an efficient learning environment.	O	O	O	O	O
56	Accessing and using my peer learners' productions was effective for my learning.	O	O	O	O	O
57	Using templates for specific activities was effective for my learning.	O	O	O	O	O

5) Tools

During the Certificate's on-line modules, how often did you use the following tools? Please tick the appropriate circle on the scale (never – very often) for each tool.

Tools	**Never**	**Not very often**	**Often**	**Very often**
	1	**2**	**3**	**4**

58	News	O	O	O	O
59	Forum	O	O	O	O
60	Chat	O	O	O	O
61	Shoutbox	O	O	O	O
63	Private messages - “Call someone” tool	O	O	O	O
65	Calendar	O	O	O	O
66	Journal	O	O	O	O
67	Library	O	O	O	O
68	Activity Folder	O	O	O	O
69	Portal guide	O	O	O	O
70	Portfolio	O	O	O	O
71bis	Module description (detailed scenario)	O	O	O	O
72	Forum awareness: did you use the “watch a topic” functionality to receive an e-mail when new posts are added to a thread?	O	O	O	O
122	Student Tracking Tool	O	O	O	O
123	Personal homepages	O	O	O	O
124	Chat synthesis	O	O	O	O
125	Member list	O	O	O	O

Concerning awareness tools, how often did you look at the following tools? Please tick the appropriate circle on the scale (never – very often) for each tool.

Awareness tools		**Never**	**Not very often**	**Often**	**Very often**
		1	**2**	**3**	**4**
73	Who is on-line	O	O	O	O
74	Forum awareness (red disk for unread messages)	O	O	O	O
75	Private messages (e-mail alert for new messages)	O	O	O	O
76	Activity folder (number of items in a folder)	O	O	O	O

Have you noticed a change in your usage of the tools? Are there tools for instance that you used a lot in the beginning, but later discarded? Or, on the contrary, are there tools you discovered later on? Please tick the appropriate circle on the scale (used rather at the beginning – used only later on) for each tool.

Tools		Used rather at the beginning 1	Used throughout the Certificate 2	Used only later on 3	Tool never used 0
77	News	O	O	O	O
78	Forum	O	O	O	O
79	Chat	O	O	O	O
80	Shoutbox	O	O	O	O
82	Private messages “Call someone” tool	O	O	O	O
84	Calendar	O	O	O	O
85	Journal	O	O	O	O
86	Library	O	O	O	O
87	Activity Folder	O	O	O	O
88	Portal guide	O	O	O	O
89	Portfolio	O	O	O	O
90	Chat recording	O	O	O	O
91	Module description (detailed scenario)	O	O	O	O
92	Who is on-line	O	O	O	O
94	Forum awareness (red disk for unread messages)	O	O	O	O
95	Private messages	O	O	O	O
96	Activity folder	O	O	O	O
97	Forum awareness: did you use the “watch a topic” functionality to receive an e-mail when new posts are coming in a thread?	O	O	O	O
126	Student Tracking Tool	O	O	O	O
127	Personal homepages	O	O	O	O
128	Chat synthesis	O	O	O	O
129	Member list	O	O	O	O

According to the pedagogical scenario and functionalities attributed to tools, do you think tools have fulfilled their “mission”? Please tick the appropriate circle on the scale (totally disagree - totally agree) for each statement.

Tools		Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree
		1	2	3	4	5	6
98	News (beginning of new module, synthesis)	O	O	O	O	O	O
99	Forum (elaborate and negotiate knowledge, exchange information)	O	O	O	O	O	O
100	Chat (debriefing, regulation, proximity communication)	O	O	O	O	O	O
101	Shoutbox (spontaneous messages)	O	O	O	O	O	O
103	Private messages (internal e-mail messaging system)	O	O	O	O	O	O
105	Calendar (relevant course information : meetings, starting of new modules, etc.)	O	O	O	O	O	O
106	Journal (reflexive, metacognitive tool)	O	O	O	O	O	O
107	Library (access digital resources)	O	O	O	O	O	O
108	Activity Folder (store learners' productions)	O	O	O	O	O	O
109	Portal guide (support users with information about tools and portal philosophy)	O	O	O	O	O	O
110	Portfolio (synthesise the module's content and revisit the learning steps)	O	O	O	O	O	O
112	Module description (detailed scenario for each module to help you organise your studies with your professional commitments)	O	O	O	O	O	O
113	Who is on-line (social awareness)	O	O	O	O	O	O
130	Student Tracking Tool (evaluation)	O	O	O	O	O	O
131	Personal homepage (social enhancement)	O	O	O	O	O	O

6) Skills

Below you will find statements about skills. Please tick the appropriate circle on the scale (totally disagree - totally agree) for each statement. Please fill in only the four questions that correspond to your situation: 1) not teaching yet while taking the Certificate course; **OR** 2) already a teacher while taking the Certificate course.

1) not teaching yet while taking the Certificate course

Skills With the Certificate course…		**Strongly disagree**	**Disagree**	**Somewhat disagree**	**Some-what agree**	**Agree**	**Strongly agree**
		1	**2**	**3**	**4**	**5**	**6**
114	… I have acquired many techniques to train students of interpretation.	O	O	O	O	O	O
115	… I am confident to lead a face-to-face course.	O	O	O	O	O	O
116	… I am confident to introduce distant learning tools in my course.	O	O	O	O	O	O
117	... I have developed the curiosity to learn more about how to teach in a blended or distant mode.	O	O	O	O	O	O

2) already a teacher while taking the Certificate course

Skills With the Certificate course…		**Strongly disagree**	**Disagree**	**Somewhat disagree**	**Some-what agree**	**Agree**	**Strongly agree**
		1	**2**	**3**	**4**	**5**	**6**
118	… I have acquired many techniques to train students of interpretation.	O	O	O	O	O	O
119	… I improved my confidence in leading a face-to-face course.	O	O	O	O	O	O
120	… I am confident to introduce distant learning tools in my course.	O	O	O	O	O	O
121	... I have developed the curiosity to learn more about how to teach in a blended or distant mode.	O	O	O	O	O	O

7) Comments

Thank you for your collaboration :)

8) Sources

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Appendix 2. Interview guide for teachers

1) Portal and pedagogical aims

Did the portal, as learning environment, support your teaching in an appropriate way ?
Did you enjoy teaching with the portal?
Comparing with your experience of previous editions of the Certificate and face-to-face teaching, what are the outstanding points of this blended edition? What are the drawbacks?
Did the media influence your way of teaching? Have you been able to teach in a more extensive way?
What about participants' performances? Compared to previous editions of the Certificate are there any changes?
Would you jump into another similar blended teaching experience?

2) Human resources organisation

Was the human resources organisation efficient? What would you change?
Was the organisation between you and the tutor appropriate?
Was the work dispatching between you and the tutor appropriate?
Were the tutor's roles sufficiently clearly defined?

3) Training

Have you been trained appropriately before being launched with the participants? What would you add? What would you change?

4) Tools

Which tools did you appreciate most?
Which tools were the most efficient to support your teaching?
Were there enough tools to support your teaching? Were there tools missing?

5) Cognitive tools

Did you use templates in your activities?
Did you observe any particular effect in the participants' deliveries that used templates?

Appendix 3. Interview guide for tutors

1) Portal and pedagogical aims

Did the portal, as learning environment, support your tutoring in an appropriate way ?
Did you enjoy tutoring with the portal?
Comparing with your experience of previous editions of the Certificate and face-to-face teaching, what are the outstanding points of this blended edition from a tutor point of view?
What are the drawbacks?
Would you jump into another similar blended tutoring experience?

2) Human resources organisation

Was the human resources organisation efficient? What would you change?
Was the organisation between you and the teacher appropriate?
Was the work dispatching between you and the teacher appropriate?
Were the tutor's roles sufficiently clearly defined?
How would you define yourself as a tutor? What did your work consist in?

3) Tutor and portal training

Have you been trained appropriately before being launched with the participants? What would you add? What would you change?

4) Tools

Which tools did you appreciate most?
Which tools were the most efficient to support your tutoring?
Were there tools missing?

Appendix 4. Correlations among variables

Correlations

		Frequency of use of the news	Frequency of use of the forum	Frequency of use of the chat	Frequency of use of the shoutbox	Frequency of use of personal messages	Frequency of use of the calendar	Frequency of use of the journal	Frequency of use of the library
Frequency of use of the news	Pearson Correlation	1.000	-.052	.312*	.247	.069	.184	.070	.051
	Sig. (2-tailed)		.718	.029	.084	.634	.201	.628	.723
	N	50	50	49	50	50	50	50	50
Frequency of use of the forum	Pearson Correlation	-.052	1.000	.106	.008	.117	-.150	.215	-.102
	Sig. (2-tailed)	.718		.467	.956	.417	.297	.135	.480
	N	50	50	49	50	50	50	50	50
Frequency of use of the chat	Pearson Correlation	.312*	.106	1.000	.603**	.329*	.245	.000	.259
	Sig. (2-tailed)	.029	.467		.000	.021	.090	1.000	.072
	N	49	49	49	49	49	49	49	49
Frequency of use of the shoutbox	Pearson Correlation	.247	.008	.603**	1.000	.290*	.445**	.097	.103
	Sig. (2-tailed)	.084	.956	.000		.041	.001	.502	.478
	N	50	50	49	50	50	50	50	50
Frequency of use of personal messages	Pearson Correlation	.069	.117	.329*	.290*	1.000	.111	.068	.146
	Sig. (2-tailed)	.634	.417	.021	.041		.444	.637	.311
	N	50	50	49	50	50	50	50	50
Frequency of use of the calendar	Pearson Correlation	.184	-.150	.245	.445**	.111	1.000	-.093	.142
	Sig. (2-tailed)	.201	.297	.090	.001	.444		.519	.325
	N	50	50	49	50	50	50	50	50
Frequency of use of the journal	Pearson Correlation	.070	.215	.000	.097	.068	-.093	1.000	.048
	Sig. (2-tailed)	.628	.135	1.000	.502	.637	.519		.743
	N	50	50	49	50	50	50	50	50
Frequency of use of the library	Pearson Correlation	.051	-.102	.259	.103	.146	.142	.048	1.000
	Sig. (2-tailed)	.723	.480	.072	.478	.311	.325	.743	
	N	50	50	49	50	50	50	50	50
Frequency of use of the module description	Pearson Correlation	.046	.053	.314*	.246	.187	.335*	.078	.260
	Sig. (2-tailed)	.754	.720	.030	.088	.199	.019	.595	.071
	N	49	49	48	49	49	49	49	49
Actual number of journal entries	Pearson Correlation	-.200	.088	-.264	-.034	.004	-.222	.481**	-.208
	Sig. (2-tailed)	.187	.564	.080	.826	.978	.143	.001	.169
	N	45	45	45	45	45	45	45	45
Actual number of forum posts	Pearson Correlation	-.100	.092	-.100	.105	.067	.111	.130	-.044
	Sig. (2-tailed)	.512	.549	.512	.492	.663	.468	.396	.772
	N	45	45	45	45	45	45	45	45
Actual number of private messages	Pearson Correlation	.034	.201	.042	.083	.425**	.028	.075	.112
	Sig. (2-tailed)	.824	.187	.786	.588	.004	.857	.624	.465
	N	45	45	45	45	45	45	45	45
Actual number of shoutbox messages	Pearson Correlation	.073	.046	.249	.367*	.103	.079	.046	.163
	Sig. (2-tailed)	.634	.766	.099	.013	.499	.605	.762	.284
	N	45	45	45	45	45	45	45	45
Constructive/ active learning	Pearson Correlation	.280*	.221	.182	.295*	-.095	-.064	.156	.128

	Sig. (2-tailed)	.049	.123	.209	.038	.510	.661	.279	.376
	N	50	50	49	50	50	50	50	50
Self-directed learning	Pearson Correlation	-.044	.114	-.144	-.133	-.120	.037	.002	-.073
	Sig. (2-tailed)	.764	.429	.325	.356	.405	.800	.989	.613
	N	50	50	49	50	50	50	50	50
Contextual learning	Pearson Correlation	.249	.171	.121	.214	-.047	-.009	.304*	.054
	Sig. (2-tailed)	.081	.235	.408	.136	.745	.949	.032	.708
	N	50	50	49	50	50	50	50	50
Collaborative learning	Pearson Correlation	.268	-.094	.126	.248	-.076	.061	.046	.226
	Sig. (2-tailed)	.060	.514	.390	.082	.598	.675	.753	.114
	N	50	50	49	50	50	50	50	50
Relevance	Pearson Correlation	.210	.132	.187	.191	.040	.085	.055	.356*
	Sig. (2-tailed)	.143	.362	.199	.183	.784	.559	.703	.011
	N	50	50	49	50	50	50	50	50
Reflection	Pearson Correlation	.075	-.270	-.057	-.022	-.086	-.130	.228	.209
	Sig. (2-tailed)	.607	.058	.696	.882	.554	.370	.111	.145
	N	50	50	49	50	50	50	50	50
Interaction	Pearson Correlation	.117	-.038	.105	.281*	.066	-.012	.311*	.113
	Sig. (2-tailed)	.418	.795	.475	.048	.651	.936	.028	.433
	N	50	50	49	50	50	50	50	50
Tutor support	Pearson Correlation	.120	-.035	.220	.208	-.083	.005	.226	.277
	Sig. (2-tailed)	.407	.809	.129	.147	.566	.973	.115	.051
	N	50	50	49	50	50	50	50	50
Peer support	Pearson Correlation	.052	-.090	.015	.117	.016	.071	.234	.076
	Sig. (2-tailed)	.720	.533	.917	.419	.914	.624	.102	.599
	N	50	50	49	50	50	50	50	50
Making Sense	Pearson Correlation	.215	.188	.037	.086	.023	-.015	.189	-.012
	Sig. (2-tailed)	.134	.190	.800	.551	.873	.918	.188	.935
	N	50	50	49	50	50	50	50	50
Constructivism	Pearson Correlation	-.032	-.146	.089	.042	-.041	-.007	.325*	.446**
	Sig. (2-tailed)	.827	.312	.541	.773	.779	.963	.021	.001
	N	50	50	49	50	50	50	50	50
Human resources organisation	Pearson Correlation	.304*	.061	-.030	.119	-.177	.158	-.027	.025
	Sig. (2-tailed)	.032	.673	.836	.411	.218	.272	.854	.865
	N	50	50	49	50	50	50	50	50
Learning environment	Pearson Correlation	.280*	.043	.137	.214	.144	-.064	.295*	.104
	Sig. (2-tailed)	.049	.769	.349	.136	.319	.661	.038	.473
	N	50	50	49	50	50	50	50	50
Presence of teaching staff	Pearson Correlation	.320*	.024	.158	-.041	.065	.055	.035	.157
	Sig. (2-tailed)	.023	.866	.278	.776	.654	.704	.811	.278
	N	50	50	49	50	50	50	50	50

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Correlations

		Frequency of use of the module description	Actual number of journal entires	Actual number of forum posts	Actual number of private messages	Actual number of shoutbox messages	Constructive/ active learning	Self-directed learning	Contextual learning
Frequency of use of the news	Pearson Correlation	.046	-.200	-.100	.034	.073	.280*	-.044	.249
	Sig. (2-tailed)	.754	.187	.512	.824	.634	.049	.764	.081

	N	49	45	45	45	45	50	50	50
Frequency of use of the forum	Pearson Correlation	.053	.088	.092	.201	.046	.221	.114	.171
	Sig. (2-tailed)	.720	.564	.549	.187	.766	.123	.429	.235
	N	49	45	45	45	45	50	50	50
Frequency of use of the chat	Pearson Correlation	.314*	-.264	-.100	.042	.249	.182	-.144	.121
	Sig. (2-tailed)	.030	.080	.512	.786	.099	.209	.325	.408
	N	48	45	45	45	45	49	49	49
Frequency of use of the shoutbox	Pearson Correlation	.246	-.034	.105	.083	.367*	.295*	-.133	.214
	Sig. (2-tailed)	.088	.826	.492	.588	.013	.038	.356	.136
	N	49	45	45	45	45	50	50	50
Frequency of use of personal messages	Pearson Correlation	.187	.004	.067	.425**	.103	-.095	-.120	-.047
	Sig. (2-tailed)	.199	.978	.663	.004	.499	.510	.405	.745
	N	49	45	45	45	45	50	50	50
Frequency of use of the calendar	Pearson Correlation	.335*	-.222	.111	.028	.079	-.064	.037	-.009
	Sig. (2-tailed)	.019	.143	.468	.857	.605	.661	.800	.949
	N	49	45	45	45	45	50	50	50
Frequency of use of the journal	Pearson Correlation	.078	.481**	.130	.075	.046	.156	.002	.304*
	Sig. (2-tailed)	.595	.001	.396	.624	.762	.279	.989	.032
	N	49	45	45	45	45	50	50	50
Frequency of use of the library	Pearson Correlation	.260	-.208	-.044	.112	.163	.128	-.073	.054
	Sig. (2-tailed)	.071	.169	.772	.465	.284	.376	.613	.708
	N	49	45	45	45	45	50	50	50
Frequency of use of the module description	Pearson Correlation	1.000	.103	.241	.089	.185	.169	.192	.212
	Sig. (2-tailed)		.506	.115	.565	.229	.244	.187	.143
	N	49	44	44	44	44	49	49	49
Actual number of journal entries	Pearson Correlation	.103	1.000	.591**	.337*	.299*	-.074	.000	.140
	Sig. (2-tailed)	.506		.000	.023	.046	.627	.999	.360
	N	44	45	45	45	45	45	45	45
Actual number of forum posts	Pearson Correlation	.241	.591**	1.000	.554**	.585**	.063	.079	.188
	Sig. (2-tailed)	.115	.000		.000	.000	.682	.608	.216
	N	44	45	45	45	45	45	45	45
Actual number of private messages	Pearson Correlation	.089	.337*	.554**	1.000	.598**	.028	.025	-.081
	Sig. (2-tailed)	.565	.023	.000		.000	.853	.869	.598
	N	44	45	45	45	45	45	45	45
Actual number of shoutbox messages	Pearson Correlation	.185	.299*	.585**	.598**	1.000	.194	.022	.024
	Sig. (2-tailed)	.229	.046	.000	.000		.202	.885	.877
	N	44	45	45	45	45	45	45	45
Constructive/ active learning	Pearson Correlation	.169	-.074	.063	.028	.194	1.000	.480**	.501**
	Sig. (2-tailed)	.244	.627	.682	.853	.202		.000	.000
	N	49	45	45	45	45	50	50	50
Self-directed learning	Pearson Correlation	.192	.000	.079	.025	.022	.480**	1.000	.425**
	Sig. (2-tailed)	.187	.999	.608	.869	.885	.000		.002
	N	49	45	45	45	45	50	50	50
Contextual learning	Pearson Correlation	.212	.140	.188	-.081	.024	.501**	.425**	1.000
	Sig. (2-tailed)	.143	.360	.216	.598	.877	.000	.002	
	N	49	45	45	45	45	50	50	50

Collaborative learning	Pearson Correlation	.114	-.095	.016	-.032	.081	.559**	.468**	.494**
	Sig. (2-tailed)	.433	.535	.915	.835	.596	.000	.001	.000
	N	49	45	45	45	45	50	50	50
Relevance	Pearson Correlation	.367**	.149	.196	.167	.211	.461**	.165	.438**
	Sig. (2-tailed)	.009	.328	.197	.273	.164	.001	.252	.001
	N	49	45	45	45	45	50	50	50
Reflection	Pearson Correlation	.254	.082	.023	-.241	-.104	.409**	.301*	.451**
	Sig. (2-tailed)	.079	.591	.883	.112	.498	.003	.034	.001
	N	49	45	45	45	45	50	50	50
Interaction	Pearson Correlation	.173	.201	.259	.004	.036	.489**	.280*	.731**
	Sig. (2-tailed)	.235	.186	.086	.981	.814	.000	.049	.000
	N	49	45	45	45	45	50	50	50
Tutor support	Pearson Correlation	.090	.046	.232	.045	.189	.602**	.337*	.549**
	Sig. (2-tailed)	.538	.763	.125	.770	.212	.000	.017	.000
	N	49	45	45	45	45	50	50	50
Peer support	Pearson Correlation	.191	.352*	.468**	.195	.212	.315*	.408**	.509**
	Sig. (2-tailed)	.188	.018	.001	.199	.162	.026	.003	.000
	N	49	45	45	45	45	50	50	50
Making Sense	Pearson Correlation	.182	.201	.150	.118	-.026	.519**	.527**	.528**
	Sig. (2-tailed)	.212	.185	.324	.441	.867	.000	.000	.000
	N	49	45	45	45	45	50	50	50
Constructivism	Pearson Correlation	.274	.217	.185	-.038	.192	.239	.287*	.358*
	Sig. (2-tailed)	.057	.152	.225	.803	.206	.094	.043	.011
	N	49	45	45	45	45	50	50	50
Human resources organisation	Pearson Correlation	.267	-.070	.122	-.061	.109	.642**	.614**	.386**
	Sig. (2-tailed)	.064	.647	.425	.689	.476	.000	.000	.006
	N	49	45	45	45	45	50	50	50
Learning environment	Pearson Correlation	.283*	.271	.348*	.201	.303*	.297*	-.018	.400**
	Sig. (2-tailed)	.049	.071	.019	.185	.043	.036	.903	.004
	N	49	45	45	45	45	50	50	50
Presence of teaching staff	Pearson Correlation	.218	-.285	-.201	-.079	-.014	.442**	.346*	.196
	Sig. (2-tailed)	.133	.058	.185	.606	.926	.001	.014	.173
	N	49	45	45	45	45	50	50	50

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Correlations

		Collaborative learning	Relevance	Reflection	Interaction	Tutor support	Peer support	Making Sense	Constructivism
Frequency of use of the news	Pearson Correlation	.268	.210	.075	.117	.120	.052	.215	-.032
	Sig. (2-tailed)	.060	.143	.607	.418	.407	.720	.134	.827
	N	50	50	50	50	50	50	50	50
Frequency of use of the forum	Pearson Correlation	-.094	.132	-.270	-.038	-.035	-.090	.188	-.146
	Sig. (2-tailed)	.514	.362	.058	.795	.809	.533	.190	.312
	N	50	50	50	50	50	50	50	50
Frequency of use of the chat	Pearson Correlation	.126	.187	-.057	.105	.220	.015	.037	.089
	Sig. (2-tailed)	.390	.199	.696	.475	.129	.917	.800	.541
	N	49	49	49	49	49	49	49	49
Frequency of use of the shoutbox	Pearson Correlation	.248	.191	-.022	.281*	.208	.117	.086	.042
	Sig. (2-tailed)	.082	.183	.882	.048	.147	.419	.551	.773

	N	50	50	50	50	50	50	50	50
Frequency of use of personal messages	Pearson Correlation	-.076	.040	-.086	.066	-.083	.016	.023	-.041
	Sig. (2-tailed)	.598	.784	.554	.651	.566	.914	.873	.779
	N	50	50	50	50	50	50	50	50
Frequency of use of the calendar	Pearson Correlation	.061	.085	-.130	-.012	.005	.071	-.015	-.007
	Sig. (2-tailed)	.675	.559	.370	.936	.973	.624	.918	.963
	N	50	50	50	50	50	50	50	50
Frequency of use of the journal	Pearson Correlation	.046	.055	.228	.311*	.226	.234	.189	.325*
	Sig. (2-tailed)	.753	.703	.111	.028	.115	.102	.188	.021
	N	50	50	50	50	50	50	50	50
Frequency of use of the library	Pearson Correlation	.226	.356*	.209	.113	.277	.076	-.012	.446**
	Sig. (2-tailed)	.114	.011	.145	.433	.051	.599	.935	.001
	N	50	50	50	50	50	50	50	50
Frequency of use of the module description	Pearson Correlation	.114	.367**	.254	.173	.090	.191	.182	.274
	Sig. (2-tailed)	.433	.009	.079	.235	.538	.188	.212	.057
	N	49	49	49	49	49	49	49	49
Actual number of journal entries	Pearson Correlation	-.095	.149	.082	.201	.046	.352*	.201	.217
	Sig. (2-tailed)	.535	.328	.591	.186	.763	.018	.185	.152
	N	45	45	45	45	45	45	45	45
Actual number of forum posts	Pearson Correlation	.016	.196	.023	.259	.232	.468**	.150	.185
	Sig. (2-tailed)	.915	.197	.883	.086	.125	.001	.324	.225
	N	45	45	45	45	45	45	45	45
Actual number of private messages	Pearson Correlation	-.032	.167	-.241	.004	.045	.195	.118	-.038
	Sig. (2-tailed)	.835	.273	.112	.981	.770	.199	.441	.803
	N	45	45	45	45	45	45	45	45
Actual number of shoutbox messages	Pearson Correlation	.081	.211	-.104	.036	.189	.212	-.026	.192
	Sig. (2-tailed)	.596	.164	.498	.814	.212	.162	.867	.206
	N	45	45	45	45	45	45	45	45
Constructive/ active learning	Pearson Correlation	.559**	.461**	.409**	.489**	.602**	.315*	.519**	.239
	Sig. (2-tailed)	.000	.001	.003	.000	.000	.026	.000	.094
	N	50	50	50	50	50	50	50	50
Self-directed learning	Pearson Correlation	.468**	.165	.301*	.280*	.337*	.408**	.527**	.287*
	Sig. (2-tailed)	.001	.252	.034	.049	.017	.003	.000	.043
	N	50	50	50	50	50	50	50	50
Contextual learning	Pearson Correlation	.494**	.438**	.451**	.731**	.549**	.509**	.528**	.358*
	Sig. (2-tailed)	.000	.001	.001	.000	.000	.000	.000	.011
	N	50	50	50	50	50	50	50	50
Collaborative learning	Pearson Correlation	1.000	.310*	.339*	.402**	.574**	.404**	.434**	.298*
	Sig. (2-tailed)		.029	.016	.004	.000	.004	.002	.036
	N	50	50	50	50	50	50	50	50
Relevance	Pearson Correlation	.310*	1.000	.385**	.453**	.524**	.490**	.475**	.467**
	Sig. (2-tailed)	.029		.006	.001	.000	.000	.000	.001
	N	50	50	50	50	50	50	50	50
Reflection	Pearson Correlation	.339*	.385**	1.000	.500**	.502**	.384**	.366**	.379**
	Sig. (2-tailed)	.016	.006		.000	.000	.006	.009	.007
	N	50	50	50	50	50	50	50	50
Interaction	Pearson Correlation	.402**	.453**	.500**	1.000	.584**	.642**	.411**	.387**

	Sig. (2-tailed)	.004	.001	.000		.000	.000	.003	.006
	N	50	50	50	50	50	50	50	50
Tutor support	Pearson Correlation	.574**	.524**	.502**	.584**	1.000	.537**	.506**	.457**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.001
	N	50	50	50	50	50	50	50	50
Peer support	Pearson Correlation	.404**	.490**	.384**	.642**	.537**	1.000	.461**	.373**
	Sig. (2-tailed)	.004	.000	.006	.000	.000		.001	.008
	N	50	50	50	50	50	50	50	50
Making Sense	Pearson Correlation	.434**	.475**	.366**	.411**	.506**	.461**	1.000	.332*
	Sig. (2-tailed)	.002	.000	.009	.003	.000	.001		.019
	N	50	50	50	50	50	50	50	50
Constructivism	Pearson Correlation	.298*	.467**	.379**	.387**	.457**	.373**	.332*	1.000
	Sig. (2-tailed)	.036	.001	.007	.006	.001	.008	.019	
	N	50	50	50	50	50	50	50	50
Human resources organisation	Pearson Correlation	.477**	.344*	.315*	.238	.428**	.309*	.516**	.202
	Sig. (2-tailed)	.000	.014	.026	.096	.002	.029	.000	.160
	N	50	50	50	50	50	50	50	50
Learning environment	Pearson Correlation	.265	.514**	.288*	.443**	.285*	.362**	.271	.295*
	Sig. (2-tailed)	.063	.000	.042	.001	.045	.010	.057	.037
	N	50	50	50	50	50	50	50	50
Presence of teaching staff	Pearson Correlation	.500**	.054	.185	.085	.172	.090	.258	.017
	Sig. (2-tailed)	.000	.708	.199	.558	.232	.532	.070	.908
	N	50	50	50	50	50	50	50	50

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

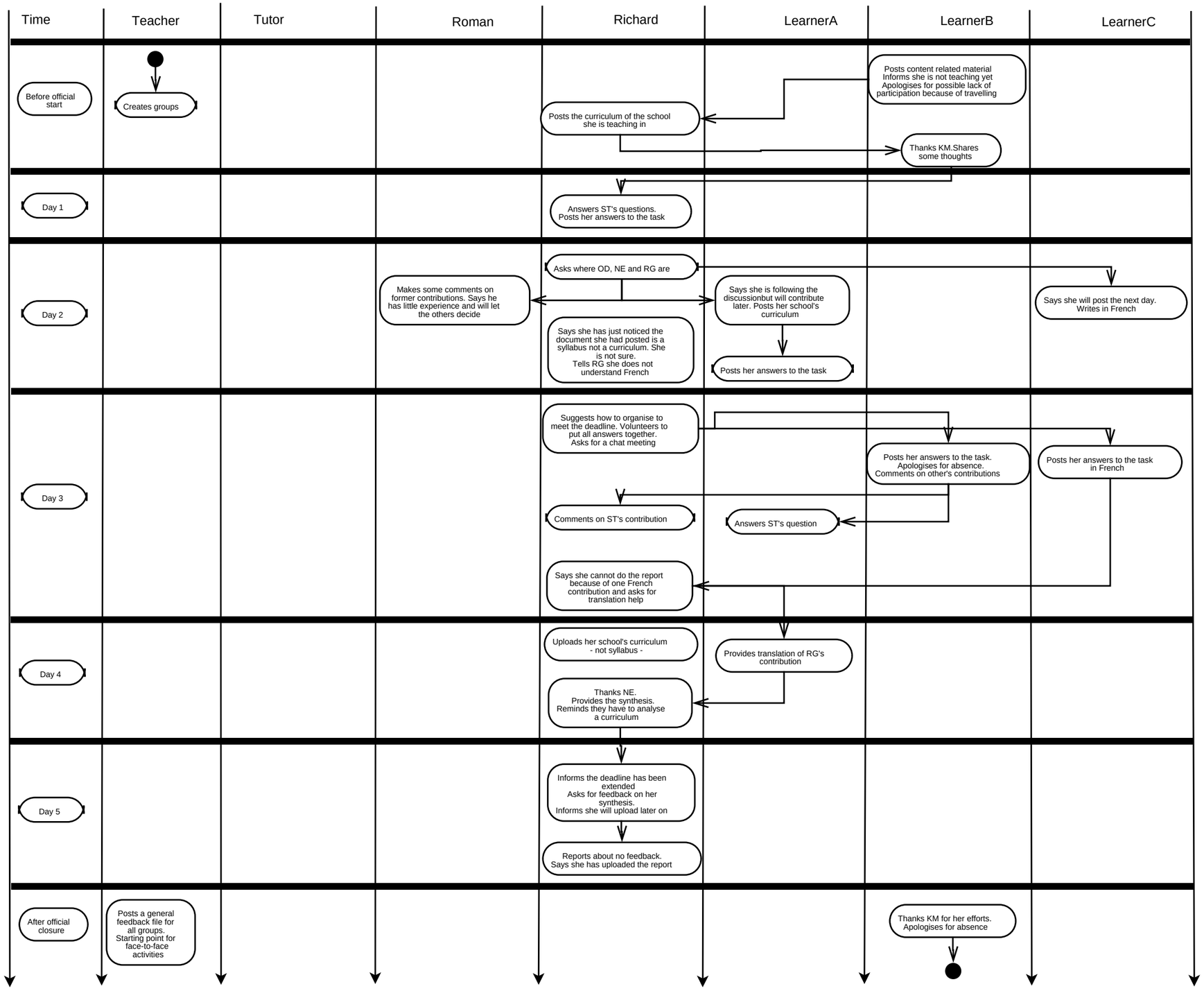
Correlations

		Human resources organisation	Learning environment	Presence of teaching staff
Frequency of use of the news	Pearson Correlation	.304*	.280*	.320*
	Sig. (2-tailed)	.032	.049	.023
	N	50	50	50
Frequency of use of the forum	Pearson Correlation	.061	.043	.024
	Sig. (2-tailed)	.673	.769	.866
	N	50	50	50
Frequency of use of the chat	Pearson Correlation	-.030	.137	.158
	Sig. (2-tailed)	.836	.349	.278
	N	49	49	49
Frequency of use of the shoutbox	Pearson Correlation	.119	.214	-.041
	Sig. (2-tailed)	.411	.136	.776
	N	50	50	50
Frequency of use of personal messages	Pearson Correlation	-.177	.144	.065
	Sig. (2-tailed)	.218	.319	.654
	N	50	50	50
Frequency of use of the calendar	Pearson Correlation	.158	-.064	.055
	Sig. (2-tailed)	.272	.661	.704
	N	50	50	50
Frequency of use of the journal	Pearson Correlation	-.027	.295*	.035
	Sig. (2-tailed)	.854	.038	.811
	N	50	50	50
Frequency of use of the library	Pearson Correlation	.025	.104	.157
	Sig. (2-tailed)	.865	.473	.278
	N	50	50	50

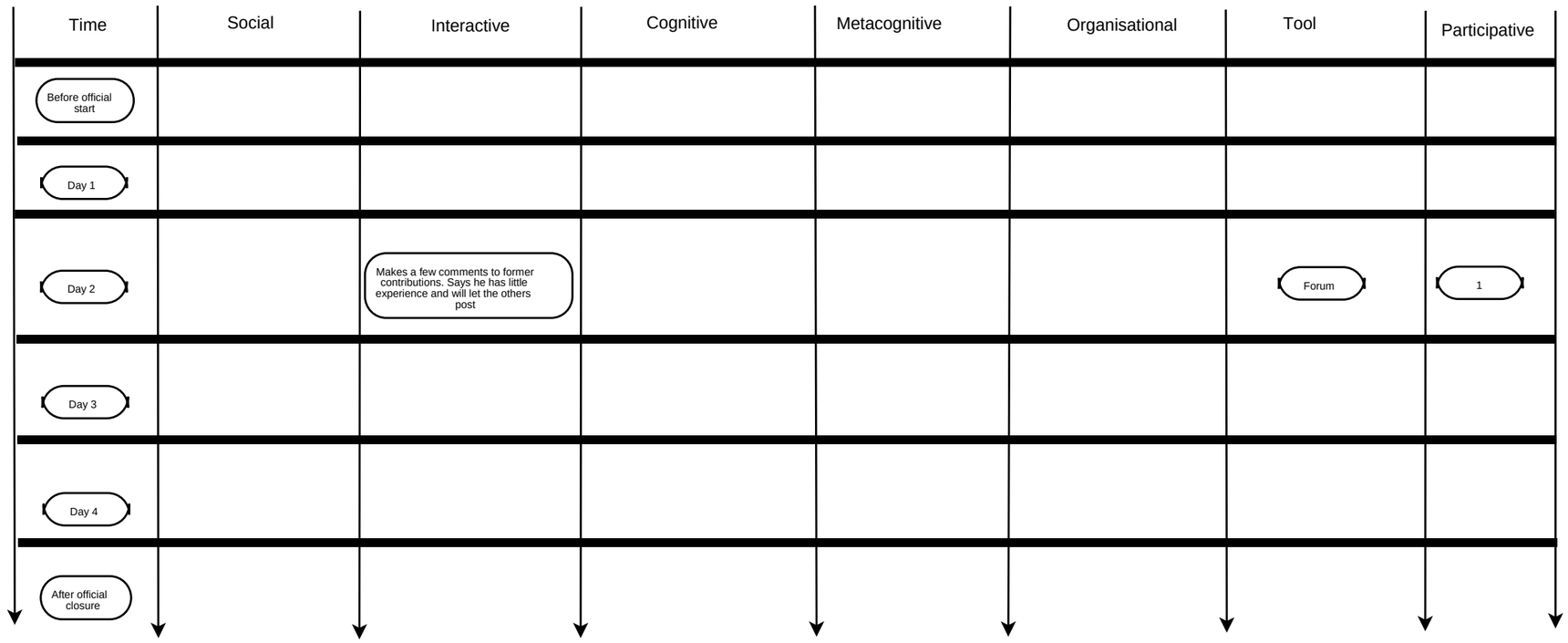
Frequency of use of the module description	Pearson Correlation	.267	.283*	.218
	Sig. (2-tailed)	.064	.049	.133
	N	49	49	49
Actual number of journal entries	Pearson Correlation	-.070	.271	-.285
	Sig. (2-tailed)	.647	.071	.058
	N	45	45	45
Actual number of forum posts	Pearson Correlation	.122	.348*	-.201
	Sig. (2-tailed)	.425	.019	.185
	N	45	45	45
Actual number of private messages	Pearson Correlation	-.061	.201	-.079
	Sig. (2-tailed)	.689	.185	.606
	N	45	45	45
Actual number of shoutbox messages	Pearson Correlation	.109	.303*	-.014
	Sig. (2-tailed)	.476	.043	.926
	N	45	45	45
Constructive/ active learning	Pearson Correlation	.642**	.297*	.442**
	Sig. (2-tailed)	.000	.036	.001
	N	50	50	50
Self-directed learning	Pearson Correlation	.614**	-.018	.346*
	Sig. (2-tailed)	.000	.903	.014
	N	50	50	50
Contextual learning	Pearson Correlation	.386**	.400**	.196
	Sig. (2-tailed)	.006	.004	.173
	N	50	50	50
Collaborative learning	Pearson Correlation	.477**	.265	.500**
	Sig. (2-tailed)	.000	.063	.000
	N	50	50	50
Relevance	Pearson Correlation	.344*	.514**	.054
	Sig. (2-tailed)	.014	.000	.708
	N	50	50	50
Reflection	Pearson Correlation	.315*	.288*	.185
	Sig. (2-tailed)	.026	.042	.199
	N	50	50	50
Interaction	Pearson Correlation	.238	.443**	.085
	Sig. (2-tailed)	.096	.001	.558
	N	50	50	50
Tutor support	Pearson Correlation	.428**	.285*	.172
	Sig. (2-tailed)	.002	.045	.232
	N	50	50	50
Peer support	Pearson Correlation	.309*	.362**	.090
	Sig. (2-tailed)	.029	.010	.532
	N	50	50	50
Making Sense	Pearson Correlation	.516**	.271	.258
	Sig. (2-tailed)	.000	.057	.070
	N	50	50	50
Constructivism	Pearson Correlation	.202	.295*	.017
	Sig. (2-tailed)	.160	.037	.908
	N	50	50	50
Human resources organisation	Pearson Correlation	1.000	.232	.368**
	Sig. (2-tailed)		.105	.009
	N	50	50	50
Learning environment	Pearson Correlation	.232	1.000	-.028
	Sig. (2-tailed)	.105		.849
	N	50	50	50
Presence of teaching staff	Pearson Correlation	.368**	-.028	1.000
	Sig. (2-tailed)	.009	.849	
	N	50	50	50

*. Correlation is significant at the 0.05 level (2-tailed). | **. Correlation is significant at the 0.01 level (2-tailed).

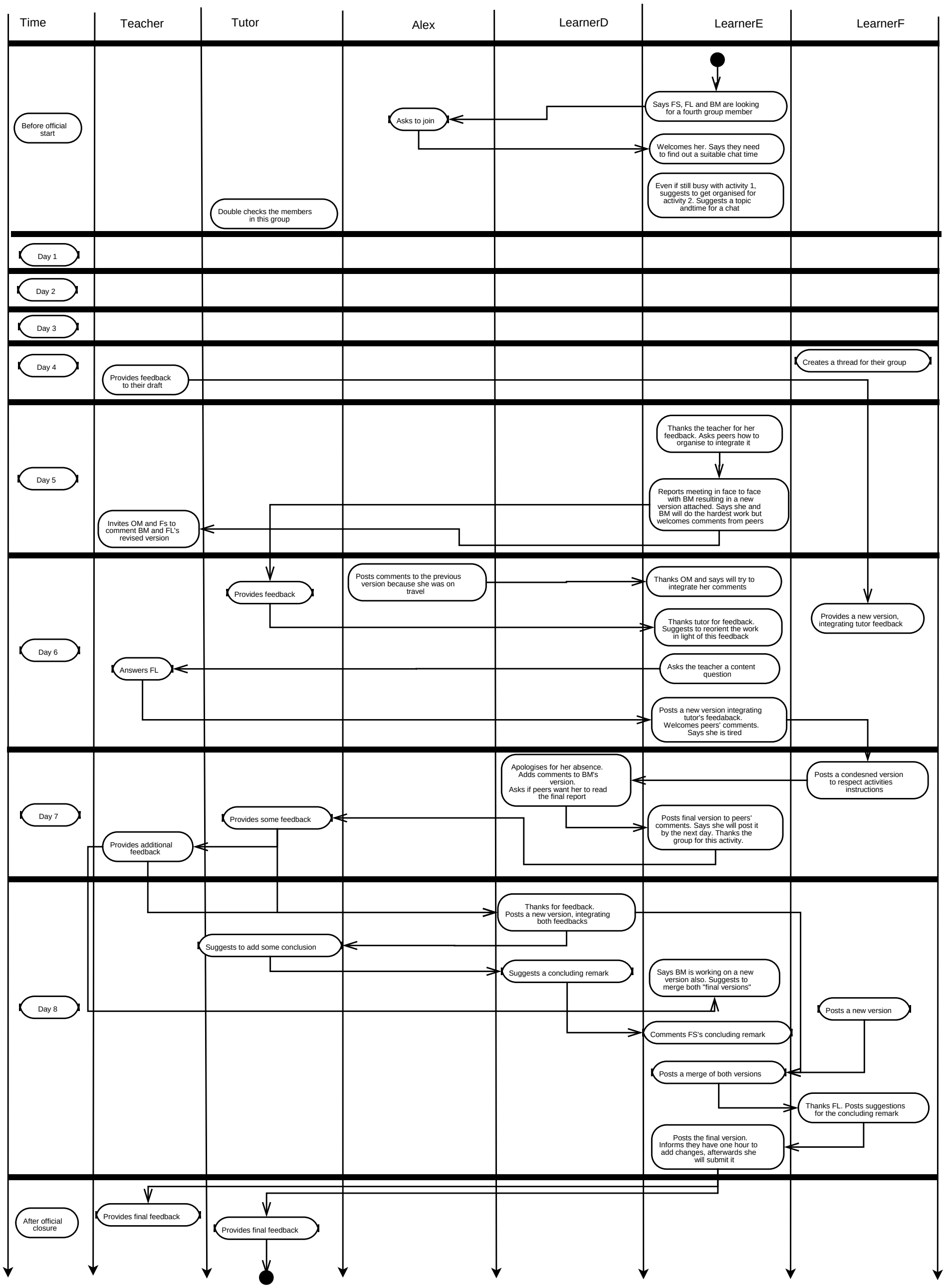
Appendix 5. Roman / Richard, group, few / lot profile, second activity, Case Study 1



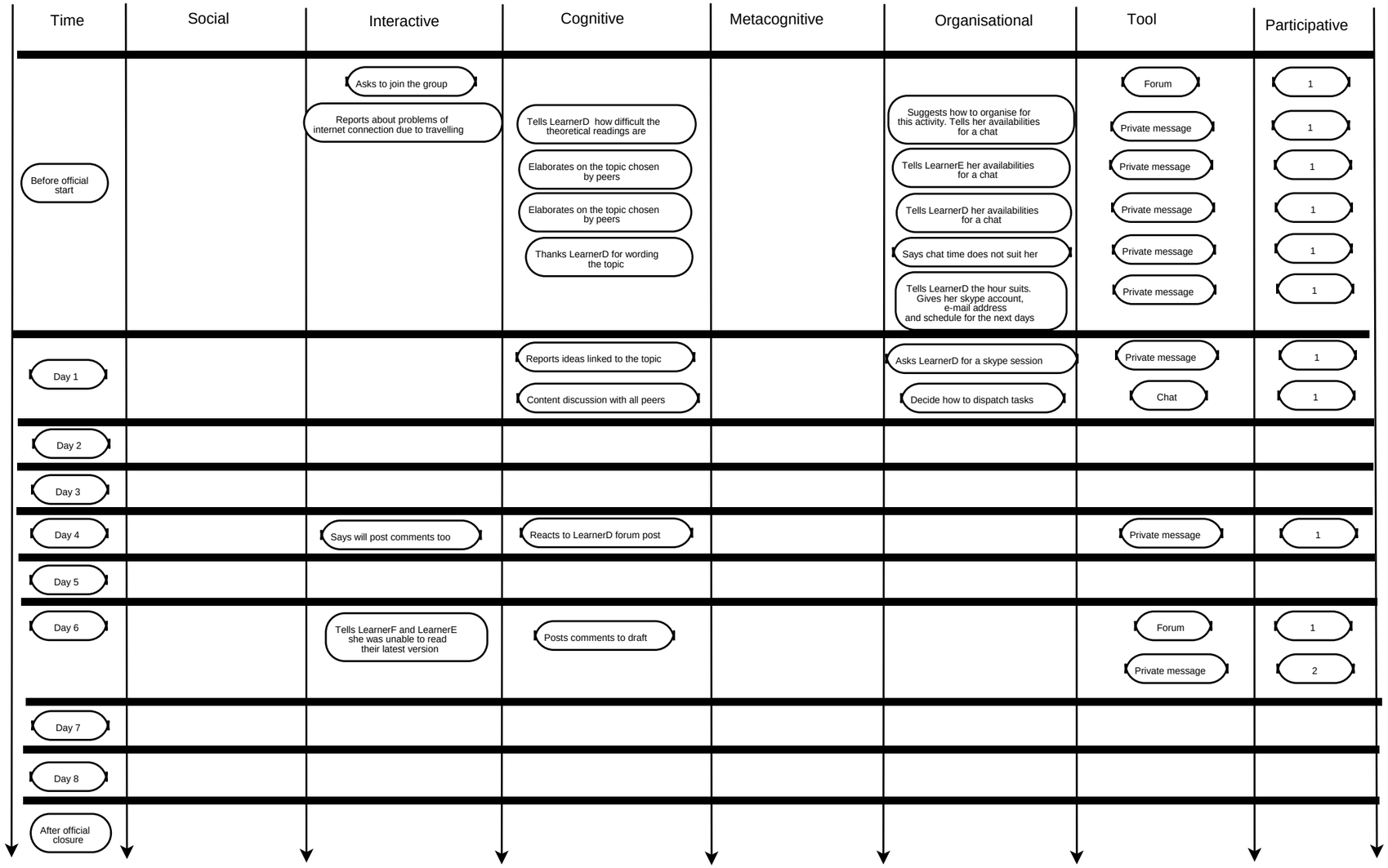
Appendix 6. Roman, “few” profile, second activity, Case Study 1



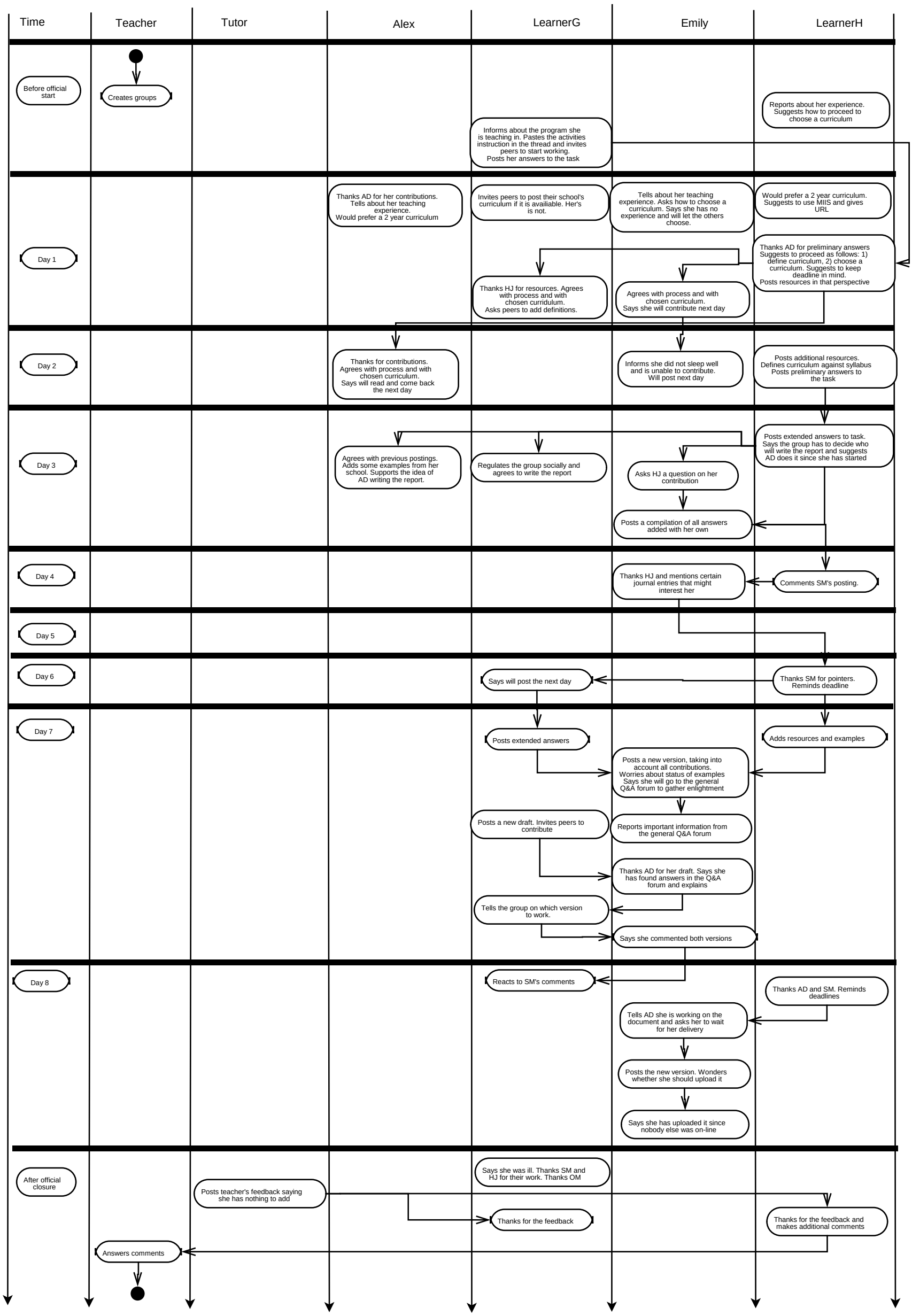
Appendix 7. Alex, group, “few” profile, first activity, Case Study 2



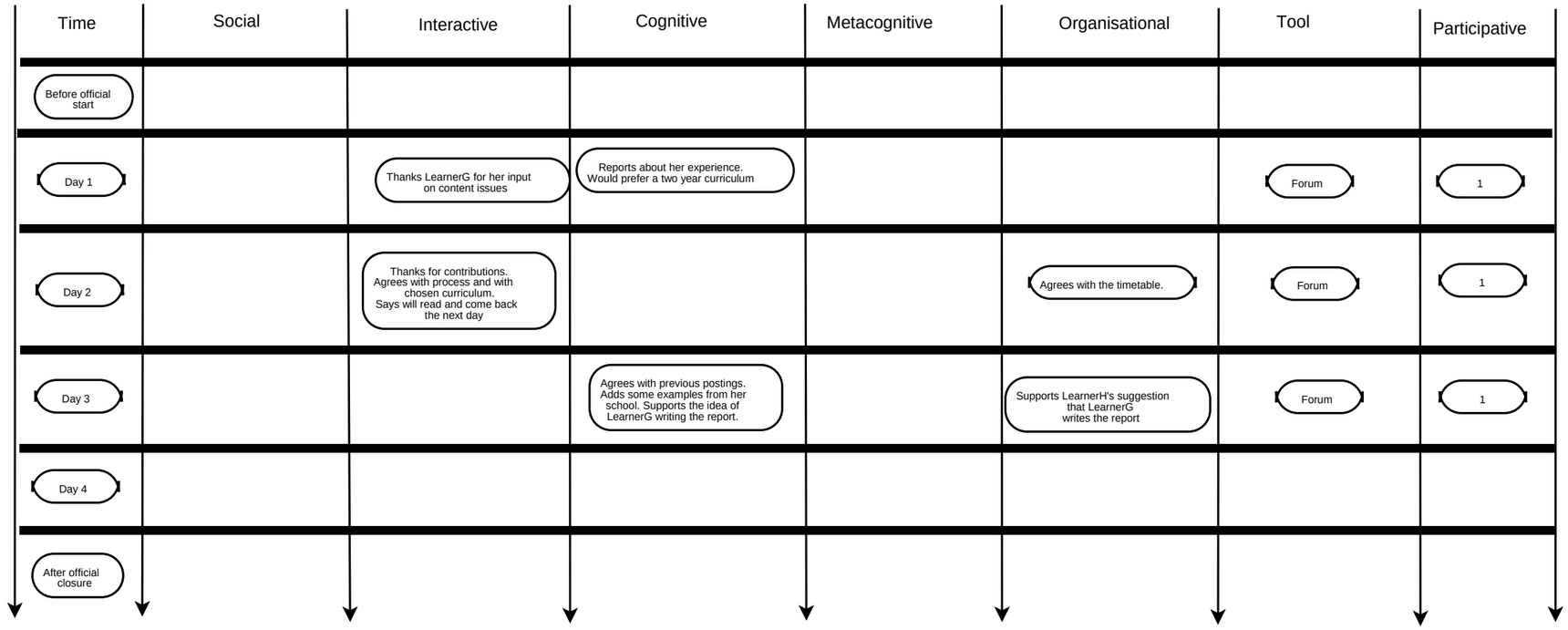
Appendix 8. Alex, “few” profile, first activity, Case Study 2



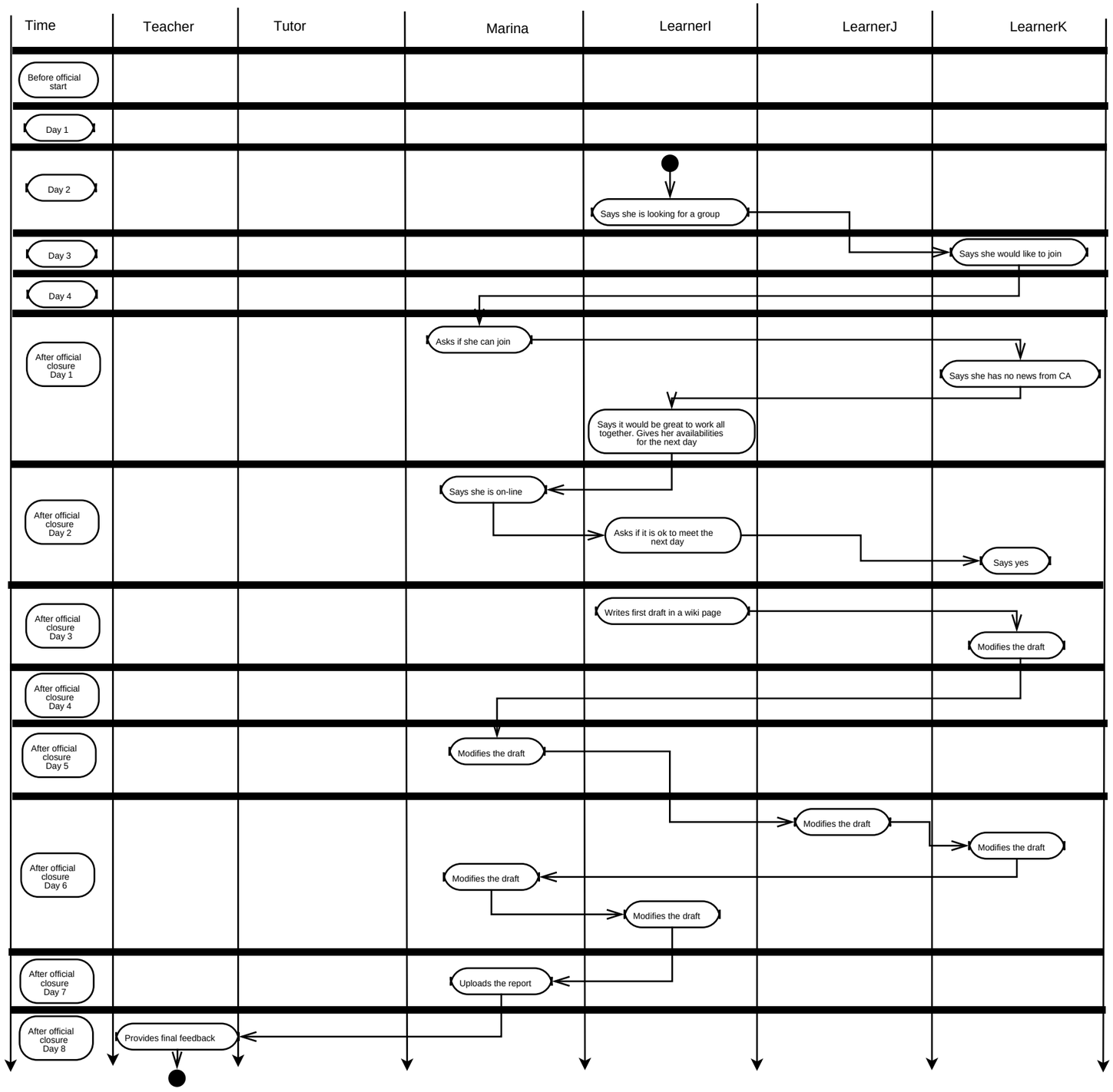
Appendix 9. Alex / Emily group, few / “average” profile, second activity, Case Study 2



Appendix 10. Alex, “few” profile, second activity, Case Study 2



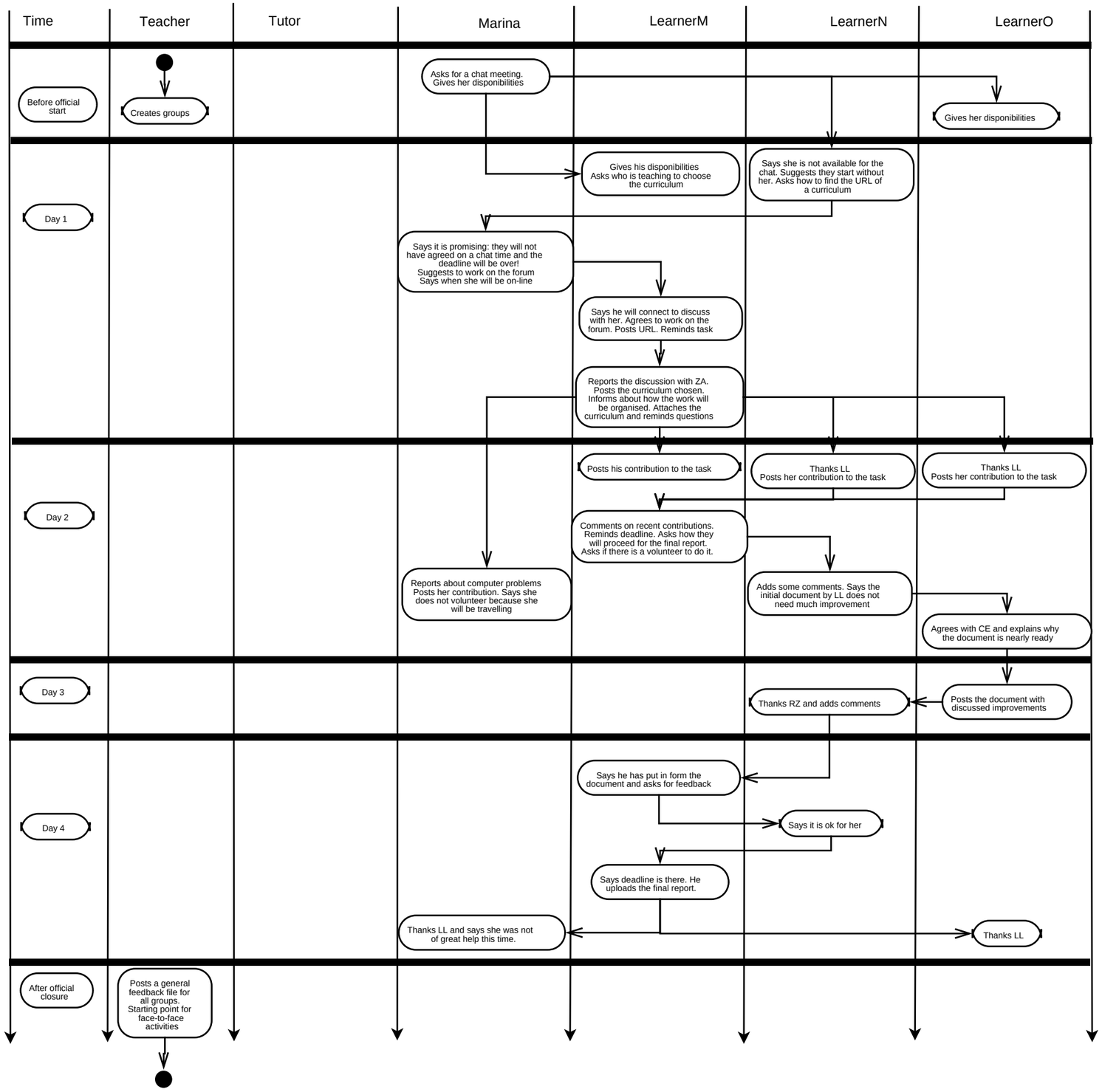
Appendix 11. Marina, group, “average” profile, first activity, Case Study 1



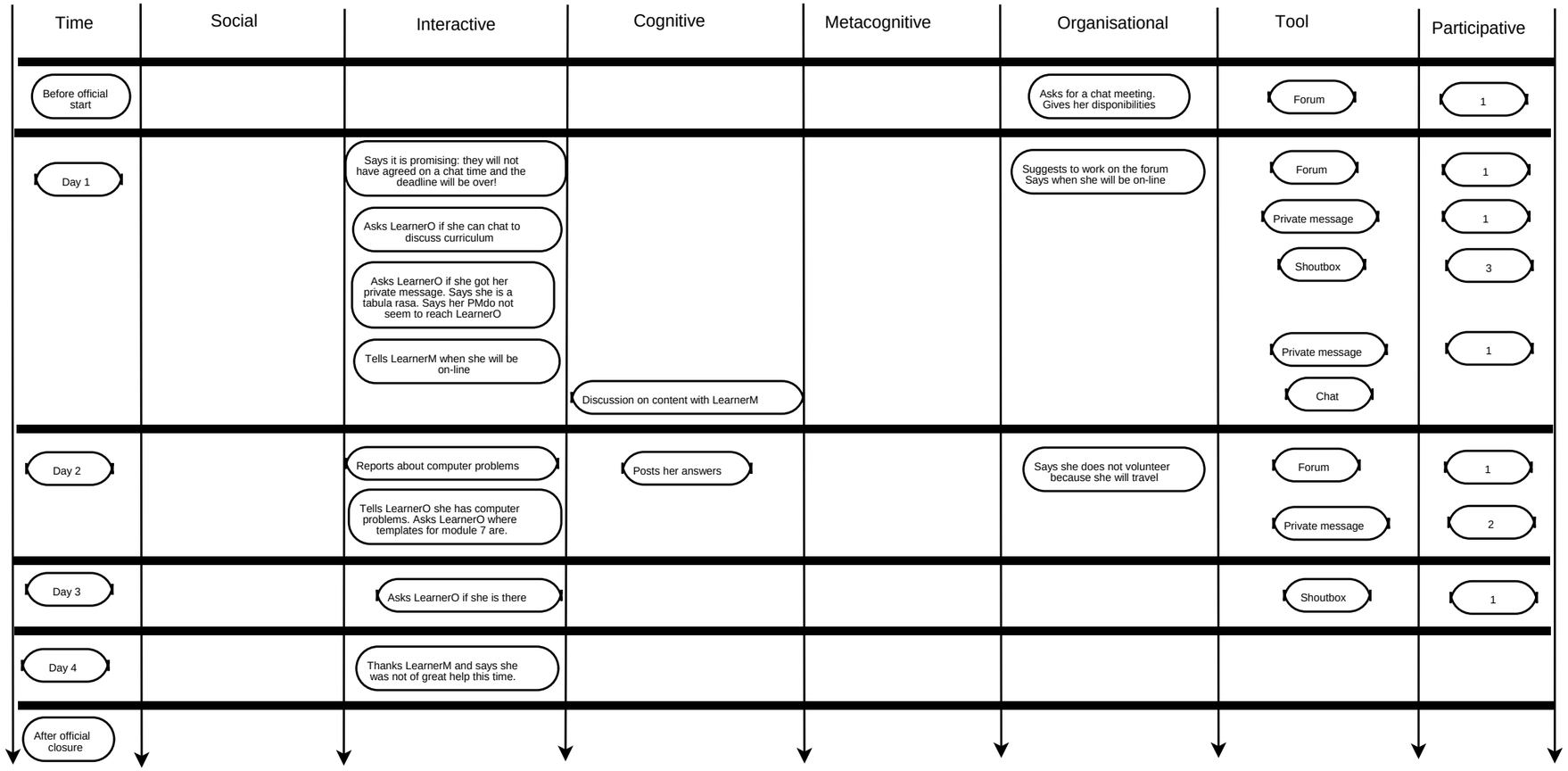
Appendix 12. Marina, “average” profile, first activity, Case Study 1

Time	Social	Interactive	Cognitive	Metacognitive	Organisational	Tool	Participative
Before official start							
Day 1							
Day 2							
Day 3							
Day 4							
After official closure Day 1		Asks if she can join the group					
After official closure Day 1		Says she is on-line Asks LearnerJ if she is in a group. Asks her how she is doing with the readings Tells LearnerJ for her it is ok if she joins the group			Says she hopes to start group work that day Asks if they shall meet on-line	Forum Private message Private message	1 1 2
After official closure Day 2		Asks LearnerJ and LearnerI what they should start with Asks how to save the chat	Content discussion		Asks if they shall meet in the chatroom. Asks if she creates a wiki page	Shoutbox Chat Shoutbox	2 1 1
After official closure Day 3							
After official closure Day 4							
After official closure Day 5					Asks if they shall meet in the chatroom. Tells LearnerI the wiki page is closed on her computer	Shoutbox	2
After official closure Day 6		Answers LearnerK it is ok to upload the report				Private message	1

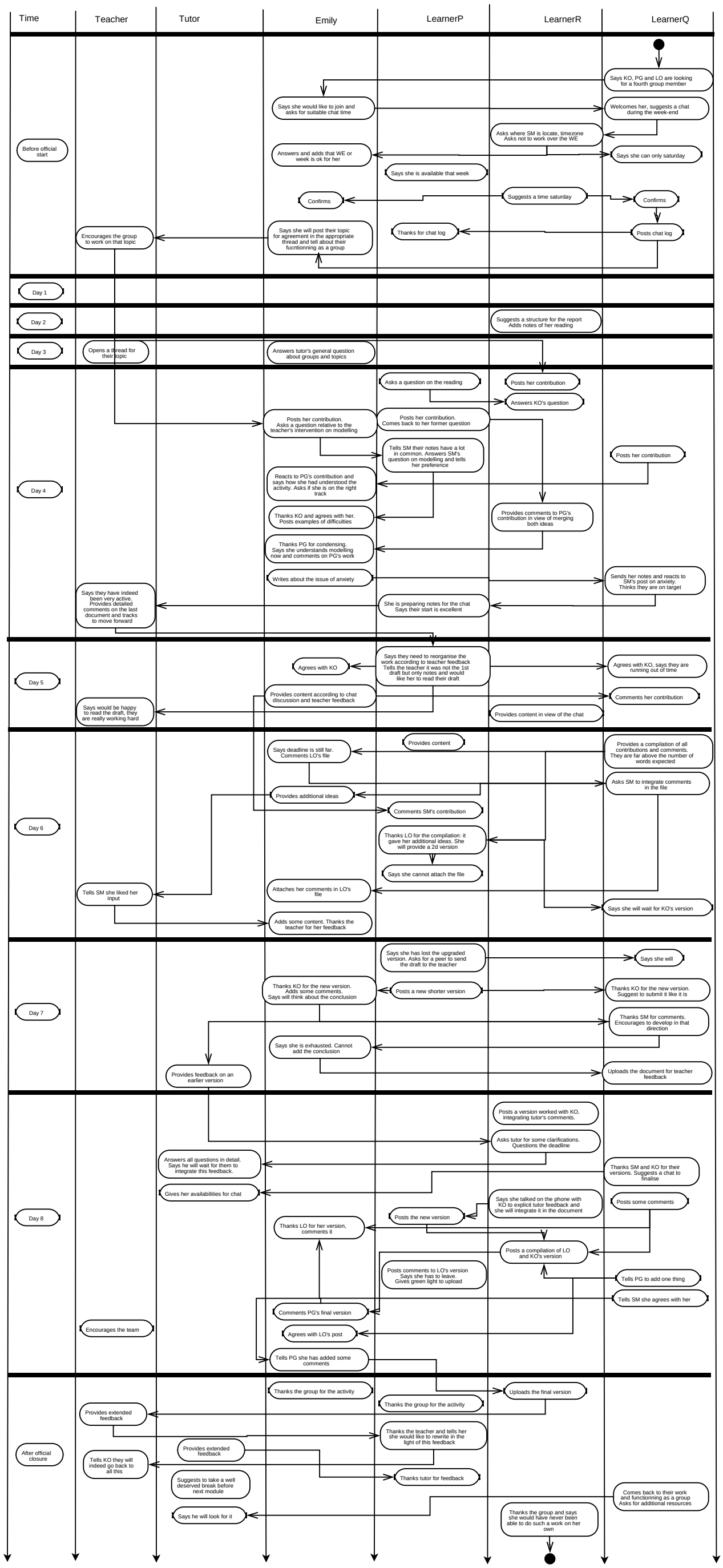
Appendix 13. Marina, group, “average” profile, second activity, Case Study 1



Appendix 14. Marina, “average” profile, second activity, Case Study 1



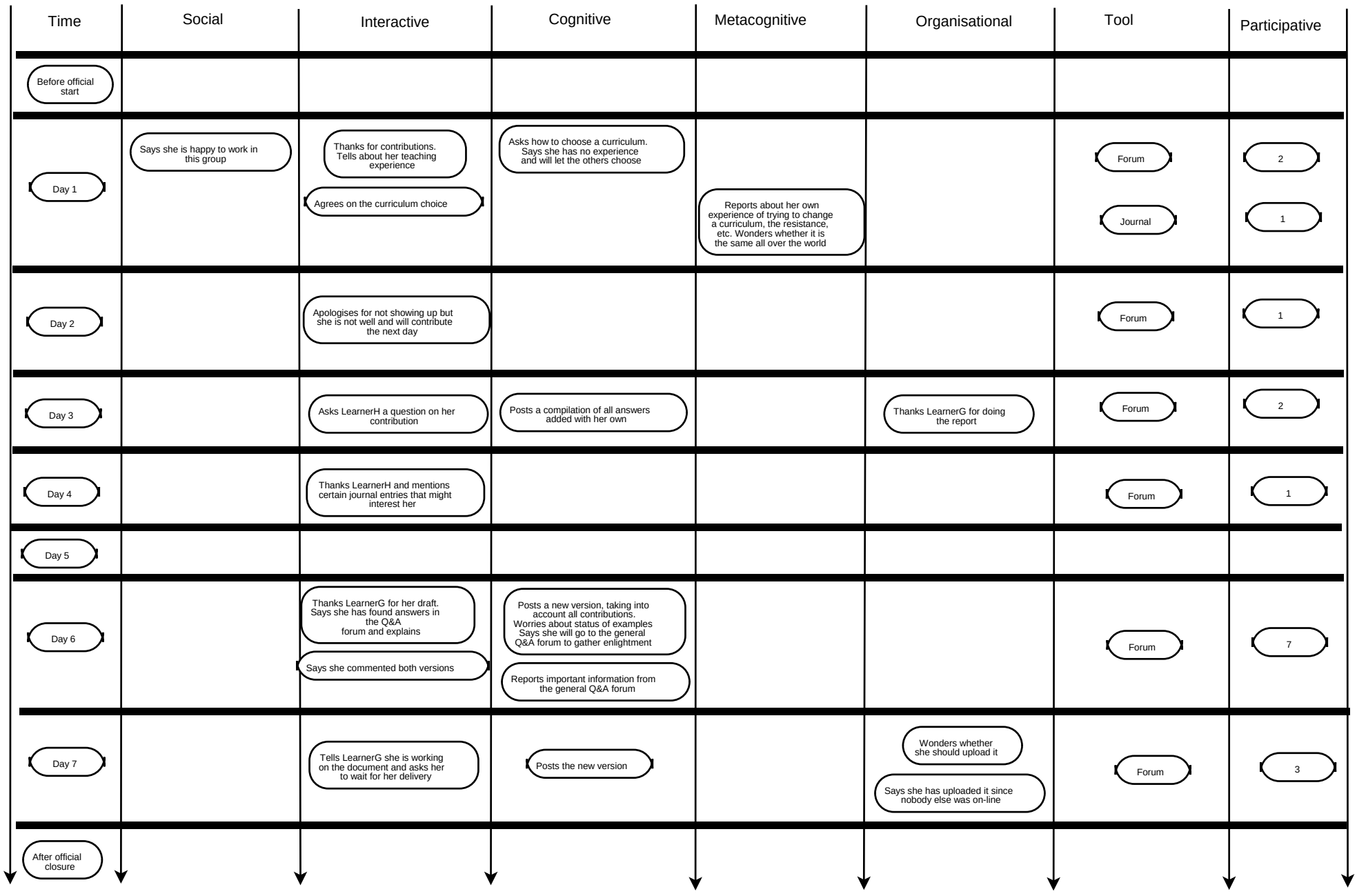
Appendix 15. Emily, group, “average” profile, first activity, Case Study 2



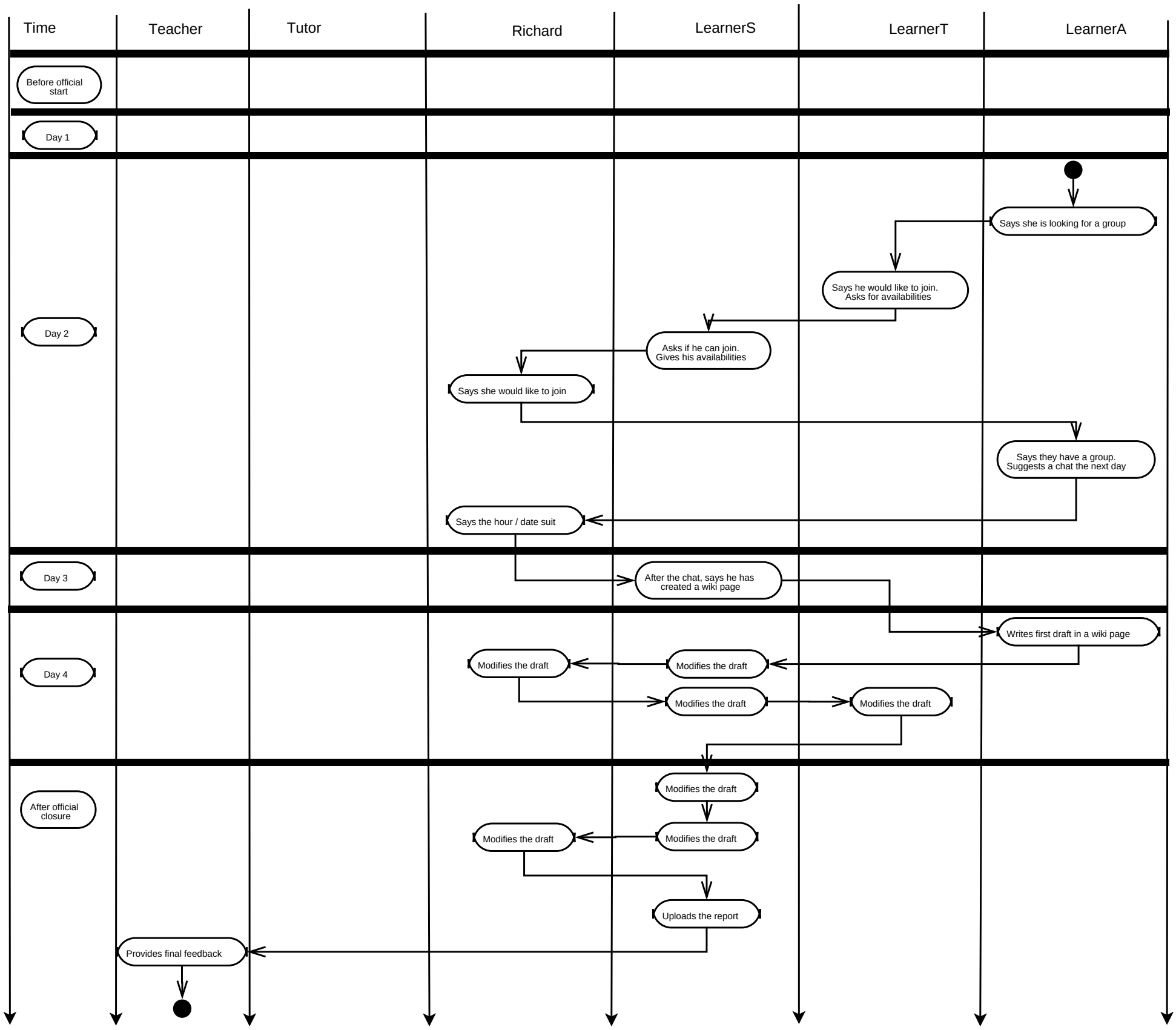
Appendix 16. Emily, “average” profile, first activity, Case Study 2

Time	Social	Interactive	Cognitive	Metacognitive	Organisational	Tool	Participative
Before official start		Says she would like to join the group Confirms chat hour Discuss interpreting differences between Europe and the States Says she will post their topic for agreement in the appropriate thread and tell about their fucntionning as a group	Tells LearnerP she is also struggling with the readings Define the difficulty they want to deal with		Asks for suitable chat time Answers regarding her timezone and adds that WE or week is ok for her to chat	Forum Private Message Forum Chat Forum	2 1 1 1 1
Day 1				Reports about an error of one of her colleague and tries to understand it in the light of the module's readings		Journal	1
Day 2	Reports about consulting other journals and seeing she is not theonly one to take on her sleep to complete activities. Reports it is worth it					Journal	1
Day 3	Feels inadequate	Answers tutor's general question about groups and topics		Reflects on content details : meaning of words Continues her reflexion on words' meaning		Journal Forum	2 1
Day 4		Posts her contribution. Asks a question relative to the teacher's intervention on modelling	Reacts to LearnerR's contribution and says how she had understood the activity. Asks if she is on the right track Thanks LearnerP and agrees with her. Posts examples of difficulties Thanks LearnerR for condensing. Says she understands modelling now and comments on PG's work Writes about the issue of anxiety			Forum	7
Day 5		Agrees with LearnerP	Provides content according to chat discussion and teacher feedback			Forum	1
Day 6		Thanks the teacher for her feedback	Comments LearnerQ's file Attaches her comments in LearnerQ's file Adds some content		Says deadline is still far	Forum	5
Day 7		Thanks LearnerP for the new version Says she is exhausted. Cannot add the conclusion	Adds some comments. Says will think about the conclusion			Forum	2
Day 8		Thanks LearnerQ for her version, comments it Agrees with LearnerQ's post Tells LearnerR she has added some comments	Comments LearnerQ's version Comments LearnerR's final version			Forum	7
After official closure		Thanks the group for the activity				Forum	1

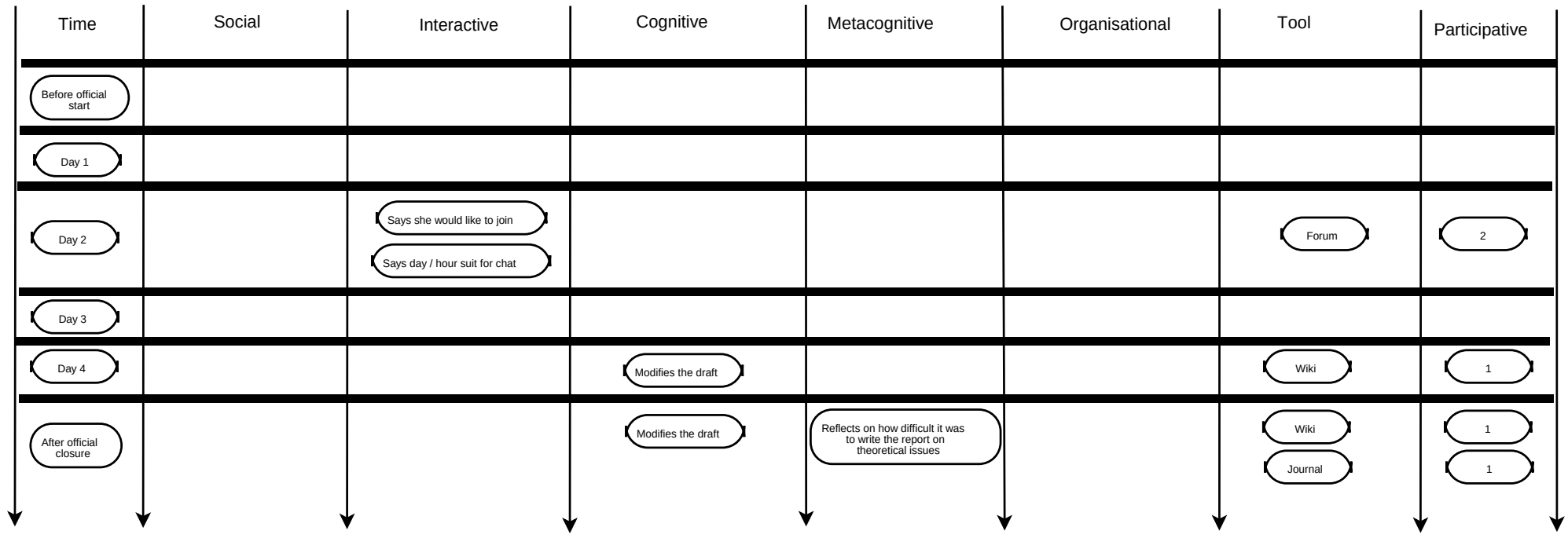
Appendix 17. Emily, “average” profile, second activity, Case Study 2



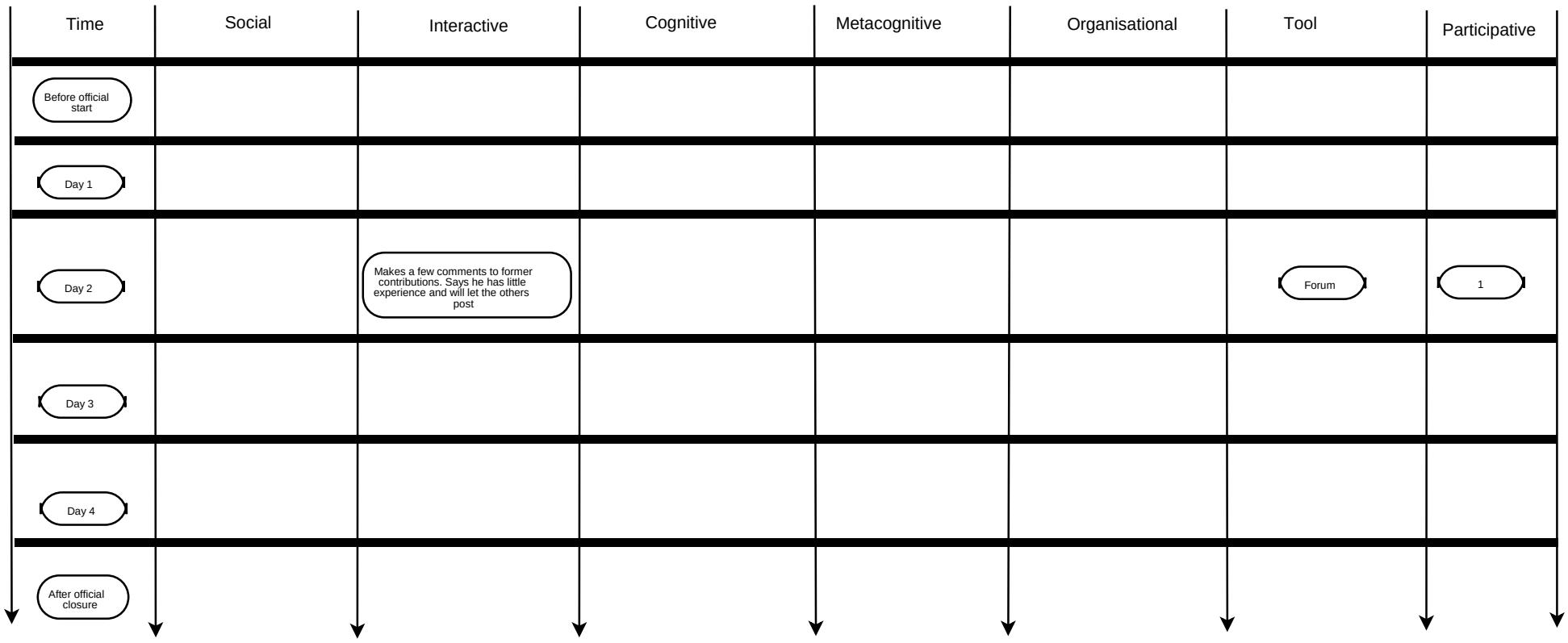
Appendix 18. Richard, group, “a lot” profile, first activity, Case Study 1



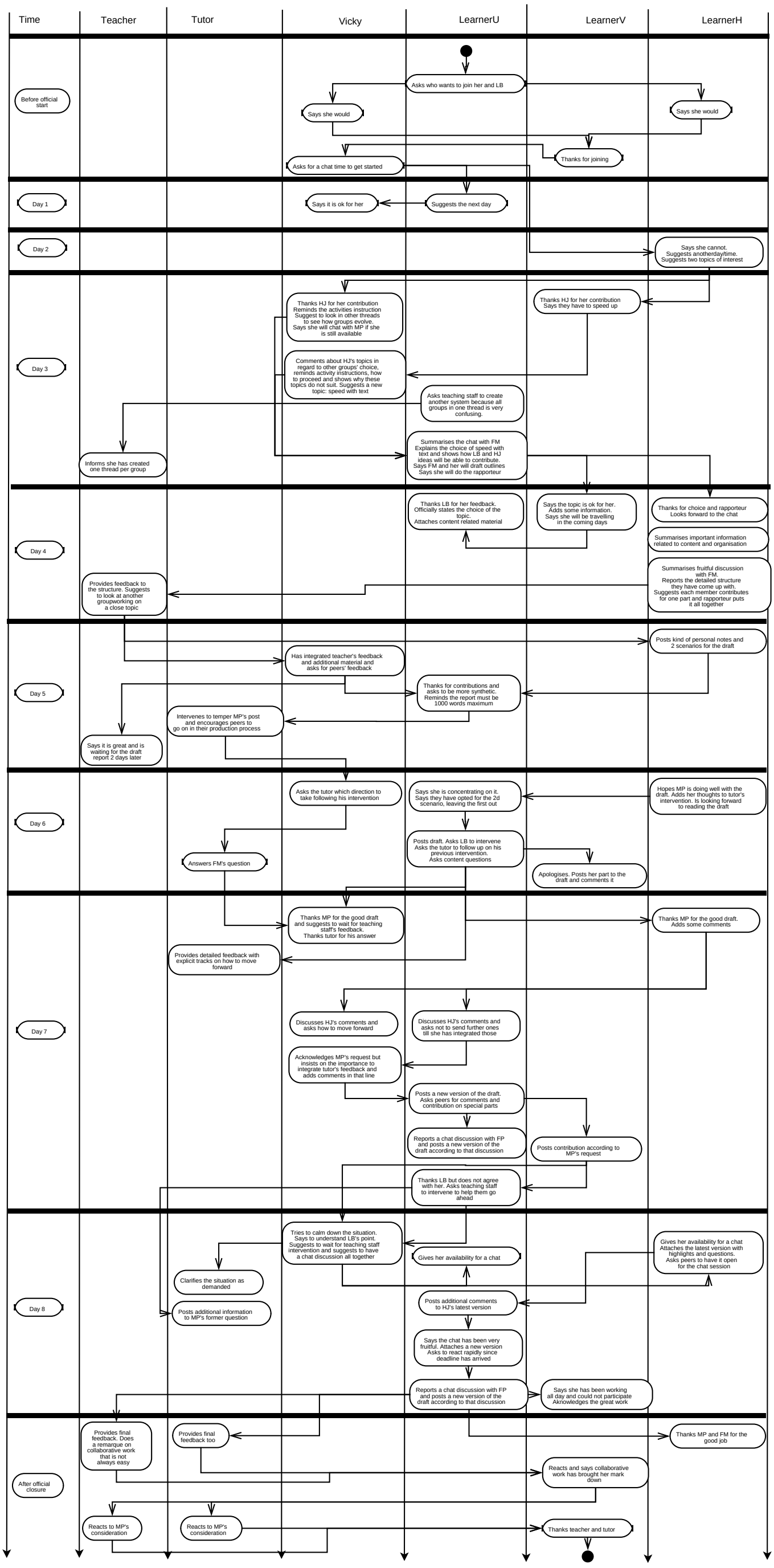
Appendix 19. Richard, “a lot” profile, first activity, Case Study 1



Appendix 20. Richard, “a lot” profile, second activity, Case Study 1



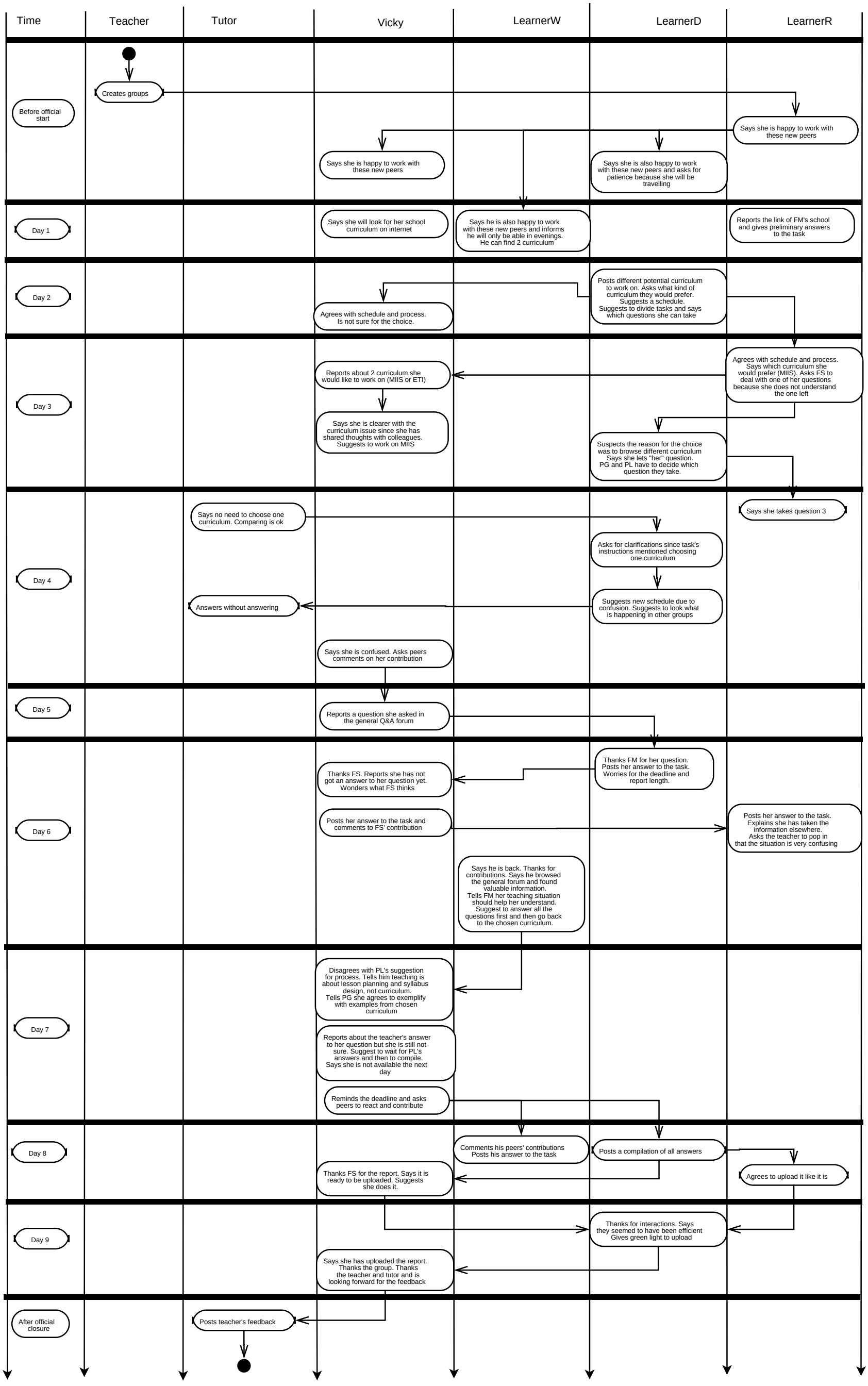
Appendix 21. Vicky, group, “a lot” profile, first activity, Case Study 2



Appendix 22. Vicky, “a lot” profile, first activity, Case Study 2

Time	Social	Interactive	Cognitive	Metacognitive	Organisational	Tool	Participative
Before official start		Answers LearnerU's message. Says she would like to join the group			Asks for a suitable chat time to get started	Forum	2
Day 1					Says the chat hour suits her	Forum	1
Day 2						Forum	1
Day 3		Thanks LearnerH for her contribution Reminds the activities instruction Suggest to look in other threads to see how groups evolve	Comments about LearnerH's topics in regard to other groups' choice and shows why these topics do not suit. Suggests a new topic: speed with text		Says she will chat with MP if she is still available Worries about organisation and content: no chat, no topic chosen	Forum Journal	2 1
Day 4			Discuss choice of the topic with LearnerH			Chat	1
Day 5			Has integrated teacher's feedback and additional material and asks for peers' feedback			Forum	1
Day 6		Asks the tutor which direction to take following his intervention				Forum	1
Day 7		Thanks LearnerU for the good draft and suggests to wait for teaching staff's feedback. Thanks tutor for his answer	Discusses LearnerH's comments and asks how to move forward Acknowledges LearnerU's request but insists on the importance to integrate tutor's feedback and adds comments in that line Discusses content with LearnerU			Forum Chat	4 1
Day 8		Tries to calm down the situation. Says to understand LearnerV's point. Suggests to wait for teaching staff intervention	Discusses content with LearnerU and LearnerH Discusses content with LearnerU		Suggests to have a chat discussion all together	Forum Chat	1 2
After official closure							

Appendix 23. Vicky, group, “a lot” profile, second activity, Case Study 2



Appendix 24. Vicky, “a lot” profile, second activity, Case Study 2

Time	Social	Interactive	Cognitive	Metacognitive	Organisational	Tool	Participative
Before official start	Says she is happy to work with these new peers					Forum	1
Day 1		Says she will look for her school curriculum on internet				Forum	1
Day 2			Is not sure for the curriculum choice		Agrees with schedule and process	Forum	1
Day 3		Reports about 2 curriculum she would like to work on (MIIS or ETI)	Says she is clearer with the curriculum issue since she has shared thoughts with colleagues. Suggests to work on MIIS			Forum	2
Day 4			Says she is confused. Asks peers comments on her contribution			Forum	1
Day 5			Reports a question she asked in the general Q&A forum			Forum	1
Day 6		Thanks LearnerD. Reports she has not got an answer to her question yet. Wonders what LearnerD thinks	Posts her answer to the task and comments to LearnerD' contribution			Forum	2
Day 7		Disagrees with LearnerW's suggestion for process. Tells LearnerR she agrees to exemplify with examples from chosen curriculum Reports about the teacher's answer to her question but she is still not sure. Suggest to wait for PL's answers and then to compile. Says she is not available the next day	Tells LearnerW teaching is about lesson planning and syllabus design, not curriculum.		Says she is not available the next day Reminds the deadline and asks peers to react and contribute	Forum	4
Day 8		Thanks LearnerD for the report	Says the report is ready to be uploaded		Suggests to upload the report	Forum	1
Day 9		Thanks the group. Thanks the teacher and tutor and is looking forward for the feedback			Says she has uploaded the report	Forum	2
After official closure							