CONTRACT N° 25093-CP-2-97-1-IT-ODL

SOCRATES - MAILBOX SPECIFICATIONS

JULY 1998

The Socrates - Mailbox project
A two-year Observatory project in the context of the ODL sub-programme of the SOCRATES Programme of the DG 22 of the European Commission, the Socrates - Mailbox project started in September 1996. It aims at studying the use of electronic communication systems in Primary and Secondary school environments, through an ethnographic approach. The experiences of 17 schools have been studied in six European countries.

The Socrates - Mailbox partnership

Seven organisations contribute to the Socrates - Mailbox project:

Eric Barchechath, Associate in Atelier (Italy) — formerly OpenStudio— is main Contractor and Project Manager of Mailbox. An international consultant, he has expertise in the field of innovation in education and training, engineering of Open and Distance Learning (ODL) systems, Information and Communication Technologies (ICT) and social acceptance of technology.

Rossella Magli (Researcher), Stéphanie Laurent (Assistant Researcher) and Yves Winkin (Director) of the Laboratoire d'Anthropologie de la Communication-LAC at the Université de Liège (Belgium). The LAC is in charge of Scientific Coordination for the project. The expertise and main research domains of the LAC focus on: ethnographic approaches to communication in urban settings, inter-cultural communication, sociology of education, innovation in education and training.

Janet Jenkins, Consultancy in Distance Education (CIDE) (UK) has been for long involved in Open and Distance Learning. An international consultant, she developed her activities in designing and implementing Open and Distance Learning systems in diverse educational contexts, and now spends much of her time conducting feasibility and assessment studies for ODL and working on technology-based development in education and training.

Inger Lise Stieng (Researcher) and Sigmund Lieberg (Director) are part of the Nasjonalt LaeremiddelSenter-NLS (National Centre for Educational Resources) (Norway). NLS is concerned as much with pedagogical documentation as with technological resources for education. The centre also conducts research in specific pedagogical questions and produces learning support for distance education.

Dagmar Hexel, Olivier de Marcellus, Marc Bernoulli (Researchers) and Fiorella Gabriel (Director) in the Centre de Recherches Psycho-Pédagogiques - Direction Générale du Cycle d'Orientation (CRPP-DGCO) (Switzerland). CRPP is a research department internal to the Geneva Lower-Secondary school system (17 lower-secondary schools, 11,000 pupils, 1,700 teachers). CRPP develops a wide range of research on pedagogical engineering, educational use of technology in school contexts, classroom organisation and its impact on learning performance, etc.

Pierre Dunand-Filliol (Researcher) and Raymond Morel (Director) of the Centre Informatique Pédagogique (CIP) in Geneva (Switzerland). The CIP is the resource centre which manages educational technology for all the Geneva area and has special responsibility in teacher training related to technology.

Michel Arnaud (Researcher) and Jacques Perriault (Director) at the Laboratoire de Recherche sur l'Industrie de la Connaissance of the Centre National d'Enseignement à

Distance (CNED, France). Their role in the project is that of advisers and assessors of project results and performance.

ACKNOWLEDGEMENTS

to the children, teachers and staff of

Arnestad skole, Arnestad — Athénée "Adolphe Max", Bruxelles
Collège Claparède, Genève — Cycle d'orientation de Pinchat, Genève
Cycle d'orientation des Voirets, Genève — Dokka ungdomsskole, Dokka
Droemtorp videregaaende skole, Droemtorp — Ecole de Corrençon-en-Vercors
Ecole Fondamentale "Emile André", Bruxelles — Ecole Les Lèches, Villard-de-Lans
Ecole primaire des Franchises, Genève — Hill Mead School, London
The Netherhall School, Cambridge — Richmond Park School, Glasgow
Scuola Elementare "Mario Musolesi", Panico,
Scuole Medie Statali "Guido Reni", Bologna — Shawlands Academy, Glasgow

A very special thanks to:

Luisa Barbieri – François Bocquet – Thierry Briffod — Jean-Jacques Collet
Luciana Conti — Richard Coton — Anna-Maria Degli Esposti
Jacky Duvillard — Philippe Ector — Brian Gillinder — Lilliam Hurst
Roseline Kornmann — Claudeline Magni — Michelle Masil
Nathalie Messori — Mauro Nanni — Marie-Claude Ollivier-Pallud
René Ollivier-Pallud — Giuliano Ortolani — M. Poels — Maggie Pollard
Mme Quinart — Phil Redman — Bruno Rudolf von Rohr
Cheryl Stonebridge — Franco Tinarelli — Roberta Venturi — Marc Wallace
Alastair Wells — Magdalena Wittwer — Patrizia Zanasi and the Norwegian staff

who accepted distractions from their work and contributed
through their behaviour, ideas, experiences and passion
for Education to our work.

Special thanks to

Directorate General XXII
SOCRATES - ODL
SOCRATES Technical Assistance Office
Office Fédéral de L'Education et de la Science - Switzerland

This report is written thanks to the contributions of all the SOCRATES Mailbox Partners. The opinions expressed and the analyses put forward fall under the exclusive responsibility of the editors-in-chief:

Eric Barchechath — Rossella Magli

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Introduction

The Mailbox Project has been in the unique position of observing information and communication technologies (ICT) in practice by children and students from 5 to 18. This research has spanned over eighteen schools of the primary and secondary levels in six different European countries : Belgium, France, Norway, United Kingdom and Switzerland.

Done during the most part of 1997, these observations brought to light a lot of material that is analysed in a « Synthesis Report » (1) available both in English and in French. An electronic version can be downloaded from the Project's Web Site. A more traditional paper version is edited by NLS (2), a partner of the Mailbox Project who takes care of the linguistic publication of this report.

The observations have shed some light on the way electronic mail and Internet software available in a number of primary and secondary schools are being put at use in the context of real life practice in the classroom. They allow us to suggest a number of complementary recommendations about the specifications of most software packages in use today.

It is quite obvious (and we shall not be so naive as to be astonished about this) that e-mail and browsing software packages have never taken into account the specific needs of educational settings. From this situation follows that these information and communication technologies products, whether commercial or not, all are governed by a logic of supply that is mostly driven by the needs of desktop work at the office rather than by the necessities of home use. They are geared towards an abstract user, basically a "computer literate" (in English in the text) or a user sufficiently motivated by information technologies to take the strain of understanding and mastering the intricacies and idiosyncrasies of professional software. More seriously: software vendors feign to believe that to disseminate on a large scale an immature software tool will be possible without a fundamental reshaping and rethinking of their basic development principles.

ICT in educational systems follow a sinus-shaped pattern: on one side, shortcomings reinforce for a long time the resistance of potential users and, on the other, promotional hype that tries to hide an inefficient engineering slows even more the penetration of technology in education and learning circles. The obsession with short-term returns is a very negative reinforcement in this context: it tries to make users believe that information technology (IT) systems and their applications can be used so as to say off the shelf and that they ought to be effective with just any kind of audience without any specific tailoring.

Reality is, of course, is far from marketing hyperbole: most real users are disheartened by complex technical settings that are not meant for them and rates about domestic purchases of IT appliance and software say nothing about real usage. Those who look behind the curtain very well know that actual benefits are very scarce.

Even in the office, if one looks closely at what is done with computers (except for games) one sees that, most of the time, only one and, more rarely, two applications are used and in less than a creative way.

Let's take the example of word processors. Real day to day use is content with the operations of a virtual typewriter: texts can be scrutinised on the screen, easily corrected, stored and printed. Desktop publishing resources or rarely used, typographical rules mostly ignored, tables built up in an empirical way, and son on. The possibility of mastering font shapes and styles has been quickly abandoned since it has often lead to hardly readable documents. A negative evolution that is also verified with small children using computers.

All those who have followed the development of software packages during the last twenty years are witnessing the progressive worsening of these programs towards a useless complexity, a trend that has accelerated during the last ten years. Functions multiply without producing a truly useful tool. Here lies the catch: to be able to achieve more does not necessarily means to fare better.

When one reflects on these matters, one should be more careful about what users are *actually doing*. It is of course mostly an illusion to try to drive novelty by hypothesising on what one believes users are *waiting for*. In a field driven by the unfortunate rationale of innovation, the most important rule is: what is possible has to be done, never mind the costs or the consequences. To say this with other words, we are dealing with a drive that obeys the contemporary principles of linear scientific progress and its limiting circumstantial ethics.

Obviously, software vendors are obsessed by their clients' needs, by how and when their clients use their products and by how they, as providers, can make their products ever more useful. Let us take the example of VCR producers who have achieved pretty a well-reasoned progress in the ease of use and user-friendliness of their machines. These improvements have made their appliances more and more comfortable to use. As a consequence, many have prophesied that future generations would learn to handle VCR much faster than the preceding one. Reality is completely different: new generations do better because the procedures to use the new machines are less complicated !

This explains why we think that the few pages that follow may be of interest to software editors and producers. They may help them to reflect on some features displayed by their products, feature that do not respond to users needs: the very needs that originate from the applications they supply to users.

The fact that most of our observations have been dealing with the inadequacies of software used by children should not dishearten them. Let us remind them that the most striking advances made with the user-friendliness of computers have happened through the pioneering work done with children at the Xeroc PARC (Rank Xeroc's Palo Alto Research Centre in San Jose, California). It is perhaps not entirely wrong to think that something that is not good for a child will not be good for an adult as well.

The following text will try to reflect on a number of features and software solutions that are questionable. These features are of a mostly cognitive nature and they are considered from the point of view of the sequences of manipulation they require from their young users, the emitters or receptors of messages.

Let us sum up our points :

(1) Today's e-mail systems do not allow for a sufficient customisation or personalisation of exchanges, especially for what concerns the identification of senders and receivers of messages.

(2) The way mail is managed in most e-mail software packages does not allow for resources and possibilities that would be really useful in classrooms.

(3) With WWW browsers, the conventions used to save "bookmarks", when the user wishes to save the locators of pages surveyed on the Web, do not follow today's standard procedures used in most applications.

(4) Managing messages and their attachments do not take into account the intentions of users and make it a complex task to perform even basic chores in e-mail management.

(5) The "follow" function is, in most systems, based on a flawed application of the thinking followed by young users when they dispatch their messages.

(6) "Attachments" are not meant to remain permanent and autonomous entities that stay clearly identified in the course of their use throughout the application and the machine's system.

(7) Finally, we shall come up, after a careful assessment of our observations, with ways to develop a management tool that could allow teachers to follow closely the work being done by their students in their classes.

Our conclusion will be considering more general observations on the implicit relationships that build themselves at the cross-roads between user's intentions, functions and operations offered by applications and the degree of integration achieved by the operations allowed by software packages.

1 "Personalising" users

Indeed, one may imagine that each pupil will soon have his own electronic mailbox. Everything heralds it. Unfortunately, you just have to go in any secondary school to quickly understand that this will not happen anytime soon, precisely so because we are in a pedagogical setting. Even if the access by every pupil or student to a personal electronic mailbox will probably be a common occurrence (3) in the future, learning settings still need quite a lot of cogitation to be able to imagine communication solutions compatible with school practice which demands constructive, orderly and step-wise progression through ever renewed fields of knowledge.

Moreover, we should remind ourselves that, in the concrete classrooms settings we observed, more often we might have ourselves expected, messages received were printed out and physically handed by teachers to every single receiver.

Nevertheless, it is sensible to foresee that practice will evolve towards more student autonomy and decision-making. Because of this evolution, it will be more and more important for each student to have his "own" mailbox. For young pupils and teenagers alike, the idea of possessing on an individual basis her own mailbox (even if this idea is basically a symbolical one) is a motivational argument not to dispose of. It encourages and sustains an important aspect of the construction of their individuality. If class to class e-mail exchanges should stay mainstream practice for times to come, this practice should evolve into taking into account the fact that future use will go towards reinforcing personalised relationships.

As for today, the mailbox address is that of the school as a whole, or the teacher's, or, more rarely, that of the classroom. As a consequence, pupils, driven by their need to ascertain themselves, a tendency usually reinforced by school settings, will demand that their messages be addressed to them personally, and they shall wish to answer to clearly identified individual partners as well.

From this situation follows that e-mail software application will have to integrate functions that will allow each sender to maintain his identity within the group formed by the class and to easily recognise the identity of a given sender in a corresponding class even if there is only one electronic mail address available on the server.

With some systems, it is theoretically possible to build a separate account for every pupil. In fact, this is not practical because the process is not compatible with the management of electronic mailboxes in class. It also would take too much time to implement this kind of structure considering the poor pedagogical benefits it would entail and taking into consideration that normal access procedures are anyway already pretty time-consuming when they have to be performed for every pupil of a class.

Users should have at their disposal a host of complementary functions included in existing e-mail applications and be able to create a sufficient number of sub-accounts on the receiving computer - whether it is set up in the classroom or elsewhere in the school. These would it make easy to:

- allow for an identifier for every pupil (i.e. Lawrence, class@server.country) in order for each one to be able to personalise his or her mail;
- provide an identifier for each addressee (i.e. Robert, other-class@other-server.other-country) that would be accepted and recognised by the recipient system as unique - in such a context, it is not necessary for each pupil to have his or her own address directory. Functions in today's application will suffice for this task;
- give each student an individual "incoming" and "outgoing" folder to be used for his personal mail.

The system has to be able to manage an individual pointer for every pupil associated with its own mailbox so that all the message sent to this particular pupil will get distributed to this very student, a function that could perhaps be implemented with the help of a script.

In the educational system, and as far as primary and lower secondary students are concerned, it may not be necessary to protect these mailboxes with a password: learning to respect each others' mail privacy is surely a significant item of the syllabus !

For teenagers more specifically, one should plan for an allowance to re-route personal resources to confidential e-mail systems to let relationships undertaken in the school setting grow outside of it (and reciprocally). It is necessary to keep to mail exchanges their undiminished personal value in order to reinforce learning and acknowledging the value of everyone's private life. To set up these various functions means to keep social learning aims within a coherent whole inside and outside of school.

To be able to further specify the required functionalities of e-mail applications, specific observations could be undertaken in order to see how usage and practical organisation patterns emerge among multiple users of a single e-mail address in settings like small and medium enterprises, where this situation is not uncommon.

2 Managing messages

The way different e-mail packages set up communication is not on accord with what young users in schools expect from them. They offer extremely poor resources to help students manage the entirety of their messages and they have very little procedures available to manipulate this kind of information. We would like to propose three major functions to allow for a better use of current systems.

It seems pretty obvious that resources that are readily available in e-mail forums would be very useful in classroom-based management of e-mail exchanges. The ability to organise message through "threads" is unfortunately hardly implemented in today's e-mail packages. And when it is, the tools provided are counter-intuitive (4). Concrete developments are to be expected on this very point.

Expanding the way through which a user may look at his messages resources by using the metaphor of "threads" - connecting messages by contents - would bring developers to conceive the body of messages as database fields to be processed. This would represent a considerable help in the context of school use. The longer the communication lasts, the more the collected material lends itself to data processing procedures.

In the educational practice, learning and acquisition of skills are a clearly cumulative processes, in the context of a sustained effort that helps shape communication among students. Messages exchanged pile up and soon there emerges a possibility of processing

this cluster of mail as a **continuous text**. But tools to do so are not provided. E.g. one ought to be able to concatenate messages that would follow a common theme or occurrence, to build up a string of messages ordered in a logical way. It is also impossible to print out a series of messages that would share a common pointer or marker.

3 The need for a better integration of mental and/or motor operations

Thanks to the development of more and more user-friendly interfaces, we are now faced with the establishment of so as to say "practical standards" that are more or less commonly shared by all micro-computer applications.

When one saves a given file as text, sound, drawing or spreadsheet the process now follows a consistent procedure with any given system and/or application. One asks the system to save (through a scrolling menu or though a keyboard shortcut, or by hitting a function button, included in the hard- or software interface). This opens a window that allows one to:

- specify where on wishes to save the file or document;
- name the file;
- choose under what format the document is to be stored;
- validate the (various) choice(s) made.

In Internet browsers as in other applications this standard procedure is applied to save an HTML page under scrutiny. Unfortunately, in these very same browsers, the notion of "bookmark" is a more complicated one. Managing these pointers does not follow the same standard rules as saving and opening files. Browsers and "explorers" would be much more coherent and user-friendly if they'd follow approved rules. Whatever the chosen convention, the point is to uphold coherent steps in procedures that may be applied to identical objects.

Bookmarks are treated as new kinds of objects. What are they ? They are resource locators for any given page currently examined. Any young user knows how to differentiate between
(a) the page he is looking at and
(b) the locator which points to the same page and that he can save.

Seen from the point of view of the user's cognitive organisation (as well as from the point of view of the computer and the way it manages declarative procedures), an address or locator is in no way different from a file: it is a pointer.

In the young users' mind the object "the page I am reading" carries two predicaments bound to the way it will be retrieved. Either I" may access it indefinitely off-line, and for this I need to save it in a known format, or I want to access it many time on-line, and for this I need to keep its locator" (URL).

Even if the access procedure to a given page is differentiated whether one works on- or off-line, there still is only one representation behind this action for the user. In the very same way a child will always recognise as a dog the objects "a dog with a leash" and "a dog without a leash": there is a common mental representation, shared by two objects. The corresponding software operations should be built on this behaviour and maintain a unique action even if associated with a complex mental/motor operation.

To say this otherwise, if one wishes to store away a locator through an intentional sequence on the part of the user, the logical pattern applied by the current system should respond to this sequence by following equivalent principles.

- One has to be able to specify where one wishes to store the address - in fact, this process exists already, but under a guise that does not follow the rules of user-friendly interfaces as they are implemented elsewhere.

- One has to be able to name the locator saved (5) by using any meaningful name - here again this is possible, but is done through non-standard means which demand multiple manipulation that do not comply with usual procedures.

- One has to be able to validate the choices made.

4 Managing messages, attachments and addresses according to muti-logical procedures

In the process of collaborative communication work, young children and teenagers engaged in an exchange situated in a group. This activity builds up a body of messages are and documents. On a concrete level, a division of labour emerges and different tasks are shared by different actors. Through the use of Internet related activities a pattern of activities together with their co-operative dimension comes forth. This mechanism integrates local group effort (with a few pupils) with extended group work that includes contribution brought about by distant collaborators (i.e. with pupils from other - possibly distant - classes).

In the context of the classroom, young users need that technical settings do not break-up their actions when they are carrying out intention that they themselves do not perceive as split into pieces. We would like to propose here a number of specifications regarding e-mail software applications that are nowhere to be found in current systems and that could make it easier for young users to perform in school settings. These specifications will define how potential addressees, mail messages and their attachments are interrelated.

The dissociated management of these three determinants of a given sent message has to allow for a **common intentional action** (6) integrating:
- personalised messages;
- mail sent to distinct and identified partners (but perceived as a group);
- attaching or not attaching to a given message, one or several attachments (or a group of attachments) in a logical process that changes according to different partners and different relationships build among them.

Here is an example to illustrate the patterns behind those constraints:

Let us take ten classes around Europe who are engaged in the same project, and let's take three pupils (Julia, Patrick and Paul) who are in three different and distant classes and who have undertaken the same sub-task within this project.

In the process of executing their sub-task, three documents (in our case three pictures) shall circulate in the smaller group until it is satisfied with the result of its editing efforts. At a given moment, it will have to hand out its contributions to all other classes.

If Julia is endowed by her team with the responsibility of sending to the other classes two of the finished images, made by her group, what will she do ? And how is she going to represent to herself what she has to do ?

"I'm going to send to every class my two images with a kind personal little message for each one, but I will not include Patrick and Paul for they and their classes have the pictures already. To Paul and Patrick I shall only send the message so that they can see that I have sent their work to everyone. Oh ! I was forgetting that I have to send the third image to Patrick, since I changed it and I also have to tell Paul that "cookies" in English are said "gâteaux" in French."

With current software e-mailers, it is not possible for her to set up directly all the actions she envisions or to organise them into an organic whole (so as to say in the same "sphere of purpose"). She will have to cut up her actions and intentions into a number of tasks.

She'll have to create a message, give it an object and associate with it the seven other classes as addressees (excluding Julia's, Patrick's and Paul's classes). Then, she'll have to attach the drawing to her messages. But through this procedure, she'll have to decide to send the very same message to all and give up her idea of personalising her mail "with a kind personal word". Contrariwise, if she decides that personalising her message is the most important feature of her work, she'll have to write seven different messages and attach seven times the same drawing to each one.

She will not be able to send at the same time the same message to Patrick without an attachment, she'll have to attach another copy of the drawing for him alone. She will not be able to explain to Paul the intricacies of translations from English to French about" cookies" and "gâteaux": Julia will be writing two new messages, one for each of her addressees, Patrick and Paul.

The issue here is to show that the problem lies in the fact that the system is not responding to Julia's cognitive intentions through a process she inevitably conceives as a global intent. "I am sending to everyone a personalised message with its attachment; to Patrick I only send the message and the other attachment he is waiting for, and to Paul I send the message plus the explanation about cookies." Julia's does not think her action as three different actions but rather as modulations of a single active scheme, through a holistic perception of her task.

In order to accomplish her intention, her mental scheme, the messaging system has to break up the way it manages the different messages, their attachments and the receivers n a radically different way. This means that, for a given **sending action**, Julia has to be able to customise her messages according to each addressee, and attach or not attach one or several attachments according to the different addressees she has in mind. She has to be able to process the messages and the attachments she is working with **according to their specific addressees** and in a dissociated way.

It is an circumstance one witnesses time and again with children and teenagers dealing with e-mail: they give a high value to personalising their messages (7). When they send the same document to several partners they always wish to personalise their accompanying message.

As regards application developers, who would wish to explore these indications, they should make sure that the workings they lend to their software truly correspond to the needs of children and it is pretty likely that, on their way, they'll meet the needs and intentions of adult users.

5 The "follow" function

The "follow" function is imbedded into a statement about what is meant to be done: to have either the message itself, or the message and its attachment (or both) be sent away to a third party.

Some systems are exacting complicated manipulations from the user to have the "follow" function correctly carried out. Here again, we have a discrepancy between users' intentions and the way the application is behaving as it responds to the operator Here again, we have the same principle of the permanence of objects that is at the core of the problem: the way actions are represented on the screen have to be consistent with the expectations of the user.

First issue: by default, some systems will "follow" the message alone as others will send the message together with its attachment(s). What is missing here is either a standard rule or else an intuitive parameter that could help define what the user needs to be done about each of his dispatches: "I want the message alone to be forwarded" or "I want the message and its attachment to be forwarded".

Second issue: whenever a young user wants to forward a message with its attachment, he expects the system to send exactly what he has got in his system. The nature of objects manipulated has to be clearly defined. The mailing system has to behave in a consistent way as seen from the user's point of view, esp. in the manner it displays a given object.

1 It should not transform an attachment by transforming it into an appendage to the message itself (whether textual or graphic). The nature of an attached object as piece of information has to be consistently preserved.

2 Likewise, for those systems which support it, parts integrated to a message (image of text) should not be transformed into attachments. Integrated texts or images have to be preserved as such and included with the messages.

We very well know that diverse systems will yield different results: what is sent from a given system will not necessarily be preserved in the addressee's system. What we are trying to clarify here is the logical internal consistency of a given system that has to mimic as closely as possible the expectations, the actions and the representations provided within itself.

6 On the permanence and autonomy of objects

Most e-mail systems defaults to the same kind of action when they deal with attachments in a given folder ("incoming", "outgoing", "download", 'inbox", etc.).

When they deal with their every day chores, children and teenagers usually change the name of the attachments they have received and transfer them into a personal folder on their system to be able to have all related material build into a meaningful whole (8). This process happens quite "naturally". First, because they need to use their own way of description and their own words to name and consider as their own the objects on which they work. Then, because they deal with different platforms (usually Windows or MacOS) where rules applied to naming and moving objects are markedly different.

Usually, when they come back after some time to their mailing software to examine their past messages, the changes they have applied to the attachments (name and/or place) are not reflected in the program (10).

Usually, the fact that an attachment has been renamed or displaced from its default folder makes it unavailable to the mailing system that has received it in the first place.

Attachments have to be managed in such a way that they have a permanent status as object.

(a) They should remain such whether they have been renamed (once or several times) or not.
(b) They should be recognised as attachments even if they have been stored elsewhere in the system's organisational tree. And this coherence should be upheld whether the mailing application is running or not.

One same given object should be **still recognised by the original application** whether its name or location has changed, and no matter how many times these changes have occurred. These constraints are well justified in school and learning systems (11)

and efficient software packages have to follow the rules of the cognitive construction of knowledge that matures in the human mind confronted with automatic systems.

This is in direct reference to Korbinsky's elementary general semantics (12): naming an object is not to be confused with the object itself, the name of the cat does not mew. The object is not to be mistaken with its label.

Naming is one of the first creative function of the mind: it is not haphazard. The name one gives to a given object is an intricate and meaningful mixture made out of mental constructs and of intentions that all converge towards an "language action", a "act-utterance" where, as it were, the word *is* the object, where the name tells everything about the object and is coupled with it.

Naming is one of the first means of appropriation of objects. Foremost, it is an elaborate mental indexing system that children and young adults need to exercise. If some sort of consensus can be met when the class is naming its favourite fetish, there still remains a large number of objects that every child needs to name in the way he needs, following semantic webs that he has constructed for himself and that he uses to understand the world surrounding him.

Additionally, relationship between the acting subject (whether child or adult) and the storing places where he puts down a given object is the result of a major cognitive activity. The liberty of choice exerted and the decision taken by a given actor when he chooses the destination of an object is in no way an arbitrary activity. It rather reflects an implicit topology (structured by the body of representations the subject has formed for himself) revealing a "necessary" or "natural" order in the spatial disposition of objects (13). The manifestation of these cognitive competencies is recognised as such since antiquity and represents a major structuring principle behind the different "formats" according to which memory is organised (14). It also typifies an active agent in the course of his ordering strategies and in the way he positions objects.

Of course, we cannot go here into any detail and analyse in a thorough way how and why so many software application dealing with communication organise different mind structures and different psychological constraints. Nevertheless, let us give an example: Netscape keeps track of received messages together with their attachment in the internal registers of the application. This means that when using the mail manager application, attachments will be regenerated as often as necessary each time the original message is reread and until, of course, the original message is destroyed. Whenever an attachment is saved, renamed or stored in a particular folder (from the point of view of the user), the same object will have been "split into two". The user's logic is not retained and is not mimicked by the system (15). When several users are involved in a common activity, as is the case in the classroom, the same attachment will be saved many times and will be stored in a number of different folders. The situation soon becomes pretty puzzling and hard disks (that are almost always too small) are quickly saturated.

More seriously, by means of the constraints imposed by interactive sequences and through the manipulations that are necessary to perform a given task, young users are compelled to mental contortions that keep their actions busy with extravagant strategies, when they are not contrary to plain common sense. These unnecessarily intricate procedures when are understood from the point of view of the development of intentional activities, clearly coerce young learners into internalising "polluting" strategies that hinder the development of their cognitive faculties.

It is to be expected that, for any child or teenage user to return to a given message should evoke the procedure used and memorised to retrieve it. Users expect from an interactive machine that it "figures" or "illustrates" the result of his or her action in a psychologically consistent way (feed-back process).

7 Following-up communication : an automatic report on the state of exchanges

When young people send a message, they usually expect an answer. Those who have responded to a message generally expect an answer in return. A number of rules have to be defined and respected in order to make sure that this process follows its due course for the most part of the human group of emitters-receptors involved.

Managing these activities within an institutional setting like the classroom means that the supervision of this largely conventional framework is the duty of the teacher. Conforming to this framework has as foremost benefit to avoids unnecessary misery for all partners involved. If teachers and trainers had as sole duty to follow the threads of a given e-mail communication project, the issue would be quickly solved. This is of course not the case. Many task need to be done during a day in class and e-mail communication is just one of them. This explains why, in most cases, the teacher has too little time to keep track of e-mail exchanges: be it by controlling the quality and frequency of messages exchanged, be by evaluating the rhythm and periodicity of communication occurrences or by assessing the consolidation and reinforcement of relationships between given partners.

Teachers do need to be able to rely on a tool that gives them a follow up of e-mail activities in their classroom setting. In particular, this tool, should point out situations where communications is on the verge of breaking down.

“A received message has not been answered”, “a message sent has got no response“. Basically these two events look pretty like the same one. Emotionally however, they represent two vastly different occurrences. In one case one is the victim, in the other one is the damage maker.

The issue at stake here is not so much that of broken interactions, where part of the massages could be called “orphaned” and others “widowed”. In fact, there are always messages that do not ask for a direct answer (“...let’s meet at the soccer game on Saturday. Cheerio !”). We are examining here the way an individual carries through a personalised relationship between two emitters/partners, taking into account that this relationship is mostly artificial, since those who perform the exchange activity do it on the basis of pedagogical transaction.

Accordingly, the software setting has to display the pattern of exchanges perceived through the demography of messages and correspondents. This means that it has to analyse the interactions and show up the following features: “ For the last ten days Peter has not responded to John’s last message ***and*** Peter has not sent a new message to John ***and*** John has not sent a new message to Peter.”

Put otherwise, the tool we describe has to show and illustrate the intensity and the flux of messages according to the following variables:

- remember for each identified emitter relevant data about his receiver;
- consolidate data about receivers with data about messages received by this identified emitter (and not to stop with merely counting up answered/not answered messages);
- analyse the resulting material under the light of duration parameters, since time granularity will decide what is pertinent in the periodicity of exchanges and what has to serve as a basis for the devising of a typical time lag such as “two months”, “since ten days”, “between November 15 and December 15”.

The interpretation of this information has to left to the teachers and professors who have a in-depth knowledge of their classes and who can use this understanding to make up adjustment strategies. He may ask students whether they are angered by their partners and why. She can verify with the (faulty of hurt) correspondent’s teacher the explanation of any negative interpretation of the breach in communications (holiday periods, hardware problems, teacher overwork, more urgent tasks to be performed by pupils that keep them away from the computers as well as other personal problems with more or less

psychological causes, etc.). He can also organise a group debate on “how does one feel when someone does not answer to one’s messages”, and so on.

The dynamics of communication need a strong conventional basis to survive. The observations made by the Mailbox team has showed that e-mail activities are, in fact, social activities based on an important social need since it re-actualises in a metaphorical way what is at the vary basis of all organised society: the exchange of gift and counter-gifts; the constraints of giving, receiving and giving back, a necessity that, if ignored, pulls back “society” into a mere gathering of individuals.

Obviously, the abilities acquired though electronic exchanges are mostly of a psycho-social nature, a socialisation process. The quality of the subjects matters debated, the objects exchanged or the knowledge acquired, in short the a priori goals of these activities (spelling, grammar, vocabulary in first or second language learning) are secondary matters, contrarily to what was postulated for quite a while.

Our observations of communication exchanges between pupils and students both at primary and secondary levels, has time and again corroborated that communication collapses when confronted with difficult or critical situations, due to a “conventional” perception of the situations. The rules behind e-mail projects need to be clarified within the framework of the institutional setting, since it is at the basis of all communication taking place between young people, members of distinct educational locuses, even if no more distant than a few miles from one another.

If exchanges fail to follow a minimum level of reciprocal obligations, previously discussed and accepted by students and teachers, the flow of communication becomes unstable and may dishearten otherwise highly motivated young users from using e-mail for a long time.

As soon as the rhythm of exchanges becomes too rare, or if they are perceived as too asymmetrical, one sees a rapid disenchantment on the part of the students. Numerous messages to which only scarce answers are returned, long messages who get only telegraphic feed back, messages which remain with no answers, etc. can sometimes trigger, beyond disenchantment, such an intense sense of betrayal - in fact proportional to the expectations of children - that when these students are offered the opportunity of a new experiment with new partners they reject it, for fear of being rejected again.

As a matter of fact, adults react in exactly the same way, but they have forgotten how intense the experience was. Additionally, the educational setting is also there to teach students how to cope with these shortcomings in the context of an institutional framework. More than once, there will be a player who will not go by the rules, either because he ignores them of because he wants to come to grip with them and transgress them in a deliberate way.

Conclusion : the risks of excessive complexity

The general trend of current applications is to include a growing number of functions: the two leader packages in Internet communication management - Communicator and Internet Explorer - are also e-mail managers, http browsers, ftp transfer tools, “usenets’’ forum managers, teleconferencing systems, etc.

Such a level of complexity is not necessarily a satisfactory situation. It is already not the case for adults and even more so for children who use them in educational settings. In all cases the biggest failings are due to the ignorance by software engineers of the cognitive constraints of the mind: there is always a discrepancy between the shaping up of the relationship, between an enacted intention - or the project of an action - and the soft- and hardware tools that are supposed to carry them out.

The mere observation of technical objects, soon reveals that they are dedicated to very specific functions. Consider a tool box: every object serves its precise purpose.

One still knows pretty little about the effective social practice that will come out in the long run from communication technologies. However, one may foresee that to take into serious account what one already knows about cognitive dispositions of the mind and the underlying constraints of complex technical objects (16) may help remove a number of obstacles to their use, obstacles that are not unavoidable on the way to a integrated and comprehensive generalisation of communication technologies.

Notes

(1) *Socrates' Mailbox Synthesis Report*, August 1998, available in electronic format at http://www.ge-dip.etat-ge.ch/cptic/socrates/welcome.html
(2) NLS, Nasjonalt Læremiddelsenter, Grev Wedels plass 1-Militaerhospitalet, P.O. Box 8194 Dep, No-0034 Oslo. Fax : +47 22 47 65 52.
(3) Without trying to really deal with the issue, let us not forget the very serious issues that are bound to the social inequalities generated by ICT access.
(4) Lotus Notes and First Class do not display the same kind of shortcomings.
(5) Se shall analyse further down in this text what is at stake name attributions, seen under the light of cognitive strategies.
(6) We should mention here a number of different ways to manipulate data, based on users' intentions offered as alternatives in various softwares' options. It could build upon the point from which the user starts: is he accessing information as "message", as "addressee/address of the receiver", or as "attachment". Current conventions in software are all grounded on the metaphor of the "message" which serves as the model from which the user defines one or several addresses and unto which he attaches one or several documents.
(7) Refer below to the issues around personalising exchanges and the subjective constraints imposed on communication within the classroom.
(8) Even if the following argument is illustrated by e-mail systems, it may be readily applied to other software applications.
(9) The following remarks are not applicable to groupware such as Lotus Notes or First Class, since Lotus "databases" or First Class "conferences" represent clearly a mental locus where all the objects bound to a given theme are grouped.
(10) With the notable exception of Claris Emailer which keeps a consistent track of attachments and reflect new names and new places, as necessary.
(11) It may be the place to remind ourselves that speaking of school settings may well be a pertinent way to analyse what happens in working environments...
(12) Alfred Korzybski, *Science and Sanity*, The International Non-Aristotelian Library Publishing Company, Fourth Edition, 1962.
(13) See the "Analysis of categories".
(14) Refer to: *L'art et la mémoire*, Frances A. Yates, Gallimard, Paris, 1975; *L'invention de la mémoire*, Israël Rosenfeild, Eshel, 1989; *Biologie de la conscience*, Gerald Edelman, Odile Jacob, Paris, 1992; *Une anatomie de la conscience*, Israël Rosenfeild, Flammarion, Paris, 1994.
(15) We ought to outline here that when a pupil either edits or renames a file, the appropriation activity modifies the status of the document: it become altogether different. This explains how the symbolical bind - that formerly connected an attached document to a message and its sender - is now broken. The system has no obligation to sustain the tie, its "loyalty" is expected only towards the original, untouched object.
(16) Gilbert Simondon, *Du mode d'existence des objets techniques*, Aubier, Paris, 1969