Tools for collective learning in higher education

FLOW, CREATIVITY and LEARNING

'Future of Learning' Workshop

Sevilla, April 28-30 2003

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including work of Catherine Frété and Paraskevi Synteta

http://tecfa.unige.ch/tecfa-people/schneider.html

TECFA

Faculté de Psychologie et des Sciences de l'Education
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Code: sevilla-2003

(slight revisions: May 5 2003)

Goal of this talk

Discuss pedagogical & technical support for socio-constructivist pedagogies on the Internet

Show an example

Look shortly at gaming & programming

Link our work to creativity and flow research (for the first time)

Menu of this talk

Our work on collective learning

Internet spirit 2002: C3MS Portals

C3MS portals & educational scenario scripting

Project-based teaching example

A short look at gaming and programming

The relation of creativity and flow

Creativity and LEs (a first attempt)

Flow

What about the teachers and the schools ?

Some conclusions

1. Our work on collective learning

Note:

All learning theories address real problems

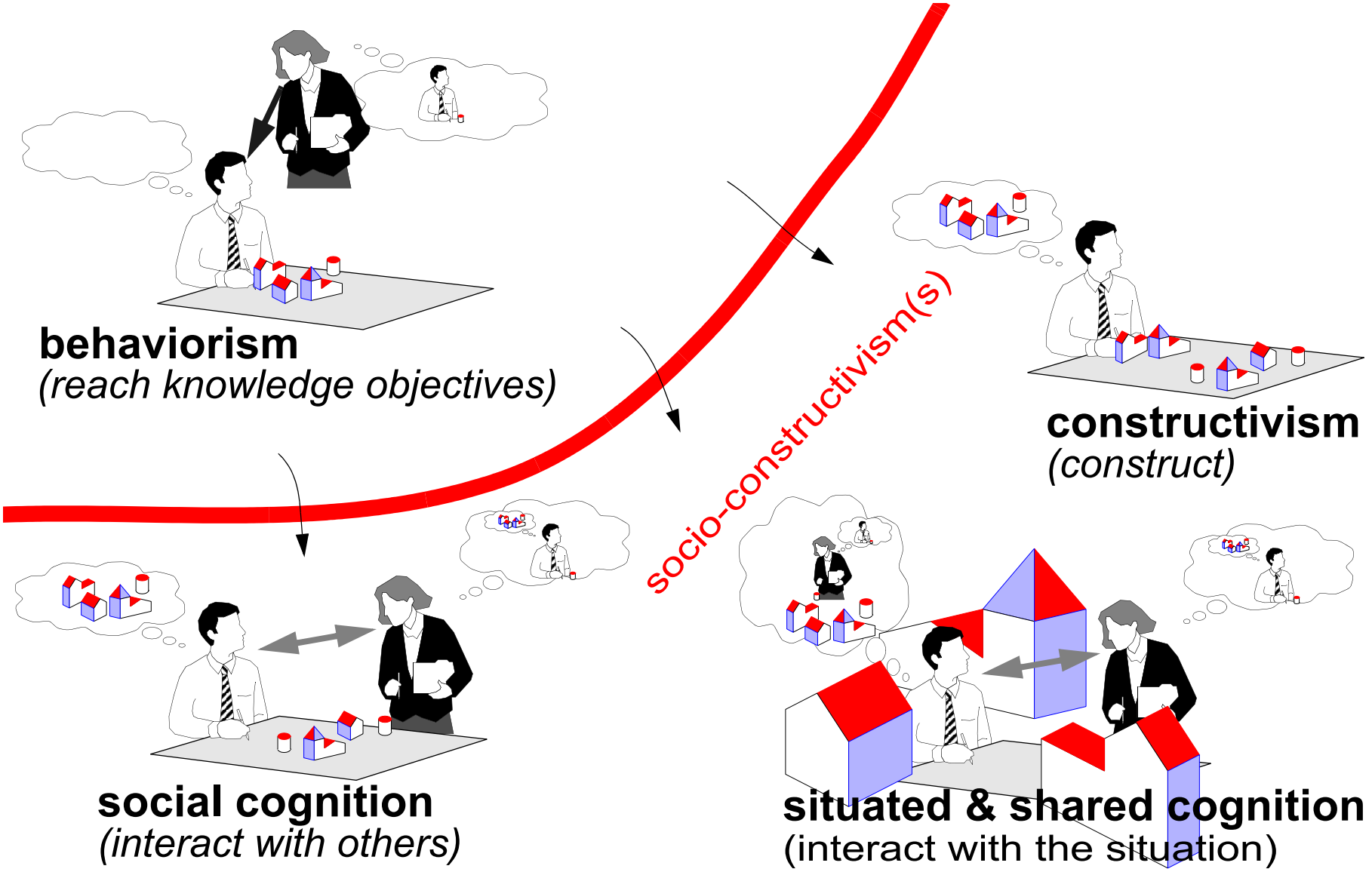
All pedagogical models have their usefulness

but ...

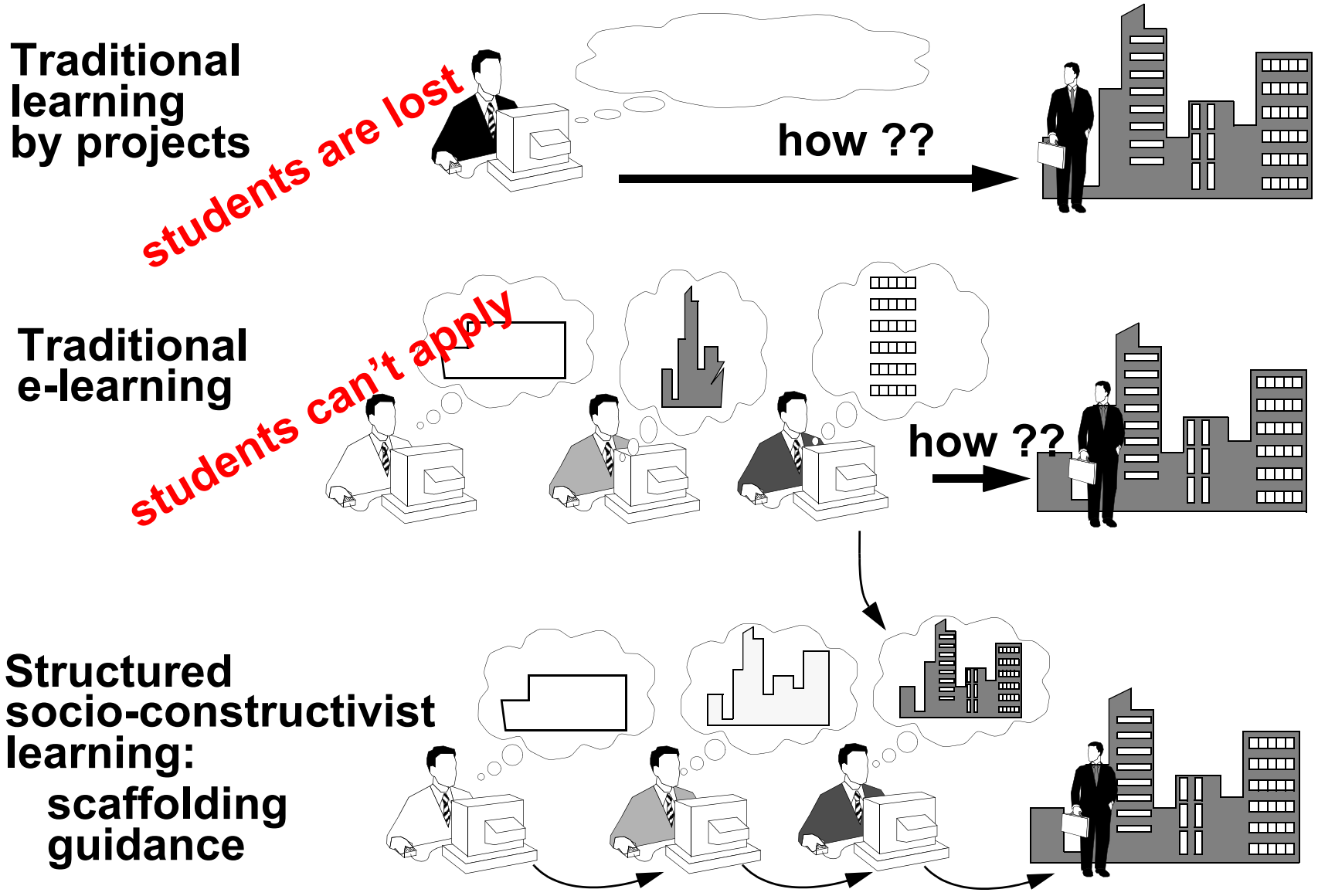
Computer-based instruction (CBT)
- what is sold as "e-learning" today -
gets too much attention !

Rich activity-based educational designs do not ...

1.1.A vague foundation in socio-constructivist thoughts

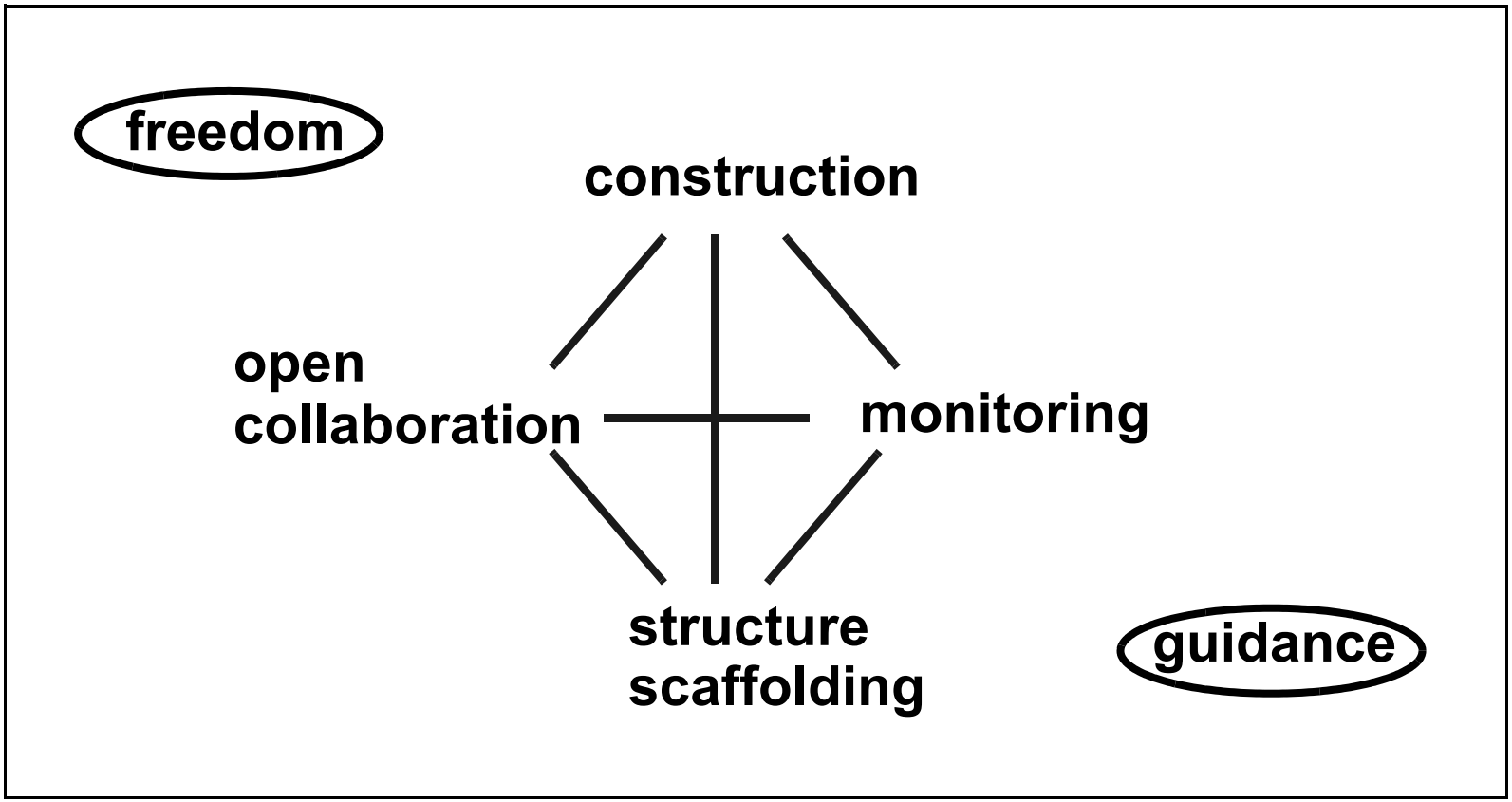


1.2.The issue of knowledge Transfer

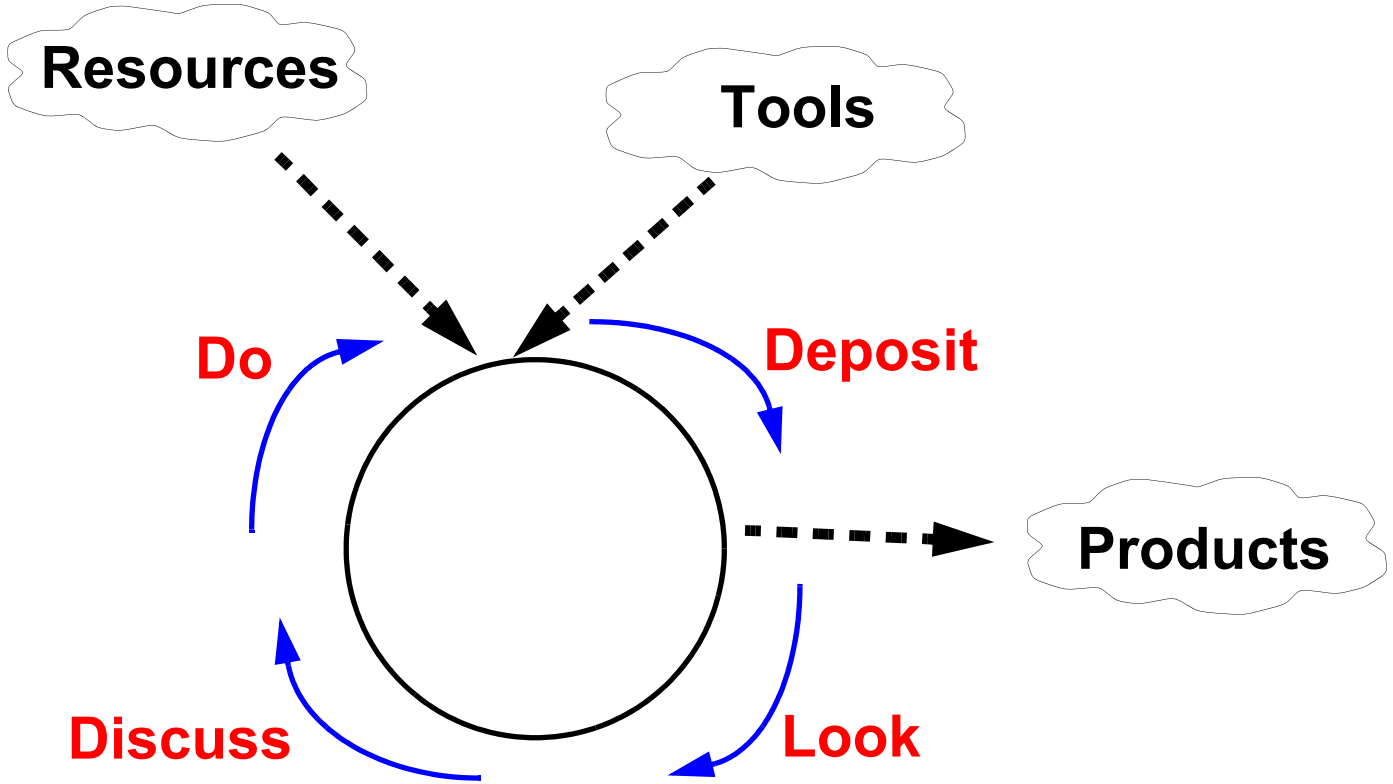


1.3.Structured socio-constructivist pedagogical scenarios

- **Open ended & "rich" socio-constructivist designs are more effective if individuals and groups have to evolve within *somewhat* specified scenarios**



- **Scenarios are sequences of activity phases within which group members do tasks and play specific roles**
- **This *orchestration* implies organizing workflow loops**



... this is just the (abstract) “ur-loop” ... hold on !

1.4.The computer in a socio-constructivist perspective

- **the computer is merely a facilitating structure, a thinking, working & communication tool**

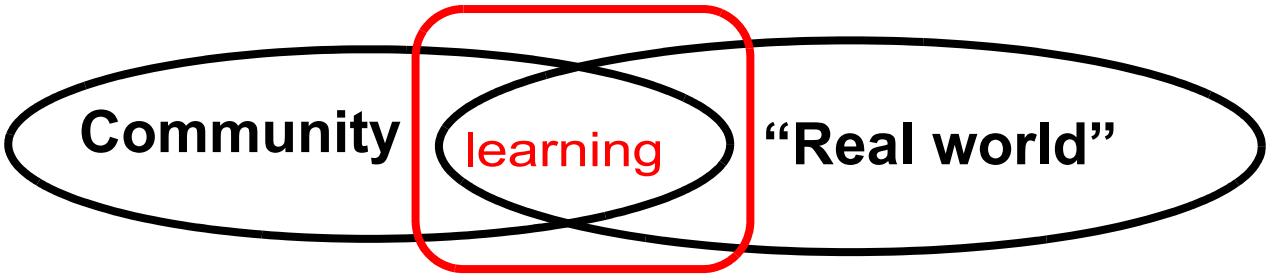
Elements	*teacher (manager)*	*learner (worker)*	*computer (tool)*	*designer (resource)*
Goal setting	helps or defines	defines or refines	provides tools	provides ideas & half-baked models
planning	suggests & controls	does		
monitoring	audits & helps on demand	self-observation, diaries		observes
contents	suggests, produces	uses & produces (!)	storage, search & awareness tools...	can provide & develop
tool use	configures, helps	selects, learns, uses	offers reflection	
community	does	does	provides tools	suggests

- **Most student and teacher activities should be supported by computational tools and lead to new "contents"**

1.5.Learning within a community and within context

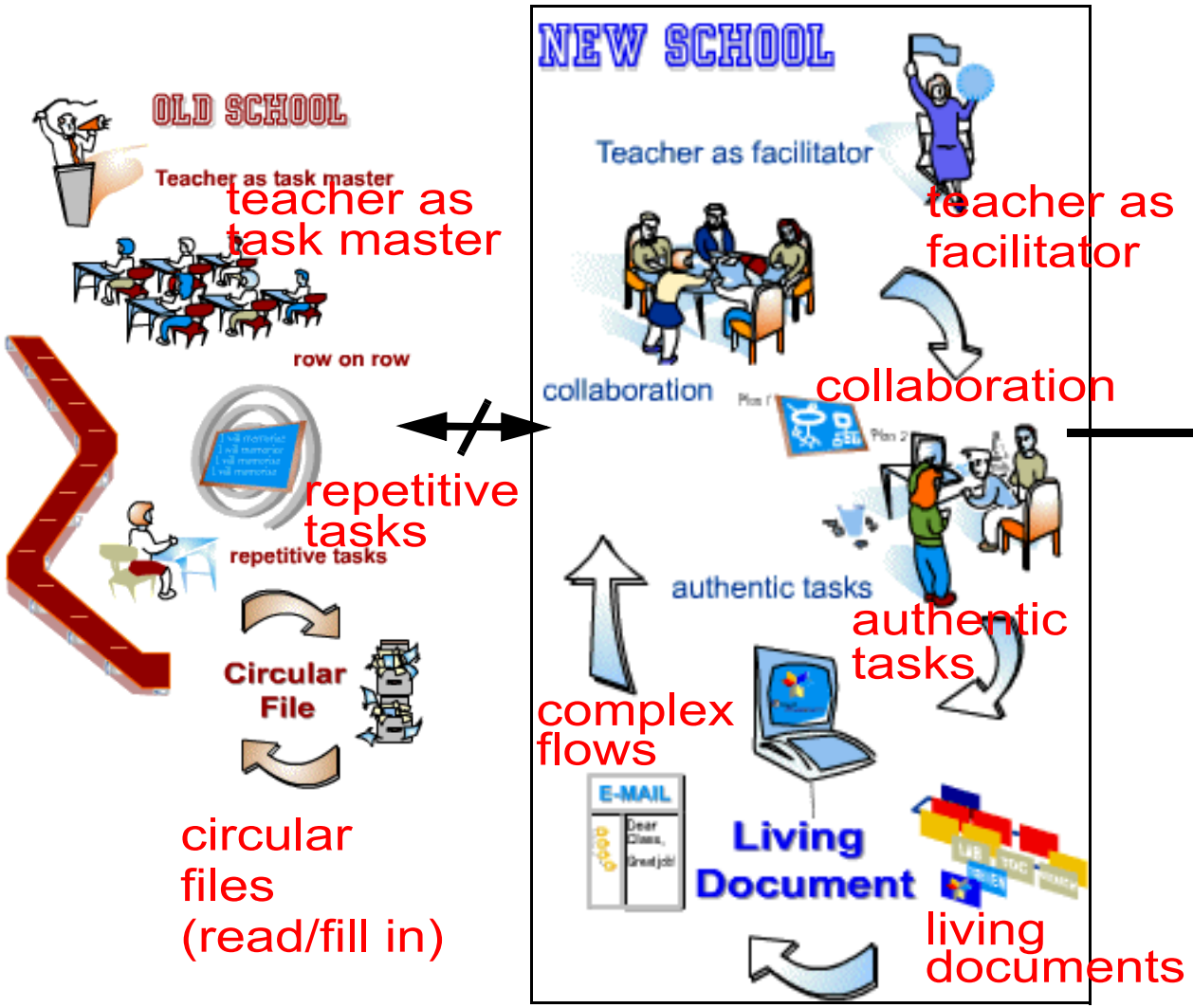
A sampler of arguments:

- **members of a community tend to make better progress (peer intellectual & emotional help and mutual stimulation)**
- **some goals can't be reached alone (distributed cognition)**
- **a group can develop special language and practice adapted to specific problems**
- **knowledge through enculturation (collective memory)**
- **cognition is tied to experience (grounded)**
- **communities can extend beyond formal groups of learners**
- **a lot of learning is informal**
- **good communities are knowledge management aware**



1.6.Requirements for socio-constructivist tools

http://www.worldbank.org/worldlinks/english/training/world/pbl/newold.htm

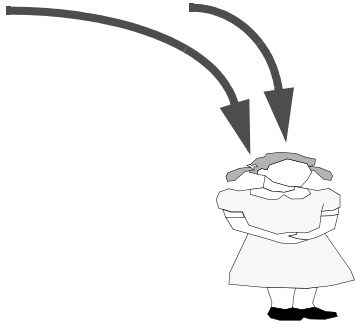


Minimal (!) requirements:

Content & knowledge management
Document & knowledge exchange
Project mgmt support
Community management

... more as needed

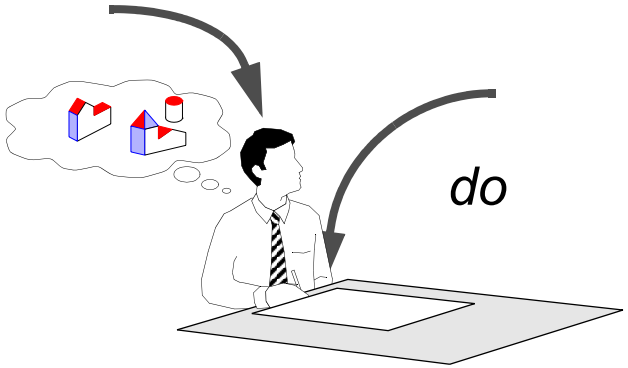
1.7.Current methods and tools for distributed learning



listen
look at multi-media
surf on the Web

bad content transmission:

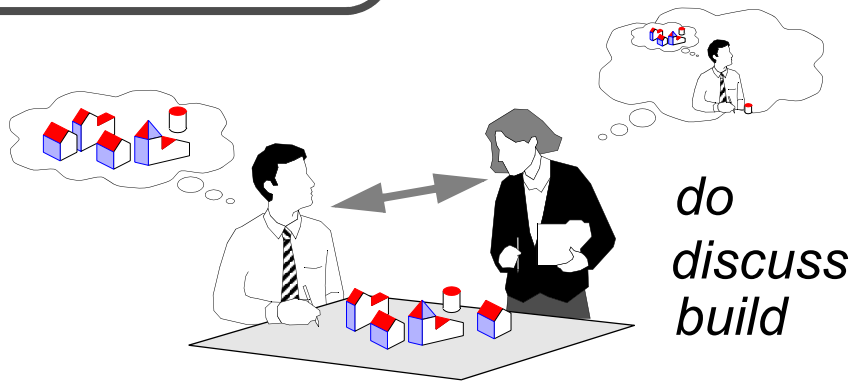
web pages / videos



do

good content transmission: instructional pedagogies

“Learning Management Systems”

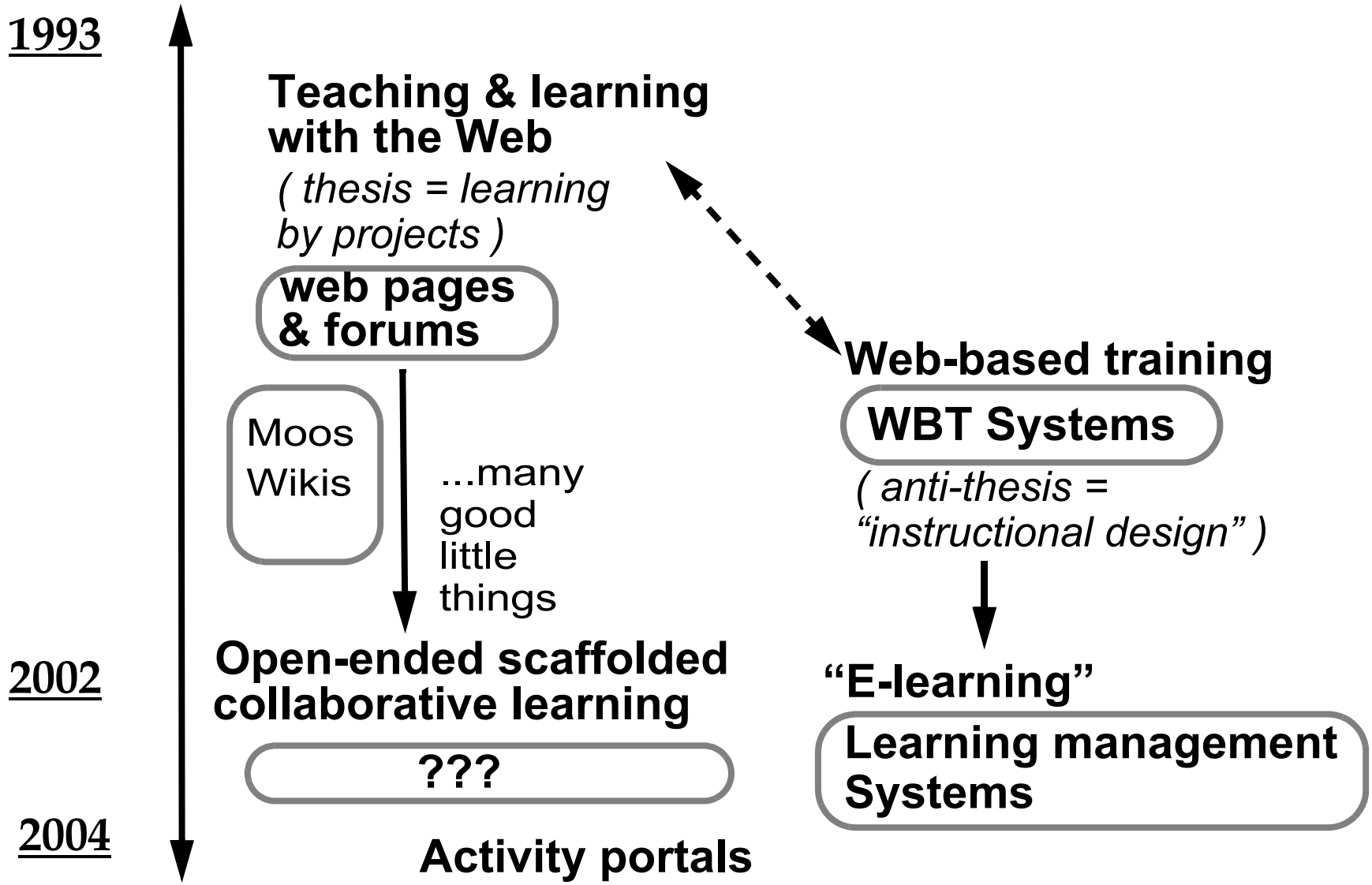


do
discuss
build

socio-constructivist pedagogies:

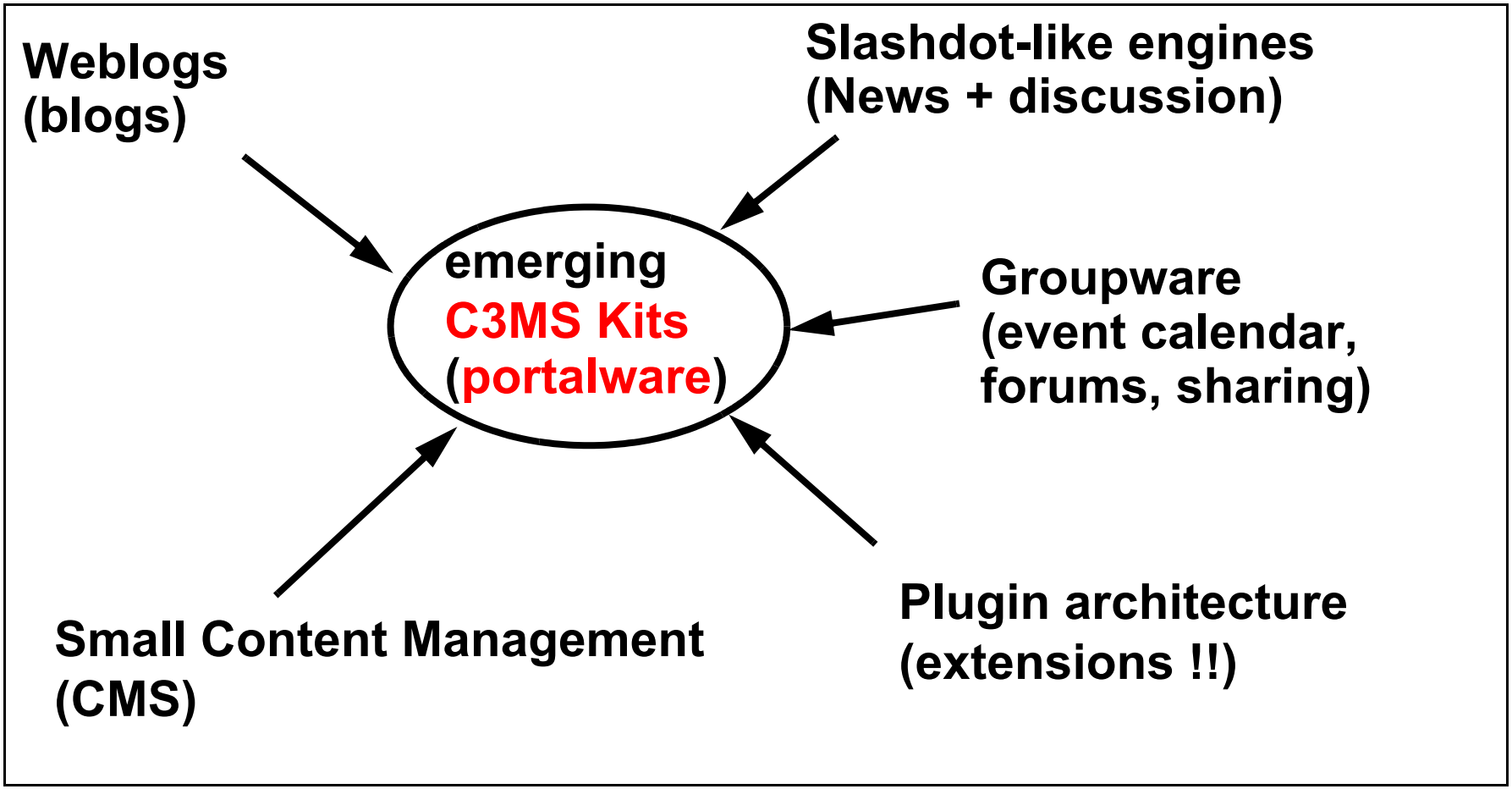
?

The 2 paradigms in historical perspective



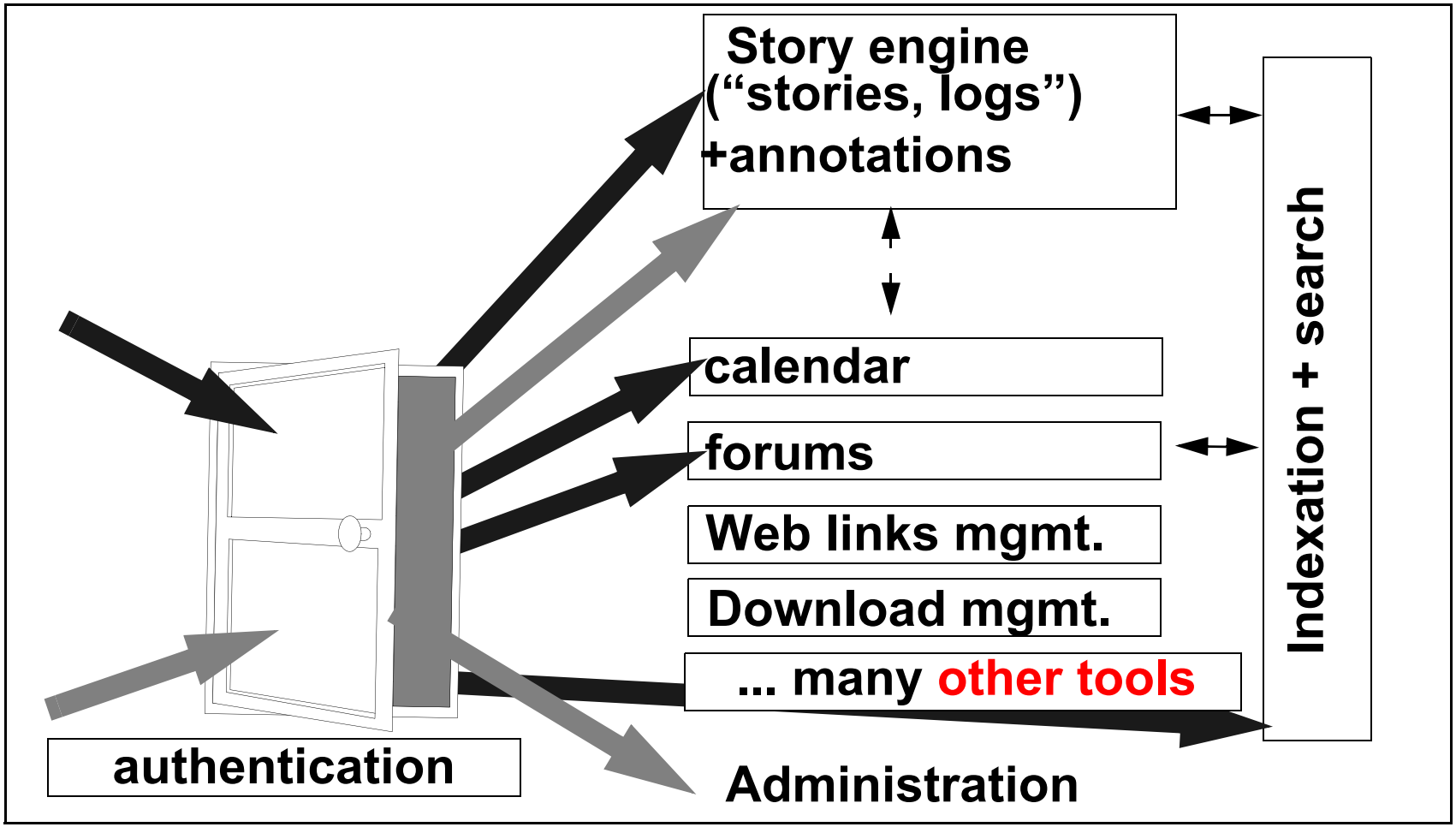
2. Internet spirit 2002: C3MS Portals

Community, Content, & Collaboration Management Systems



- ... it's a MEGA trend !
- Examples: PostNuke, PhpWebSite, Drupal, Jetspeed, ...

Base features of the C3MS portal



- ***Integration*** of most applications (authentication, interfaces,...)
- User system (administrator, members, invited, ..)
- ***Plug-in architecture*** ! (YOUR organization can write modules)

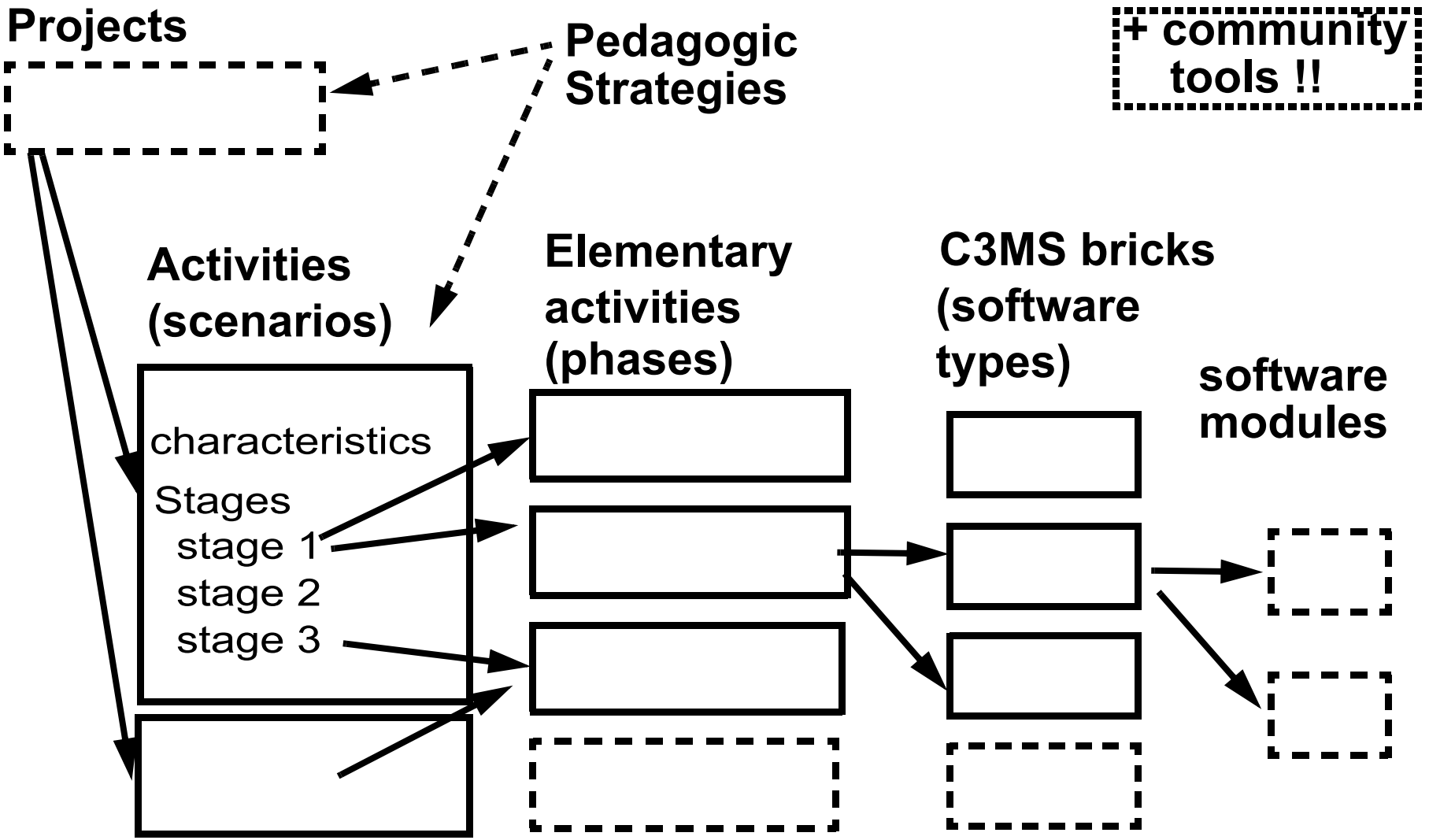
WOW ...

- it works (thousands of sites, some of which thrive)
- people even learn with them
- some good communities of practice or communities of interest
- many people join to improve these systems and write modules:
  - like: collaborative hypertexts (wikis), pictures galleries, simple content management systems, event calendars, chats, project managers, file-upload, glossary management, weather, shout boxes, chats, ...
- ***might*** be useful to support educational scenarios

STRANGE ...

- major use in education is limited to student portals and user support in industry
- weblogs (diaries) are getting a bit popular
- overally: little creative use in education
  (few documented socio-constructivist scenarios)

3. C3MS portals & educational scenario scripting



3.1.planning example: Study architectures of Sevilla

PROJECT	
	Activities (scenarios)
1	Teach portal to students
2	Make a glossary
3	Find research subjects
4	Make a research plan
5	Field trip
6	.....

GLOSSARY *activity (scenario)*		
	Stages	***Simple activities***
1	Participants think about terms	IntroWork, BrainStorm
2	An alphabetic list of terms is entered	EditGlossary or EditPage
3	Students search and share links	SearchWeb, EditLink
4	Work is synthesized and combined	CoEdit
5	Teacher moderates	CheckWork
6	Final definitions	CoEdit

Simple activity	***Description***	***Available C3MS modules***
CoEdit	make collaborative documents	Wiki (phpWiki portal module), CMS (EzCMS module)
BrainStorm	Generate Ideas	Wiki, News Engine, Forums, Bulletin Boards

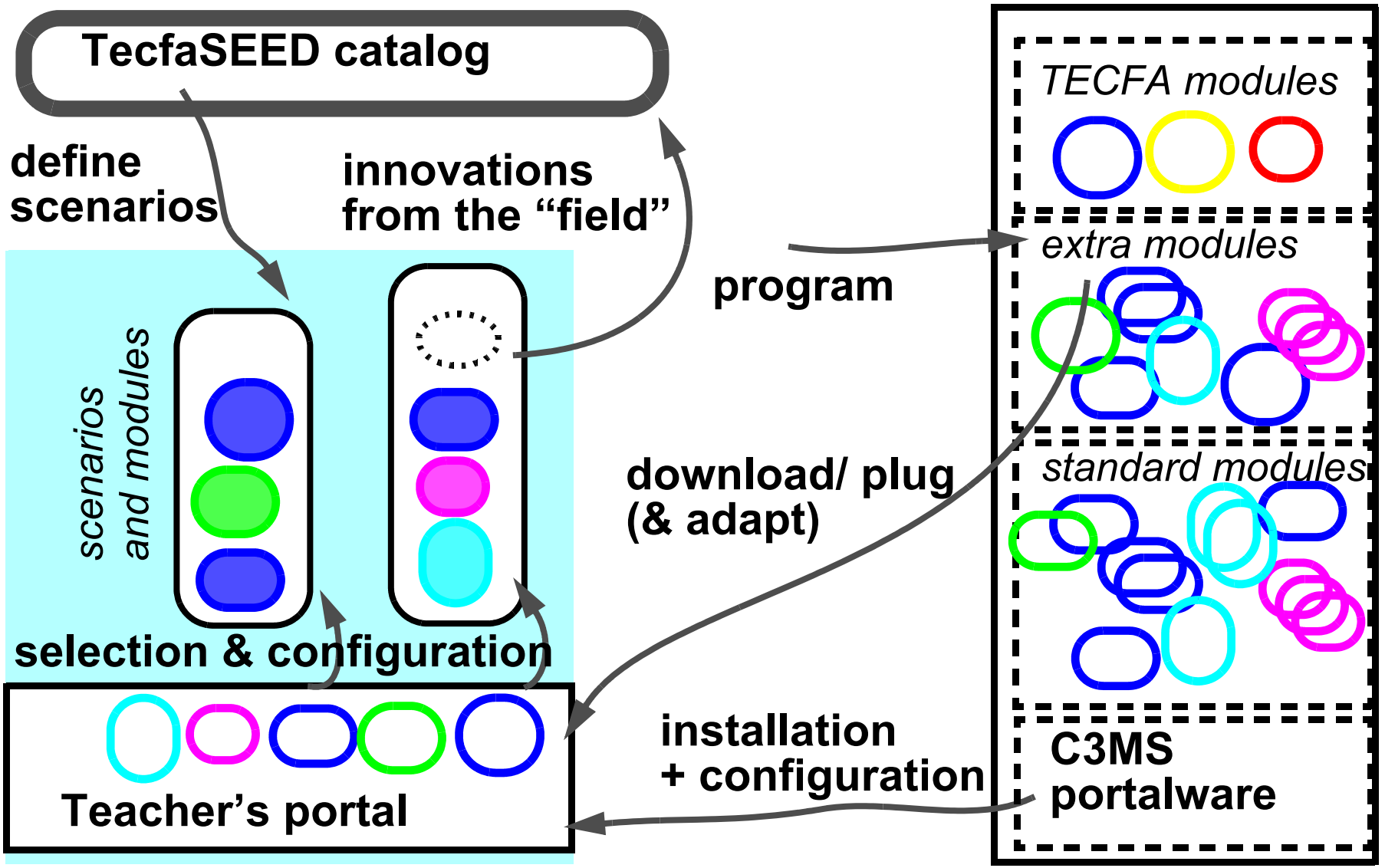
Result (one single activity of the whole project)

(previous step: learn portal)

Instantiated example "glossary" ***activity (activity 2)***			
Stages		***Tools***	***Instructions***
1	Suggest terms	Wiki (= coll. hypertext)	Each student must suggest 3 terms and enter them
2	Provisional list of terms	Wiki	Together in class we clean up the list
3	Search and sharing of results	Google, Links manager	Each student must provide 4 links and make comments to 2 other
4	Raw information is synthesized and combined	Wiki	Each student must enter 2 definitions, make links from "his" definitions to others and modify others
5	Teacher moderates	News engine	Teacher will give feedback in an article
6	Students produce final definitions	Wiki	Students can make final modifications

(next step: find research subjects)

3.2.So what does “scripting scenarios” mean ?



4. Project-based teaching example

- **Life demo:** http://tecfaseed.unige.ch/staf18iris/
- **work related to Paraskevi Synteta's Ph.D thesis**

4.1 Summary of the "Staf18" course

Blended (mixed) format

- **duration: 6 weeks (a few initial half days in classroom)**
- **2 hours presentation at the end of the course**
- **public: graduate students in educational technology**

Project-based

- **large freedom for choice of subjects within the general theme**
- **requirements: research plan, respect of task schedules**
- **some mandatory collective work**

Theme 2002/3: "Exotic hypertexts"

- **New languages (e.g. Topic Maps, RDF/RSS), Wikis, MOOs, etc.**

4.2.Students activities (task) related tools

	Activity	*Date*	*imposed tools (products)*
1	Get familiar with the subject	21-NOV-2002	links, wiki, blog
2	project ideas, Q&R	29-NOV-2002	classroom
3	Students formulate project ideas	02-DEC-2002	news engine, blog
4	Start project definition	05-DEC-2002	ePBL, blog
5	Finish provisional research plan	06-DEC-2002	ePBL, blog
6	Finish research plan	11-DEC-2002	ePBL, blog
7	Sharing	17-DEC-2002	links, blog, annotation
8	audit	20-DEC-2002	ePBL, blog

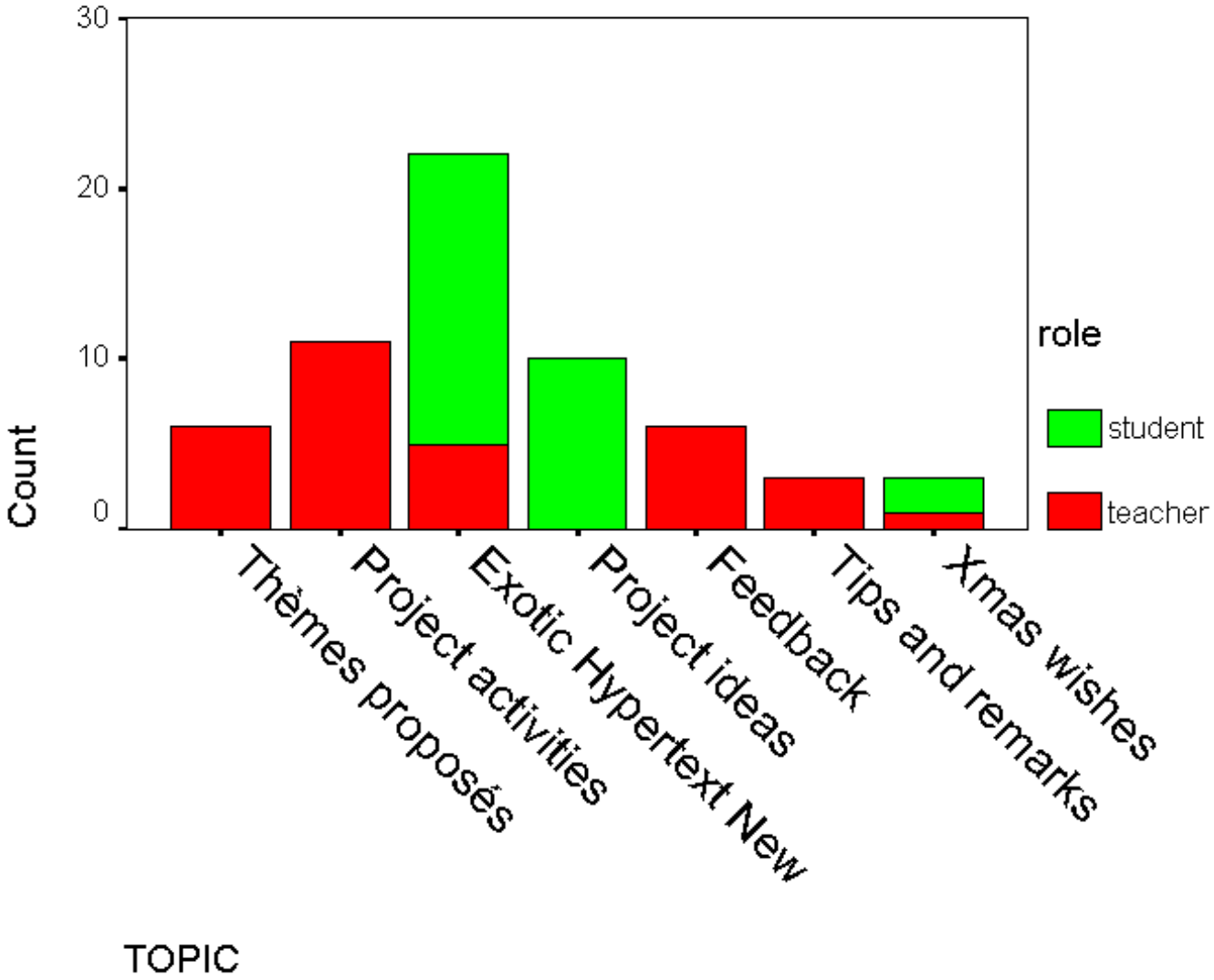
9	**audit**	10-JAN-2003	**ePBL, blog**
10	**Finish paper and product**	16-JAN-2003	**ePBL, blog**
11	**Presentation of work**	16-JAN-2003	**classroom**

In ADDITION, every activity can make use of:

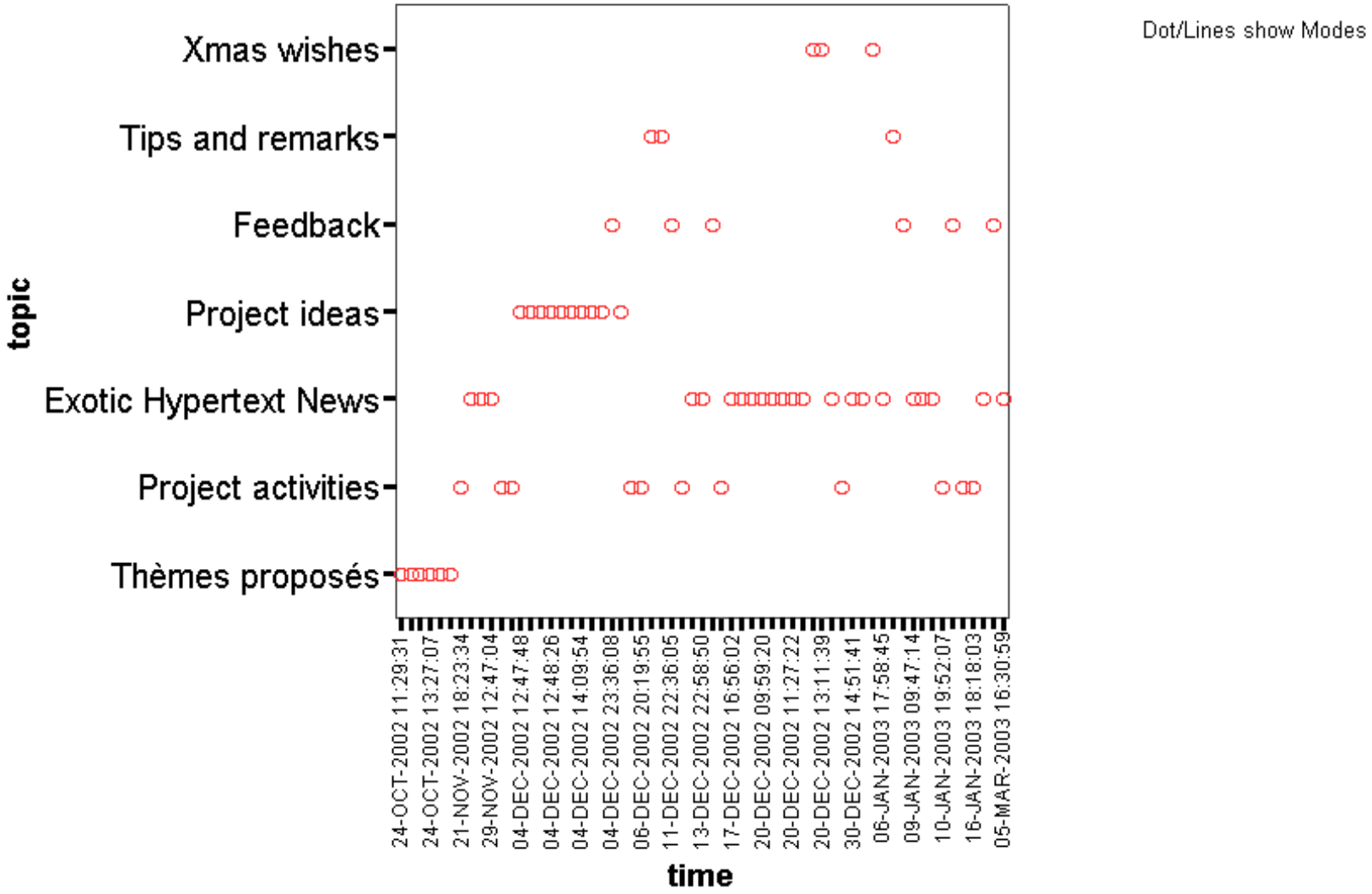
- **shoutbox**
- **links**
- **RSS feeds**
- **wiki**
- **various forums**
- **articles + annotations**
- **calendar**
- **various awareness tools (presence, what's new) !**

4.3.News engine as central organizing tool

A. Types of news articles



B. Distribution of new items over time



C. More Details ...

1

Title	Date	com-ments	topic type	author
Vers des nouveaux standards et systèmes	24-OCT-2002 11:29:31	1	Thèmes proposés	teacher
2. Wikis	24-OCT-2002 13:23:19	12	Thèmes proposés	teacher
3. Visualisation d'information	24-OCT-2002 13:25:06	3	Thèmes proposés	teacher
4. Interactive Fiction et jeux d'aventure	24-OCT-2002 13:27:07	16	Thèmes proposés	teacher
5. Navigation sociale et environnements virtuels	24-OCT-2002 13:28:52	13	Thèmes proposés	teacher
6. Théories générales sur l'hypertexte	24-OCT-2002 13:32:25	5	Thèmes proposés	teacher
Activité 1: Familiarisation avec le sujet du cours	21-NOV-2002 18:23:34	4	Project activities	teacher
My first tiny topic map	26-NOV-2002 23:02:48	4	Exotic Hypertext News	teacher
My first PHP-RSS pages	28-NOV-2002 01:44:18	0	Exotic Hypertext News	teacher
MooML	29-NOV-2002 12:47:04	0	Exotic Hypertext News	student
Activité 2	29-NOV-2002 15:47:02	0	Project activities	teacher
Activité 3: Vos idées de projet	02-DEC-2002 23:27:43	0	Project activities	teacher
IF multijoueurs (+MJ) sur le moo	04-DEC-2002 12:47:48	0	Project ideas	student
Interactive Fiction (IF) avec Topic maps (TM)	04-DEC-2002 12:48:01	0	Project ideas	student

Title	Date	com-ments	topic type	author
Topic Map des sites portant sur l'intégration des TICs dans la GRH	04-DEC-2002 12:48:13	0	Project ideas	student
Comment coupler IF et Wiki ?	04-DEC-2002 12:48:26	0	Project ideas	student
Le wiki et l'enfant de 10 ans	04-DEC-2002 12:48:40	0	Project ideas	student
Topic Map pour les Mathématiques	04-DEC-2002 13:42:58	0	Project ideas	student
[duclaux]	04-DEC-2002 14:09:54	0	Project ideas	student
Topic Map pour l'intelligence artificielle	04-DEC-2002 14:18:16	0	Project ideas	student
SWIKI et RSS	04-DEC-2002 14:18:37	0	Project ideas	student
Feedback activités 1 et 3	04-DEC-2002 23:36:08	0	Feedback	teacher
Topic Maps sur un thème rallié à l'apport du socioconstructivisme à l'éducation	05-DEC-2002 01:23:35	0	Project ideas	student
Activité 4: Entrer le projet et commencer à définir le projet	05-DEC-2002 13:57:39	1	Project activities	teacher
Activité 5: Finir le plan provisoire de recherche	06-DEC-2002 20:19:55	0	Project activities	teacher
Mutualisation - participez et profitez !	10-DEC-2002 22:09:57	0	Tips and remarks	teacher
N'oubliez pas la réflexion!!!	11-DEC-2002 13:16:21	0	Tips and remarks	teacher
Feedback activité 5	11-DEC-2002 22:36:05	2	Feedback	teacher
Activité 6: Finir le plan de recherche	11-DEC-2002 22:39:09	0	Project activities	teacher
A GPS controlled interactive narrative	13-DEC-2002 17:47:11	4	Exotic Hypertext News	student

Title	Date	com-ments	topic type	author
tm-summary.xslt - affiche le contenu de votre *.xtm	13-DEC-2002 22:58:50	0	Exotic Hypertext News	teacher
Feedback projet de recherche (activité 6)	17-DEC-2002 00:34:58	2	Feedback	teacher
Activité 7: Mutualisation	17-DEC-2002 01:16:52	0	Project activities	teacher
Introduction des TICs dans les ressources humaines et Topics Map : deux concepts	17-DEC-2002 16:56:02	0	Exotic Hypertext News	student
Topic Navigation Maps	17-DEC-2002 17:23:11	0	Exotic Hypertext News	student
co-construction d'un cours avec l'outil wiki (Calvin 2os)	18-DEC-2002 17:07:49	0	Exotic Hypertext News	student
Jeu de rôles éducatif dans le moo	20-DEC-2002 09:59:20	0	Exotic Hypertext News	student
Le modèle Bicyclique	20-DEC-2002 09:59:50	0	Exotic Hypertext News	student
Projet staf18: Le Wiki et l'enfant de 10 ans	20-DEC-2002 10:00:22	0	Exotic Hypertext News	student
EDUCASUP: développer un réseau d'utilisateurs des TICE dans l'enseignement	20-DEC-2002 11:27:22	0	Exotic Hypertext News	student
Mailing List for TOPIC MAPS	20-DEC-2002 11:28:03	0	Exotic Hypertext News	student
JOYEUX NOEL ET UNE EXCELLENTE ANNEE 2003	20-DEC-2002 11:39:20	2	Xmas wishes	student

Title	Date	com-ments	topic type	author
Bonnes fêtes/Merry Xmas!!!	20-DEC-2002 13:11:39	0	Xmas wishes	teacher
The evolution of text adventures	20-DEC-2002 16:59:21	2	Exotic Hypertext News	student
Activité 8: Préparation pour un audit	20-DEC-2002 20:27:07	0	Project activities	teacher
J'ai testé pour vous : Nexist-Topic-maps open source software	30-DEC-2002 14:51:41	1	Exotic Hypertext News	student
Moteur de recherche sous forme de carte	02-JAN-2003 17:44:42	1	Exotic Hypertext News	student
BONNE ANNEE A TOUTES ET A TOUS	02-JAN-2003 17:46:36	0	Xmas wishes	student
Notes de Lectures sur un article de Amy Bruckman	06-JAN-2003 17:58:45	0	Exotic Hypertext News	student
Nouveautés pour l'article (Paper)	07-JAN-2003 15:55:36	0	Tips and remarks	teacher
Feedback activité 8 (audit workpackages)	09-JAN-2003 00:10:59	0	Feedback	teacher
Un tutoriel sur comment faire des Topic Maps que j'ai écrit ...	09-JAN-2003 09:47:14	1	Exotic Hypertext News	student
Outils Topic Maps	09-JAN-2003 12:41:59	0	Exotic Hypertext News	teacher
Un autre outil pour developper les topics Maps	10-JAN-2003 16:21:05	2	Exotic Hypertext News	student
Activité 9: Préparation pour un audit	10-JAN-2003 19:52:07	0	Project activities	teacher
Feedback audit (activité 9)	16-JAN-2003 13:27:48	0	Feedback	teacher

Title	Date	com-ments	topic type	author
Activité 10: Finir le papier et le dispositif	16-JAN-2003 18:06:15	0	Project activities	teacher
Activité 11: Présentation de votre travail et rattrapage mutualisation	16-JAN-2003 18:18:03	0	Project activities	teacher
Syndication du site 'THOT'	20-JAN-2003 10:50:08	1	Exotic Hypertext News	student
Dernier Feedback	04-FEB-2003 17:43:49	0	Feedback	teacher
Travaux sous forme de livres	05-MAR-2003 16:30:59	0	Exotic Hypertext News	teacher

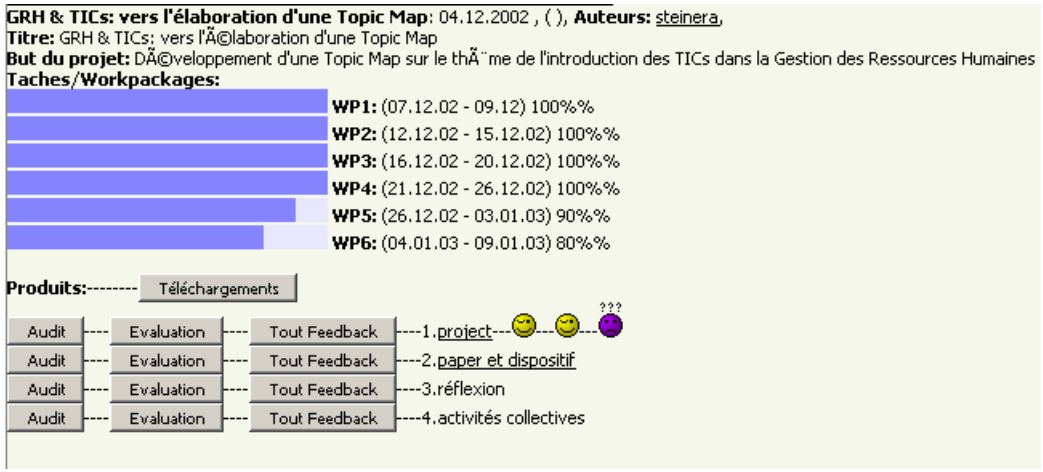
4.4.The ePBL tool

(Ph.D. thesis of Paraskevi Synteta on project-based learning)

Project Tool

- **File sharing system + XML grammar for:**
  main goal, sub-goals, approach, work packages management
- **It is a work/thinking/monitoring tool**

Audit Tool: Tied to work packages & student projects



Paper / virtual book

5. A short look at gaming and programming

5.1 Intrinsically motivating elements of gaming

(Frete 2002, Master thesis)

Element	
fantasy	• imagination and freedom (make believe + voluntary activity)
challenge & curiosity	• a level of difficulty that triggers curiosity • presence of goals • uncertainty (surprise)
feedback	• immediate • clear
self-esteem	• adapted tasks • encouragement to learn & augment scores
control	• levels to play, some selection of goals, strategies & tactics

5.2.Classes of games

Main types	*sub-types*	*skills that could be learnt (mostly meta-skills)*
Action & skill	sports, fights, platform, labyrinth, interactive movie,	spatial competence (some) contents procedures languages systems thinking attitudes communication collaboration decision making
strategy & role	interactive fiction, adventure, quest, strategy/construction, war games, edutainment, ...	
hybrid (action/ strategy)	real time adventure, real time strategy, simulations	

5.3.The Boston Consulting Group 2002 Hacker Survey

OVERVIEW OF KEY FINDINGS

Why should we care?

High creativity

What motivates hackers?

Fun, skill, freedom and need

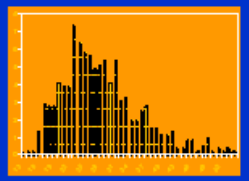
Increasing knowledge biggest benefit

Losing sleep biggest cost

Who are these guys?

Volunteer significant time

IT professionals



Generation Xers

What about the community?

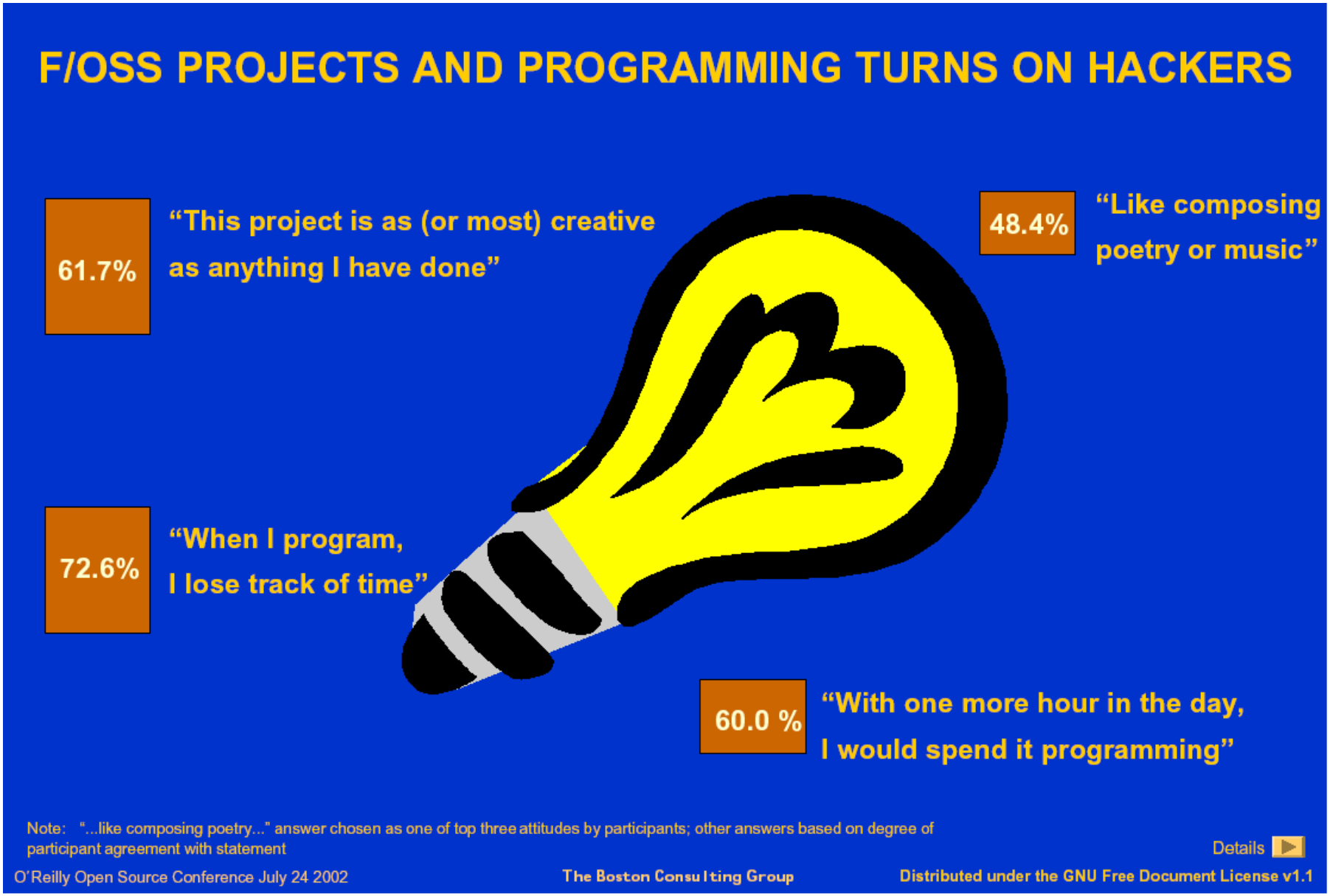
Strong identification

Global effort

Peer leadership preferred

O'Reilly Open Source Conference July 24 2002 The Boston Consulting Group

The Boston Consulting Group 2002 Hacker Survey IIT



BCG study on participation in open source projects III:

Some results rephrased:

- It's intellectually stimulating and creative
- One learns
- There can be "flow"
- Needs community
- Needs leadership (for the initial code base in particular)
- .... almost a game, certainly "fun"

But ...

- participants are skilled
- it's very optional, 4 types of followers:
  - community believers (19%)
  - professionals (25 %)
  - hobbyists (27%)
  - learning & stimulation seekers (29%)

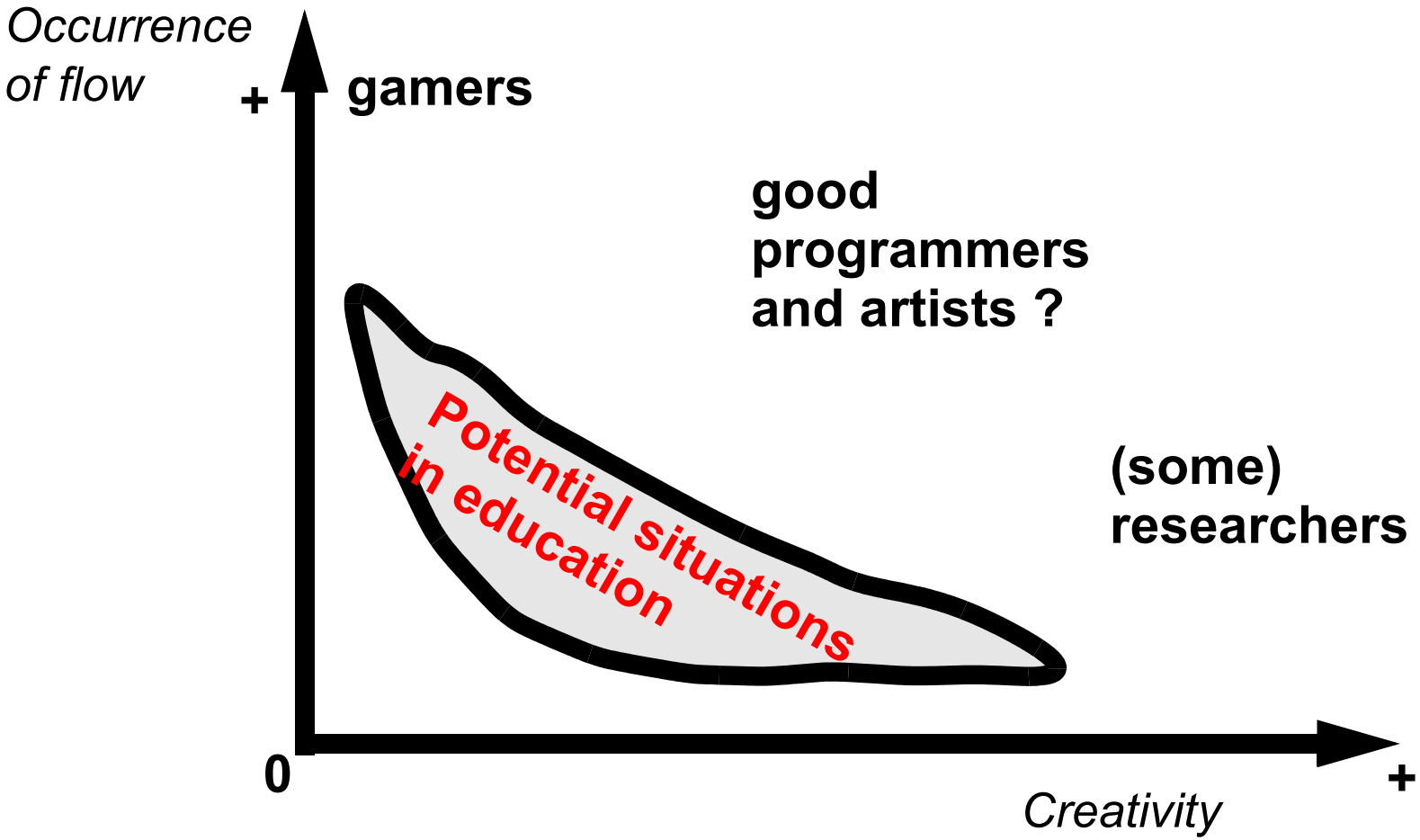
5.4.Summary

- Neither games nor programming are very good metaphors for pedagogics
  - games are chosen according to very different tastes, creativity is rather poor, meta-skills are not necessarily transferable, ...
  - proper programming is very difficult to learn
- ... but one can learn a few things from these domains, in particular from their motivational features ....

Interesting elements	*games*	*programming*
imagination	X	x
clear goals	x	x
feedback	X	x
“right” challenge	X	x
community	x	x

6. The relation of creativity and flow

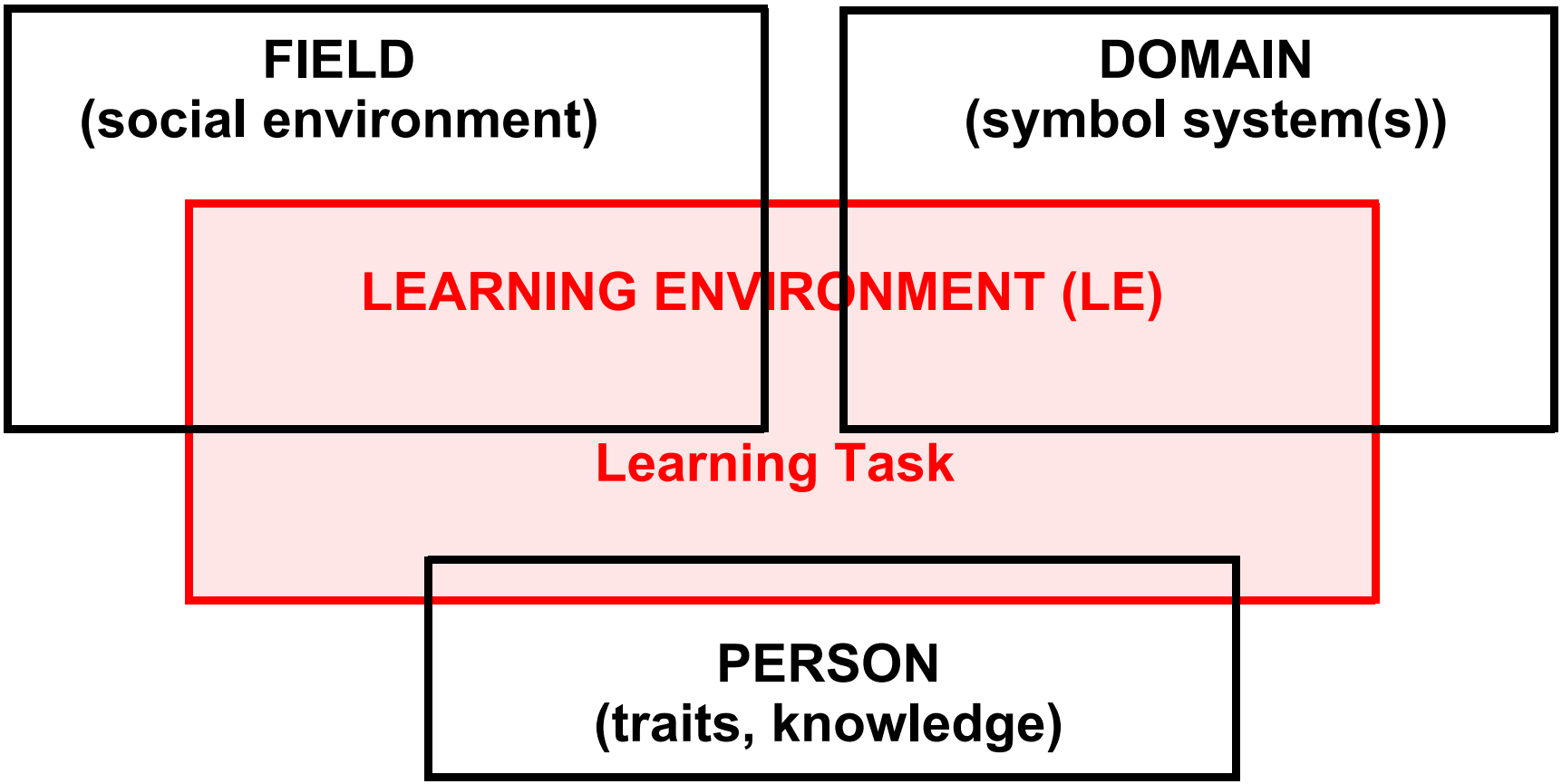
- **Flow and creativity are 2 different concepts**



- **... we need simpler variables upon which we can act (see below)**

7. Creativity and LEs (a first attempt)

7.1 DIFI (Domain Individual Field Interaction) framework



- 3 levels of analysis (Feldman 94 et al.)
- A learning env. must provide advantageous conditions at all

7.2.Important creativity variables (Feldman 94 et. al)

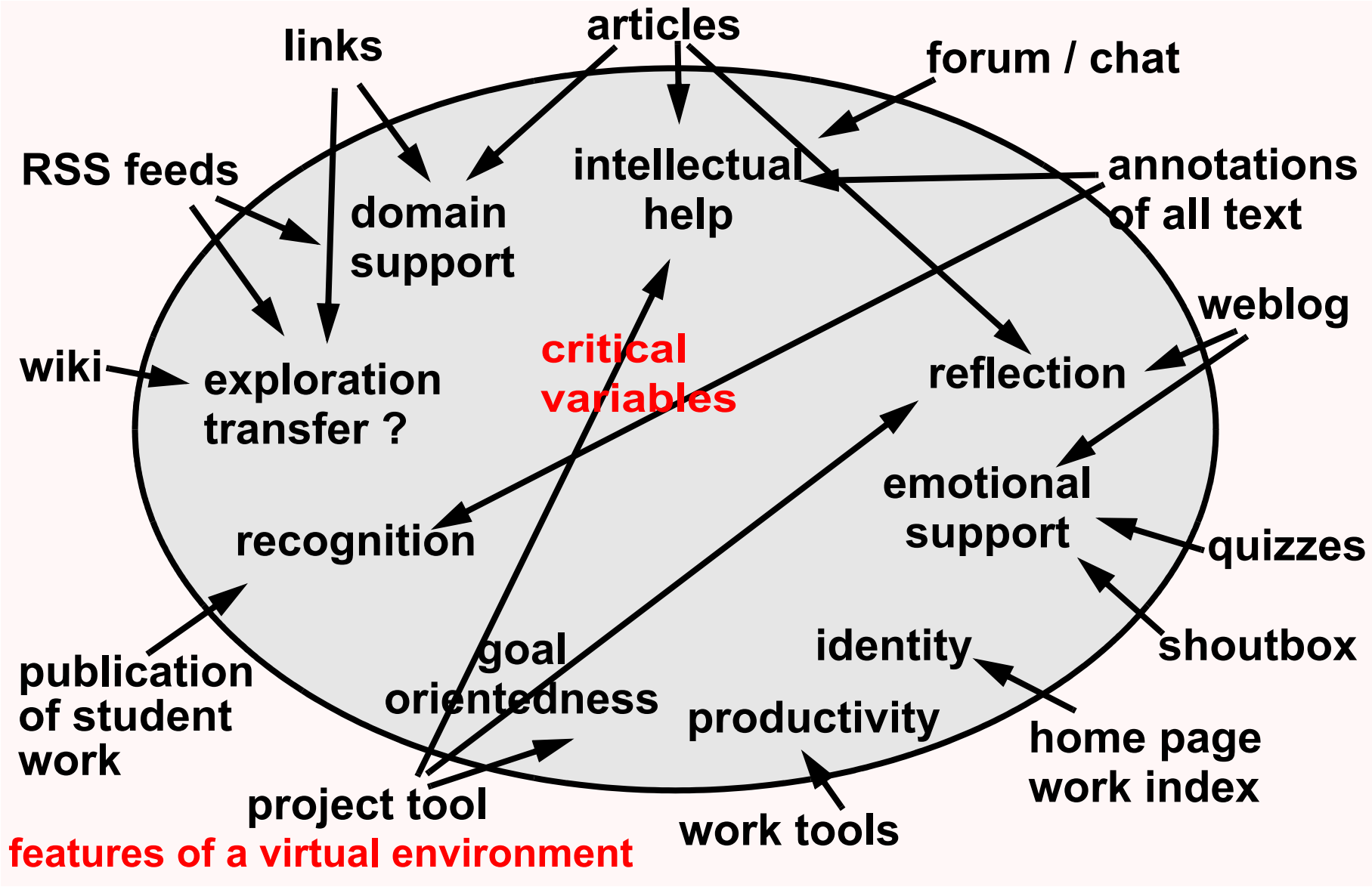
Analysis level	*Main variables of interest*
Intellectual traits:	• fluency of ideas, • flexibility in thinking, • complexity of conceptual structure, • increased reflectiveness
Personality traits: should lead to productive balance !	• sensitivity to environment, • preference for complexity (do you like complex mosaic design patterns ?), • work of its own sake (intrinsic motivation), • effort and some control: “Real” creativity needs protracted processes (insight is rather an end point !), • ability to transform unconscious material , • ability to find balance between desire to transform and desire to preserve important features ...

Analysis level	*Main variables of interest*
Cognitive structures:	• expertise of some domain, • "networks of enterprise" (goals, projects, etc) = purposefulness, • conceptual images of wide scope.
Domain Environment:	• domains (symbol systems) into which possibilities can be introduced.
Field environment	• network of people, support, instruction, evaluation, recognition • cognitive and affective support system, • faustian deals

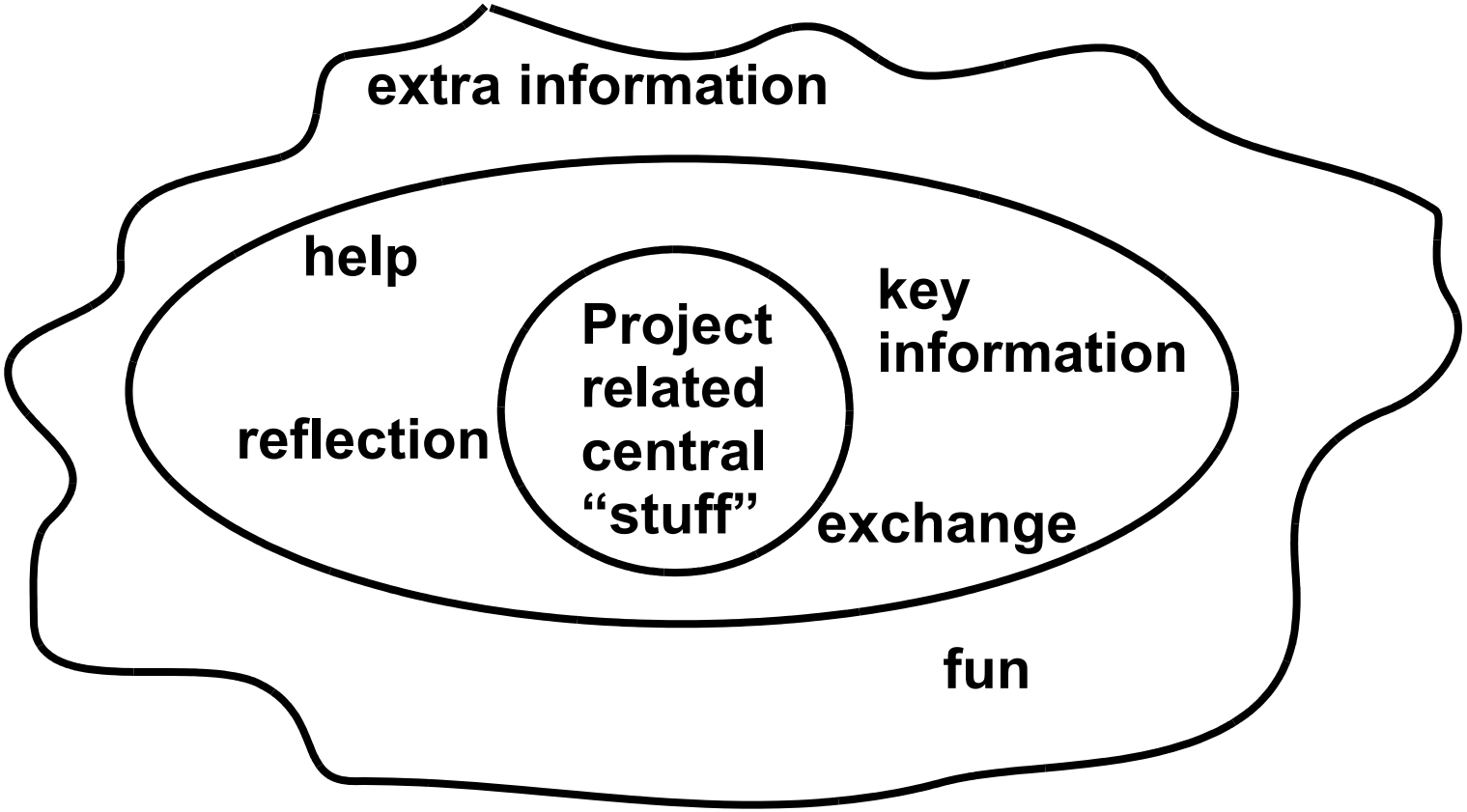
Can some of it be trained, exploited or conditioned ?

- **training: divergent thinking skills (Barron), cog. structures ?**
- **conditioning: intrinsically motivating tasks, field variables**
- **"zeitgeist": in some domains there are creativity surges, i.e. on can try to create a collective "class" spirit.**

7.3.LE design = tools that support creativity “elements”

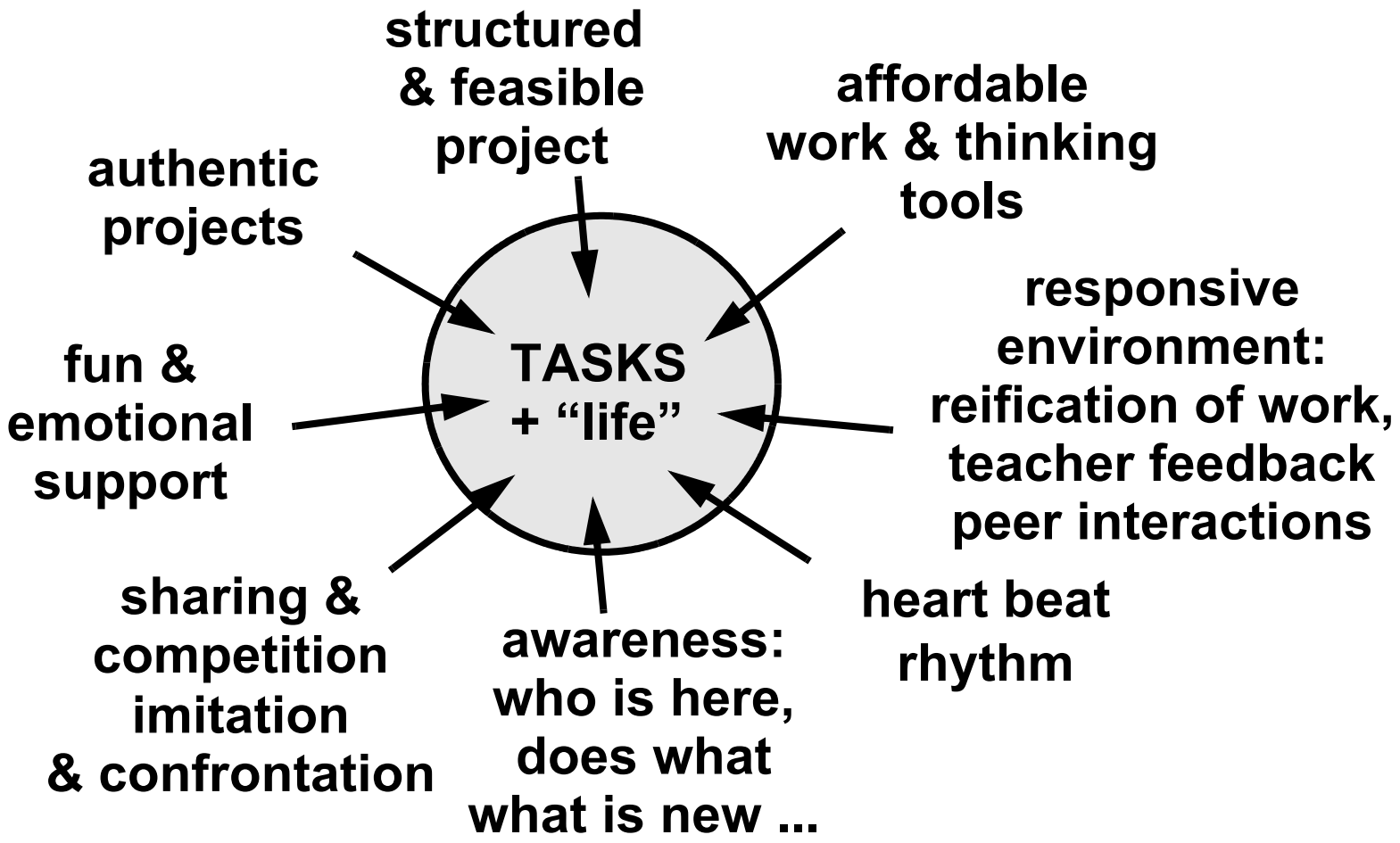


7.4.LE design = sharp focus and fuzzy edges



- central focus instrument is the "news" tool (central in the display)
- for each task there is one (or more) central tool (application)

7.5.LE design = landscaping & conditioning



conditioning = project specific design of the LE
+ co-design of the project

8. Flow

8.1 Csikszentmihalyi's elements of "optimal experience" (flow)

element	games	programming		learning
		good	bad	
1. optimal challenge	xx	x	no	improvable
2. immersion	xx	x	no	improvable
3. clear goals	xx	x	no	improvable
4. immediate feedback	xx	x	x	improvable
5. concentration	xx	x	no	?
6. sense of control	xx	?	no	improvable
7. disappearing self	xx	x	no	?
8. altered sense of time	xx	x	no	?

... take advice from "skilled programming" and gaming

Strategies to promote higher “energy states” in students

flow element	*Design of learning environment (LE)*
1. optimal challenge	Clear subgoals are not enough, they should be realistic (LE provides project tool) Also: use behaviorist training when needed
2. immersion	optimal challenge with authentic tasks
3. clear goals	use a goal tool, subgoals should relate to the general goal and to planned work
4. immediate feedback	reify as much production as possible and organize discussion + teacher feedback
5. concentration	(can’t be influenced)
6. sense of control	have students reflect (articles, weblog), assign some easy tasks
7. disappearing self	(can’t be influenced)
8. altered sense of time	(can’t be influenced)

Problems:

- **Not many people have a highly "autotelic self" (can focus & find enjoyment in the task of the present moment)**
- **We can't always let ordinary students decide what games they like**

Therefore, other (related) additions:

flow element	*Design of learning*
9. extrinsic rewards	**Each subtask should lead to a product, some tasks should be easy (sense of achievement)**
10. thinking tools	**E.g. help for both differentiation & integration (structuring and combining ideas)**
12. fun	**The LE should provide outlets for collective fun (shoutbox, surveys, blogs)**

9. What about the teachers and the schools ?

Let's be pessimistic:

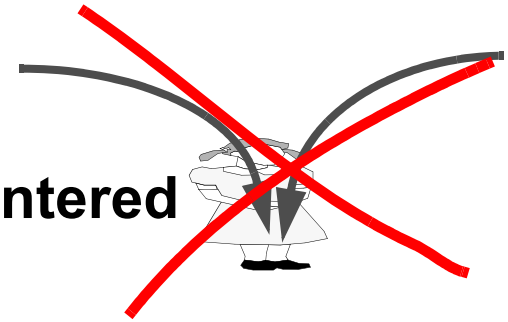
- **Learner-centered teaching requires huge teacher efforts**
  - **an LE without active teacher is a dead place**
  - **an LE without (at least some) activity planning is fairly useless**
  - **an LE must be carefully designed (and adapted)**
- **Technology bites**
  - **computers don't work (if they are available)**
  - **working with portals must be learnt (almost as hard as gaming)**
- **Project-based work is not favored by the curriculum &**
  - **teachers don't work together (could pool lessons)**
  - **teachers don't plan activities above lesson level**
- **Innovation takes 30 years (50 in education)**

Let's be optimistic:

- **Project-based teaching can lead to cool results**
- **If structured and scaffolded, students even learn curricular contents ...**

10.Some conclusions

(1) Shift the focus from learning *materials*
to learning *activities*



(2) Learner centered pedagogics is teacher-centered design

(3) Need careful balance between structure & improvisation
between monitoring and freedom
Do not overscript, be somewhat "authentic"
e.g. don't transform construction into programmed learning

(5) Start with pedagogies & technologies that are somewhat *familiar*. E.g. use real workplace tools if possible.

Just born :
Tecfa SEED community site
http://tecfaseed.unige.ch/door/

Available now:

- **exchange & some support**
- **examples of running portals (school & university education)**

Available soon (summer/fall 2003):

- **repackaged and documented "PostNuke" C3MS software**
- **modules for activity planning, project management, workshop organization, concept teaching, etc.**
- **Catalog = *cookbook* with "half-baked" *scenarios* and *tools***

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