

The research plan and conceptual frameworks

(version 1.0, 1/4/05)

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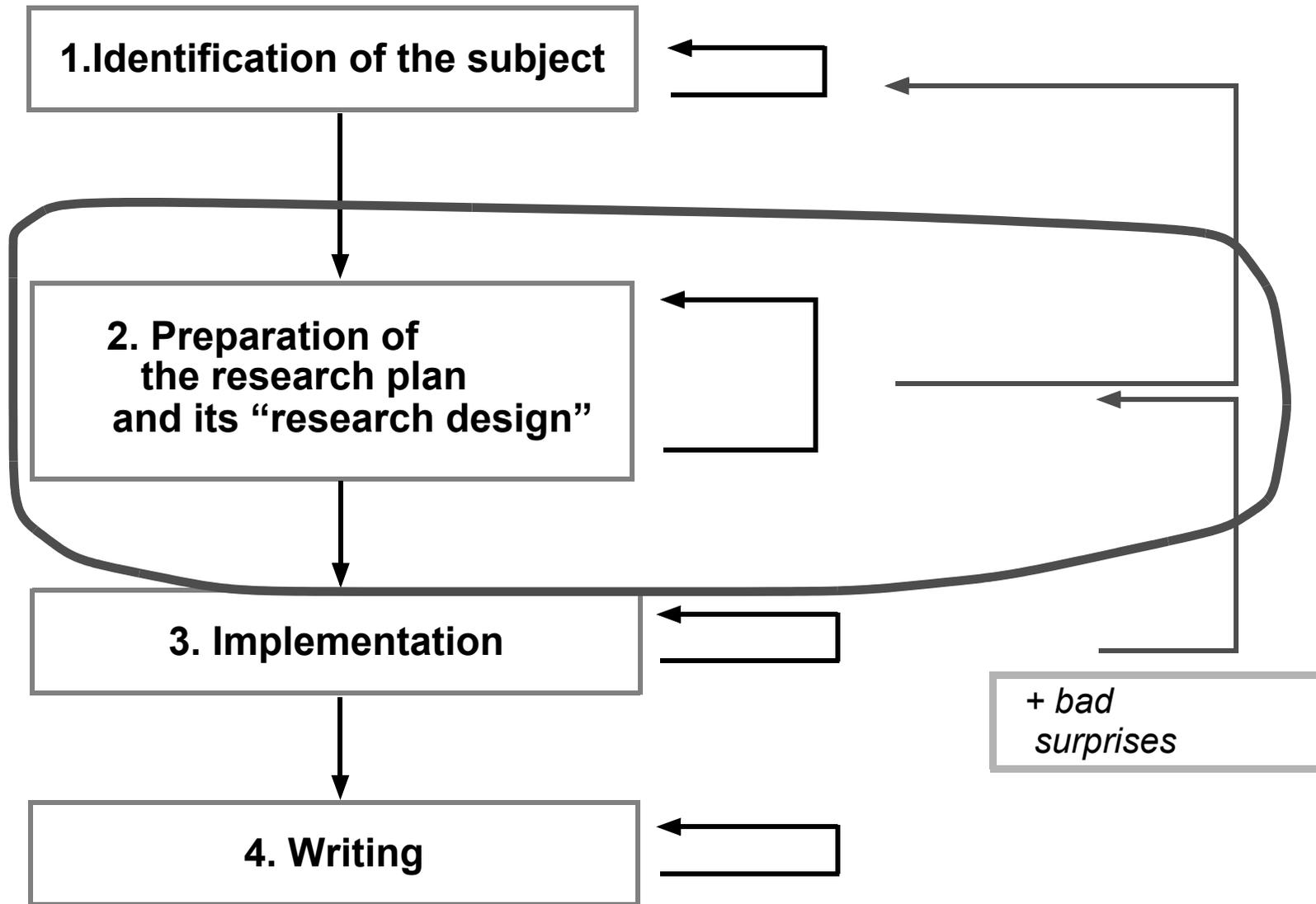
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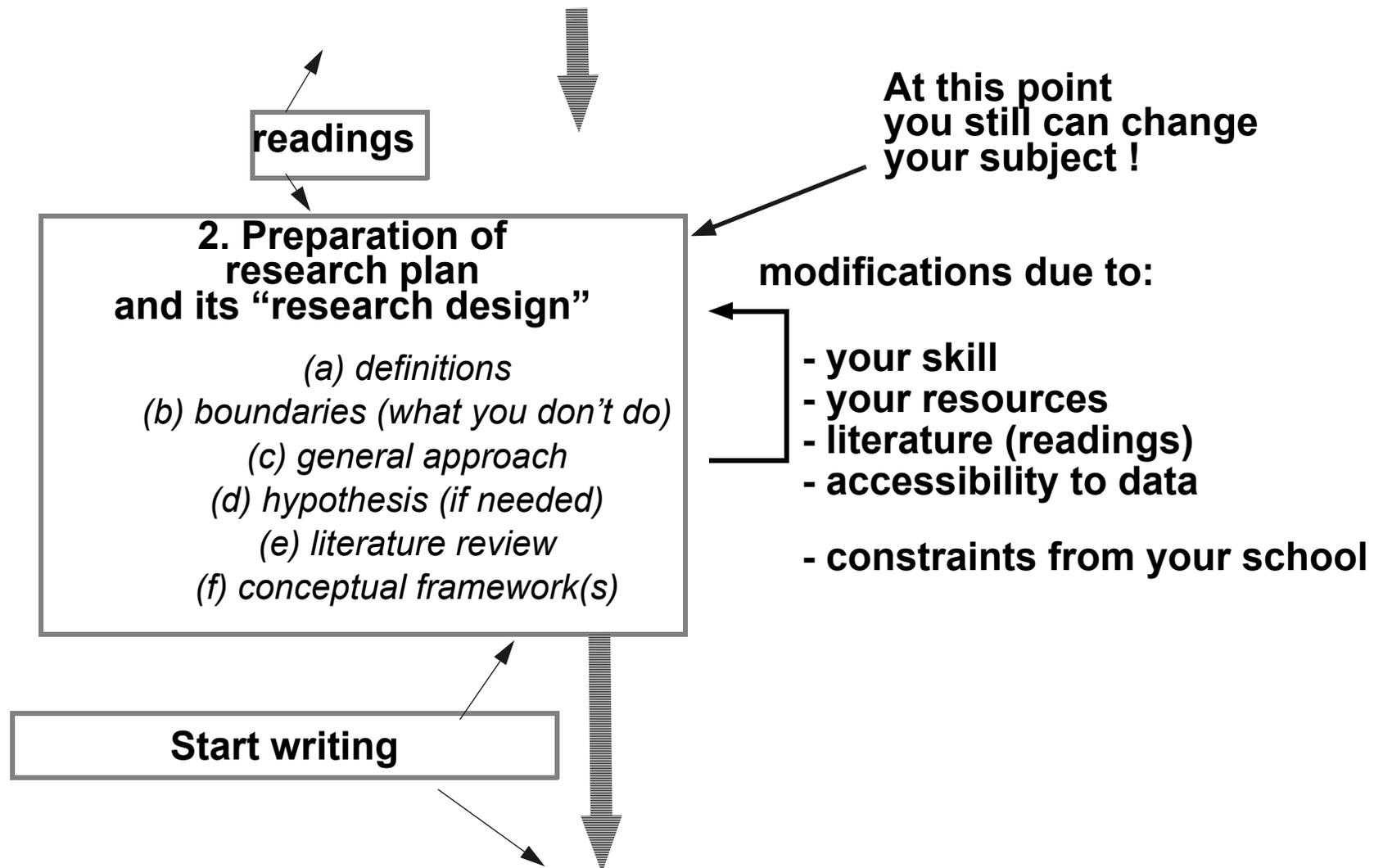
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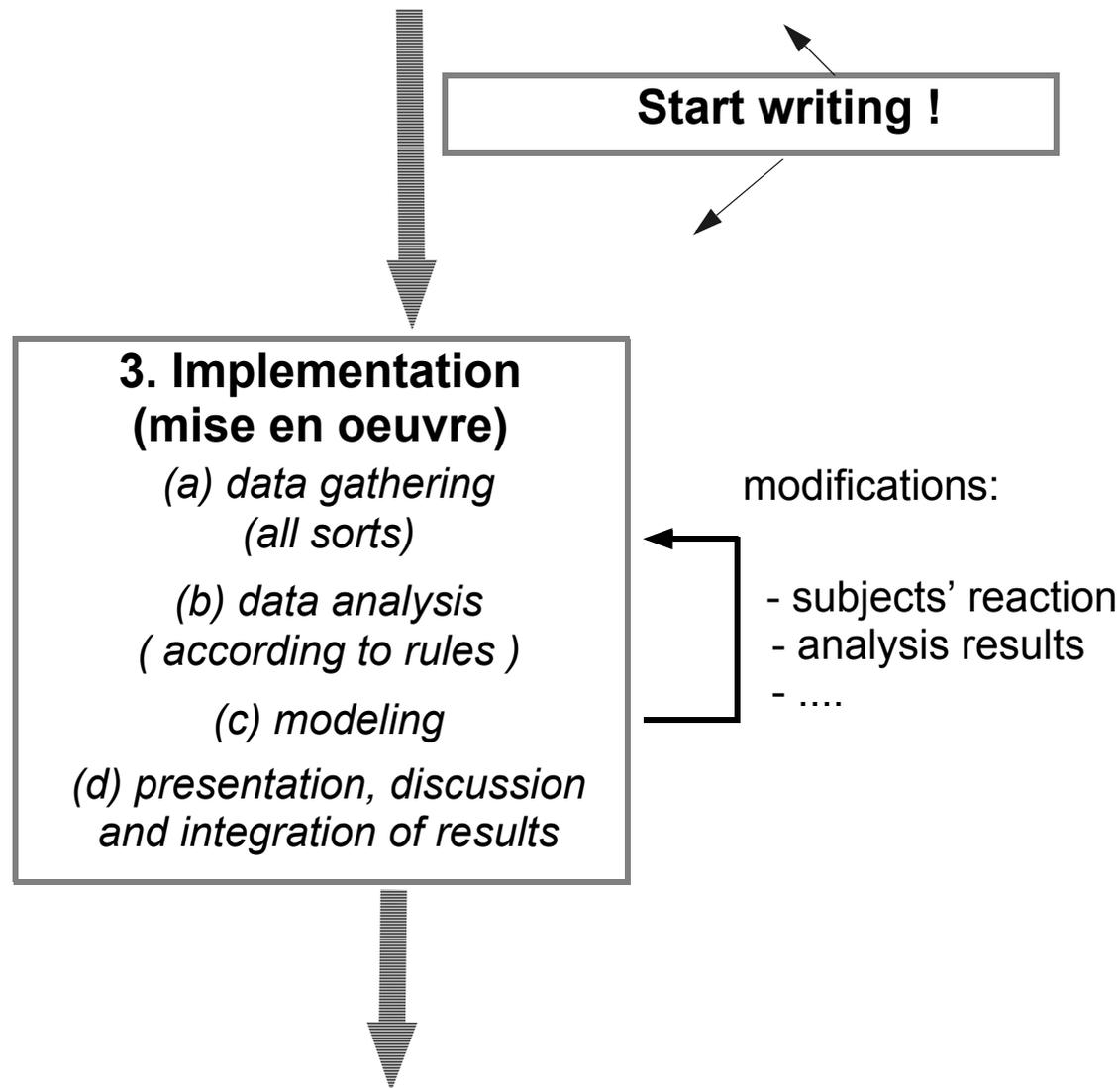
1. Place of the research plan



1.1 Important elements of the research plan



1.2 Anticipation of main research activity (implementation)



2. Elements of a typical research plan

- Note: You may have to adapt this list to fit formal requirements from your institution or methodology constraints ...

2.1 Element: Your research subject

- the big question (general subject in one sentence)
- explicitation of the big question
 - at least a few sentences that demonstrate its practical and theoretical interests.
- motivations and various ends
- delimitations (what you are not going to do)

2.2 Element: Objectives of your research

- Say clearly what you wish to achieve
- Will determine «Element: Research questions and/or hypothesis» [p. 6]
- Valorization (if appropriate): how can you transfer results in a "real context" ?

2.3 Element: theory

- Start with a short and synthetic text describing and discussing the "state of the art" in your subject area.
 - Be sure to mention the major publications. Read the ones you quote from !
- You may point out inconsistencies and gaps (adds additional interest to your project !)
- Identify theories and conceptual models that you will use.
 - Maybe add your modifications and present both at the end
- Make sure that you define all concepts
 - A lot of concepts are controversial, e.g. pedagogical effectiveness, efficiency, ...

2.4 Element: Research questions and/or hypothesis

Make explicit your research subject, main goal and objectives

Choose from (or combine):

- Open research questions (but make an effort to be as precise as possible).
- Research questions formulated as working hypothesis.
- Real hypothesis that are based on theory.
- In theory-oriented research, formulate hypothesis that postulate causalities
 - Bad: "I postulate that my e-learning design will work"
 - Good: "Conditions for successful implementation of an e-learning design in the context XXX of are"
 - Bad: "ICT doesn't work in schools"
 - Good: "Critical variables A, B, C for successful implementation of e-learning are ...".
Then, make explicit A, B, C as causal rules.

2.5 Element: Approach & methodology

- “Description of your overall approach (for example "experimental design", "survey study", "usability study", "instructional design")
- Description of data gathering and analysis techniques (for example, semi-directive interviews, content analysis ...)

Note: Make sure to explain your methodological designs for all levels of analysis !

- at the organizational level (if you are interested in this question),
- at the individual level (e.g. students, teachers)

Basic principle:

- show convincingly ***how you are going to answer each research question !***
- Obey guidelines dictated by the general approach
 - in particular: be careful with experimental designs (rules are strict !)
- (more details below)

A. Approach

- Briefly describe the overall approach you are using
- Discuss analysis grids that will measure important concepts
- You also can discuss conceptual frameworks (if not done before)
- For experimental studies: clearly describe the experimental conditions

B. Measures and material

- Data gathering techniques: (interviews, observations, surveys,)
- Sampling strategies (or justification of singular case selection)
- For qualitative in-depth studies
 - sampling of interviews, events, etc.
- For experimental studies
 - there is a strict way of doing things ! You have to describe in detail experimental conditions, materials used, sampling conditions etc.

C. Analyses

- Shortly describe analysis techniques (both qualitative and quantitative)
- If necessary: point out which methods need development (e.g. analysis of student-student interaction in a CSCW environment)

2.6 Element: Information sources

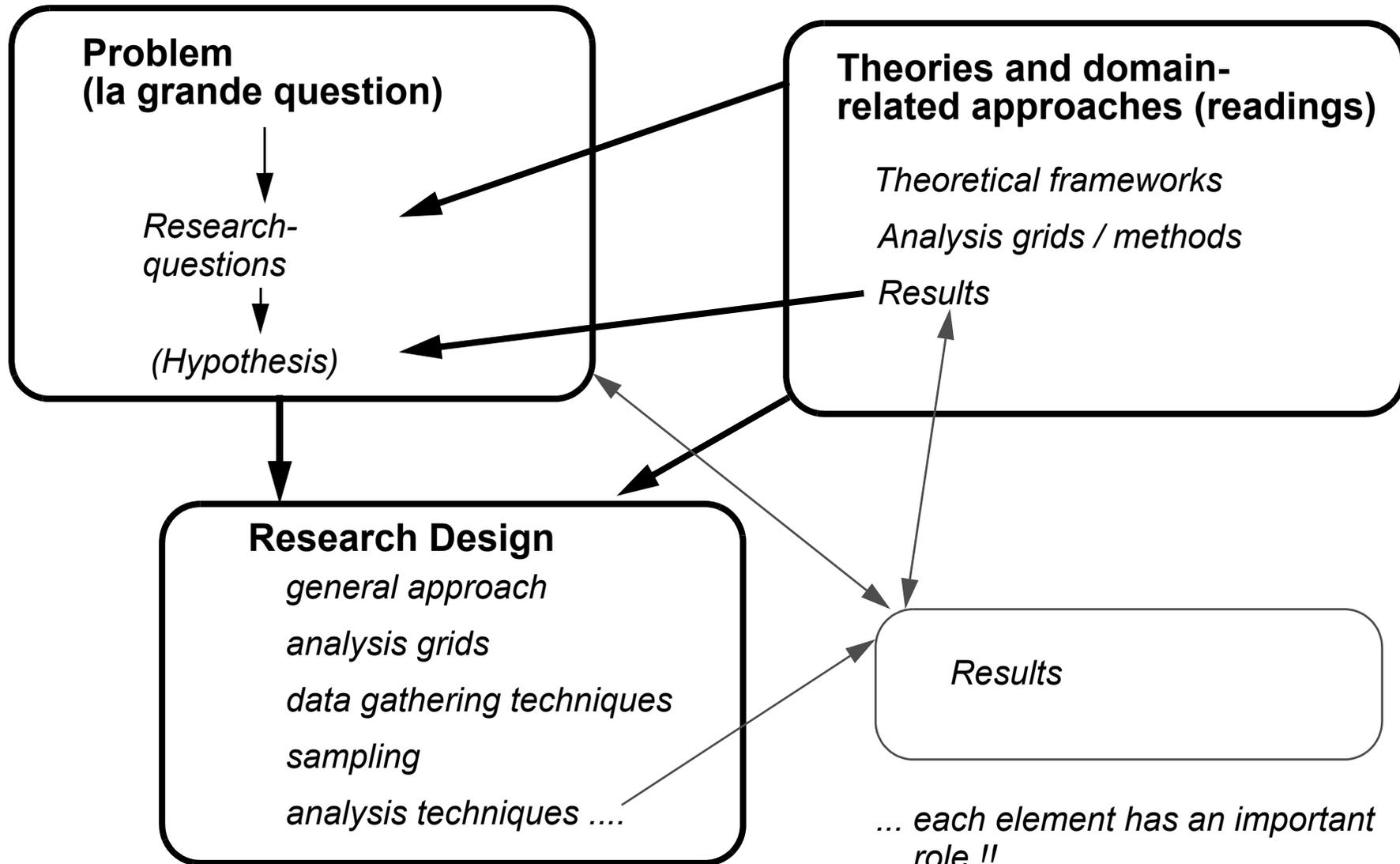
- Bibliography (use a real standard, like APA !)
- Documents to analyze
- Information interviews, etc.,

2.7 Element: Work Agenda

(see module «xiv Planning techniques»)

3. The research plan is a whole

3.1 Major elements must be linked together



3.2 Recall: Research plan = what + why:

What ?	A good question ! (problématique)	<ul style="list-style-type: none"> • “So what” ? "What knowledge do we gain"
	A (or more) good conceptual framework(s) that...	<ul style="list-style-type: none"> • links your research to a larger identified issue, • structures your phenomenon • links your project to a body of existing knowledge • ... is preferably available as a nice drawing
How?	Consider that your research plan should be ...	<ul style="list-style-type: none"> • systematic: show that you will study your "big question" and related research questions (and nothing else!) • academic: identify your main approche(s) and major techniques you will use. • somewhat flexible (make sure that you identify priorities also) • In some designs it is required that show details regarding how you plan to answer your questions.
	Be realistic ! Prove that you have ...	<ul style="list-style-type: none"> • the time to do it ? • access to data ? • the ability to do it (or to learn how to do it) ?
A whole !	Integration !	<ul style="list-style-type: none"> • A coherent whole ! • All your intentions are made explicit. • Your research questions cover your essential planned work.

3.3 Before you believe that you are done

Check again:

1. Theoretical feasibility
 - You can't do it all by yourself, check the literature (if not already done so, find "ground breaking" articles)
 - In particular: theoretical frameworks, analysis grids, theoretical statements.
 - organize an interview with a least an academic and a domain expert
2. Inventory of approaches and methods
 - there are some constraints, you can't study everything in any way (but you do have choice !)
 - finding a good design always is an iterative process (so don't worry if your first version looks bad)
3. Identify your main approach :
 - look at similar research
 - if you want to prove things and make causality claims, you need comparison !
 - use qualitative approaches to explore and to understand, quantitative to confirm, generalize, prove, ...
4. Methodological feasibility
 - Dress a list of all the **concepts** that appear in your research questions (and hypothesis if you have)
 - Take each concept apart for its dimensions,
 - Operationalize each empirical dimension (make it is measurable)
5. Does your theory part really relate to your empirical / practical part ?
6. Make sure that you can produce needed data and then analyze them
 - do you know how to gather data (make observations, design questionnaires, make interviews, ...
 - can you handle these data ?

4. Importance of conceptual frameworks, typologies and grids

Analytical frameworks

- Provide an overview of the phenomenon (elements and relations)
- Help to bridge the gap between theory and empirical research
- Direct analysis (e.g. what causalities to look at, what's of interest, etc.)

Lists of dimensions

- Help to focus on all aspects of a concept

Analysis grids

- Help to organize data gathering and collection
- Will bridge the gap between general concepts at theory level, e.g. in your research questions) and measurable indicators

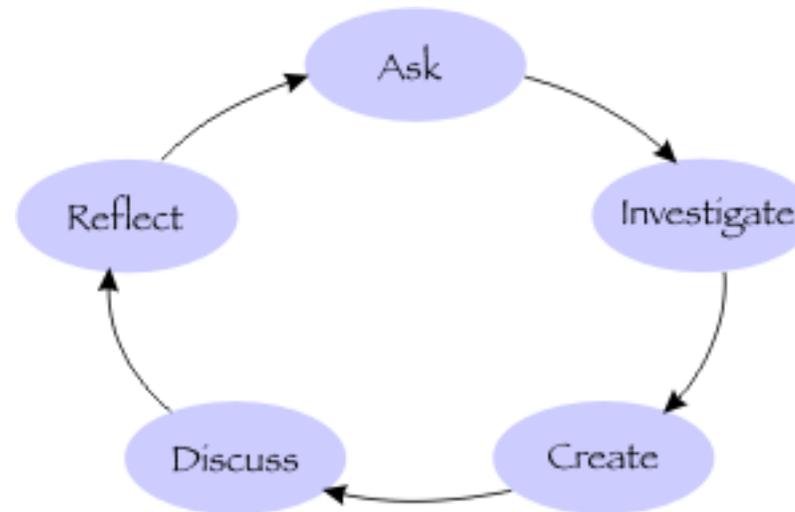
(examples on the next slides)

4.1 Example frameworks

Exemple 4-1: The inquiry circle in inquiry-based learning doctrine

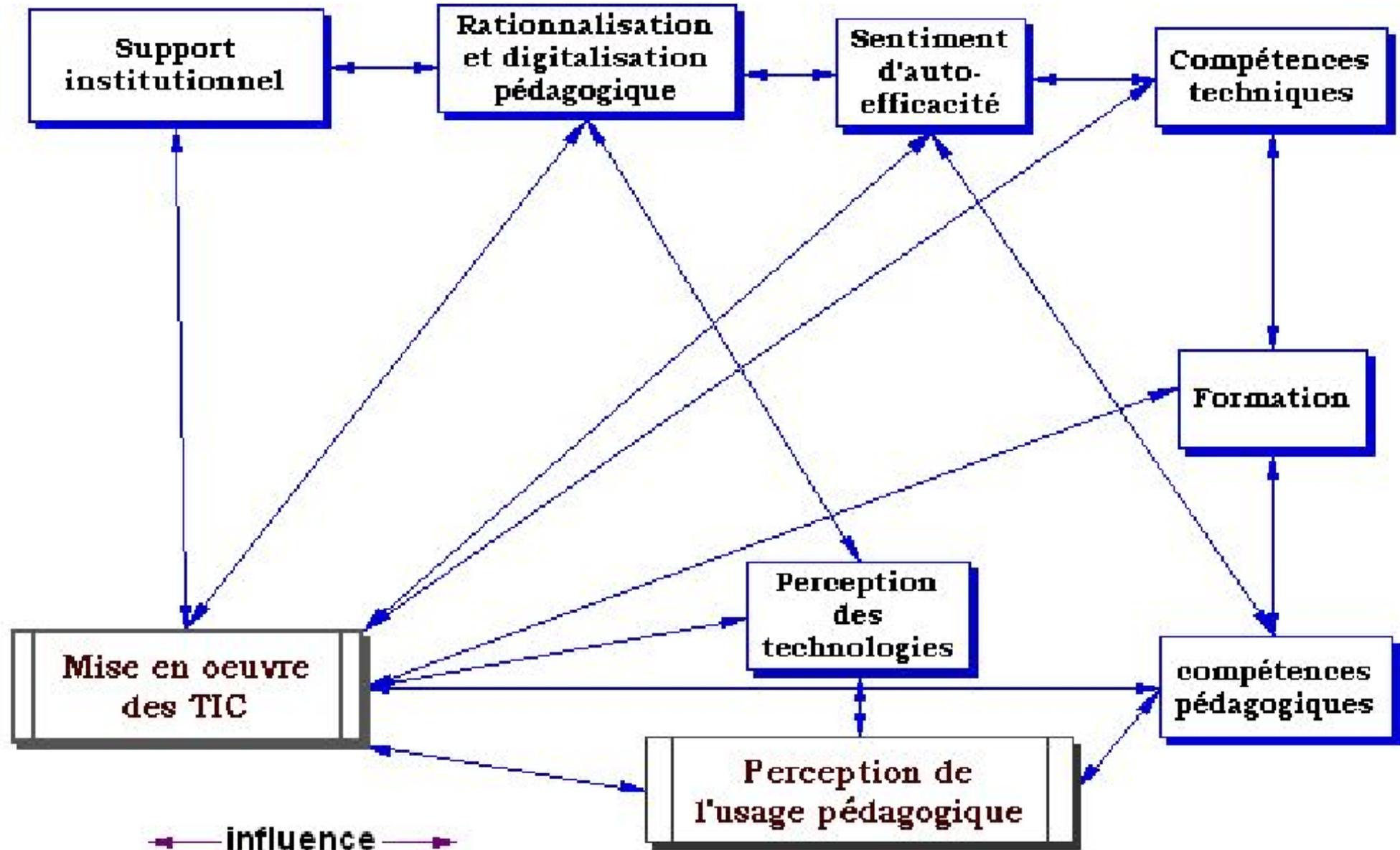
url: <http://www.inquiry.uiuc.edu/>

- See also: DESS mémoire de Stéphane Lattion (2004)



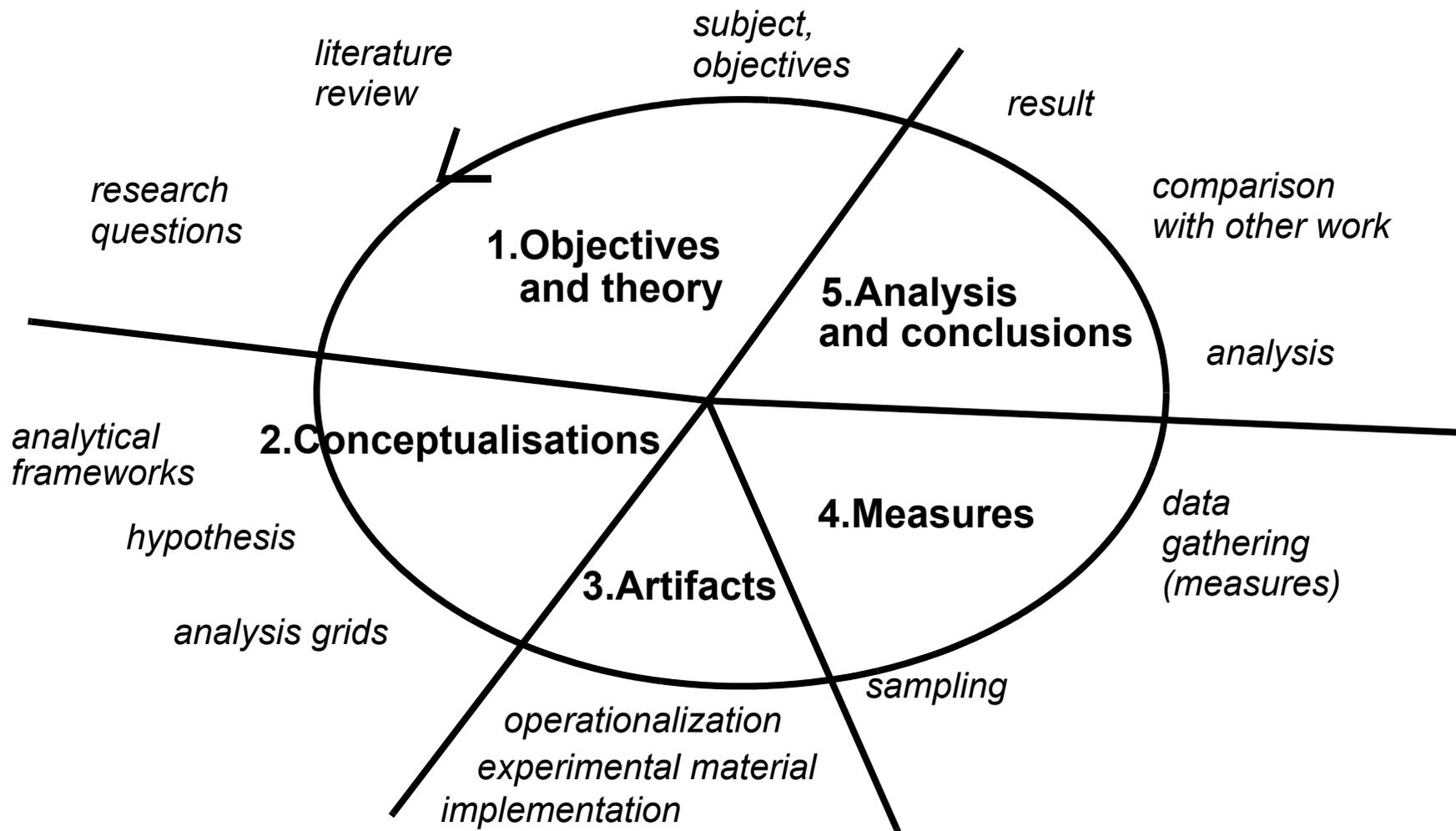
- clearly identifies 5 elements of inquiry
- claims/shows that inquiry is circular

Exemple 4-2: Gonzalez 8-factor model for ICT usage in schools



Exemple 4-3: A linear model of research

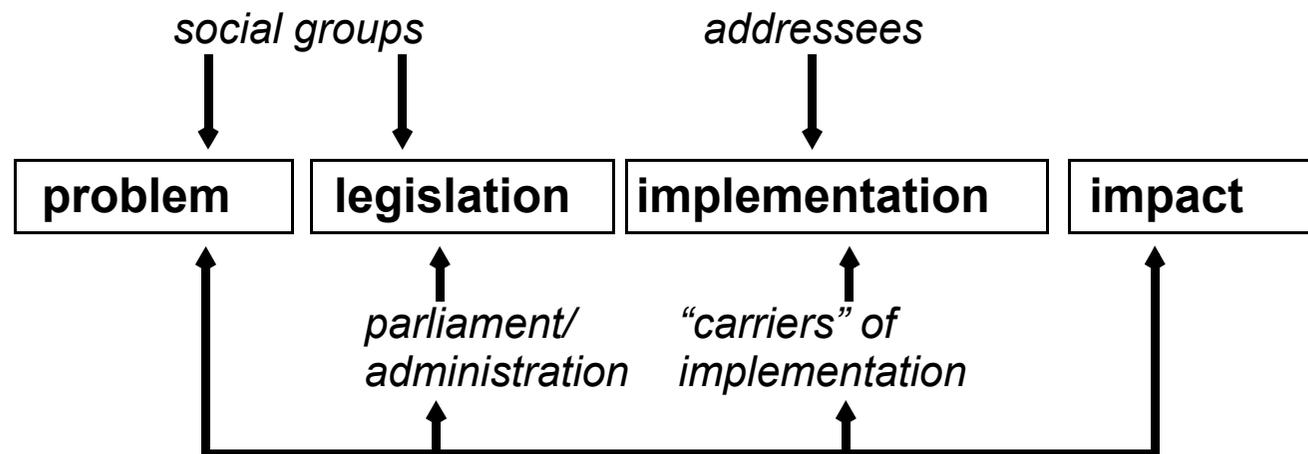
- Note: Even this course has a analytical organizing framework :)



Exemple 4-4: Implementation research model

Provides a certain "image" of the policy-making process:

- Actors intervene during the whole process (and not just in their "natural" stage)
- Problem perception, goals and other elements can be changed over time !
 - i.e. sometimes the implementors may redefine the set goals !



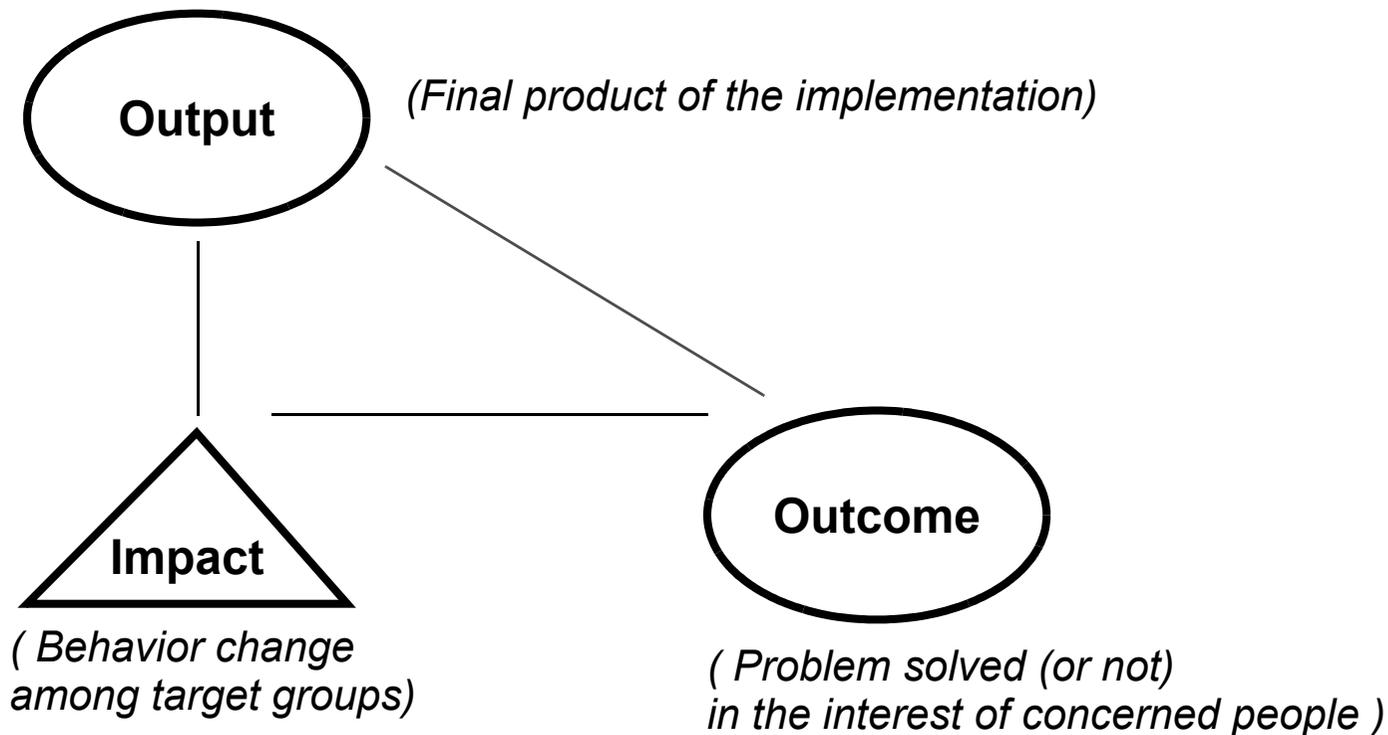
Possible relevance for educational technologies:

The fact that a government agency has been created to sponsor ICT-based pedagogical reform, does not entail that it will happen as they plan. Implementation "carriers" (e.g. schools) and addressees (e.g. teachers) may redefine goals and will have to establish operational practise.

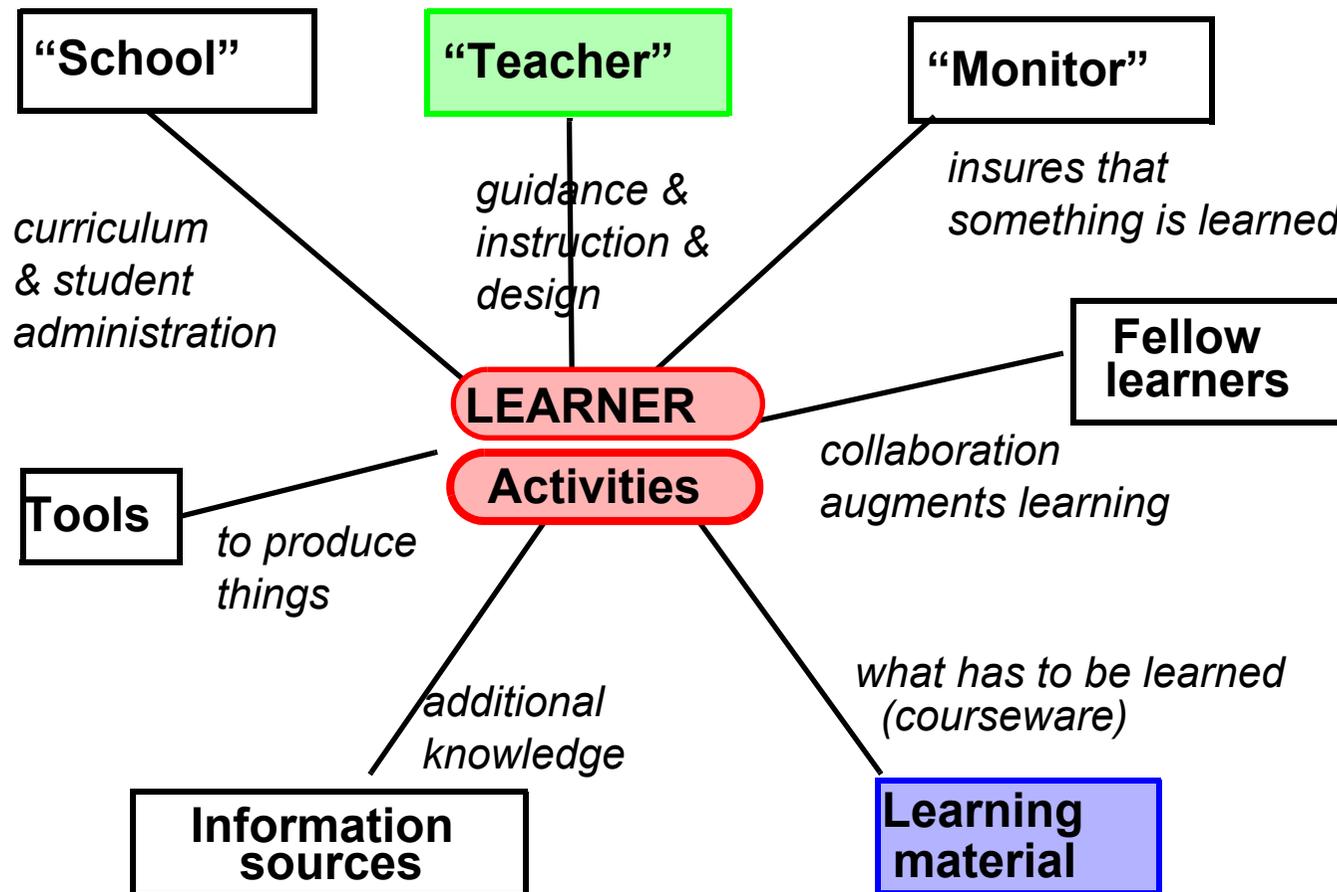
Exemple 4-5: Policy outcomes

Définition des prestations au sens de produits finaux de mise en oeuvre d'une politique publique [Knoepfel, P. (1996) TQM et fédéralisme, Cahier de l'IDHEAP, 159, p 10]

- E.g. useful to provide a perspective on the analysis of educational reform policies
- There are three major kinds of "results" you can study according to the author



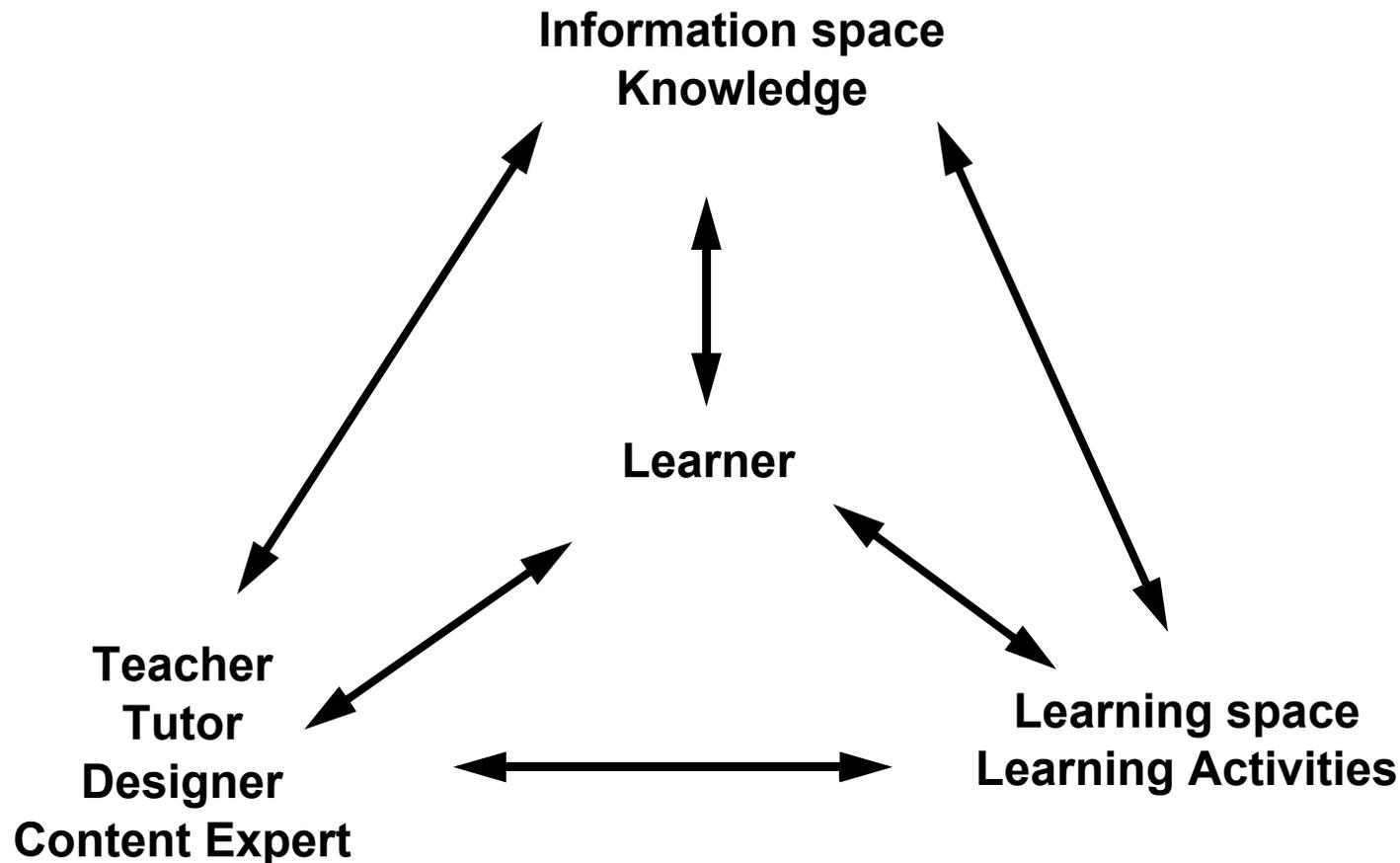
Exemple 4-6: Functions of a learning environment: Where do we focus ?



modified from Sandberg

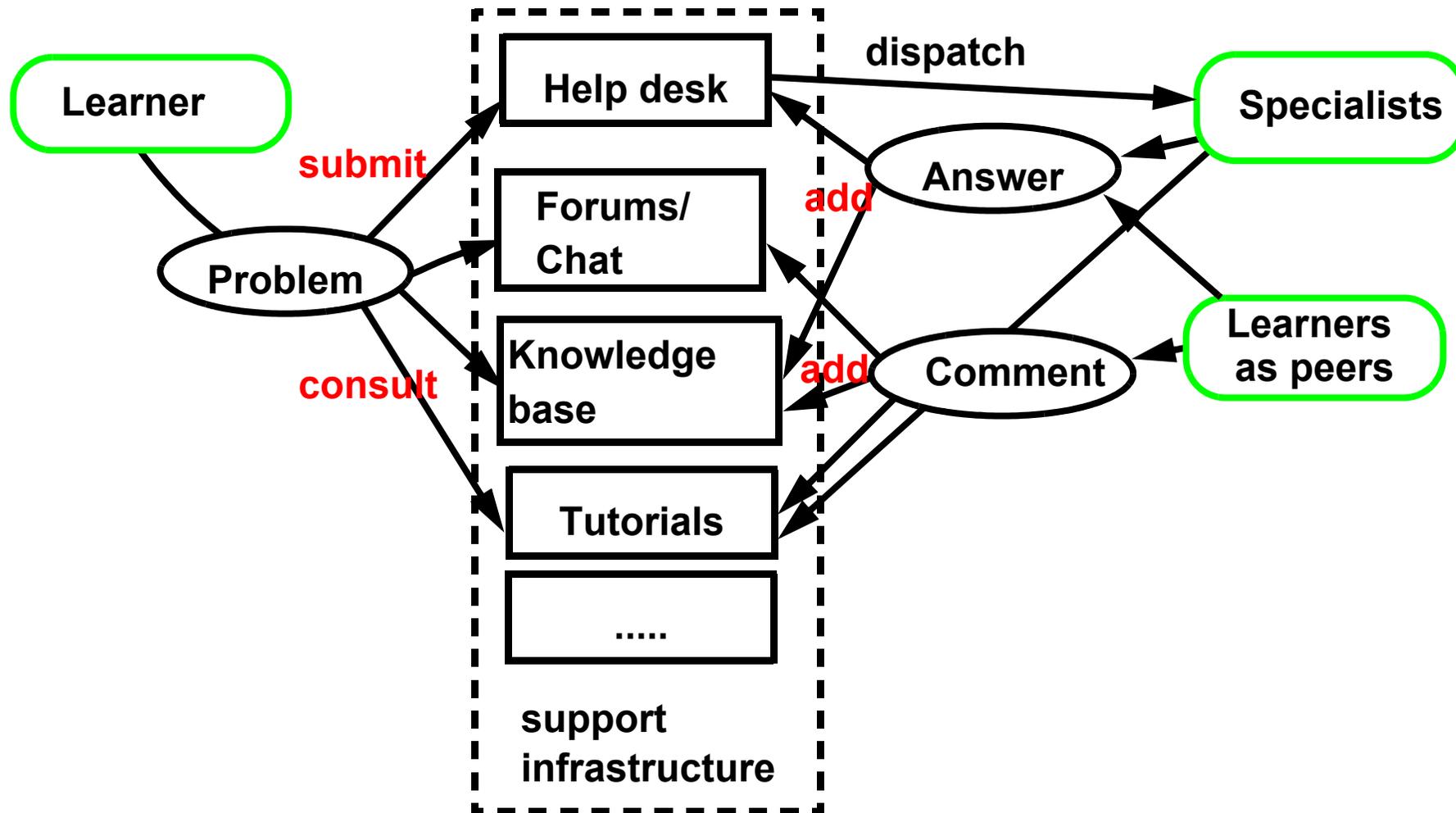
- This model makes you think about functions that a learning environment should provide and therefore about structure that will instantiate function
- It also allows to think about priorities in your design
 - E.g. **teacher role** is central in activity-based designs
 - E.g. **Learning material** is important in e-learning designs for mass-education

Exemple 4-7: A simple picture defining key elements of an ICT design



- This is not a great model, but it makes you think about the distinction between pedagogical activities, informations (learning material), people involved.....
- Roles and relations here can't be filled in without some reference to pedagogical method (so it's not such a good model)

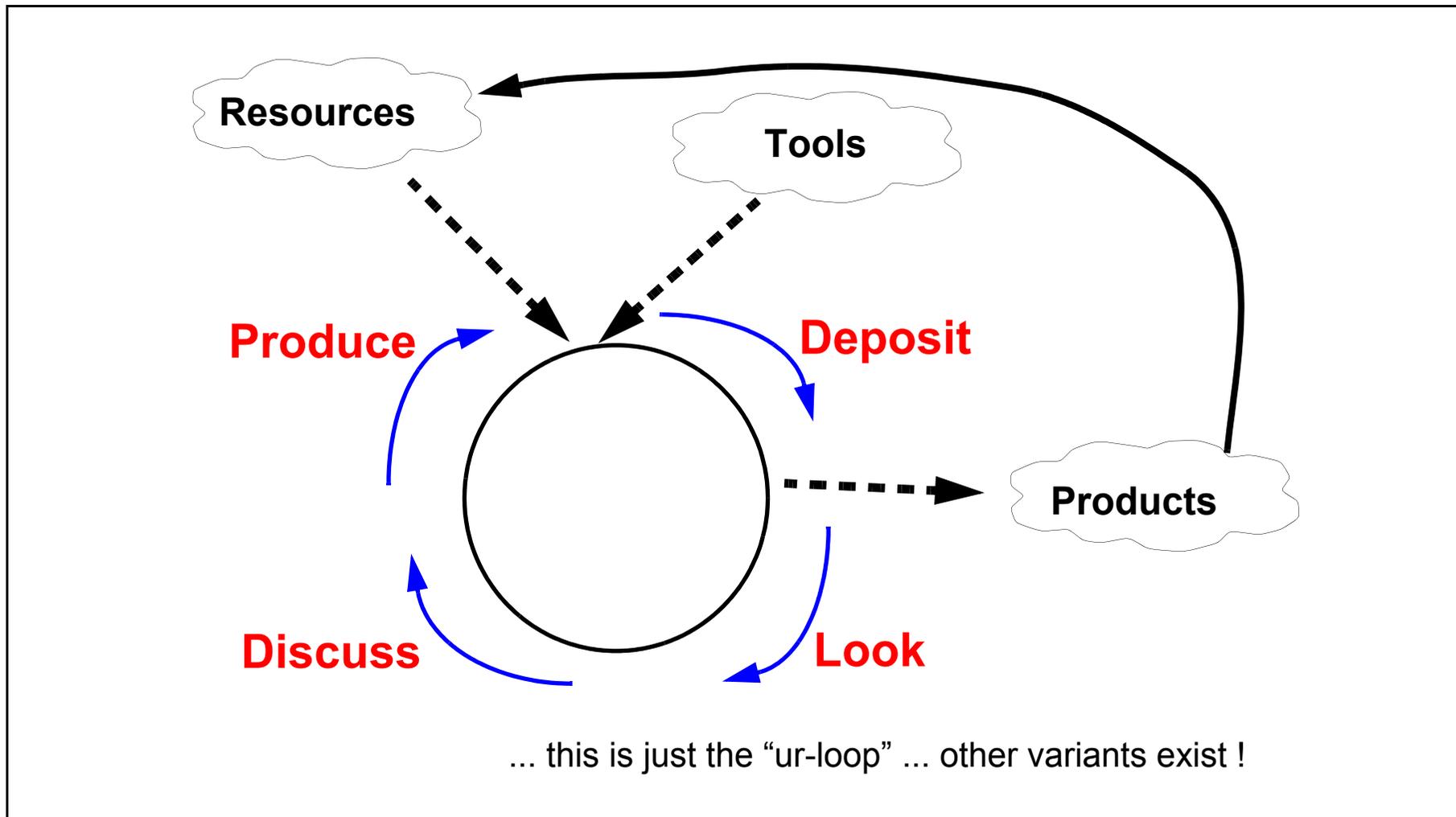
Exemple 4-8: A "help desk model" for "on-the-spot" life-long learning



- This model allows you to think at the same time about system components and actor's roles
- Technical infrastructure used: either C3MS portals, groupware, specialized help desk, knowledge management software.

Exemple 4-9: My favorite picture for introducing activity-based teaching

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



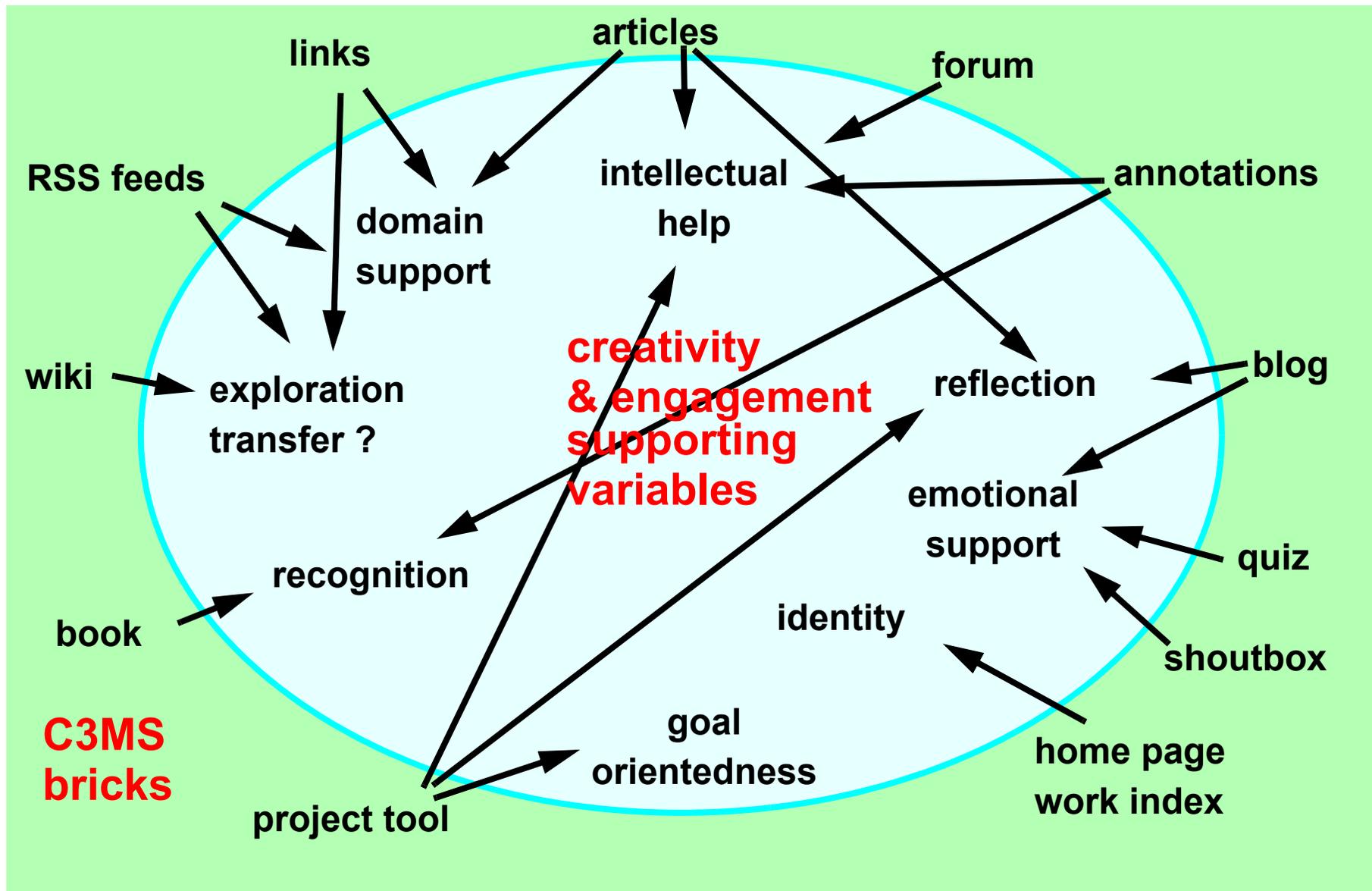
- This framework clearly shows that students have to engage in activities, that activities lead to products that can be discussed and reused.

Exemple 4-10: Definition of a C3MS (community) portal (Schneider)

Function	C3MS modules (tools of the portal)
Content management	News engine (including a organization by topics and an annotation mechanism) - Content Management Systems (CMS) Collaborative hypertexts (Wikis) - Image albums (photos, drawings, etc.) - Glossary tool or similar - Individual weblogs (diaries)
Knowledge exchange	News syndication (headlines from other portals) File sharing (all CMS tools above)
Exchange of arguments	Forums and/or new engine Chats,
Project support	Project management modules, Calendars,
Knowledge management	FAQ manager - Links Manager ("Yahoo-like") Search by keywords for all contents "top 10" box, rating systems for comments "What's new" (forum messages, downloads, etc.),
Community management	Presence, profile and identification of members Shoutbox (mini-chat integrated into the portal page) Reputation system Activity tracing for members Event calendar News engine,

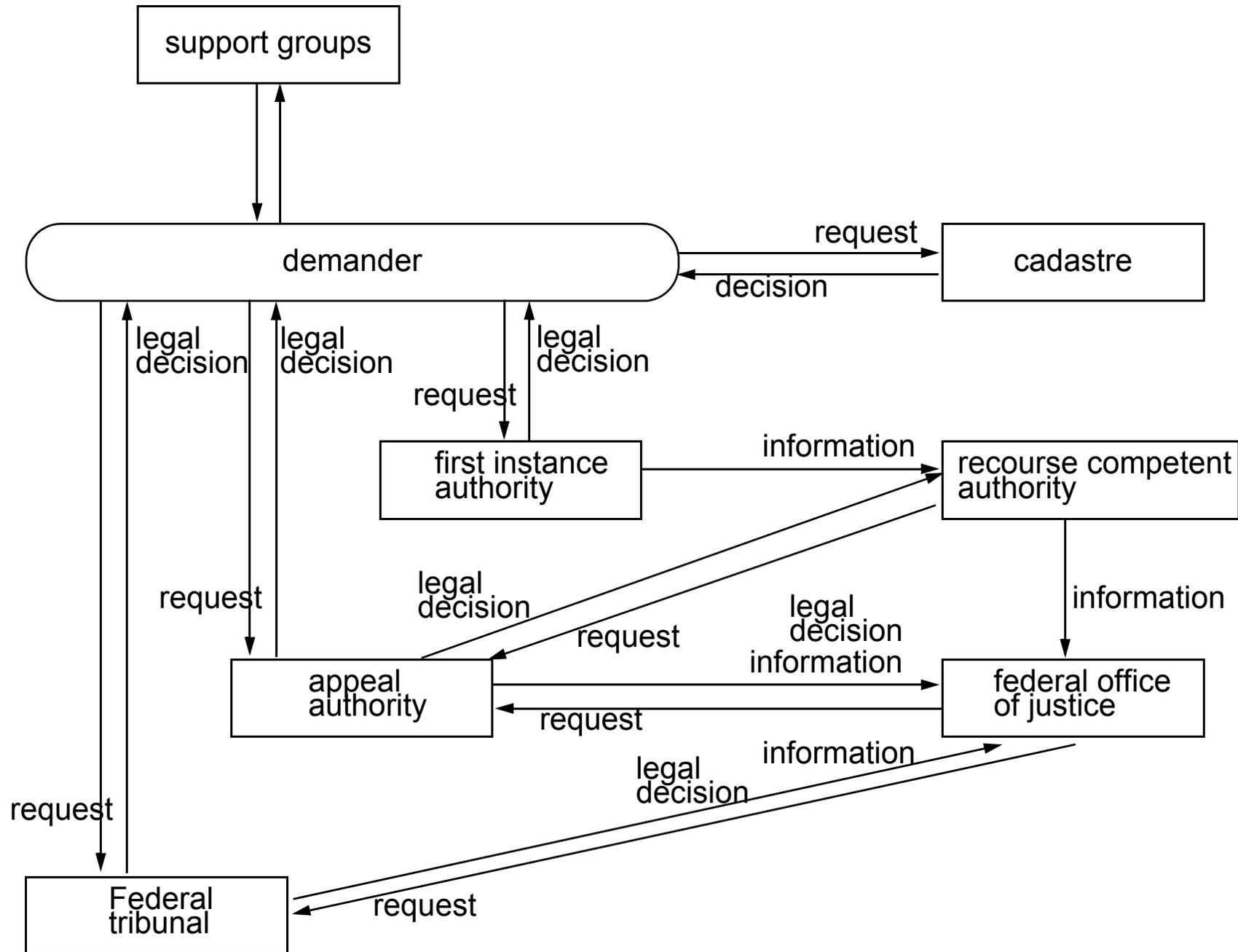
- This table makes association between a list of functions and structure (software modules)

Exemple 4-11: C3MS modules support for creativity and engagement variables



- Also links structure (software elements) to functions (creativity and engagement enhancing variables)

Exemple 4-12: Visualization of formal procedures



4.2 Lists of dimensions and typologies

Exemple 4-13: Types of Learning (Kearsley's <http://tip.psychology.org/>)

1. **Attitudes:**
 - Disposition or tendency to respond positively or negatively
2. **Factual Information** (memorization):
 - Processing of factual information and remembering
3. **Concepts** (discrimination):
 - ... how to discriminate and categorize things. Concept mastery is not related to simple recall and must be constructed.
4. **Reasoning** (inference, deduction):
 - thinking activities that involve making or testing inferences
5. **Procedure** learning:
 - being able to solve a certain task by applying a procedure.
6. **Problem solving:**
 - identification of subgoals, use of methods to satisfy subgoals.
7. **Learning strategies:**
 - can hardly be taught and only be learned through appropriate experience and to some extent only !

Exemple 4-14: Major pedagogical approaches (strategies)

(**Baumgartner & Kalz**, modifications by Schneider)

Transfer	Tutor	Coach
Factual knowledge, "know-that"	Procedural knowledge, "know-how"	Social practise, "knowing in action"
Transfer of propositional knowledge	Presentation of predetermined problems	Action in (complex and social) situations
to know, to remember	to do, to practise	to cope, to master
Production of correct answers	Selection of correct methods and its use	Realization of adequate action strategies
Verbal knowledge, Memorization	Skill, Ability	Social Responsibility
to teach, to explain	to observe, to help, to demonstrate	to cooperate, to support
Teaching I	Teaching II	Teaching III

- E.g. helps to decide what sort of teaching and learning you want to study or favor with an ICT-based environment

Exemple 4-15: Khan's (2000) list of pedagogical methods and strategies

Presentation	Exhibits
Demonstration	Drill and Practice
Tutorials	Games
Story Telling	Simulations
Role-playing	Discussion
Interaction	Modeling
Facilitation	Collaboration
Debate	Field Trips
Apprenticeship	Case Studies
Generative Development	Motivation

Makes you worry a bit:

- Which pedagogical strategies work better **for what types** of learning ?

Exemple 4-16: Intrinsically motivating elements of gaming ...

(Frété 2002, Master thesis TECFA)

Element	
fantasy	<ul style="list-style-type: none"> • imagination and freedom (make believe + voluntary activity)
challenge & curiosity	<ul style="list-style-type: none"> • a level of difficulty that triggers curiosity • presence of goals • uncertainty (surprise)
feedback	<ul style="list-style-type: none"> • immediate • clear
self-esteem	<ul style="list-style-type: none"> • adapted tasks • encouragement to learn & augment scores
control	<ul style="list-style-type: none"> • levels to play, user selection of goals, strategies & tactics

- What could we learn from gaming ?
- Why do kids spend many hours playing games without getting bored or tired ?

Exemple 4-17: Typology and typical functions of virtual environments

*Multi-user Dungeons (MUDs)
and MMORPGs(*)*

**"community
building"**

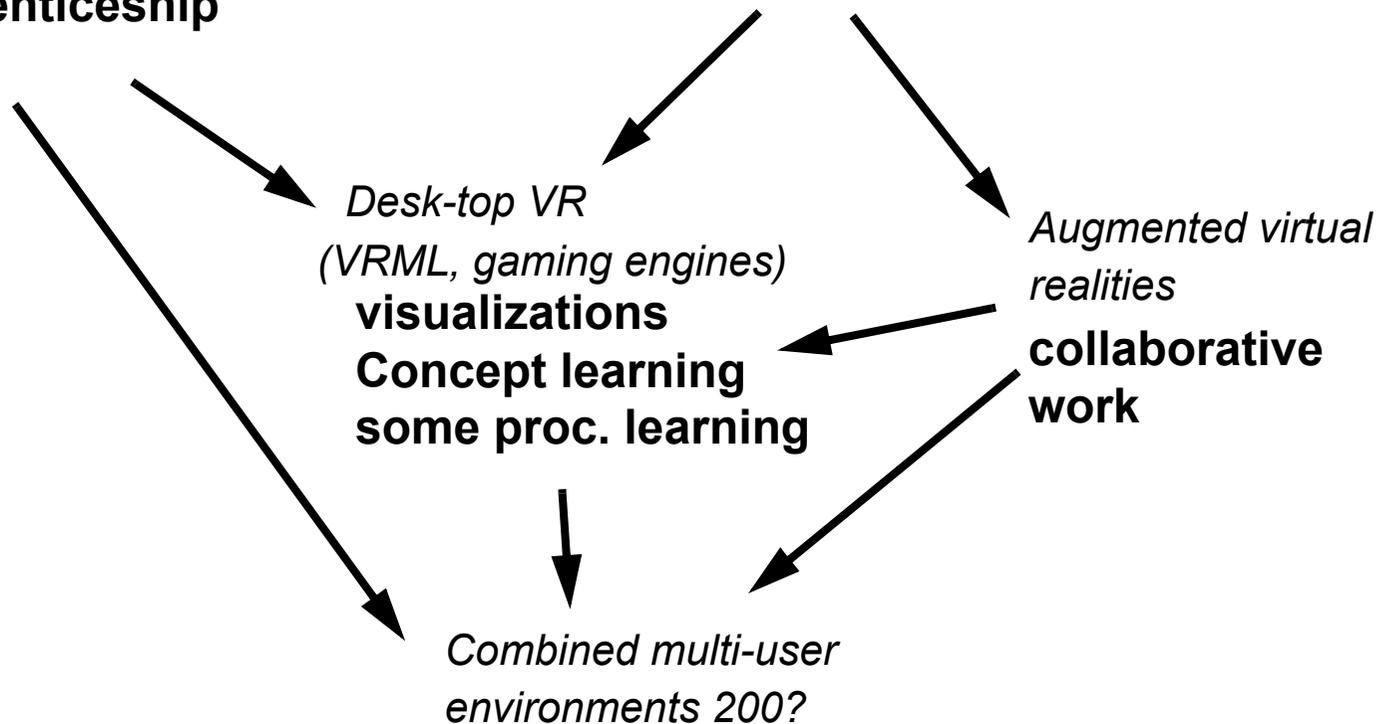
apprenticeship

Immersive virtual realities

direct experimentation

constructions

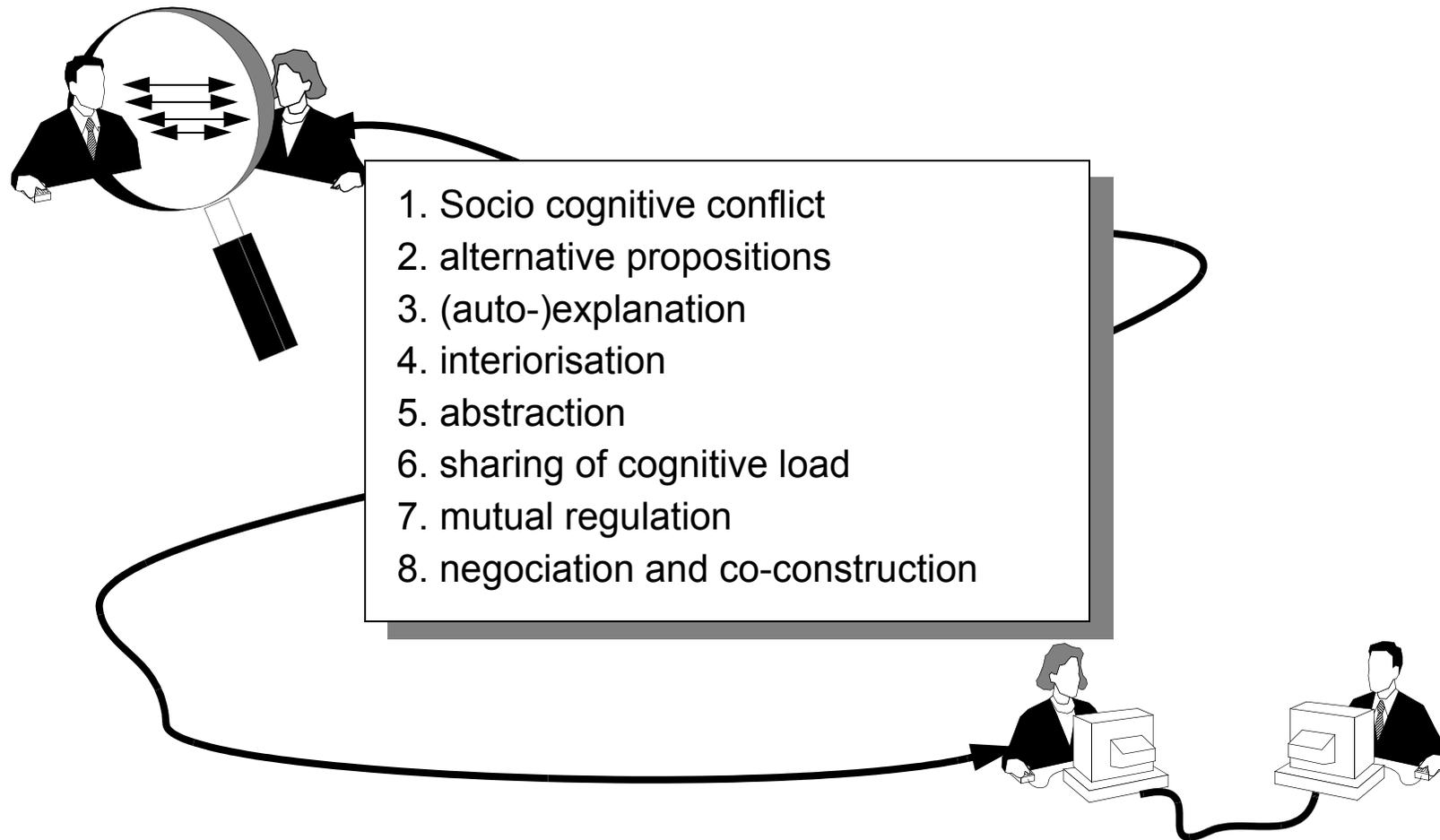
procedure learning



(*)Massively multiplayer online role-playing games

- What do **you** mean by a virtual environment ?
- Is it safe to use "virtual environment" when you talk about an e-learning platform ?

Exemple 4-18: Pierre Dillenbourg on CSCL (Computer supported collaborative learning)



- Collaborative learning can be very powerful because its properties engage students in various meta-cognitive activities.
- Note: needs scenario-building (story-boarding)

4.3 Example analysis grids

- more grids (scales) are shown in quantitative design and analysis modules

Exemple 4-19: Ergonomics criteria de Bastien

url: http://www.lergonome.org/pages/detail_articles.php?indice=22

<p>1. Guidage</p> <p>1.1 Incitation*</p> <p>1.2 Groupement/Distinction entre items</p> <p>1.2.1 Groupement/Distinction par la localisation*</p> <p>1.2.2 Groupement/Distinction par le format*</p> <p>1.3 Feed-back immédiat*</p> <p>1.4 Lisibilité*</p> <p>2. Charge de travail</p> <p>2.1 Brièveté</p> <p>2.1.1 Concision*</p> <p>2.1.2 Actions minimales*</p> <p>2.2 Densité informationnelle*</p> <p>3. Contrôle explicite</p> <p>3.1 Actions explicites*</p> <p>3.2 Contrôle utilisateur*</p>	<p>4. Adaptabilité</p> <p>4.1 Flexibilité*</p> <p>4.2 Prise en compte de l'expérience de l'utilisateur*</p> <p>5. Gestion des erreurs</p> <p>5.1 Protection contre les erreurs*</p> <p>5.2 Qualité des messages d'erreur*</p> <p>5.3 Correction des erreurs*</p> <p>6. Homogénéité/Cohérence*</p> <p>7. Signifiante des codes et dénominations*</p> <p>8. Compatibilité*</p>
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Exemple 4-20: Profil des compétences d'un manager (dimensions)

Emery, Y. (1997) Le centre d'évaluation pour managers publics, Cahier de l'IDHEAP 166, p9.

A. compétences personnelles:

1. introspection et apprentissage permanent
2. résistance aux tensions, énergie et ténacité

B. compétences intellectuelles:

3. pensée systémique, capacité d'analyse et de synthèse

C. compétences relationnelles:

4. leadership et de gestion de groupe
5. capacité d'écoute et de communication

D. compétences managériales:

6. attention à l'environnement et proactivité
7. entrepreneurship et esprit de décision
8. planification et controlling

Sur 4 pages l'auteur indique ensuite les sous-dimensions et ensuite comment les mesurer par des dispositifs expérimentaux variés....

Exemple 4-21: COLLES Grid - socio-constructivist features of on-line teaching

(Taylor and Maor) - Teacher education over the Internet

1. Relevance

- How relevant is on-line learning to students' professional practices?

2. Reflection

- Does on-line learning stimulate students' critical reflective thinking?

3. Interactivity

- To what extent do students engage on-line in rich educative dialogue?

4. Tutor Support

- How well do tutors enable students to participate in on-line learning?

5. Peer Support

- Is sensitive and encouraging support provided on-line by fellow students?

6. Interpretation

- Do students and tutors make good sense of each other's on-line communications?

Remarks:

- This grid clearly identifies 6 dimensions of socio-constructivism (there are many other grids)
- We will see in the data gathering and analysis modules how to make it operational

