cEVU

REPORT WORKING GROUP 7:
Pedagogical Models and Online Pedagogy

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0. Introduction

The working group started with the presentation by the participants of pedagogic models that are in use at their university and research and projects they were/are doing in the field of e-learning. Although all presentations claimed to provide learning environments that are based on constructivist insights, it soon became clear that the educational concepts underpinning the practice and the used pedagogies provided a quite heterogeneous picture. Building consistent models for online pedagogy or e-learning that could be accepted by all universities in a cEVU environment on the basis of these experiences turned out to be impossible; more over, the working group did not see sufficient consistency in actual research to create such models: in its appreciation of the actual situation of instructional design, more research and development is still needed for that purpose[1]. The working group therefore decided to contribute to a "background paper" that outlines the way to go towards such models and proposed the support for the application of a project that should lead to didactic e-competence of teachers as an immediate result of the working group's activities. Apart from that, "job aids" would be made to orient practice on the basis of good experiences and partial research outcomes, as well as on the insights that were laid down in this background paper.

1. The background paper

As stated in the *Background paper of the cEVU workgroup "online pedagogy",* current developments of online pedagogy in the field of net-based teaching and learning are too fragmented and heterogeneous to enable this. Even in the framework of the cEVU project, which brings together universities that have experience with and are actively involved in e-learning, there is a remarkable range of variability to be noticed with respect to technology use and used technologies, their embedment into different organisational structures and in implicit and/or explicit educational concepts. This situation is not only to be noticed when comparing universities, even within universities exists diversity between approaches of individual teachers or/and disciplines (eventually departments). The main reason for this phenomenon seems to be that there are no uniform, coherent educational theories, models or concepts for e-learning at the moment. Such observation is remarkable, as at the same time a second observation can also be made: "Never in the relatively short history of learning theories (one hundred plus years) have there been so many theoretical foundations that share so many assumptions and common foundations. Never have alternative theories of knowledge and learning been so consonant in their beliefs and methods they espouse."[2] However, the noticed consensus does not refer to educational approaches with highly structured theoretical premises, it

[1] See also Mayes T. (2001) Learning Technology and Learning Relationships. In: Stephenson, J. (Ed.) Teaching & Learning online. Pedagogies for New Technologies. London, Kogan Page

[2] Jonassen, D. H., & Land, S. M. (Eds.). (2000). Theoretical Foundations of Learning Environments. Mahwah, New Jersey: Lawrence Erlbaum.

rather refers to common educational beliefs, i.e. basic pedagogical principles that help explain what values good practice, and consequently can be used to draft guidelines. Such guidelines can be structured in various ways.

The original idea was to structure the guidelines according to the insights that were developed in the background paper. For a better understanding the background paper is summarized here; for interested readers, the full background paper is to be found as a separate document in connection to this report.

The background paper starts with a list of *pedagogical beliefs* or pedagogical principles that bear consensus of educationalists that support constructivism as a valid theory for learning:

1. shift from teaching to learning
2. student - centred approach
3. construction of learning environments and learning advice
4. focus on active learning and learning strategies
5. self-organised and self-directed learning
6. competences
7. interactive and collaborative learning
8. international communication
9. authentic situated learning
10. problem-oriented, case-oriented and guided enquiry-oriented learning

In the background paper it is argued that when applying these leading principles, it is not necessary or useful to construct pedagogical models as pre-requisites for the design of powerful learning environments (including learning platforms, learning systems, teaching and learning arrangements). A pragmatic approach, aligning pedagogical praxis to educational functions that are organised within the perspective of the named educational beliefs around key elements of learning and instructional settings should be more helpful.

The identified *functions* are:

I. authoring and representation
II. moderation and facilitation
III. working with tools and cognitive tools
IV. supporting learning strategies
V. evaluation, self-steering, control and self-control

Whether these functions support effectively the pedagogical beliefs is dependent on a number of *variables* that can be clustered around four topics:

a. technology and digital platforms
b. hypermedia content and presentation
c. media and ICT
d. teachers, learners and ICT

2. Guidelines and recommendations

The background paper deepens out extensively these variables, and indicates in detail how to provide them with the values that lead to good results. As such, many detailed hints and recommendations can be found in the paper.

While the background paper provides a solid basis for further research, which is aimed at through the submission of a project application that deepens out the e-competence of teachers, the workgroup proposed an approach for the purpose of the guidelines that goes less into details while taking more global perspectives and entities. It therefore identified key elements of what the members identified as good practice within their own university, clustered these elements and structured them in the following larger categories; taking into account that the average setting in the participating universities is one of blended learning:

- preparation
- tasks
- materials
- flow of activity
- feedback and support
- overall advice for policy makers
- management university

The guidelines were worked out in lists that can act as job aids for the intended actors of e-learning around these various categories. Job aids exist in various formats, from general, more or less extensive job descriptions to check lists of operations that have to be executed in a specific sequence. What we propose are lists of reminders that are based in research where possible and appropriate. However, a number of these reminders just come from experience of "what works**". It is not the intention to give job aids on pedagogy in general[3], but to limit the job aids to aspects that are related to e-learning and to its use in a cEVU (networking) context in particular.** In a later stage they will have to be incorporated in the structure of the background paper, after confirmation and elaboration of this structure by further research.

[3] Job aids of this kind can be found on many websites, e.g
http://www.nedc.nrcs.usda.gov/isd/isd11.html,
http://www.edci.purdue.edu/schaffer/561sp03/links.htm,
http://classweb.gmu.edu/ndabbagh/Resources/IDKB/index.htm
http://www.ou.edu/education/edpsy/iptwww/instdsgn/Summary/evntsmry.pdf
http://www.ou.edu/education/edpsy/iptwww/instdsgn/JobAids/Job_Aids.pdf

and specifically for e-learning: www.flexiblelearning.net.au/accessequity/downloads/R014G.pdf

1 Preparation of the course

1.1 be goal-oriented

- Have attention for specific goals that can only or better be put in the framework of networking in a Transeuropean context,
    - With respect to knowledge, i.e. connected to a specific content (e.g. European literature, law, politics…)?
    - With respect to skills (e.g. communication in a multicultural context)?
    - With respect to the acquisition of attitudes (e.g. development of European citizenship)?
- Identify gap(s) in the level of attainment of the goals by learners before they enter the course (in terms of subject specific prior knowledge, skills, attitudes, meta-cognitive strategies), and look in how far these gaps are connected to the diversity of the involved learner groups (e.g. related to the diversity of educational structures and programmes in the various countries). Decide whether eventual gaps should be tackled on a local level or on the network level.
- Not every goal is as important: prioritise your goals (i.e. position the goals connected to networking).

1.2 re-use materials

Look for (re-)usable materials that are available in the network of participating institutions, and consider their usefulness. Pay not only attention to usefulness of contents, but also to the various "educational beliefs" you want to realise, e.g. which materials are stimulating the learner activity, do they enable collaboration, are they confronting the learner with a real problem, etc.

- Be attentive to the following aspects:
    - Technical aspects
        - Is the necessary technological infrastructure available in each of the participating institutions for their use (e.g. sufficient bandwidth for IP bases videoconferencing)?
        - Is the material suited for use within the (eventually various) technological platforms in use in each of the participating institutions?
    - Pedagogical aspects
        - What is the added value of the found materials in terms of content as compared to what may be developed?
        - Is the pedagogical concept behind the materials fit for the course, and are the targeted audiences and local student support staff sufficiently familiar with its implications (e.g. materials developed for problem based learning may be less suited in for other pedagogical concepts and imply familiarity with its specific methodologies)?
        - Is the selected materials fit for networked learning (e.g. with respect to timing constraints, the already mentioned prior

knowledge and abilities, familiarity of students and teachers with specific technologies and their educational use)?
    - Organisational aspect
        - Are copyrights and intellectual property rights of these materials cleared?
- While working out contents, keep in mind their (eventual) re-usability. Take learning content standards in consideration, in adding standardised meta-description of the material to enable easy uptake in suitable repositories, and retrieval of the materials as well as their transportation to the learning platforms that follow the technical standards?

1.3 take care of good modularisation of your content

Modularisation supports (later) re-use. It also helps to structure the content. Modularisation should pay attention to both discipline related logical structuring as well as *psycho*-logical structuring (taking into account learner characteristics such as abilities, learning styles and motivation to modularise and sequence the contents.

Keep modules small enough to cope with diversity in a cEVU environment, but make them at the same time large enough to obtain meaningful chunks.

1.4 think about intercultural aspects

In the framework of a cEVU, courses will be exchanged in a transnational contest or will be specifically developed for transnational use and co-operation. Pay attention to cultural and linguistic differences in the various learner audiences that will use the course.

- Allow where possible multilingual approaches
    - Provide course materials and extra resources in various languages
    - Have local and common support sites for the same course in which the local sites may use the mother tongue, whereas the common site serves transnational exchange and support (in language that students commonly master) with eventually multilingual discussion forums
    - Use transnational, multilingual working groups at least part of the assignments in the course
    - Provide where possible translation facilities (e.g. multilingual glossaries, references to translation of texts, simultaneous translation or subtitling of videoconferences and video instruction)
- Agree on a joint language management system between the participating institutions[4].

[4] For a more detailed discussion of this aspect, see the report of the working group on language management

1.5 use teams in preparation of teaching and learning materials

- Use where possible and appropriate for course exchange and joint course production international and interdisciplinary teams (include content specialists, media specialists, pedagogical and technical experts)
- Use peer reviewing of the materials to ensure quality of content and presentation
- Consider team teaching approaches and plan activities accordingly

2 Tasks

Learning tasks should be adapted in their complexity to the prior knowledge and (cognitive) skills of the targeted students. This can be a difficulty in a cEVU, since these learner characteristics may be more difficult to handle in a network than on a campus. At the same time, learning tasks should sufficiently complex to be motivating. A more detailed discussion about designing learning tasks can be found in van Merriënboer's 4C/ID*-Model[5].

Some recommendations for learning tasks in a cEVU are the following:

2.1 provide sufficiently complex learning tasks

- Use tasks that integrate various objectives instead of tasks that aim at one specific objective
- Include task assignments that make benefit of the intercultural context of a cEVU as part of the complexity of the task

2.2 select tasks that need collaboration

According to Bonk[6] collaborative educational learning tools should respond to "(1) learning as information processing - a cognitive skills approach, (2) learning as experiential growth and pattern recognition - a cognitive constructivist approach, and (3) learning as a sociocultural dialogic activity - a social constructivist or

[5] Van Merriënboer, J. J. G., Clark, R. E., & De Croock, M. B. M. (2002). Blueprints for complex learning: The 4C/ID-model. *Educational Technology, Research and Development*, 50(2), 39-64. The article can be found also on http://www.ou.nl/otecresearch/publications/Jeroen%20van%20Merrienboer/Jeroen%20vanMerrienboer%20etrd.pdf

[6] Chapter 2: Bonk C. & Cunningham D. Searching for Learner-Centered, Constructivist, and Sociocultural Components of Collaborative Educational Learning Tools. In C. J. Bonk, & K. S. King (Eds.), *Electronic collaborators: Learner-centered technologies for literacy, apprenticeship, and discourse* (pp. 25-50). Mahwah, NJ: Erlbaum. This chapter provides an in depth theoretical discussion of collaborative educational learning tools according these three approaches. It can also be found on http://php.indiana.edu/~cjbonk/chap2.doc.

sociocultural approach. If learning is predominantly information processing, then instruction should provide for efficient communication of information and effective strategies for remembering. If learning is predominately experiential growth, the n instruction should focus on experiences and activities that promote the individual development of the appropriate cognitive networks or mind maps. And, finally, if learning is predominately a sociocultural dialogic, then instruction should provide opportunities for embedding learning in authentic tasks leading to participation in a community of practice."

For a cEVU, this means that the task assignments as well as the provided technological tools to fulfil the task should be adapted in such a way that they maximally serve the task objective in the larger goals of the course. Collaborative tools should include:

- Online presentation tools (slide show software, eventually conferencing tools)
- Communication tools (conventional mail, discussion forums, chat environments)
- Negotiation tools (brainstorming, negotiation, decision making support)
- Collaboration tools (annotation tools, application sharing)
- Even networked gaming tools could be considered

Clark and Mayers (2003)[7] give some very practical guidelines about collaboration tools:

If your learning environment has high to moderate levels of concurrency:

- Assign collaborative projects or problem discussions to heterogeneous small groups or pairs
- Use e-mail, chats, message boards, and conferencing facilities for collaborative assignments
- Use message boards for learner exchanges related to course topics

If your learning environment has low levels of concurrency:

- Use e-mail and discussion boards for collaborative assignments modified for individual learners
- Use e-mail for learners to contact instructors
- Use message boards for learner exchanges related to course topics

2.3 linked to personal experience / life of students

Use concrete and authentic tasks that enable mindful abstraction from the concrete experiences in the task.

[7] Clark, R.C. & Mayer R.E. (2003) *e-Learning and the Science of Instruction: Proven Guidelines for Consumers and Designers of Multimedia Learning*. Jossey-Bass Pfeiffer. Summery of guidelines on http://www.edci.purdue.edu/SCHAFFER/561sp03/clarkmayerevalguide.pdf

3. Materials

3.1 media use in e-learning

Guidelines for media use in e-learning can be found on various places. An example for such guidelines comes from Clark & Mayer (2003). They are formulated separately for media that use visual mode only, use a combination of audio and visual modes. They are connected to principles that the authors identify for effective instruction:

If Using Visual Mode Only:

1. Use relevant graphics and text to communicate content—Multimedia Principle
2. Integrate the text into the graphic on the screen—Contiguity Principle
3. Avoid covering or separating information that must be integrated for learning—Contiguity Principle
4. Avoid irrelevant graphics, stories, and lengthy text—Coherence Principle
5. Write in a conversational style using first and second person—Personalization Principle
6. Use virtual coaches (agents) to deliver instructional content such as examples and hints—Personalization Principle

If Using Audio and Visual Modes:

1. Use relevant graphics explained by audio narration to communicate content—Multimedia Principle
2. Maintain information the learner needs time to process in text on the screen, for example, directions to tasks, new terminology—Exception to Modality Principle
3. Avoid covering or separating information that must be integrated for learning—Contiguity Principle
4. Do not present words as both onscreen text and narration when there are graphics on the screen—Redundancy Principle
5. Avoid irrelevant videos, animations, music, stories, and lengthy narrations—Coherence Principle
6. Script audio in a conversational style using first and second person—Personalization Principle
7. Script virtual coaches to present instructional content such as examples and hints via audio—Personalization Principle

These prescriptions look however only to the materials themselves. Another viewpoint to approach materials comes from attribution theory in psychology. Comparative media research demonstrated the relation between attributes of media (their visual, audio, manipulation character) and preferred learning mode of the learner (people with visual preferences benefit the most from visual media). Learner centred e-learning, might therefore present the same information in various ways of encoding and offer the learner to chose its own preference.

In technology environments, and certainly in the networked environments of a cEVU with students from various countries, it is important to take the technological infrastructure in consideration: download time of large files (complex animations, video sequences) can be quite considerable due to unavailability of sufficient bandwidth, even in universities in some countries.

This consideration leads to the following guidelines[8]:
Learners tend to be highly sensitive to system response time. If perceived as slow, it can seriously obstruct the effectiveness of instruction. Findings include:
a. To maintain participants' attention, they should be informed when any download requires more than a 10-second wait.
b. When directly manipulating objects on the screen (e.g., disassembling a piece of equipment represented in 3D), the time between moving the cursor and seeing the result on the screen should be under 0.1 seconds. (If slower, the lag time becomes a source of frustration.)
c. When clearing a spreadsheet or turning a page, for example, a lag time of up to one second is acceptable. However, waiting more than one second tends to discourage learners from exploring options they otherwise would (e.g., supplemental material).

3.2 Allow interactivity

Connected to the previous is consequently the suggestion to design materials that allow the learner to interact (e.g. simulations of various nature) and environments in which communication with others is an essential part of the course.

It remains still largely unclear what the precise function of interaction may be in the learning process[9] and concrete guidelines are consequently difficult to provide, but evidence exist that interaction between the learner and the "material" (even if this material include communication) is beneficial and motivating.

4. Flow of Activity

4.1 Management of learning

The fact that in a cEVU students from various participating institutions do not know each other put additional problems to the management of learning. Suggestions to facilitate communication and collaboration are:

- Create – if possible before the start of the course – learning communities (e.g. through information about "who is who", inviting learners to express their

[8] As found on http://www.stratvisions.com/e-learning-bytes/25--web-based-instruction2.html (Adapted from "Research Reveals Imperatives for Effective Web-based Instruction" by Frank J. Troha, 2002).
[9] For a more detailed discussion, see Sims, R. (2000). An interactive conundrum: Constructs of interactivity and learning theory. Australian Journal of Educational Technology, 16(1), 45-57. (http://cleo.murdoch.edu.au/ajet:ajet16/sims.html)

expectations about the course, enabling the more or less self organised composition of learner groups for tasks and transnational assignments, etc.)
- Use (virtual, e.g. via videoconferencing or chat sessions) starter and wrap up meetings in which learners, teachers and tutors participate online
- Structure the collaboration and instruction, including the support and moderation (see also 5. Feedback and support)
- Make very concrete agreements between all actors on timing, roles, eventual sanctions when people do not act according the agreements
- Allow for independent learner-activity and provide the tools for it

4.2 provide navigation and learner control

One of the tools for allowing independent learner-activity is the provision of navigation tools and learner control. Clark & Mayer (2003) suggest the following on these topics:

Allow learners choices over topics and instructional methods such as practice when:
1. They have related prior knowledge and skills and/or good self-regulatory learning skills
2. Courses are designed primarily to be informational rather than skill-building
3. Courses are advanced rather than introductory
4. The default option leads to important instructional methods such as practice

Limit learner choices over topics and instructional options when:
1. Learners are novice to the content, skill outcomes are important, and learners lack good self-regulatory skills

The Institute for Simulation and Training provides similar guidelines[10], with references to research on which the guidelines are based.

5. Feedback and Support

The difference between information transfer and education is the availability of support for the learning activities that a learner is supposed to undertake. There are various categories of support:
1. the teacher offers the targeted result of learning activities directly to the learner (e.g. presents the content in a clear structure, gives a summary of the information, provides a detailed study planning)
2. the teacher motivates the learner to perform the learning activity and support the process by giving instruction and hints (e.g. encouragements, demonstrations, exercises)
3. the teacher provides feedback on the process and product of the learning.

[10] Joint ADL Co-laboratory (2001) *Guidelines for Design and Evaluation of Web-Based Instruction*. http://www.adlnet.org/screens/shares/dsp_displayfile.cfm?fileid=452

In distance learning this support is as well embedded in the learning material (e.g. explicit objectives, structuring introductions, study hints, lay out that emphasises important information, etc.) as (often) provided through face-to-face tutorials and electronic communication. For e-learning environments these functions have to be provided through the learning platform.

5.1 provide sufficient support

Support provision should be "sufficient", this means both not too much and not too less. Where shortage of support puts the learner in a difficult situation while trying to master the learning task, overdoses of support may kill the learning process by reducing the learner's motivation or turn for the learner existing learning strategies that were applied successfully into poorer ones.

For the same reason support should be offered just-in-time, thus avoiding similar reduction of motivation or/and cognitive overload.

Embedding (and automating) such support in electronic learning platforms is a costly (and in the development stage of the learning materials a time consuming) activity. It is therefore often considered as a function that is to be taken over by the communication facilities of the platform.

In the networked environment of a cEVU, such support can become problematic. Already in the on campus e-learning organisation of an institution, teachers complain about the extra time investment that supportive communication with the learners requires from them. In a networked environment, depending upon the organisation of the learner support, this extra time investment is considerably increased as the number of learners is not only limited to one single institution.

To avoid a dramatic increase of learner support time for the teacher, it is suggested to:

- Carefully plan and calculate the necessary learner support
- Use team teaching approaches to spread the support over various persons (and over the local and central level)
- Use students for specific management roles connected to task performance (e.g. introduction to the task, motivation of participants to contribute, wrapping up at regular intervals, etc.)

5.2 embed support in the learning materials

Therefore it is recommended to include verifiable interactions in the learning activities with course materials, other learners and the instructor (e.g., reporting results upon completing independent and team-based activities), only then a kind of automatic detection of support needs can be assured.

5.3 provide regular feedback

Feedback should be as immediate as possible and explicit with respect to the learning process and products. It must be to the point and avoid personal attacks or offensiveness. In a cEVU environment, it should take also into account known cultural differences that may create tensions between learners of different countries and backgrounds (e.g. what is a businesslike wording for some can be felt insulting by others).

6. Overall Advice for Policy Makers

6.1 stimulate research and development of networked learning platforms and tools

There are many commercial products available, be it that most of them are not integrating the full range of technologies that support all necessary pedagogical functions. It should be recommended that the development of such tools, by preference through an open source approach that enables their educational orientation and affordability, would be promoted and funded in educational technology application programmes at national as well as European level.

6.2 encourage research on e-learning pedagogy

Research stimuli (and financial incentives) are needed to boost research on e-learning pedagogy. But apart from such stimuli, it is also important for a cEVU that a structure is created that leads to the application of relevant research outcomes and experiences in sustainable environments. Project funding leads too often to a sudden rupture in the implementation process when the project ends.

6.3 be continuously aware of the fact that grass does not grow by pulling it

Academics and scholars are very susceptible for interventions that can be interpreted as forcing them into a wanted direction. Still today a large number of teachers is opposed against e-learning and networking for that purpose. Being too directive might lead to mobilisation of their opposition.

7. Management University

7.1 provide an infrastructure (learning platform and facilities) that enable the necessary pedagogical functions in e-learning

7.2 provide sufficient teacher support for the implementation of e-learning at local and network level

7.3 organise teacher training that involves networked collaboration