PEDAGOGICAL MODELS IN NETWORK-BASED EDUCATION

Sanna Vahtivuori-Hänninen
Media Education Centre, University of Helsinki, Finland

Abstract: This paper discusses an ongoing project which aims to examine the collaborative and game-based pedagogical models underpinning network-based education (NBE). These models are derived from didactic and pedagogical thinking on teaching–studying–learning (TSL) process. The research design is based on a qualitative approach, complemented with ethnographic study and participant observation in addition to thematic interviews and web-based questionnaires. The data of the study consists of two cases: 1) The national program on educational use of ICT study program in Higher Education and 2) The game-based simulations in NBE, which analyses how a collaborative and game-based models support TSL process in NBE. This paper briefly presents the background of the study and describes some preliminary findings of the teachers' and students' conceptions of NBE from the higher education case. The outcomes of the study will be pedagogical models and principles to be used when designing and assessing NBE.

Key words: learning models, collaborative learning, games, simulations

1. INTRODUCTION

The real challenge when developing network-based education (NBE) is to investigate how different pedagogical models function and support teaching–studying–learning (TSL) process in network-based environments. This paper presents four pedagogical models applied to NBE. The objective of the paper is to demonstrate the didactical and learning theoretical points in order to develop NBE and educational uses of ICT. The paper presents briefly the background and the empirical part of the study. The study encompasses two different case studies from higher education and working

life contexts. Also some pilot findings of the teachers' and students' conceptions of NBE from the higher education case will be discussed.

The study is part of the MOMENTS Project 'Models and Methods for future Knowledge Construction', which is a co-operative research project between Tampere University of Technology, Pori, the University of Lapland, University of Turku and the University of Helsinki. It is also part of the Academy of Finland 'Life as Learning' Research Programme.

2. TOWARDS PEDAGOGICAL MODELS IN NBE

The theoretical background of the study falls within a social-constructivist and sociocultural framework. According to these conceptions, knowledge is not an objective reflection of the world around us that can be transferred as such, but rather, something constructed by individuals and the social community surrounding. (Vygotsky, 1978; Lave & Wenger, 1991; Vahtivuori et al. 2003.)

2.1 About Teaching, Studying and Learning Process

The study emphasizes the pedagogical models that are inspired by, and partly based on, this sociocultural framework and which underpin collaborative and experiential modes of teaching, studying and learning (e.g., Sharan & Sharan 1992; Vahtivuori & Lehtonen 2003). These models are also derived from didactic and pedagogical thinking about teaching, studying and learning (Uljens, 1997; Kansanen et al., 2000). Uljens (1997) particularly emphasizes the process of teaching–studying–learning (TSL) as central for didactics and teachers' pedagogical thinking. According to him, both teaching and learning are important but equally important is studying. For this reason, we also need to examine teaching, studying and learning as equally important components.

These concepts are also seen as a fruitful way to organize, design and assess NBE and network-based environments. Especially the concepts of studying and *studybility* are in focus and are analysed and understood through the different implementations of NBE (Vahtivuori & Lehtonen 2003). These concepts include the concrete activities of the students, and the situation and circumstances in which study and activity take place.

2.2 Four Pedagogical Models

This study analyses four pedagogical models which can be particularly useful in carrying out experiential, collaborative modes of learning and studying in network-based environments. (Sharan & Sharan, 1992; Joyce et al., 1997; Vahtivuori & Masalin, 2000; Vahtivuori et al., 2003).

The four models utilized in this study are the following:

- The group investigation model;
- The model of learning and teaching through game-based simulations,
- Model of the different uses of ICT;
- The integrated model of NBE.

The first pedagogical model used is the group investigation model (Sharan & Sharan 1992, 18). It is a holistic TSL model that can be defined as a collaborative learning model. The elements of this model consist of:

- investigation;
- interaction;
- intrinsic motivation;
- interpretation.

These elements are interrelated and simultaneously present. According to the group investigation TSL can be seen as a process of gaining expertise. This process of expertise acquisition requires social support. The model is one method in distributing amount of speech evenly among the students and teacher and creating new knowledge in social groups in network-based environments. In this study the group investigation model and its key principles have been combined with the second model, the model of learning and teaching through game-based simulations (Joyce et al. 1997, 130). This model has four phases:

- orientation;
- participant training;
- phase of simulation operations;
- debriefing of the simulation.

Both of the models described above have been used, especially when designing and implementing the case study 'The game-based simulations in the guidance process of NBE'.

The third pedagogical model utilized is the model of the different uses of ICT, partly based on Goldsworthy's (1999) lenses of learning. It deals with four categories that examine the relationships between studying and technology. This pedagogical model also includes the four overlapping categories of ICT use:

- pedagogical;
- instrumental;
- communicative;

– collaborative.

These categories describe the different uses of technology for facilitating and enhancing TSL process. The pedagogical use of ICT category refers to how learning can be facilitated by having content explicitly taught by a technical application or software package. The Instrumental use of ICT category refers to a common way of understanding the use of ICT in learning. It describes how ICT enhances an individual's capability and efficiency when learning and studying (Goldsworthy 1999, 59). Communal use of ICT represents a communal way of learning. Skills and content are learned through the structuring of the situation, where a group of students shares applications. Communicative use of ICT is in question when TSL process primarily occurs through the interaction of learners at a distance, as mediated by ICT, the learning may be considered as facilitated through technology (Goldsworthy 1999, 59–60). This is the classical distance education (DE) situation. (Goldsworthy, 1999; Vahtivuori & Masalin, 2001.) This model has been used especially when designing the thematic interviews of the teachers of the higher education case.

The fourth model used is a compilation of different pedagogical models that can be used when designing and assessing NBE. The model combines a variety of principles, characteristics and models of teaching and studying. The model is based on Uljens' (1997) thinking of TSL process. The integrated model has been elaborated during the Higher Education Case Study (Ruokamo et al., 2002; Vahtivuori et al., 2003) This combined model embraces the features and principles of i) reflective teaching, ii) purposive studying and iii) meaningful learning (Ausubel, 1968; Jonassen, 1995; Ruokamo et al. 2002). The combined pedagogical model and its features, that is, the concepts of the model, have been functioned as the classificatory outline of the data of the higher education case.

All of the models described here can be useful when analysing and developing NBE because they remind us of the complex roles and uses of ICT in TSL processes. They help us to identify the different uses and aspects better when designing NBE and network-based environments, and also to make reasonable choices. In the NBE, it seems vital to understand ICTs as tools and contexts to think of and to act with. If we are cognizant of these various models, their principles, different uses and roles of technology as designers and teachers, we can support the students' process of studying and learning in the best possible way and design good quality NBE and network-based TSL environments. (Vahtivuori & Masalin, 2001.)

3. COLLABORATIVE USE OF GAMES IN NBE

According to the recent research, many skills can be learned through collaborative use of games and simulations in NBE, e.g. social communication and collaboration, problem solving, decision making, rules, visual and spatial ideas (e.g. Wigforss, 2003, p.24). As its best, a network-based course can be a multiplayer game, simulation, story or a narrative about an interesting subject. Network-based course or a study program can be an emotional experience. The central idea, a logically built game-based simulation through the course helps students and teacher combine things and same time motivate to carry on working. Games can take real advantage from narratives. Simple text based narrative materials and games can be designed even for e-mail (Jasinski & Thiagarajan 2000). With games and simulations, real experiential studying and learning can be created. Immersion of the game and game-based thinking and activity makes action in the network-based environment more experiential. Also, the level of interactivity and communal modes of studying can be increased (e.g. Tella et al. 2001). The creation of experiences in NBE seems to be at least as important as in face-to-face TSL process (Ackermann 1994; Jonassen 1995; Boud & Feletti 1997; Vahtivuori 2001). It seems that with the aid of role games and simulations, collaborative, experiential and problem-based learning contexts can be created, and make virtual "hands-on" sessions possible more and more in the NBE. (Vahtivuori & Masalin, 2001)

4. RESEARCH TASKS AND QUESTIONS

The above theoretical discussion will lead to several research areas that are divided into the following research questions:

- How can the collaborative and game-based pedagogical models of NBE be perceived and function in higher education and working life contexts?
- What kind of design, quality, and assessment principles can be used and elaborated for NBE?
- What kind of functionalities and features does the guidance process demand from the network-based environment?

The concepts and design principles, which have a special emphasis in the study, are collaborative and experiential learning and studying. The concepts are examined and discussed especially in the case ii) 'The game-based simulations in the guidance process of NBE' where the group investigation model and the model of teaching and learning through game-based simulations have been used as a basis for designing and assessing NBE.

5. METHODOLOGY AND DATA COLLECTION

The research design of study is based on a qualitative approach, complemented with ethnographic study. In the addition of the participatory observation (web discussions, video conferences and face-to-face meetings) and collection of textual groupware-based data, the data are also collected with web questionnaires from students (N=83) and thematic interviews of the teachers (N=11). The study aims at dialogic and communal action and developmental research, where a researcher is actively involved in the designing and implementation of the TSL process in NBE.

The data of the study consists of two case studies. In the spring 2003, the study has been concentrating a higher education case (N=55), which is part of the national program on Educational Use of ICT of the Finnish Virtual University of Educational Sciences (KasVi) and The Helsinki–Lapland Educational Use of ICT Programs Evaluation Project (HelLa). The general aim of the higher education case is to study, develop, and assess how higher education training programs relate to educational use of ICT and can create good quality NBE. (Ruokamo et al., 2002; Vahtivuori et al., 2003.)

The working life case has been implemented in the summer 2003. This case analyzes how a collaborative and game-based working and learning environment supports the TSL process, especially from the viewpoint of the guidance process. The data of the working life case is gathered from the leadership training course of the Finnish Defence Forces for young officers (N=28). This case study focuses on analyzing how a game-based and collaborative network environment should be designed in a purposive way and what kind of pedagogical guidance models will support purposive studying (Vahtivuori & Lehtonen 2003). These questions will be answered by analysing the students' action and the teachers' guidance process. This case study is also conducted in line with a business partner's R5 Vision product development process. Special emphasis will be laid on the pedagogical functionalities, features and tools for the guidance process in NBE. The content analysis is used to analyse the text data of the both case studies.

6. CONCLUSION

The pilot findings from the higher education case focus teachers' and students' conceptions on teaching and studying and guidance process in the network environment and the principles of design and assessment. The findings of the case shows that teachers in NBE seem to design and act in more theoretical level than in face-to-face teaching and guidance situation.

NBE seems to demand more from the designing phase than face-to-face to situation. According to the teachers the exploratory teaching and problem-based and also reciprocal and collaborative teaching were the most commonly used pedagogical models among teachers of the course. According to the questionnaire, the students' opinions mostly support this finding. Almost the half of the students found that the ethos of the course was problem-oriented. Teaching and guidance had also a more significant role for both teachers and students than in face-to-face TSL process. (Vahtivuori 2003) The instrumental and communicative uses were the most central ways of using network-based environment to support TSL process. The data of the working life case study will be analysed in the autumn of 2003.

The paper has discussed how NBE could be designed in TSL processes. The object is to summarize and further develop the collaborative and game-based pedagogical models for NBE. The higher education ICT course and working life leadership training course provide a versatile opportunity to experiment with different implementations of NBE that can be tested against the pedagogical models and the principles of design and assessment. The outcomes of the study will be theoretical pedagogical models and practical principles, which will help teachers and students to teach and study in network-based environments. The study will contribute to the use and the development of novel teaching, studying and learning and working methods of NBE in higher education and working life contexts.

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BIOGRAPHY

Sanna Vahtivuori-Hänninen (sanna.vahtivuori@helsinki.fi) is a researcher at the Media Education Centre of the Department of Teacher Education, University of Helsinki. Her research interests and developmental work deal with pedagogical models and design and assessment of network-based education. Her recent research has been focused on different uses of ICT in teaching, studying, learning processes, and collaborative and experiential modes of studying and learning in different higher education and working life contexts.