

LEARNING IN SEMI-VIRTUAL CAMPUS – DEVELOPING PEDAGOGICAL GROUNDS OF EDINET-PROJECT

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ABSTRACT

This paper discusses the pedagogical grounds of E-learning in Distributed Data Network Laboratory –project (Edinet). The Edinet-project aims at to establish an e-learning environment which is based on the ideas of life-long learning. In the project seven European universities create semi-virtual campus in the field of Information Technology to support development of modern competences of students, teachers, researchers and other experts. The paper introduces the technical solutions for the semi virtual campus and the pedagogical principles that guide the piloting phase and development of the modules in the partner universities.

Keywords e-learning, pedagogy, virtual campus, virtual private network, remote management system

1. INTRODUCTION

The need for development of e-learning possibilities rises up from the changes of society and working life, and accordingly, the requirements of competences. Work has become more and more distributed and networked since traditional boundaries of work communities disappear. Therefore students need to be equipped with skills which enable them to work in such an environment. Distributed working and learning mean new pedagogical and technological challenges. Often pedagogical issues have been set aside in development of e-learning or web-learning environments. Spencer [15] and Eynon [5] stress that questions about educational purpose, curriculum and pedagogy ought to be answered (or at least, addressed) before any attempt to specify configurations of hardware and software. The Edinet project started from building up the pedagogical ideas first [14] and after that technical development took place. Chen & al. [3] state that e-learning relies heavily on technological platform, and the functionality of the e-learning system plays an important role in the learning process. The pedagogical processes of instruction and interaction are more dependent on technological infrastructure in e-learning than in traditional face-to-face scenario. For that reason pedagogical development and technical development should go hand in hand.

One of the main technical development target in Edinet project is to research and test so called “Open Educational Resources” (OER) implementing to the Data Network area in education. With the OER will be understood teaching, learning and research resources that will be offer via the public service or under a limited account in virtual campuses [12].

2. EDINET-PROJECT AS A CONTEXT OF DEVELOPMENT

The Edinet-project aims at to implement European education policy especially from three main perspectives point of views. Firstly, the project develops a system of using technical resources of the partner universities in

order to increase learning opportunities of students and experts in the field of information technology. Especially, data network technology education requires very expensive laboratory equipments to achieve high learning outcomes. By connecting the existing laboratories of the partner universities the European wide virtual campus offers new possibilities for students, teachers and experts.

In this case better name is “Semi Virtual Campus”. Edinet is not in traditional meaning “Virtual Campus” because it includes real laboratories and real equipments which are connected together. Figure 1 illustrates the basic idea of the connected laboratories to the common Semi Virtual Campus.

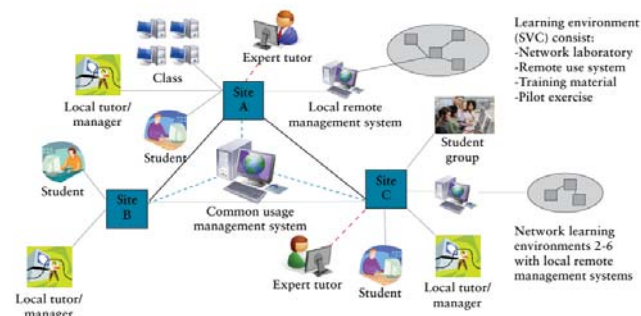


Fig. 1 Edinet, Semi Virtual Campus

Development of more equal accessibility and opportunities to high-quality education and training is one of the priorities of the European education policy. In addition, Semi Virtual Campus saves economical resources but offers added-value to learning resources of an individual university.

Common Semi Virtual Campus will be created by connecting existing laboratories together via the public wide area network. Semi Virtual Campus allows equal access of users of all participants to the resources in different laboratories based on “Open Educational Resources” principles. Semi Virtual Campus will have the common management system portal. Portal has several activities; single-sign-on account and authentication based

on Shibboleth [13], learning material database and reservation system for the laboratories. Using of the other participants laboratories needs remote management access to the laboratory equipments. For the security reason remote management is only possible via the Virtual Private Network (VPN) connection. VPN connection will be created between participants based on point-to-point connection. Figure 2 will illustrated VPN connections.

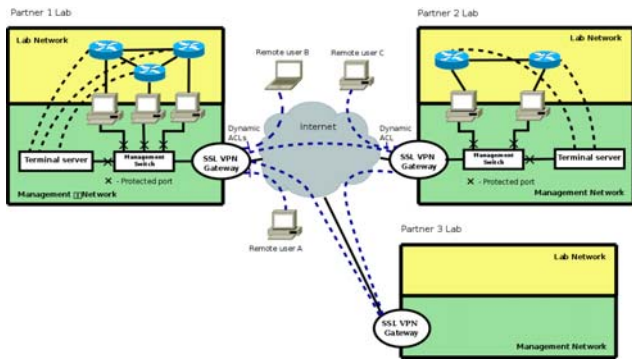


Fig. 2 Remote Management via point-to-point VPN connections [7].

Development of more equal accessibility and opportunities to high-quality education and training is one of the priorities of the European education policy. In addition, virtual campus saves economical resources but offers added-value to learning resources of an individual university.

Secondly, the Edinet-project forms an arena to share expertise of each university and an individual teacher and an expert. Sharing of expertise includes distribution in terms of the substance which in this case is information technology, especially data network technology. Furthermore, sharing of information on the education systems, curricula and innovations in training of the experts of information technology is highly valuable from the development of education point of view.

Thirdly, mutual learning addresses development of modern competences of students and teachers. The students will become experts who are designing and running data networks in international corporations, work as international teams based on their function regardless of the physical location of each individual person or the physical location of the networking devices. Working with real devices and in international settings is the key issue to achieve real competence. Semi-virtual campus offers authentic learning environment to develop such knowledge and skills.

Also, mutual learning of teaching staff is important part of the development process. The teachers develop pedagogical approaches, sufficient laboratory exercises and pedagogical international collaboration. The Edinet-project facilitates pedagogical and international competences as well as overall professional development of the teachers.

3. E-LEARNING AND BLENDED LEARNING

E-Learning means learning supported by information and communication technologies (ICT). However e-learning is not limited to ‘digital literacy’ (acquiring ICT

skills). It may encompass multiple formats and hybrid methods: using software, Internet, CD-ROM, online learning or any other electronic or interactive media [2]. Hamid [8] describes the difference between e-learning and traditional learning so that effective e-learning context requires following elements:

- (1) *Information architecture*: the design of the organisation, labelling, navigation, and search system.
- (2) *User interface design*: the process of selecting elements and features based on their ability to deliver support for the cognitive processes involved in the instructional activities facilitated by the application.
- (3) *Content strategy*: adapting to the principle that ‘Web users do not read BUT scan’. It is suggested that Web content be given in chunks in a manner that encourages scanning and should be organised in a pyramid form with the important points highlighted and details following.
- (4) *Pedagogical dimensions*: eight important pedagogical dimensions are identified:

- Constructivist approach.
- Self-directed learning.
- The evoking of intrinsic motivation.
- Reflective approach.
- Individual learning styles.
- Experiential learning.
- Learning as both a private and social activity.
- Learning as non-linear

The figure below gathers dimensions and elements of e-learning process which should be taken into consideration when planning and implementing courses, modules or study entities. The figure 3 reflects similar matters discussed by Hamid [8] and in addition highlights the dimension of a student or a learner.

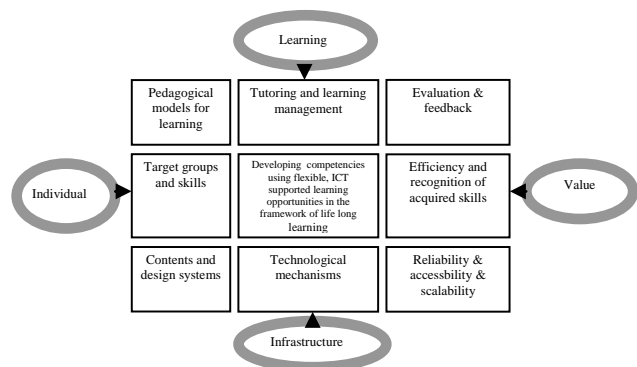


Fig. 3 Elements of eLearning

Many researchers have brought up various aspects and benefits of e-learning. Thus, e-learning depends on networks and computers but will likely evolve into systems consisting variety of channels and technologies, Young & Ku, [20]. E-learning may incorporate synchronous or asynchronous access and may be distributed geographically with varied limits of time. E-learning can take the form of courses as well as modules and smaller learning objects, Wentling & Waight, [16]; Wentling et al. [17]. In the context of Edinet-project there are modules which will be piloted by the European partner universities.

Successful e-learning requires a well-designed technological infrastructure, Lin et al. [11] and according to Young [19], in addition of that, well trained and qualified teachers to reorganise digitised teaching materials and adopt new pedagogical models. Thus successful e-learning depends to a large extent on the quality of teaching and the commitment of teachers. The figure illustrates the meaning of pedagogical competence as a success factor of e-learning.

3.1. Blended learning

Development of e-learning has included different trends and emphasis areas. In the very beginning, in early 90's, there was a great enthusiasm to build completely virtual learning environments. Now, a variety of forms of social web is an interest of many developers. Anyhow, face-to face teaching still has its strengths, which cannot be ignored, and therefore one area to develop further is mixed use of face-to face teaching and new technologies. The ideology of semi-virtual campus is based on that, Hemmi, Pollack & Swartz [9]. Semi-virtual campus includes both local onsite teaching and learning as well as virtual learning possibilities via internet, mobile equipments etc.

Concept of blended learning has been introduced in the context of semi-virtual learning and teaching environments. Blended learning refers to the use of resources which combine electronic-learning or mobile-learning with other educational resources. Adams [1] states that a blending strategy is a highly unique mix-and-match approach to using a variety of training and development tools that are focused on learning the matter in question. Blended learning can mean mixing a short lecture with a video clip, an in-class exercise, a take-home project, or a short conference call with classroom or e-learning delivery methods. Garrison and Kanuka [6] stress tutoring as a key element in blended learning. Thus, students can get support and help when they need it as tutoring is available during the whole learning process. Blended learning strategy supports an active role of students because the students can choose the ways and resources of learning.

Jääskelä & Pirttimaa [10] discuss the main reason for blended learning arrangements. The following aspects support the blended learning strategy:

- **Equality:** Student can take courses not offered at locally. University studies become possible at the rural areas as well.
- **Quality of learning:** Studying by using blended learning strategies steers student to self-directed and independent studies. Students are active in contacting teachers and tutors if problems arise and they learn to plan their studies and analyse their own learning when choosing optimal ways to study.
- **Flexibility:** Students can take courses while working or meeting family commitments. They can learn at any time of the day and places that suit them best.
- **Individuality:** Although open learning environments serve masses of students blended

learning offers individual instructions. Students can learn at their own pace, going through course material as slowly or quickly as they desire.

- **Economic efficiency:** Students need not to pay travel costs or accommodations and university reaches many students from large area.

In international context semi-virtual campus and blended learning strategies increase learning opportunities for students as well as teaching staff. It is not only question of enhancing learning opportunities in terms of contents but also in terms of intercultural exchanges and knowledge sharing.

3.2. Learning Process

Zheng and Yoneo [21] have modeled context awareness in e-learning. They suggest that the e-learning context encompasses all the information that shapes e-learning situations, from physical settings to virtual space, from individual interests to social culture, from explicit conversations to tacit cognition, from technical media to human emotions, etc. Thus, e-learning is multifaceted and complex process.

Figure 4 illustrates a framework description of the e-learning context. Knowledge, human and technology are highlighted as the three key elements in e-learning settings. Accordingly, the knowledge, social and technical contexts are identified as the three fundamental components of the e-learning context, which are interdependent and interwoven with one another, and jointly construct a contextual environment for e-learning. [21].

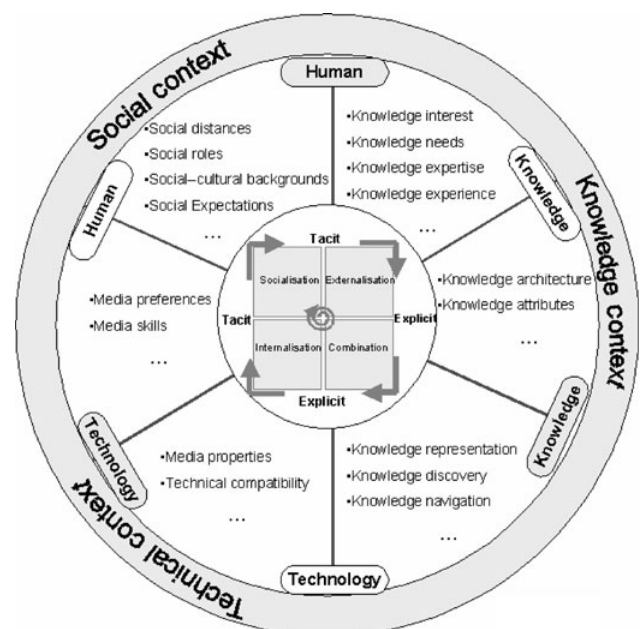


Fig. 4 Framework description of the e-learning context

Zheng and Yoneo [21] describe knowledge context, social context and technical context as following: Knowledge is not only the strategic resource for learning practice but also the object of learning efforts. The knowledge context deals with knowledge objects and the

relations amongst them, and enfolds knowledge-related influencing complications for e-learning, such as learners' knowledge backgrounds, needs, expertise and interests. The social context is related to human beings. The human dimension involves triple fold implications: the human as the subject of learning activities, human-based social network and human-based social culture. The social context considers mainly social, cultural, psychological and emotional influences on e-learning, such as learners' social-cultural backgrounds, social distances, social roles/responsibilities and social prestige or status in the e-learning context. Technologies are usually utilised to overcome barriers of time or space in distributed learning settings. The technical context refers to those technical factors that may influence e-learning, such as the characteristics and functions of technical media themselves, learners' preferences, skills or time proximity in the use of media.

There are number of models regarding the phases of learning processes. Engeström's [4] model defines six phases of learning which are following: 1) motivation, 2) orientation, 3) internalisation, 4) externalization, 5) evaluation and 6) reflection. The idea of the model is that the phases take place in that particular order and in an integral learning process all of the phases are hone through. Zheng's and Yoneo's [21] idea partly overlap with Engeström's model as they both have internalisation and externalization as phases of learning. However, the underlying ideas differ to some extent. Zheng and Yoneo highlight two aspects of knowledge, explicit and tacit knowledge, which have to take into consideration in planning learning. Explicit knowledge can be expressed in words, diagrams or formulas, which are easily codified, represented and shared asynchronously.

Contrarily, tacit knowledge is ineffable, contextual and based on personal experience, which directly relates to personal cognitive skills, embodies personal beliefs and values, and is best communicated through face-to-face encounters. In a physically distributed e-learning environment, it is very important and challengeable therefore to explore the knowledge context, especially in the tacit dimension [21].

4. EDINET'S PEDAGOGICAL PRINCIPLES

In this chapter concrete methods and practices used in laboratory piloting in Edinet Project will be presented. The list below gathers dimensions and elements of learning process which should be taken into consideration when planning and implementing courses, modules, study entities or assignment and exercises.

Pedagogical principles

Following pedagogical principles that aim at carrying out learner and learning -centred pedagogy are raised from learning theories [14]. Pedagogical principles are the most important concepts that guide planning and implementing teaching-learning processes.

Principle of constructing knowledge based on partnerships

- Refers to shared responsibility in teaching and learning process
- Role of a teacher is not a deliverer of information but a creator of knowledge together with students

- Equal relationship between teachers and students – partnership of learning means communicative learning together, dialog and collaboration
- Encouraging atmosphere in tutoring and supervision
- Dialogue and interaction, encouragement and support are ongoing
- Assessment and feedback are continuous, interactive and aiming at improving learning outcomes, individual learning processes are facilitated

Principle of collaborative learning

- Refers to collaborative forms of learning and establishing relationships between persons
- Emphasises meaning of social interaction in learning (student – student interaction, student-teacher interaction)
- Highlights such forms of interaction which require learners to work on, explain and present their views to others

Principle of contextuality of learning

- Meaning of learning environment and processes (atmosphere and functions) as well as personal factors of students (knowledge, skills, attitudes) are emphasised in learning
- Knowledge is useful once it is learnt by applying it into concrete problems.
- New views, thoughts and knowledge are meaningful once they are presented in connection with each other
- New knowledge is gained by widening and correcting prior knowledge

Principle of self-directed learning

- Emphasises learner's own control in learning process
- Channels learning towards personally important goals, supports personal experience concerning meaningfulness of knowledge (no passive facts and repeating)
- Is a qualitative feature which describes relationship of a student and a learning task
- Aims to increase student's independence and individuality as well as responsibility in learning

5. CONCLUSIONS AND FUTURE WORKS

The development of Edinet semi-virtual campus started by building the pedagogical ideas first and the technical development and solutions were based on that.

The implementation of the Edinet, semi virtual campus will offer real open educational resources. Edinet gives a realistic solution to reduce costs of the expensive individual laboratories. In addition it forms rich and interesting educational setting in which the pedagogical ideas, views and strategies could be explored.

One of the future works is to develop new technical solutions how the real distributed laboratory will be created. It means solutions where separated equipments are connected together so that they make possible to use them in a single laboratory exercise. This solution has several problems. How the OSI layer 2 connections can be

performed via the public network so that realistic connections with high speed and low delay are possible?

Intercultural collaboration and development, sharing expertise and resources is a multi-level process which would be valuable to research further in terms of students' and teachers' working.

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