
LITERACY FOR THE KNOWLEDGE SOCIETY

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While there are large areas of the world where many people are unable to read and write (fig 1), in the most economically developed countries there is increasing awareness of the need for a new kind of literacy, called digital literacy, reflecting the features of the knowledge society.

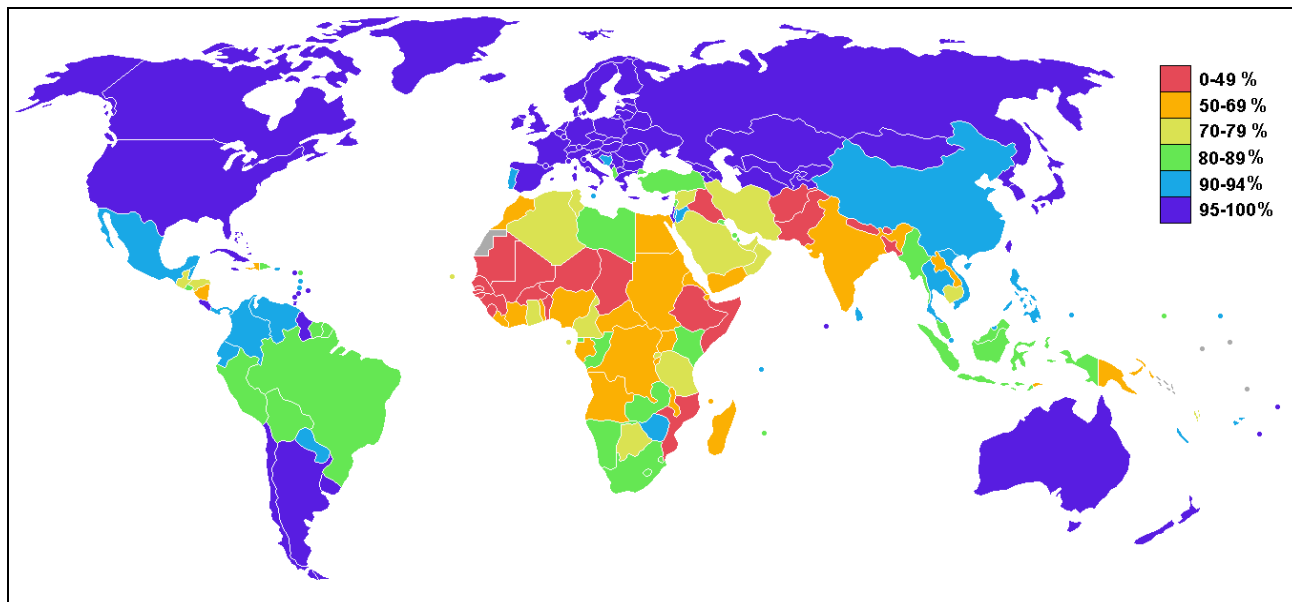


Figure 1. World literacy rates by country (From Wikipedia, the free encyclopedia)

eStart, is an EU-funded project dedicated to the establishment of a Europe-wide network of experts and key stakeholders aimed at providing a communication base for understanding, supporting and promoting Digital Literacy in Primary & Lower Secondary Education across the EU.

The first step in this project is the formation of a partnership to negotiate an operative, shared definition of digital literacy, as a basis for subsequent activities related to teacher education. This paper aims at contributing to this negotiation process.

As in many proposals, the starting point is a reflection on the meanings of the terms involved.

Wikipedia (July 2007) describes literacy as follows:

"The traditional definition of literacy is considered to be the ability to read and write, or the ability to use language to read, write, listen, and speak. In modern contexts, the word refers to reading and writing at a level adequate for communication, or at a level that lets one understand and communicate ideas in a literate society, so as to take part in that society. The United Nations Educational, Scientific and Cultural Organization (UNESCO) has drafted the following definition: "Literacy is the ability to identify, understand, interpret, create, communicate and compute, using printed and written materials associated with varying contexts. Literacy involves a continuum of learning to enable an individual to achieve his or her goals, to develop his or her knowledge and potential, and to participate fully in the wider society."

This definition covers four main areas

- the context: a literate society
- the scope: taking part in that society
- the specific aims: to understand and communicate ideas
- the skills involved: to read and write, or the ability to use language to read, write, listen and speak

and includes some implicit features:

- scripts pervade a literate society
- illiterate people are excluded from active participation in social life.

Digital is an attribute reflecting one of the main characteristics of ICT, in which programs and data are represented in a binary form.

What does it mean when used to qualify a literacy? the following sections discuss this issue, starting from the meaning of digital documents, which in the knowledge society parallel scripts in the literacy society.

Digital documents

A technology implies three basic elements: 1. processes (theories, models, methods, techniques, procedures, etc.), 2. systems which implement these processes (tools, machinery, etc.) and 3. a class of products, manufactured by means of these systems.

Writing can be considered a technology that emerged to face different social needs.

Historically, writing processes and systems evolved across the world in different ways, and have developed to the point of pervading almost all human activity.

In addition, in literate society scripts are the class of products of writing technology; in the knowledge society, digital documents are a class of products of ICT and their nature contributes in determining the framework of capacities needed to master them. Let's see then some of the main characteristics of digital documents.

Producing, storing, searching and using

In the case of written scripts, the functions of producing, storing, searching and using are rigidly separate, while for digital documents these functions are strictly linked together, as they are handled using the same digital system.

Multimediality

Digital documents support different communication channels. So a digital document can be a text, a still image, a movie, a sound and all possible combinations of these. The possibility to integrate different communication channels makes digital documents intrinsically multimedia.

Hypermediality

Any digital document, or parts of it, can be linked to any other digital document, or parts of it. This fact breaks the boundaries of a single document and requires us to reconsider the concept of document boundaries.

Reproducibility and reuse

Digital documents, or parts of them, can be easily and cheaply duplicated and reused.

Transmissibility and accessibility

Digital documents are easily accessed/transmitted without time or space constraints.

Dynamic nature, modifiability easy to process

Digital documents are easily to modify, format and, in the case of texts, print. Some documents, such as electronic magazines and newspapers, have an intrinsic dynamic character, which enables instant updating and enrichment with comments from readers. Some digital documents are produced collaboratively and can develop over time, Wikipedia being a prime example. Another example of the dynamic nature of digital documents are dynamic web pages, whereby a human author defines a template and then provides contents as required, while a software system handles the integration of the two. Moreover digital documents can be easily processed by computer programs for a variety of useful purposes.

Computability and interactivity

In computer science, both data and programs are represented as sequences of 0 and 1, the difference lying in their interpretation. Something similar also happens for digital documents and executable programs, where the boundaries between digital documents and executable code is not sharply defined, as in the case of documents produced by word processors, which can embody macros, spreadsheet excerpts, etc. As a consequence, a further characteristic can be added to digital documents: interactivity. The user can interact with a digital document, and the interaction can take different forms. A document can be adaptive, accommodating to the user's behaviour according to a user model, and also reactive, reacting to a user input according to some computational model etc.

Context and scope of digital literacy

Scripts are used to perform different social functions:

- Recording. This is one of the first functions of writing (Uruk tablets list sacks of grain and heads of cattle, (1987, Jean)) and consists in recording facts and events in script, saved in suitable archives.
- Coding. Since the beginning of writing, scripts were used to codify commandments, laws and knowledge, as in the case of codes and manuals.
- Communicating. In this case, scripts encapsulate messages and news, supporting mainly unidirectional communication.
- Conversation. Here scripts support a conversation, meant not only as the exchange of letters, but also as a record of negotiation processes (Pask, 1975.).
- Expression. Here, scripts refer to all kind of literature production such as poetry, novels and plays.

Of course, there are cases where these functions are strictly linked and cases where a neat classification is difficult.

For each of these functions to be implemented in a literate society, a complex system is required that has been developed across the ages according to the available technologies. Recording requires a system of archives, Coding and Expression the publishing industry, the book shop and library systems, Communication the press and news systems, Conversation the mail system.

Conversely, systems for producing and using digital documents (such as electronic mail, database programs etc.) are strictly integrated, distributed in space and usable anywhere anytime.

From its original context of writing and reading, the concept of literacy has now widened to cover different sectors of human and social life. Some of the more commonly cited examples of “new literacies” are visual literacy, media literacy, numerical literacy, technology literacy, network literacy, and ICT literacy.

The evolution of the concept of literacy in each of these sectors can be reconstructed in the same way as for reading and writing. In these cases, literacy means the capacity to satisfactorily operate inside a given community, using the technological repertoire of the considered area; as Belisle (Belisle, 2006) points out, the concept of literacy has meaning only in terms of its social context.

What is the context of digital literacy? The knowledge society, in which ICT supports the main functions of social life. The attribute digital is transferred from the technologies used to the literacy required to live in such a society. It would be better to talk of literacy for the knowledge society, but since digital literacy is currently used, in the following both expressions will be used interchangeably.

In our society, knowledge is the main driving force, continuously increasing by means of a collaborative process. In this society, digital literacy can be interpreted as an individual identity (or as the process determining it), which not only allows an individual to effectively operate in society, but also to participate in its development. This participation takes place through the performance of social functions, by means of effective use of the available technologies and resources.

But what are the functions and the characteristics of the knowledge society relevant for understanding the features of this identity? The functions include all those mentioned above when examining literacy in its entirety (recording, coding, communicating, conversation and expression), but with essential differences due to the different nature of scripts and digital documents, to the different underlying technologies and to different organisations. In the knowledge society we are witnessing the emergence of new functions, that differ from those typical of the material economy, as well as new ways of developing knowledge.

In the material economy the engine generating value has been technology, markets and decisions on resource allocation, while in the knowledge society the engine is knowledge (Rullani, 2005)

An approach is required which allows us to explore the new, giving meaning and value to possible experiences. This can be done by means of the knowledge economy, in which value is produced by building the world of possibilities and creating shapes and values which are not necessarily a response to immediate need, but are a result of imagination, communication and sharing.

Knowledge becomes the true engine of society and the economy. Let us examine some of its more relevant features so as to detect the characteristics of a literacy suitable for the knowledge society, where knowledge growth is accelerating at a tremendous pace, not only due to ICT development, but above all to emerging ways of accessing, sharing and producing new knowledge.

Accessing knowledge

The web is becoming the predominant place for finding information and knowledge. Because everyone can make their own information available on the web, the issue of being able to find the right information for a given task has become a crucial one.

Sharing knowledge

The widespread diffusion of software and hardware tools for sharing music, video, pictures, links, etc. is a reflection of web users' strong interest in sharing not only commodities but also ideas, feelings and knowledge embodied in digital documents. The huge development of the blogosphere testifies this desire to share parts of one's inner world. This wish is the essence of what is called Web 2.0.

Creative Commons are another example of this wish to share knowledge. Here a new conception is growing of what constitutes value on the web: not immediate financial revenue, but visibility, measurable by means of number of accesses to given documents.

A further example is the MIT OpenCourseWare project, which is aimed at providing free, searchable access to MIT's course materials for educators, students, and self-learners around the world, while at the same time extending the reach and impact of the "opencourseware" concept itself. Other examples include the EU eContent programme, and the project initiated by the UK's Open University to make all its materials available through the web.

Sharing knowledge, ideas, feelings across the web makes the prospect of a collective distributed intelligence, as described by several authors like Levy and Seely Brown, a very real one .

Collaborative production of knowledge

Collaborative production of knowledge inside a community of practice is not a new process, but nowadays knowledge is increasing exponentially by means of the Internet, which connects people and ideas easily. The web has catalysed the birth of many virtual communities, which cooperatively develop new knowledge, as real communities of practice. Examples are the open software community and the free software movement.

An exemplar case of this new willingness to be involved in a collective development of knowledge is that of the mathematician Grisha Perelman. He made available a solution of a very important topological conjecture, the Poincaré conjecture, not bothering about the fact that someone might steal his idea:

If I made a mistake and somebody used my work to arrive to a correct solution, I am happy, since I don't care to be the only solver, but that the Poincaré is solved.

The last example, taken from Wikipedia, is Commons-based peer production

Yochai Benkler describes Commons-based peer production as a new model of economic production in which the creative energy of large numbers of people is coordinated (usually with the aid of the internet) into large, meaningful projects, mostly without traditional hierarchical organization or financial compensation.

The digital literacy dimensions

In a literate society, the objective of literacy is to understand and communicate ideas adequately by means of scripts. In the knowledge society, literacy should take into account new needs and available technologies. Two new interrelated levels are built on the foundations of traditional literacy:

1. The capacity to operate in the world of digital documents, to tackle tasks and solve problems. As in a literate society, it is important to know how to read and write, but in the knowledge society it is also important to know how to produce and use digital documents.
2. The capacity to participate in the process of knowledge building. As in a literate society, it is important to be able to listen and speak but in the knowledge society it is also important to access, share and collaboratively produce knowledge.

Let us briefly discuss these 2 points

Operating in the world of digital documents

Operating within the knowledge society, an individual faces tasks requiring the production and/or use of digital documents to perform social functions. Therefore, s/he has to be familiar with the intrinsic characteristics of digital documents, which may differ according to the different tasks. In addition, the individual has to know how to choose the most suitable documents (and related production and use programs) according to different needs, and also to know how to use these programs to produce and use digital documents.

Understanding the characteristics of digital documents

As digital documents are intrinsically multimedia and hypermedia in nature, a digital-literate individual needs to have a strong grasp of these characteristics.

Multimediality involves being able to operate with documents (decoding, producing, using, etc.) supported by different communication channels (media literacy).

Hypermediality implies being able both to navigate purposefully in the digital world without getting lost, being able to reach the aim which generated the navigation, and to produce hypermedia documents, with meaningful links to other documents.

These processes require continuous reflection on one's cognitive activity (metacognition).

Choosing the right applications according to the task (function) to be accomplished

Digital literacy involves being able to choose the most appropriate digital documents and related applications for performing the different functions of social life (e.g. recording, coding, conversing, expressing).

Mastering the different applications

This area of mastery concerns the technical capabilities to produce, store, transmit and use digital documents using the available technology (hardware and software) (ICT literacy). By doing this, the individual is able to fully exploit the characteristics of reproducibility, reusability, modifiability, computability and interactivity typical of digital documents.

Participating in knowledge construction

To be involved in the construction of new knowledge, an individual should be able to access and share knowledge, as well as be able to cooperate in the construction of new knowledge.

Accessing information and knowledge

Accessing and navigating information and knowledge is so important that some authors identify it as the new literacy.

What I want to suggest, though, is that the new literacy, the one beyond just text and image, is one of information navigation. I believe that the real literacy of tomorrow will have more to do with being able to be your own private, personal reference librarian, one that knows how to navigate through the incredible, confusing, complex information spaces and feel comfortable and located in doing that. So navigation will be a new form of literacy if not the main form of literacy for the 21st century (1999, Seely Brown).

This competence area is often referred to as information literacy:

...knowing when and why you need information, where to find it, and how to evaluate it, use and communicate it in an ethical manner (Irving and Crawford, 2007)

This capacity requires a number of different abilities (Caviglia and Ferraris 2007). First of all, being able to focus the information requirement, to formulate the problem and to identify the available resources. Then, knowing how to search for information on the web, formulating hypotheses, translating the information problem into a web search. Moreover, knowing how to use the results found, integrating the information in the framework of personal beliefs and knowledge. Finally, being able to reflect on one's own process of information searching, and to evaluate its reliability (metacognition).

Sharing knowledge

This competence area involves the exchange of digital documents of various kinds (text, music, videos, photos) so as to make one's own experience available to others and to draw directly on their personal experience. As such, it does require a certain level of technological know-how in order to use a range of tools and artefacts effectively. However, knowledge sharing involves much more than this. It presupposes strong motivation to share ideas, feelings and artefacts. It also involves the ability to participate in the life of interest communities that can form through the use of tools such as blogs, calling on the capacity to attract attention and the ability to respect the community's participation codes. The willingness to open up one's own document repositories to others is a key factor in fostering the sharing of knowledge.

Cooperative production of knowledge

The cooperative construction of knowledge on the web takes place mainly within virtual communities of practice, often supported by Computer Mediated Communication (CMC) systems. A community of practice implies a common enterprise, a set of mutually related individuals and a shared conceptual and procedural repertoire. The capacity to operate in relation with the other members of the community along with the mastery of the repertoire are prerequisites for full participation in the practice of the community. During this practice, individuals create new objects (documents, concepts etc.) and new procedures, which enrich the shared repertoire and the knowledge distributed within the community.

Summing up, digital literacy involves several dimensions and, according to the approach outlined above, the following operative scheme has been assumed:

- Understanding the characteristics of digital documents (media literacy)
- Choosing the right applications according to tasks (functions) to be accomplished (problem solving in an ICT environment)
- Mastering the different applications (ICT literacy)
- Mastering information problem solving, using methods and tools for accessing information and knowledge (information problem solving, information literacy)
- Being able to share information and knowledge in an ICT environment (this capacity is a prerequisite for building a distributed collective intelligence)
- Capacity to participate in the life of virtual communities of practice by constructing knowledge in virtual environments in a cooperative manner (cooperative work, cooperative learning in an ICT environment)

All these dimensions are interdependent and strictly linked.

The multidimensionality of digital literacy seems to be a shared understanding. For example, Tapio Varis proposes the following dimensions (Varis 2005):

- Technology Literacy: The ability to use new media such as the Internet to access and communicate information effectively.
- Information Literacy: The ability to gather, organize and evaluate information, and to form valid opinions based on the results.
- Media Creativity: The growing capacity of citizens everywhere to produce and distribute content to audiences of all sizes.
- Global Literacy: Understanding the interdependence among people and nations and having the ability to interact and collaborate successfully across cultures.
- Literacy with Responsibility: The competence to consider the social consequences of media from the standpoint of safety, privacy and other issues

Moreover, Allan Martin proposes (Martin, 2006) the following dimensions:

1. awareness of the ICT and information environment;
2. confidence in using generic ICT and information tools;
3. evaluation of information-handling operations and products;
4. reflection on one's own e-literacy development;
5. adaptability and willingness to meet e-literacy challenges.

There are large areas of intersection among these definitions. However, whatever conceptualisation we may choose, deep understanding of the abilities required by each of these dimensions remains a theme for further research.

Becoming digital literate

What is the process of becoming digital literate?

José Manuel Pérez Tornero (2003) states:

digital literacy is not just a simple operative and technical consciousness that is made up of nothing more than technical knowledge. Digital literacy is the complex acquisition process of an individual of humanity combined with their abilities and intellectual competencies (perceptive, cognitive, emotive) and practical competencies physiological and motor). These correspond to the technological transformation of the last decades in the twentieth century – the technological change of the Information Society. To reduce digital literacy exclusively to the skills of using a computer is a crude simplification and a loss in meaning. Using a computer requires diverse and complex previous knowledge. It also introduces the individual and humanity to new contexts, which demands mental, intellectual, profound and complex changes. In essence, digital literacy is a complicated process that consists of acquiring a new tekne. This Greek term means the ability of art or craft by an individual or humanity. We are facing the transformation of the most profound tekne that humanity has ever experienced.

This process should start at the very beginning, in primary school, and, as personal identities are linked to the dynamics of the knowledge society, should last all life long. Hence the importance of all those forms of formal and informal learning called Life Long Learning.

The eStart project focuses on digital literacy, seen as a process, in the first years of formal learning and aims at promoting a community of practice whose common enterprise is supporting and promoting digital literacy in primary and lower secondary school.

Key ideas

As in the literate society knowing how to read and write is a pervasive prerequisite for all educational activities and the starting point for any formal education, so, in the knowledge society, digital literacy is becoming an essential prerequisite in learning processes and a necessary starting point for formal education. Accordingly, given that in a literate society children learn how to operate with scripts (reading and writing) from the earliest years, so, in the knowledge society, they should learn to operate with digital documents, using and producing them. This implies an enormous change in education systems, involving a complete rethink of school contents, methods and structures.

Contents

Contents are related to the six dimensions mentioned above (media literacy, problem solving in ICT environments, ICT literacy, information literacy and information problem solving, knowledge sharing, cooperating in a community of learning and/or practice). These dimensions are strictly interconnected and, at least at beginning, the learning process should involve all of them in a integrated way. Reading and writing abilities should be developed in learning environments permeated by ICT, in situations in which (multimedia and hypermedia) digital documents are used and produced. This implies rethinking how children are expected to learn reading and writing; it also means developing learning methods and techniques aimed at extending the capacity to understand and express ideas beyond scripts, encompassing the use and production of multimedia and hypermedia digital documents.

Methods

In accordance with the above-mentioned contents, digital literacy should, at least initially, be developed in the context of cooperative learning projects. In these projects learning takes place within a learning community, by sharing a common task aimed at creating a product, a service or a solution to a given problem. These products or solutions take the form of digital documents. The practice of the learning community takes place in a learning environment embedding ICT. While operating within a learning community, children face problematic situations, which may require them to search the web and share ideas

and feelings with other children, as well as to use and create hypermedia digital documents. This cooperative approach embodies several pedagogical models such as social constructivism, situated learning, cognitive apprenticeship, anthropological theories of communities of practice, activity theory, etc. Working within a learning community, any child can express their own personal learning needs, which depend on personal learning style, affective needs and motivations. Here an important feature of the digital literacy process emerges: personalisation. There is no conflict between cooperative learning and personalisation, since one complements the other, as in a learning community there is a difference in roles and cognitive identities. It should be noted that the present assessment system does not appear suitable for evaluating the higher order competencies implied by digital literacy such as critical thinking, respectful minds, the ability to construct new knowledge and so on. New formative evaluation tools such as personal portfolios, peer reviews etc. should replace traditional techniques and tools for assessing learning.

Structures

To fulfil the requirements posed by the above-described approach, the classroom needs to have structural and organisational characteristics supporting the practice of the community of learning. The space should be configurable according to the activities to be accomplished. This implies, for example, that all the objects in the classroom should be easily movable and configurable to create either common work areas or personal spaces for individual work. In this classroom organisation, desk and seats can be easily moved and assembled in different ways, computers (possible one per child) should be small and portable, with no electrical cables (fast, wireless connections and sets of batteries available), print, copy and projecting devices available etc. Of course, further learning spaces should be available for the children in the school, so that they can express themselves in forms other than those involving ICT, such as physical activities, theatre, games, etc.

Conclusions

The aim of this paper is to present an operative definition of digital literacy, to contribute in defining the requirements of contents, methods and structures needed for implementing it in the classroom and to define a related professional profile for teacher education.

Starting from the analogy (similarities and differences) between scripts and digital documents and from the features of knowledge growth in the knowledge society, the characteristics of a literacy suitable for this kind of society (digital literacy) have been discussed.

According to many authors, digital literacy can be described as a multidimensional concept. Herein, six dimensions are proposed, namely media literacy, problem solving in ICT environments, ICT literacy, information literacy and information problem solving, sharing knowledge, cooperating in a community of learning and/or practice.

Each of these competence sectors is a research area, and the proposals of frameworks and actions should take into account the related state of the art.

Finally, content areas, learning methods and classroom organisations have been briefly mentioned, in relation to primary and lower secondary education.

Thus far, no mention has been made of the issue of the digital divide, a very important issue related to digital literacy. In the knowledge society, those who have no access, or are unable to effectively operate in a digital environment, are in the same position as illiterate people in a literate society. Digital literacy does not guaranty happy lives, but being digitally illiterate excludes individuals from many social activities and deprives them of an important source of empowerment.

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THE PERSONALIZATION PARADOX

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Abstract

This paper depicts the paradox which arises when virtual personalization capacities are introduced to classrooms. While personalization is usually associated with an enhanced sense of autonomy, meaningfulness, interest and intrinsic motivation, it may also lead to side effects commonly associated with excessive ICT use. The primary manifestations of such side effects are gradual disintegration of the self, a weakening of social involvement, flattening of inter-subjective communication and instrumentalisation of human interactions. While the initial benefits of personalization are self evident, counter productive side effects of ICT use, like the ones mentioned above, are over looked in most ICT design and research. In the paper before you we suggest that this paradox may be resolved by unifying the virtual personalization process with an on going process of self definition and self development. The paper concludes with a concrete suggestion for implementation of this new approach within the iClass project,¹ and guidelines for the design of a virtual Self Profile for teachers and students alike.

The Origins of Personalization

Personalization may be seen as a recent development of the concept of mass customization, coined in "Future shock" by Toffler (1971). The idea of mass customization is based on an economic observation noting the existence of clear customer interest in products which are adapted to individual needs and preferences. Naturally, along side the rise of the standards of living during the last 50 years, the demand for individualization has also increased and thus enjoys more industrial research attention and resource allocation.

In today's economy, customers have the power to demand and receive products tailored to their individual needs, specifically designed and manufactured to suit their personal preferences in almost every aspect of life. Stan Davis describes this phenomenon as "Future perfect" (1987). Davis characterizes the applicability of mass customization as events where "the same large number of customers can be reached as in mass markets of the industrial economy, and simultaneously be treated individually as in the customized markets of pre-industrial economies" (Davis 1987).

Tseng and Jiao (2001) provide a working definition of the mass customization objective in an attempt to address the implementation issues of mass customization: "to deliver goods and services that meet individual customers' needs with near mass production efficiency". The question remains: What is the applicability of mass customization and personalization to the classroom environment?

The Advantages of Automated Customization

The classroom environment may be metaphorically viewed as a very small scale industry in which one supplier (the teacher) struggles "bare handedly" to meet the growing and ever changing preferences, interests and divergent needs of its customers (the students). If we zoom out to observe the teachers in their natural, real/physical, surroundings, we find an environment which poses several complementary challenges and a myriad of constraints that can be classified into three main groups: internal, pedagogical and situational.

¹ iClass is a project dedicated to the development of an intelligent, cognitive-based, open, learning system and environment, adapted to individual learners' needs and to ensuring their integration into the education sector at a European level. iClass Project is funded under the FP6, the European Community Framework Programme for Research, Technological Development and Demonstration. It is part of the Technology-enhanced learning and access to cultural heritage action line, and is also one of the two integrated projects in the area of education.

Internal constraints may be attributed to various personality characteristics of teachers such as motivation, charisma, flexibility/rigidity and creativity. Pedagogical constraints might be inflicted on teachers through educational policies, school traditional legacies and pre-defined or prescriptive methodologies which they must follow. Finally, situational constraints may be associated with the specific learning environment. These may include lack of proportions between the number of students and the size and number of classrooms or available teachers. Other constraints can be attributed to low budget allocation which only allows for poor maintenance standards of teaching facilities and accessories. Finally, difficult socio-economic background of the school's target population and its physical location may also force a challenging burden onto the teachers' shoulders.

The ICT revolution which was introduced to the classrooms during the mid 80's launched a new version of mass customization, tailored to classrooms' needs which was later named "Automated Customization" (AC). AC promoted personalization to an extent that was unimaginable, unfeasible or at the very least lacked economic viability until that time. By developing adequate tracking, profiling and matching capabilities, ICT actualized the dream of several generations of educators and thinkers in the fields of constructivism, learning styles, interests, intrinsic motivation, multiple intelligences, open-learning and special education. Given the aforementioned background and unfortunate constraints teachers are forced to contend with, it is clear why virtual avatars equipped with AC capabilities were seen as a promising counterpart to the perplexed teacher.

Moreover, Specialists in this last field have been advocating for the inclusion of children with (what is still referred to as) "learning disabilities" and for the pluralization and personalization of teaching and learning. They hope was to gradually transform what is currently seen as a deviation from the norm into a legitimate characteristic of a unified learning approach, a combination of learning styles, intelligences (Gardner, 2004), interests and personal temperaments, among others.

The Benefits of Personalization

One of the major benefits of AC was that it enhanced personalization, and increased the ability to adapt, as much as possible, the learning process and its content to the personal characteristics and preferences of the learner (Cronbach & Snow, 1977 and Corno & Snow, 1986). Justification for defining personalization as a desired end goal can be drawn from the benefits it generates in terms of: learning advantages, European educational goals and tomorrow's workforce.

Learning advantages: Personalization can meaningfully contribute to a sense of self competence and autonomy (Ryan & Deci 2000, and below). It also may triggers reflection of the learner on herself, the learning process, and the relationship between the two. By contributing to motivation and triggering reflection, as well as enhancing the learner's sense of comfort within the learning process, personalization can contribute to the deepest level of learning. It has the potential to enhance transfer, understanding, long-term memory, and applicability of learnt content. In other terms, personalization enables the student to learn how to learn and become an effective, lifelong, learner (UK Department for Education and Skills, 2006).

European educational goals: Enhanced personalization and the consequent enhancement of senses of autonomy and competence or personal empowerment, stem directly from humanistic European ideals and support the European educational goals (as stated in the Lisbon Objective of 2000).

Tomorrow's workforce: Finally, on the organizational and economic levels, personalization is widely perceived as a sine qua non for a flexible, ever-changing and adaptive "Learning Organization" (Senge 1990), which is the only type of organization fit to thrive in the postindustrial global economy. It allows positioning employees in roles that best suit their capabilities by making employees more aware of their personal preferences, unique characteristics and interests and enabling them to maintain open dialogue with their future managers about their roles and responsibilities. (Drucker 1993; Cunningham, 1999).

The Personalization Paradox

For times it seemed as if the holy grail of education has left teachers anxiously waiting for an avatar or a virtual agent, completely free from reality based constraints, to replace them.

However, although the role of teachers must undergo substantial revisions it is clear today that the utopian promise of AC in the classroom was not completely delivered. An elaborate, state-of-the-art, research conducted towards developing the iClass pedagogical model yielded the following findings:

AC contribution to learning processes - There is no meta-analysis research to support the claim that AC of the learning process can improve the learning process without the learner's explicit and conscious knowledge and involvement. Surprisingly, most schools assume that the sole ability to automatically assess the students' knowledge level and capabilities along with sophisticated grouping and tracking capacities lead to superior learning results (Slavin, 1987; Wilkinson et al. 1999).

AC contribution to learning styles - Many of the studies regarding learning styles, conducted during the 1980s and early 1990s, found that catering to the student's specific LS increases motivation and effectiveness of learning (for example Dunn & Dunn, 1987). Later on, harsh criticism was mounted against those studies as and the validity of LS research, and even of the models themselves was called into question (Coffield, et al. 2004). It is impossible to refute earlier findings today, but it is clear that the research done is not enough to support those findings, so the results remain inconclusive.

AC and interest - The only evident and conclusive finding is attributed to the positive effect transparent AC has on student's interest levels which are defined as grounded in stored values and knowledge of object classes leading to the student's desire to be involved in activities related to that topic (Boekaerts & Boscolo, 2002). It can also be translated to the choice of a subject matter or a kind of a preferred learning activity. Recent research on this topic shows that catering to individual interests improves learning (Boekaerts & Boscolo, 2002). More specifically, it improves attention and retrieval processes, acquisition of knowledge and effort expenditure (Hidi, 1990). Finally, AC was also found to increase persistence (Ainley et al., 2002). In addition, catering to individual interest increases intrinsic motivation (Tobias, 1994; Boekaerts & Boscolo, 2002; Katz et al., 2006). This finding is also valid in traditional-authoritative cultures (Katz & Assor 2003). Well-developed individual interest can also provide teachers with a means to help students make connections between the content and context of the tasks they are assigned.

AC and ICT - The findings of the survey about the general effect of promoting ICT use within learning environments were rather alarming. The main concerns that were raised focused on the apparent negative effect that most virtual environments had on their users, both young and mature. These effects manifest themselves in a gradual disintegration of the self, erosion of rational abilities, weakening of social involvement, flattening of inter-subjective communication and instrumentalisation of human interactions (Gordon & Alexander, 2005; Amichai-Hamburger & Ben-Artzi, 2003; Bargh & McKenna, 2004; Gergen, 2000).

These side-effects are not surprising given the original mindset of mass customization which identifies users according to a limited set of variables. When we buy a car or a hamburger, such a mindset might not seem so hazardous, but when trying to define a student's skills, talent or personality according to a limited set of variables we risk losing the ability to appreciate human complexity and the many shades of gray that color our personality. Such a loss will invariably create students with an overly simplistic perception of the self that is bound to eventually collapse.

When we draw conclusions from these findings it becomes apparent that even though the initial purpose was to increase personalization and meet individual needs and preferences, we might end up gradually losing the users sense of self identity which personalization is trying to promote. This "Personalization Paradox" is one of the main challenges that the iClass project is trying to resolve. The following section outlines a "Self Profile Feature" that may be able to address this paradox.

The Self Profile

The iClass platform was designed according to the SRPL (Self Regulated Personalized Learning) model which amalgamates pedagogical considerations of self regulated learning (SRL), Personalization and Intrinsic Motivation. Given the limited scope of this paper the discussion will focus on a subsection of the SRPL model which aims to resolve the personalization paradox.

In order to achieve this goal, students and teachers alike should be able to personalize their online experience while simultaneously developing their sense of a self identity. In order to settle the contradiction between these tendencies, the Self Profile Feature must be imbedded with a process which unifies self personalization and AC and supports explicit processes of self design. This unification may allow users to benefit from the advantages of AC and personalization while, at the same time and same (virtual) space, work actively and consciously towards enhancing their abilities to develop their sense of self identity.

Self Personalization

The first challenge is to allow users to self regulate the system's personalization capabilities while making mindful and meaningful choices. The self personalization process is based on an analysis of personalization variables that relate to learning and teaching experiences. The variables that apply to both students and teachers can be grouped into five major categories: physical environment, interface, learning processes, learning subjects, knowledge level and attitudes. Each group was allocated a relevant set of variables.

Usually AC processes are used to automatically assess the learners' profile and set, according to predefined algorithms, the values for the various variables. It is important to note that the end users (both learners and teachers) remain oblivious to the logic and considerations that guide these algorithms. The Self Profile was designed to change this approach by entrusting users (rather than the system) with the responsibility to choose the values for each variable. In order to support these choices the Self Profile is equipped with scaffolding activities.

In order to define choice, it is important to explain that merely providing the learner with a multiplicity of options, regarding as many aspects of the learning process as possible, and with the freedom to select any of these options he or she wishes, amounts to nothing more than arbitrary picking.

Picking in of itself is a meaningless exercise which does not support expression of the individual's deep preferences and characteristics. Picking becomes choosing only when it is (a) well understood by the learner and (b) the options are relevant to the learner's personal interests. When these two considerations do apply the learners can expect their choice to become motivational. Choice of this type was also found to increase opportunities for self-realization and development of the learners' identity as a self-regulated lifelong learner (Katz & Assor, 2006, in light of Self-Determination Theory; for example Ryan & Deci, 2000, 2003).

Thus, for picking to become choosing two types of scaffolding activities should be available. The first type of scaffolding activities should promote mindfulness of the end users with respect to their choices. Mindfulness stems from a deep understanding of both the semantic meanings of the terminology related to the choice options and from the practical meaning thereof.

The second type of scaffolding activities should promote meaningful choices. Meaningfulness means that at least some of the choices are associated with the individual's preferences and personal interests. Naturally these conditions have to be accompanied by the two previous conditions for picking, namely: multiplicity of options and the freedom to select among them.

To summarize, according to the SRPL model every choice within the Self Profile Feature should be meaningful to end users. Additionally, choices should be mindful and regulated by the end users themselves with the support of the aforementioned scaffolding activities. Nevertheless, not all of the categories and not all of the variables in each category of the Self Profile are open to every learner at every moment. Deciding what should be unveiled depends on various pedagogical factors such as the policy of the school, students' maturity level, the cognitive load they can carry, etc. The gradual unveiling of the self-profile also aims to support the learner's perceived competence.

The system uses the learner's personalization preferences as a reference point to match relevant content elements and system processes in the iClass system. This means that the content presented to the users, the UI orientation, the presentation modes as well as other processes will follow users choices and preferences and reflect their desired learning experience.

AC to Support Self Design

After successfully integrating personalization capacities, a second challenge is presented in the form of engaging end users in a process of developing a sense of self identity. AC processes are used here not to automatically assess the users' preferences but rather to promote their reflection on these preferences and provide monitoring services by juxtaposing the learner's choices within the self-profile, with the result of system tracked information about the learner's actual behavior and performance. It is important to emphasize that iClass uses the term "Profile" to concisely describe the intentional choices made by the learner and convey the dynamic and self regulated aspects of the learner's activities. Naturally, the learner can view and change the values of his or her self-profile at any point in time.

A typical AC initiated process may begin when the system detects a user actual behavior which deviates from the preferences indicated by the Self Profile choices. An automatic alert will then prompt the user to notice this discrepancy and ask him or her to reflect on it. This reflection might result in a comment the user makes with regard to an action within a specific context about what caused him or her to deviate from the usual preferred behavior (that is recorded in the Self Profile). A user might also choose to modify his or her preference as a result of the alert and adjust his or her actual behavior. Finally, the user may choose to ignore the alert and continue working.

Providing users with opportunities to reflect on their individual parameters (preferences, values, goals, abilities, styles, interests and attitudes), and to adjust these variables according to this feedback, increases their self-knowledge, sense of self identity and sense of autonomy. Engaging in self reflection may also increase personal and professional growth (Stark, 1994). Therefore, self reflection triggered by AC processes may achieve the second goal of the Self Profile,: to promote a sense of self identity.

Conclusion

In this paper we argued that while AC in the service of personalization is usually associated with an enhanced sense of autonomy, meaningfulness, interest and intrinsic motivation, it may also lead to side effects, commonly associated with excessive ICT use such as gradual identity loss and disintegration of the self, personalization is designed to promote. This phenomenon was named the "Personalization Paradox". A possible solution to this paradox, in the form of guidelines to a Self Profile Feature, based on a subsection of the iClass' SRPL pedagogical model, was then presented.

We claimed that unifying self personalization processes and AC processes (that lead to reflection), within the Self Profile Feature, will help promote self identity and self knowledge. We explained how this unification allows users to enjoy the benefits of AC and personalization while at the same time and (virtual) space, actively and consciously enhance their abilities to develop their sense of self identity.

It is believed that this approach to the "Personalization Paradox" may lead to a new balance between real teachers and virtual agents. Whereas the future role of teachers may be focus at creating a sense of a learning community, trust and acceptance addressing the commonly shared needs of all students in a classroom, The self profile might complement these efforts and be used to provide students with a supportive system to develop their sense of self identity and explore new ways to self regulate their virtual learning environment and eventually their learning experience.

To conclude, we would like to revisit the perplexed teacher facing a classroom filled with a diversified collection of students' wishes, desires and authentic needs. Though originally AC agents were believed to be waiting patiently around the corner for their gradual maturation which will allow them to replace their physical rivals, we may now expect a more generous cooperation model and task allocation. The research teams of the iClass project, as a representative of this new SRPL pedagogical model, will conduct follow up evaluation activities throughout the project's life span in order to improve and assess this new approach and further investigate the work allocation between teachers and virtual agents. These efforts may lead to a better understanding of the "Personalization Paradox".

DESIGNING OF THE CLASSROOM OF TOMORROW BY USING ADVANCED TECHNOLOGIES TO CONNECT FORMAL AND INFORMAL LEARNING ENVIRONMENTS

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Abstract

The main objective of the CONNECT project is to develop an innovative pedagogical framework that attempts to blend formal and informal learning, proposing an educational reform to science teaching. The project will create a network of museums, science centres and schools across Europe, to develop, apply and evaluate learning schemes by pointing to a future hybrid classroom that builds on the strengths of formal and informal strategies. The proposed approach will impact upon the fields of instructional technology, educational systems design and museum education. It will explore the integration of physical and computational media for the design of interactive learning environments to support learning about complex scientific phenomena. The project will be implemented on an advanced learning environment, the Virtual Science Thematic Park, developed upon emerging technology that will allow for ubiquitous access to educational and scientific resources. The CONNECT project will evolve through a systematic, multi-step assessment process involving the collection and interpretation of data. The current paper presents the project's framework, the initial ideas and the future plans of the consortium.

Introduction

During the last decade some attempts have been made to evaluate the impact of efforts and investments made in Science and Technology Education worldwide, for example the Third International Mathematics and Science Study (TIMSS, 1994) and the Programme for International Student Assessment (PISA, 2000). These two large scale studies have explored the achievement and the attitudes towards Science and Technology (S&T) of the students' population in many countries of the world. The main findings of these studies are that the average achievement of the students' population is relatively low in most of the Southern European countries. Additionally while the vast number of students hold positive attitudes towards S&T at the early schooling stages (70-80% of the 4th graders in all countries), this situation is considerably moderated at the latest stages (8th grade). These findings suggest that the educational systems need to shift from the traditional paradigm of the teacher-directed learning and the dissemination of knowledge to the learner-centered curricula that promote the development of lifelong learners who can think critically, solve problems and work collaboratively (King, 1996). Sfard (1998) argues that learning becomes a process of discovery and participation based on self-motivation (informal learning) rather than on more passive acquaintance with facts and rules (formal learning). The importance of visualisation and of hands-on experiences as vital components to the learning process has also been stressed (Bransford et al. 1999).

From the beginning of the nineties there has been a considerable growth and development of the research on learning in science museums. Changes in accepted paradigms and definitions of learning have resulted in studies that point to the considerable richness of learning that have the potential to emerge from experiences in informal settings. There was widespread acceptance of the cognitive, affective and social value of experiences in museums and similar institutions (Rennie & McClafferty, 1996), and Falk and Dierking (1992) had drawn attention to the physical, social and personal contexts in which learning occurs.

Exploring the integration of informal learning experiences within the formal school curriculum could make an important contribution to the field of science education by helping students to develop critical capacity and deeper understanding of the concepts underlying scientific investigation. It will further provide students

with first-hand experience of the ways that technology can both serve and inspire scientific investigation. This will later affect their career choices and will provide a scientifically qualified workforce (Falk, 1999). It will furthermore significantly enhance the learning of science for diverse and heterogeneous populations of future citizens, promoting the public understanding of science and the development of lifelong learners who can think critically, solve problems and work collaboratively (King, 1996).

The CONNECT Project

The CONNECT project¹ is a step towards an ambitious comprehensive educational reform, pointing to a future hybrid classroom that builds on the strengths of formal and informal strategies. It is an innovative approach that crosscuts the boundaries between schools, museums, research centers and science thematic parks and involves students and teachers in extended episodes of playful learning.

The CONNECT project is a joint initiative of pedagogical, cognitive science and technological experts, museum educators and psychologists, that research the possibilities of using advanced technologies for educational purposes. The CONNECT project develops an active learning environment the Virtual Science Thematic Park that functions in two distinct and equally important, from a pedagogical point of view, modes: the museum mode and the school mode.

The Virtual Science Thematic Park allows for ubiquitous access to educational and scientific resources and will incorporate all the innovative use of technology for educational purposes. The partnership aims at providing students with a variety of learning methods that will incorporate experimental, theoretical and multidisciplinary skills that will eventually enable them to become independent learners. The suggested educational scenarios include field trips (virtual and conventional visits to science museums and parks) that are tangential to the curriculum, pre- and post-visit curricular activities (including the use of internet resources), ‘minds-on’ experiments and models of different kinds into everyday coursework heavily involving ‘real’ remotely controlled experiments in the “student-friendly” and engaging environment of a thematic park or a remote observatory.

The working hypothesis of the CONNECT project is that the amendment of the traditional scientific methodology for experimentation with visualization applications and model building tools will help students and learners in general to articulate their mental models, to make better predictions and to reflect more effectively. The CONNECT project will take advantage of the fact that students enjoy visits to museums tremendously and that the resulting increased interest and enjoyment of science activities constitute extremely valuable learning outcomes that persist over time (Ayres & Melear, 1998). The CONNECT project will provide students with observations and experiments that have the potential of showing to them that some of their beliefs can be wrong; will create the circumstances where alternative beliefs and explanations could be externalized and expressed and design activities that give students enough time to restructure their prior conceptions.

Pedagogical innovation of the CONNECT project

The CONNECT project is developing a new science learning scheme by introducing a technologically advanced approach for teaching and learning and by connecting a wide range of learning environments (school, home, science museums, research centers, science thematic parks exhibitions) and bridging the theoretical and applied aspects of every day personal activities.

¹ The CONNECT project is co-financed by the European Community, within the framework of the Information Society Technologies (IST) priority, Sixth Framework Programme and the National Science Foundation (NSF), USA. The CONNECT consortium is composed by the following partners: Institute of Communication and Computer Systems (Greece), Fraunhofer Institute of Technology (Germany), INTRASOFT (Belgium), University of Duisburg Essen (Germany), Vaxjo University (Sweden), University of Bayreuth (Germany), University of Birmingham (UK), Ellinogermaniki Agogi (Greece), HEUREKA (Finland), @BRISTOL (UK), Evgenides Foundation (Greece), ECSITE (Belgium), Institute for Learning Innovation (USA), Weizman Institute of Science (Israel), International Environment and Quality Services S.A. (Greece), Ministerio da Educacao (Portugal), Universidade do Minho (Portugal).

In order to learn science in meaningful ways students need to see connections to familiar problems relevant and important in their daily lives. Additionally, situated learning fosters the ability to transfer acquired knowledge to a variety of different situations. Situated learning is an essential component of acquiring the ability for self-organised and self-regulated learning. The schools of the CONNECT project will provide opportunities for the development of a competence to learn and an ability to be an autonomous learner in the future. This includes the development of meta-cognitive learning competences like e.g. elaboration strategies or learning strategies and their application and usefulness. The learning processes are embedded in communicative situations where teaching science offers good conditions for fostering communication and cooperation in students' experimental practices. For the content orientation the planned teaching topics are based on a broad field of knowledge and applications. The teaching sequences are built up in a way that student knowledge can increase and link, in other words be “constructed” by them.

The educational material and the adopted instructional strategies are tailored to the abilities and aptitudes of different types of learners. The development of the educational scenarios aims at providing materials and instruction that gives reality and concreteness to scientific concepts (Hofstein & Walberg 1994).

In the light of the above the “basic scenario principles” of the CONNECT project can be summarized as follows:

Personalization: The learning tasks need to be related to the interests and background of a wide variety of different learners and facilitators and to built upon these individual differences, tapping into intrinsic motivation and providing opportunities for choice and control.

Interactivity: The tasks should be “learner-centered” and should provide learners with opportunities to engage actively in the experience.

Collaboration: Learning is often enhanced by collaborative efforts. The tasks should promote such collaborative learning, through opportunities for collective work on problems or challenges.

Self-regulation: Teachers should help students to plan and monitor their learning, to set their own learning goals and to correct their errors.

Authenticity. The learning tasks should be as real-world and authentic as possible.

Learning Strategies: When possible, the learning tasks should employ effective learning strategies, e.g., the use of advanced organizers, the use of dynamic explanations, making explicit connections between visible and invisible phenomenon, making explicit connections between linked-phenomena which take place on different scales (micro vs. macro), etc.

Another important aspect of the CONNECT project is the promotion of ubiquitous access for students and teachers that will be able to access to the Virtual Science Thematic Park; to visit the exhibits and the experiments; the research laboratories and the advanced scientific instruments. Thereby science education will act as the mediator among people in different countries reducing at the same time prejudices and stereotypes and increasing social cohesion. The direct interaction with science or the doing of science reflect a fundamental pedagogy of the museum to provide learners with personal and direct experiences which can build upon in their own ways. Students will experience the phenomena presented in their own terms, freely choosing what to attend to and interact with, depending on their prior knowledge, interest and expertise. It is important also to note that in the science museums and science centres the exhibits and the related phenomena are embedded in rich real world contexts where visitors can see and directly experience the real world's connections of these phenomena.

Finally, a virtual learning community of learners, students, teachers, museum educators and researchers who are involved in the project has been created and will have the possibility to communicate and to collaborate via the CONNECT system.

Scenarios of Use

The Virtual Science Thematic Park requires the use of augmented reality tools which visually explain with the help of virtual objects projected onto the real setting the physical phenomenon manifested by an experiment inside the museum. By this way many “invisible” parameters in physical phenomena (e.g. forces, fields, waves, charges) will be visualised and presented in the eyes of the students augmented on the real experiments. Haptic feedback could add to the experience of complex physical phenomena. An example is the representation of Lorentz force in space. Other scenarios include, giving life to static exhibits by animating parts of it (e.g. the cloud creation in the water cycle, meteorological movements, tectonic plates movements, sea currents, the propagation of sound waves, etc.) or performing on-line astronomical observations (Sun movement, planets and stars, solar and lunar eclipses, etc.) with the use of a robotic telescope. Furthermore, wearable systems will provide an additional wealth of information, linked to dedicated databases.

The add-on of the augmented exhibit, compared to a conventional exhibit, is that the students wearing the CONNECT system have at their disposal additional wealth of information. The real exhibits are mixed in their optical view with the 3-D visual objects and representations that the system is producing and embedding into this augmented world through their glasses. In this way all the important parameters of the experiment, all the abstract symbols, which are normally represented in drawings after the experiment, can be visualised. This interactive hands-on experience is recorded on the students’ wearable computer for later use. The next day at school (post visit procedure) the students are sharing their personal experience of the visit to the museum with their fellow classmates by projecting it onto a video screen. The fellow students will be able to make a virtual visit to the museum and follow a different tour or make different choices to the same tour through the Virtual Science Thematic Park. Various collaborative activities (discussion forums, mini-projects, writing reports etc) follow the visit in order to provide students with the necessary time and the appropriate tasks to better understand the new information.

Expected Impact

The goal of the CONNECT project is to redefine the conceptual framework of education, by designing learning environments and implementing pilot experiences that use state-of-the-art digital technologies. Such environments would encourage reflection and collaboration and draw their pedagogical value from the cross-over between education and entertainment.

The CONNECT approach will impact upon the fields of instructional technology, educational systems design and museum education.

In the field of instructional technology, our research will examine alternative instructional systems that attempt to blend informal and formal learning and to situate learning in real-world contexts.

In the field of educational systems design, the CONNECT Virtual Science Thematic Park represents an example of designing new systems from the ground up. As such, it may inform current burgeoning theory in the process of educational systems design and in systems theory-such as the SIGGS theory (King & Frick, 1996). Additionally, the CONNECT approach will provide information for one of the key processes of educational systems design, transcendence: it will create knowledge regarding a new class of alternative schooling that will be informative to future educational designers.

In the field of museum education, the CONNECT project will correct three deficiencies that are restricting current reform efforts to expand the educational role of museums: the limited number of model programs, the absence of a body of professional literature, and the lack of contact with the broader field of education. Indeed, the CONNECT project provides a framework for a closer and more effective collaboration between museums and schools, while keeping intact the strengths of these different educational environments. By describing and analyzing the functionalities of the virtual thematic park and by creating operational terminology, the CONNECT projects aspires to guide the design of future museum-school collaborations and to document efforts that seek to bring the worlds of formal and informal learning closer together.

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TEACHER TRAINING LAB IN SECOND LIFE: A CONCEPT FOR TEACHER EDUCATION IN THE 21ST CENTURY

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Introduction

This article provides an insight into a current research project at the University Duisburg-Essen's chair of educational media and knowledge management. Its basic idea is to create a virtual training lab in the online world of Second Life giving students enrolled at the department of educational sciences the possibility to test their own didactical settings in a virtual environment.

Second Life – a persistent online world

Second Life is a persistent three-dimensional virtual online world populated by its user's avatars¹. Unlike other virtual worlds – for example World of Warcraft or Lineage – Second Life has no inbuilt narrative; there are no defined roles for the user's characters and also no specific goals or objectives (the so-called quests). Second Life is completely created by its users in every single respect beginning with the environment (landscape, houses, furniture, etc.) the appearance of the avatars (hair, face, clothes, tattoos) and leading to every object situated in the world. In contrast to many of the other virtual worlds Second Life also offers (basic) membership for free. The original idea of a virtual online world in which its user appear in the shape of individual avatars refers to Neal Stephenson's novel "Snowcrash" published in 1995. Here Stephenson describes a comparable online world by using the term of the metaverse.

At the moment Second Life is facing great publicity, a fact which is underlined by actual data, too. According to its own sources Second Life is having 8.2 million inhabitants from all over the world. The reason for its popularity seems to be caused by the above mentioned possibility for every user to create everything imaginable inside this virtual world. Most users spend a large amount of their free time and money² in the virtual world by creating and improving their avatar's appearance or objects which can be used in Second Life. Some users already created their own business with a store in Second Life. Although several myths circulate concerning people who made much money in the virtual world, there seem only to be only few who are really that successful. Nevertheless the semblance of Second Life as a new virtual market place led many real life companies to build their virtual correspondents in Second Life. Adidas for example created a pair of shoes that is only available in Second Life.

Learning and education in Second Life

Creativity and economy are not the only aspects considered as very important in Second Life. Educational aspects and learning are also highly recommended by the users. Although there are several voices pointing out, that Second Life is not a game in its original definition, we reject this assumption. According to Roger Caillois' functional definition of the phenomenon game and its main components –agon (competition), alea (chance), ilinx (inebriation) and mimicry (costuming) – it is completely obvious that Second Life at least fits into the last mentioned category and therefore we will regard it in this article as a special kind of role-playing (Caillois 1982).

¹ The term avatar alludes to Hindu religion. In this context it describes the incarnation of a god in the body of a human entity (Adamowsky 2000, p.204). In the world of digital games this expression is used to describe the character in the game which is the user's virtual representation and thus led and controlled by him/ her.

² Payment in Second Life is based on an own currency, the Linden Dollar.

Learning processes in computer and video games

Learning processes in the worlds of digital games are not a new aspect in the scientific discussion about digital games. Recapitulatory, the most important questions in this context seem to be what and how users learn by playing computer and video games. Consequently this also leads to the broader question how games have to be designed to foster special learning processes.

The current discussion about learning in computer and video games seems to focus mainly on the question what users can learn in these virtual worlds. There seems to be no doubt about the fact that first they have to learn how to control the game (i.e. gear, rules and main objectives). Another facet in this context is the idea of informal learning mostly related to cognitive aspects as for example spatial skills or inductive discovery skills (see for example Fromme 2006 as a resuming description).

Regarding computer games themselves as “learning environments” and following the arguments of John Paul Gee, digital games foster especially processes of active learning (Gee 2003). Pointing out, that most learning processes in computer games are constructed and implemented in the playing process in a manner that users do not perceive that they are actually learning, Bopp created the term of *stealth teaching* (Bopp 2004, p.78).

Second Life as a learning environment

As we already mentioned the aspects of education and learning seem to be of high importance for Second Life. Similar to those facts we discussed above the primary learning processes which contain in coping the control and rules in Second Life. However, in distinction to other computer games, Second Life’s virtual environment is also used for conscious learning for example inhabitants teaching others how to create objects or giving language courses.

Among other educational institutions many universities created their representations in Second Life. The Ohio University’s campus in Second Life nearly mirrors the actual one in reality. Some universities already offer lectures in Second Life, for example the University of Applied Sciences Cologne. Students here can attend a lecture on communication in companies in a virtual auditorium.

Another project we decided to be worth taking under short consideration in this context is SLOODLE. SLOODLE is the attempt to affiliate the advantages of the Learning Management System (LMS) MOODLE with Second Life. The project is based on the idea that LMS offer many possibilities to communicate but are in most circumstances used as a virtual storage space for documents. Second Life offers the chance to create visual representatives of communication tools and other services implemented into LMS. Therefore SLOODLE is intended to ease communication and collaborating work (Kemp/Livingstone 2006).

A teacher training lab in Second Life

Observing the discussion and coverage about Second Life, especially the aspect of using Second Life for education and learning, the idea arouse to utilise this virtual world as a teaching lab for our students. At the moment there seems to be no comparable project in Second Life or other virtual worlds, so we are on the one side in the role of a pioneer but on the other side facing the problem that no experience with such a project has been gained so far. Thus one of our major targets despite of the practical effect to create this training environment will be testing our project’s feasibility by clarifying fostering and hindering factors in this context.

The conception

Our project’s basic idea is to create a learning environment in Second Life which can be used by our students as a training lab to try out ideas and concepts of didactical settings. The German teacher education is situated at universities and there have been – and of course still are – critical voices pointing out that the few weeks students have to spend in a school giving real lessons to real pupils in the context of work experience are far too little to prepare them for their further work. Additionally since the presentation of the PISA-surveys outcomes there has been a widespread discussion about education and the educational system in Germany also with regard to the question how to improve the arrangement of lessons – an original didactical question.

Nevertheless during their education students are not facing many possibilities to experiment with didactical ideas. Even oral presentations are mostly not expected to be combined with a special didactic setting. Lecturers judge students' talks in the most cases only with regard to the content's quality not considering the manner of its presentation.

As students are facing a lack of room for gaining experiences in didactical settings, our project's general intention is to create an area in the virtual world of Second Life where these experiences are possible. In detail we are planning to create a virtual building with several rooms in it – comparable to a school building with different classrooms. As Second Life gives the opportunity to create buildings, rooms and objects freely each classroom will be designed in a different way thus supporting different didactical settings and ideas not only through the teacher's behaviour but also through the arrangement of the room and the furniture.

Main objectives

There are several objectives we want to achieve with the implementation of a teacher training lab into Second Life. The first – and already above described – achievement is the possibility for students to test didactical settings and ideas while other students are playing the roles of virtual pupils. The advantage of using Second Life in this context is that students are not restricted only to their presentational manner. In our virtual classrooms they will be able to create the whole room and even all furniture and other objects inside in a way that those will support their didactical approach. For example they can rebuild a classical classroom and teach in classical manners or in a total different way they can try out constructivist ideas and create a room according to the claims of this didactical theory. Furthermore it is also possible to create rooms and areas which are unfeasible in reality e.g. teachers and pupils can sit on clouds instead of chairs or hang from the ceiling. It will be an interesting question to let students experience the consequences of such settings. Students will also face the possibility to play the role of pupils themselves and therefore be able to experience lessons from a different point of view.

The method of role-playing is not a new aspect in the scientific discussion about higher education. Bremer reports her experiences by utilising role-playing elements in online courses and tutorials for students of economics. Her findings show that although students needed some time for familiarisation they played their roles concentrated and disciplined and later judged this experience as motivating and a contribution for their success in learning (Bremer 2005 und 2001). In this context we have to allude to the fact that Bremer studied role-playing in chats and not in 3-D virtual worlds. Here, where users interact with visible avatars, we expect the motivating effect to be even higher. The research work of Dickey and Dede et al. strengthens our opinion, too. They examined the use of virtual worlds for education in different contexts. Their findings display the fostering effects on motivation and learning (Dickey 2005 and Dede et al. 2005).

Preliminary conclusions

Actually the teacher training lab in Second Life is a project in the state of its beginning. Even we have only begun to explore Second Life and all its possibilities. The next step in our research work will lead to the development of a feasibility study. To succeed in creating a teacher training lab in Second Lab for our students we have to identify aspects that will foster and those that will hinder the realisation of our idea and also find ways to resolve the problems and obtain our major goal: creating an environment in a virtual world where students can try out ideas and settings and transfer their findings into reality.

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MATHEMATICS EDUCATION IN SECOND LIFE

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Introduction

In this paper we consider various ways to use virtual realities, such as Second Life, in mathematics education at the tertiary level. Virtual realities carry the potential to address the social problems associated with virtual learning. Students studying online courses using their computers lack social interaction with their fellow students. If they attend virtual classes as avatars, they can, at least, see other avatars, and talk to them between classes. This has enormous potential and is likely to play an instrumental role in e-education. These remarks apply, naturally, to any discipline, and almost everything that we express below applies generally to all virtual learning in Second Life.

While it is rather clear how this setting may help train students in real life pretend situations (Michael Begg, 2005), it is not as clear how it can be used to enhance learning of abstract subjects such as mathematics. Therefore it is also necessary to take a critical stand and to try to answer the question whether such environments support new features which may contribute effectively to better learning in comparison with the tools which are used conventionally and for which we already have developed legacy educational materials. Any new technological development considered as educational tool ought to be backward compatible with the technologies that are already in use since producing technology enhanced courseware is very costly.

There are several virtual realities platforms, most notably a new open source effort called OpenSimulator (<http://www.opensimulator.org/>) devoted to developing a functioning virtual worlds server platform capable of supporting multiple clients and servers in a heterogeneous grid structure. Second Life (ref) is a privately developed virtual reality that has received a lot of media attention because of investments by large corporations like IBM, ABN-AMRO, Intel and by government institutions like a Swedish Embassy and several national parties. The education community has also been looking into SL and conferences and surveys aim to establish it as a platform for teaching and distance learning (Second Life Best Practices in Education: Teaching, Learning, and Research 2007 International Conference, 2007). Its main contribution to distance learning programs is the provision of an enriched social environment where the familiar discussion forums and chat-rooms become actual 3D inhabited spaces in which both textual and voice communication is possible. The virtual learning environment Moodle is presently being “contaminated” by Second Life in the mixed learning environment Sloodle (Sloodle) (Kemp) which will automatically create a 3D classroom in Second Life populated with the resources that are stored in any of the Moodle classes and each tool is recreated as an interactive or a metaphorical object. There are, however, limitations in the type of media that can be used within Second Life. Foremost the commonly used HTML pages currently cannot be browsed directly and other formats commonly used to distribute lecture notes and slides, such as pdf and PowerPoint, need to be converted to images and uploaded at a cost.

A different view is offered by looking at the history. The first browser, Gopher (1991) allowed the link of text files to other text files. Gopher offered one dimensional browsing. Mosaic, a two dimensional browser, was released only two years later, and Gopher experienced an almost sudden death. Gopher is still supported by some servers, but for all practical purposes, Gopher is dead already.

Second Life is a three dimensional browser. It has the same potential power to render two dimensional browsing obsolete as what Mosaic had over Gopher. This has not happened yet, however, mostly because Second Life requires new computers with powerful graphics capabilities. A large part of computers used to access the internet cannot be used to run Second Life. It is interesting to see how long it will take until two dimensional browsing follows the way of Gopher.

Mathematics in Second Life

Searching for mathematics in Second Life yields surprisingly - or possibly not surprisingly at all - very few locations dealing with mathematical subjects. Public Institutions offering support in mathematics are very few, one is Warwick University Maths Department (Kirriemuir, 2007) that has its own island.

Exhibits are a popular initial approach to developing in Second Life. They are relatively easy to setup and the results are remarkable. As an experiment, we have replicated, in Second Life, the Lars Ahlfors Exhibit that took place for the centennial celebration of the first Fields medallist. The exact same electronic resources were used for the posters that hang at the University of Helsinki and for those that were shown in the Millenium Tower on EdTech Island, see **Error! Reference source not found.**



Figure 1 Lars Ahlfors Exhibition in Second Life

We have also created an office and exhibit space for the JEM, Joining Educational Mathematics, thematic network where we held a mixed reality seminar: speakers were presenting to the audience live in the auditorium and their avatar was simultaneously speaking to attendees gathered in the JEM office in Second Life as shown in . The major technical difficulty was synchronizing the display of slides on the virtual board with those projected in the auditorium. Slides of the presentations, converted to images, had to be uploaded to the virtual board before the meeting and were updated synchronously by an “assistant” avatar while the voice was directly streamed.



Figure 2 Mixed reality JEM seminar

A good starting point for searching learning resources in Second Life is the SaLamander wiki (SaLamander wiki), which to date lists only 4 locations with mathematical content: a gallery of fractal art and one of mathematical sculptures, a hypercube, and the math playground¹. This last place is specifically geared to exploring how 3D virtual environments can enhance children's understanding of K-12 basic mathematics concepts.

Learning Mathematics in Virtual Realities

A virtual reality environment such as Second Life can be viewed as a powerful simulation framework providing primitives that students may use to create 3D objects. By carrying out any kind of construction or scripting activity, a user experiences concepts such as translation, rotation, scalar transformations, and as a result, learns about vector calculus. By interacting with other avatars in the economy of buying and selling items, a student can practice the kind of financial mathematics that is needed in day to day life, including computing discount percentages, and checking the money transactions on one's own budget. These are learning outcomes which are a by-product of becoming active in the virtual platform itself. However, it is also possible to create specific learning activities, within Second Life, that promote mathematics learning.

Educational Gaming

EduFrag (EduFrag: Educational Gaming) employs a modification of Unreal Tournament, a popular first-person shooter video game, to setup a maze whose doors opens only if the student answers to a question in a quiz correctly. Quiz questions, chemical reactions or statements are posted on doors within maps. Correct answers lead to further exploration of map. Incorrect answers lead to starting over in a study room. A quiz is composed of multiple maps or rooms interconnected by teleporters. Each map is a single room (a decision point) with 4 doors, one door for each choice in the multiple choice questions. One of the doors bears a correct statement and leads to the next room. Three other doors are incorrect and lead to a study room, or to the beginning room in the maze. There can be more "doors" that have no associated teleporters and lead to study rooms with material that should be helpful to the student.

This model is not hard to adopt in a virtual reality world such as Second Life and work to do so is in progress.²

Even though EduFrag has been used to teach chemistry (Bradley & Lucci), the same kind of tests is ubiquitous also in mathematics. At the University of Helsinki, we have developed a large collection of interactive exercises that can be delivered online by systems for automated testing and assessment such as MapleTA. At present it is very difficult to make these exercises available to avatars in Second Life without the support of in-world browsing since the architecture for computer-supported testing and assessment is strongly based on web technologies. An additional problem is the issue of input and display of mathematics: a picture of a formula is a poor representation of the mathematical object since it cannot be manipulated by computational software nor understood by a search engine. To overcome these limitations, which most likely will be removed with time, we have designed a mixed approach game to take place partly online in a conventional web browser and partly in the virtual world. In the JEM sample treasure hunt (Caprotti) each instruction is handed out only upon the correct completion of a practice exercise (selected from our collection). Completing the whole assignment produces the entire collection of instructions which contain the directions for the scavenger hunt in Second Life.

Experiential Learning

Experiential learning is "learn by doing" and by reflecting on the experimental activities which in mathematics may include hands-on laboratories and practice sessions.

The experiential learning cycle of (Kolb, 1975): concrete experience, observation and reflection, formation of abstract concepts and testing in new situation is crucial in mathematics: the process of analysing some object, making a conjecture about it and proving an assertion about some property of the object is what a

¹ <http://slurl.com/secondlife/Eduisland%20II/27/90/22>

² <http://slurl.com/secondlife/Eduisland%20II/191/188/22>

mathematician is trained to do. For certain abstract objects, a virtual reality may offer a concrete and immediate way of visualizing a model for the objects in which the avatar can move, and experience in a very vivid fashion for instance the geometry as in **Error! Reference source not found.** Exploration can be guided by additionally providing a notecard with a number of questions and pointers to where to learn more. Ideally, the interested student will go on to attempt the construction of other regular polytopes to further the understanding. Furthermore, all these activities can be carried out in groups or alone.

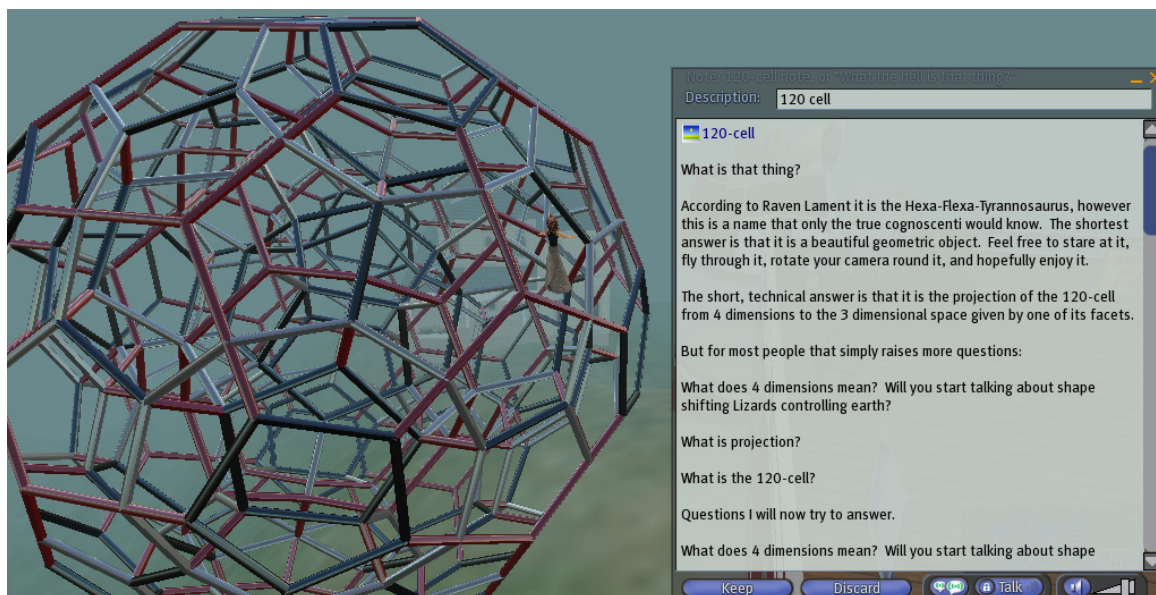


Figure 3 Dodecaplex with avatar flying inside

Concluding Remarks

The power of three dimensional browsing enables the users of systems like Second Life to develop educational games in all disciplines. This is important for all initiatives in e-learning. This is also the way the current students, digital natives, have learnt to get a big part of their information. YouTube rules for most teenagers today. We have to acknowledge that and take-up the opportunity offered by emerging technology. Virtual realities offer also concrete ways to visibly recognize students' achievements. They can brag to their friends by showing off their medals or other rewards they have obtained for good performance. We, the developers of e-learning content and services, on the other hand, can also brag, to our peers, about our solutions to virtual learning. There is a nice promise of rewards to everybody concerned.

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THE LEARNING DESIGN PARADIGM, WEB 2.0, AND THE BRAINHONEY PLATFORM

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Introduction

Technology continues to empower new interactions and engagement in the everyday lives of students, so it makes sense that their expectations in learning environments are also changing (Oblinger & Oblinger, 2005). Today's younger students have never known life without digital devices. This "Net Generation" of digital natives has been trained not only to text message, surf, and stream, but to multi-task these activities. This group comes with an entirely new set of aptitudes, attitudes, expectations, and learning styles that require a fresh learning model decidedly different from the traditional classroom that trained existing faculty and administrators. The mismatch between traditional learning models and net generation learning needs was evidenced in the 2006 High School Survey of Student Engagement (Yazzie-Mintz, 2006). In this survey of 81,499 students in 110 schools within 26 different states, 50% of high school students said that they are bored in classes every day, and 17% were bored in every class. The majority of students, 75%, responded that the material was not interesting. The second most commonly selected reason (39%) for lack of interest was, "the material wasn't relevant to me" (Yazzie-Mintz, 2006).

The instructional model that most directly addresses student apathy is engaging students to be a part of the teaching process, often called "learning by teaching." Andersen Consulting found that learning by teaching others was 90% effective, compared to traditional lectures (learning by listening) which were found to be only 5% effective. The Wingspread Group (1993) observed:

There is a growing body of knowledge about learning and the implications of that knowledge for teaching. What is known, however, is rarely applied by individual teachers, much less in concert by entire faculties. We know that teaching is more than lecturing. We know that active engagement in learning is more productive than passive listening. We know that experiential learning can be even more so. We know we should evaluate institutional performance against student outcomes. We know all of this but appear unable to act on it. It is time to explore the reason for our failure to act. (p. 14)

The Wingspread Group (1993) concluded that effective education goes beyond lecturing and that the role of teachers will gradually change away from lecturing toward facilitation of meaningful experiences. Effective online learning platforms provide one tool that can provide an environment that encourages these meaningful learning experiences to occur (Rogers, Flores, Matthews, 2007).

This paper outlines some of the theoretical background and project description regarding the creation of such an online platform, BrainHoney, which allows for dynamic and engaging informal and formal learning experiences.

Literature Review

Flexibility and Customization

If we were to characterize the emerging era in two terms, they would be flexibility and customization. Flexibility and customization are being noticed in almost every area of human endeavor – at least where technologies have been implemented. Customers are able to choose among a myriad of products, even utilizing new technologies which involve them in the process of designing their own product. Tapscott and Williams (2006) state "The new generation of digital citizens has the means of creation at their fingertips so that anything that involves information and culture is grist for the mill of self organized production" (p. 285). Dell, as an example of the new trends, used the internet to allow the customers to choose and configure their

own computers prior to purchasing them. This policy has been copied by other computer providers. Other online services and social networking sites (e.g. Facebook, MySpace, del.icio.us, and so on) allow for a great degree of flexibility and customization according to user preferences.

Flexibility and customization is also influencing education. Open source movements, for example, are creating extensive content repositories that are being used for a variety of purposes. Students are better capable of assembling content they want and which fits their particular needs and interests (Hill, 2006). The recognition that flexibility and customization will continue to influence educational efforts is leading organizations to reconfigure their paradigm of teaching, the infrastructure they use, the services they provide, the way in which curriculums are restructured and delivered, and the technologies they will use to reach their students. Flexibility and customization constitute two of the most important element of the paradigm shift in education and understanding how they works will mark the difference between institutions that will move ahead and other that will lag behind.

Hill (2006) asks a question “How might we, the larger educational community, address the concerns raised by educators, learners and researchers in order to improve what we do in online learning environments?” (p. 188). She answers the question without dismissing traditional education but arguing in favor of a more flexible approach to learning. She explores the key features of flexible learning and indicates that flexible learning environments include flexible delivery and flexible learning. Hill (2006) explains:

Flexible delivery focuses on options regarding access for learners: the what, where, and when learning occurs. Flexible delivery is concerned primarily with managing and administering the provision of access, content, delivery style, logistics, and productivity (Smith, 2000; Taylor, 1998). In contrast, flexible learning focuses on options related to how learning occurs; that is, the learning process. The goal is to provide quality learning experiences through consideration of the learner’s personal characteristics, learning styles, work responsibilities, learning needs and desires, and personal circumstances (Nikolova & Collins, 1998; Nunan, George & McCausland, 2000; Smith, 2001).

He also indicates that flexible learning is the product of negotiating what, where, when, why, and how to learn.

A Paradigm Shift

Etienne Wenger (2004) said, “perhaps more than learning itself, it is our conception of learning that needs urgent attention...” (p. 9). Barr and Tagg (1995) suggest that a paradigm shift is taking hold in higher education and see that a renovated mission is “not instruction but rather that of producing learning with every student by whatever means work best” (p. 13). Education and the traditional instructional paradigm imitated in some ways the models of the industrial revolution, mass production and standardization. Schools were designed following the same thinking, the educational system designed as if students were empty vessels where knowledge and content could be poured. On the other hand, the concepts of flexibility and customization consider that learners contribute to building relevant knowledge – a constructivist approach.

In opposition to the traditional “instructional paradigm”, the idea of flexibility and customization might be introduced to facilitate the emergence of a “learning paradigm.” According to Hill (2006), the underlying principles of flexible delivery and flexible learning are: learner centered instruction, facilitation of learning, and negotiation. In learner centered instruction learners make their own decisions or actively participate in the decisions made by their instructors. Facilitation of learning implies primarily a change in the teacher’s role to adopt a guiding role. Negotiation occurs when instructor and students discuss a learning contract and determine roles and responsibilities and ways of interaction.

Flexibility and customization act as the driver to facilitate the paradigm shift from teaching to learning. Barr and Tag (1995) indicate that:

The very purpose of the Instruction Paradigm is to offer courses. In the learning paradigm, on the other hand, a college’s purpose is not to transfer knowledge but to create environments and experiences that bring students to discover and construct knowledge for themselves, to make students members of communities of learners that make discoveries and solve problems. The college aims, in fact to create a series of ever more powerful learning environments.

Barr and Tag (1995) differentiate the mission and purposes of the instruction paradigm and the learning paradigm in this way:

Table 1

The instruction paradigm	The learning paradigm
Produce/deliver instruction	Produce learning
Transfer knowledge from faculty to students	Elicit students discovery and construction of knowledge
Offer courses and programs	Create powerful learning environments
Improve the quality of instruction	Improve the quality of learning
Achieve access for diverse students	Achieve success for diverse students

In contrast to the instructional paradigm, the learning paradigm elicits more student discovery and construction of knowledge. This paradigm is in more agreement with the theories of connectivism (Siemens, 2004), social constructivism (Brown, Collins, & Duguid, 1989; Vygotsky, 1978), and communities of practice (Wenger, 2004).

A Flexing Point: Web 2.0

In the midst of this paradigm shift, we are experiencing a flexing point which affects our perceptions about education. It is clear that not only “something has changed,” but that quite a bit has changed – and that we are traveling through out an inflection curve, the inflection point occurring where the slope of a curve changes sign (e.g. going from negative to positive or vice-versa). One thing greatly influencing that flexing point is the design of a new generation of web tools, popularly categorized by the term “Web 2.0” (O’Reilly, 2005). Web 2.0 tools have revolutionized how users interact with information on the internet – turning the web from a read-only web to a read/write web. Tools such as wikis, blogs, or social bookmarking for example, stimulate an environment that makes participation more active, consuming and creating have become two sides of the same coin. A central idea of web 2.0 tools is that people would collaborate and create virtual points of convergence, virtual spaces that serve as a meeting point for communities of practice.

The reality is that web environments of these social networks are able to empower new ideas, peering, and sharing resources locally and globally (Tapscott & Williams, 2006). According to Kroski (2006) “community is the new consumption. With the emergence of the new Web 2.0 tools, the non-technical person has been given a major voice online.” In many ways, Web 2.0 tools both feed off of and stimulate the concepts of flexibility and customization. The tools of the new Internet give opportunities for collaboration and for constructivist learning, and allow students to become meaningful contributors to the vast body of knowledge that is the [social] internet (Richardson, 2006). Among other things, Web 2.0 re-emphasizes that we need to unlearn the idea that teachers are the sole content experts in the classroom, because (1) students can now be much more engaged in the process of collecting and sharing content, and (2) we can now connect students to people who know far more about almost any content area.

Project Description – The BrainHoney Platform: Online Engagement and Flexibility

BrainHoney, created by Agilix, is a free global virtual platform that utilizes the native rich media environment of the net generation and the “learn by teaching” instructional model to engage student curiosity and motivation. The goal of BrainHoney is to harness the power of social networking to create an open learning community in which participants worldwide can instruct and learn from one another, and in a sense, so every member can say, “I am the teacher.” As researchers, we have been involved from early on in the creation of the BrainHoney concept until its recent launch, and take much of the material for this section from our experience and from the BrainHoney data sheet (available at www.agilix.com).

World Learning Community Concept

BrainHoney features a free and intuitive rich-media authoring tool that enables participants to create and share engaging learning content related to any topic. The community provides a toolset for teachers to share

curriculum with their peers and search for age-appropriate instruction across a wide range of subjects. At the same time, students can use BrainHoney to discover and create instructional content and watch its impact spread across time, topic and geography.

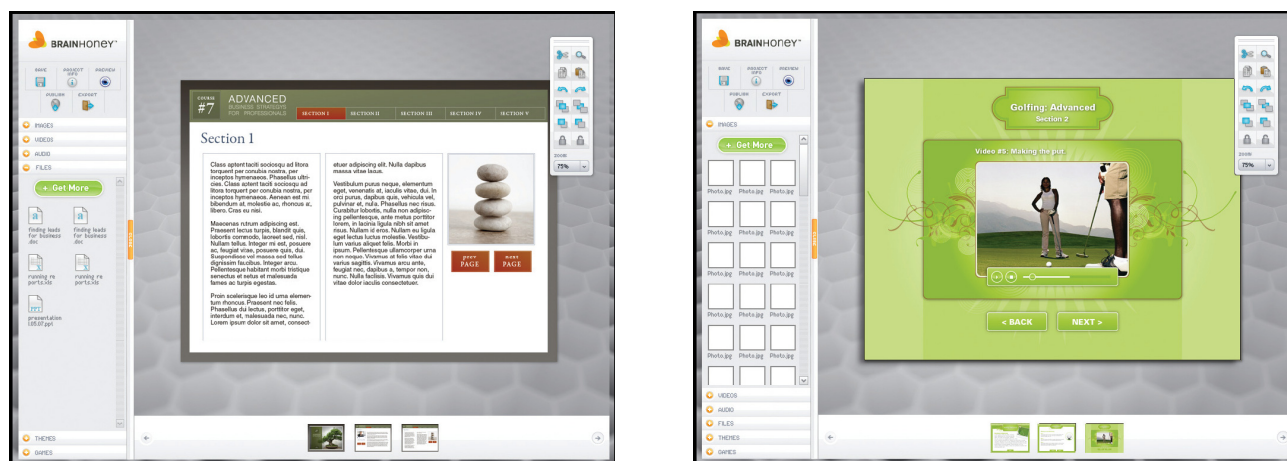


Figure 1 Screen Shots from BrainHoney Platform

BrainHoney is designed to deliver a library which weaves together community generated learning resources from around the world. Members can engage student curiosity, access peer authored teacher development, and create adaptive learning experiences. BrainHoney recognizes that learners are not simply “knowledge receptacles,” but that they have the ability to participate in the creation and/or discovery of what is to be learned. This bottoms-up approach helps motivate students to take ownership over their learning experience and in the process build a repertoire of learning materials for general benefit.

In the past the door to individual classrooms was closed; what happened in one educational setting was hidden from the next. The BrainHoney web service enables transparency of some instructional efforts. It can bring the best available online pedagogy to the surface where everyone can access and improve upon it. It is intended as way to allow education to evolve and improve much more quickly.

The Platform Tools

Participation is made possible by intuitive, easy to use tools, offered as a free online service. There is no software to buy, and ideally, there is no training necessary. Instruction can be quickly built through drag and drop customizable templates. BrainHoney’s user interface is as easy to use as a traditional wiki, blog, or forum, but it goes beyond their traditional functionality (of text with occasional image).

The supplemental materials available at BrainHoney combine rich media learning materials to offer a variety of instructional combinations. Diagrams can be paired with audio explanations. Videos can run side by side with imported presentations and/or HTML commentary. Displaying complementary materials simultaneously can create more effective pedagogy. In addition, rich media formats also allow learners to customize a personally effective learning experience (e.g. if students are audio learners they can select instruction with mp3 files, if they are tactile/kinesthetic learners, they can opt for games and drills).

Community members can import existing learning materials from their hard drive or other popular online content sources, and create their own “mashup”. The BrainHoney tool is equipped to import images, text documents, diagrams, spreadsheets, presentations, audio files, and video learning materials. Once the files have been gathered, assembly of the mini lesson can begin. Members can drag and drop multiple materials into a single template screen. Multiple pages can be sequenced into a single piece of instruction which learners can navigate at will.

BrainHoney includes traditional assessment options as well as interactive games which members can easily generate using lists of keywords and definitions. These games allow learners to drill learning and practice application. Learning is tested and confirmed in an engaging videogame-like environment that ideally will retain interest in addition to giving immediate feedback.

The Community Features

BrainHoney allows individual teachers and learners to access and contribute to a community of educational intelligence. Rather than creating supplemental material from scratch, teachers now have a free professional development resource that they can search and reference as needed. Rating and feedback systems help bring the best available instruction to the top. Instruction takes on a living, growing quality—cross-pollinated by user contributions, weeded and pruned by user feedback. Materials that are more effective and popular naturally become visible and are iterated upon. Materials that are ineffective fall into obscurity and die out. It is a type of natural selection for instruction.

As the community expands, the rating and feedback system will allow members to rate and offer comments on individual learning materials, full lessons, and peer contributors. This means as contributors actively participate in the community, they can also build their reputation as an expert. As the individual gets to know the network, the network also gets to know the individual. Collaborative ratings, rich learning profiles, and assessment performance will allow the network to make sophisticated learning recommendations. Learners can choose from automated suggestions, or choose to manually subscribe to specific authors or topics of interest.

Through community ownership, academic crowds can tag contributions with keywords, classifying information using natural connections and more flexibility than a contrived hierarchy. This folksonomy architecture allows the community to organize like a learner thinks. As the BrainHoney library grows, users will have the ability to sort, filter, and search for topics of interest. Tags, instructional text, and document profiles will all be visible to the BrainHoney search engine.

Speed to instruction becomes increasingly significant when you consider that the information in textbooks is about seven years old by the time the shrink wrap is peeled off by the first student. Today's instructional materials are not only outdated but largely irrelevant in the minds of most students. Instruction must be current and customized to the audience to be meaningful. Collaborative technology can deliver sustainable instructions that rewrite themselves through digital discussion. The task of updating and customizing information can be delegated to the community that consumes it. Because the content is community owned and authored, it is consistently relevant. This has massive implications for emerging countries which have previously relied on instructional imports with no cultural adaptation beyond language translation. Native authoring as well as easy adaptation of existing resources in BrainHoney ensures culturally relevant content for diverse sub-communities.

Users of the Windows Vista operating system can even download a mini-application gadget and receive constant, real time feedback on the spread of their contributions and the rise of popular new instruction, visible on their Windows Vista Sidebar.

Conclusion

This article began with recognition of the mismatch between the “net generation” and the traditional educational models. Several researchers have suggested that a paradigm shift from “instruction design” to “learning design” can assist in envisioning and creating educational environments that have the flexibility and customization that net generation students thrive on. Web 2.0 tools, with the emphasis on sharing and social engagement, have become catalysts in this paradigm shift. BrainHoney represents an example of a Web 2.0 global online learning platform which provides for intuitive creation, sharing and adaptation of learning content – as well as community features which can harness the collective intelligence of users from around the world. A combination of the learning design paradigm and Web 2.0 tools (that make collaborative participation more intuitive) help increase the opportunity for educational experiences to be more relevant and engaging for learners in the 21st century.

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DISTANCE TEACHER'S PROFESSIONAL DEVELOPMENT – WHY, WHAT, AND HOW?

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Why is it so important with teacher professional development in distance learning?

Teaching distance courses is something totally different from teaching in the classroom and the difference is often underestimated. Unfortunately, it is not unusual that teachers start teaching in distance education without having profound knowledge of what distance learning is, without necessary training, and experiences that is needed according to several authors (Dippe & Zackrisson, 2006; Holmberg, 2006). Holmberg writes that a “trial-and-error” behaviour has been in practise and too often, an ordinary campus course is simply moved into the new framework without important and necessary alterations. The result has been “double drop-outs”, i.e. students drop out of badly planned courses and teachers reject working with distance courses without realizing the complexity of the project they have participated in. Dippe and Zackrisson (2006) have studied a teacher training program for un-qualified teachers in Sweden, the SÄL-program, and have found that there are significant differences between campus education and distance education within the program. The authors argue that distance learning within the SÄL-program is based on the conclusion that the competence needed for distance teaching is the same as for teaching campus courses. Hedestig (2002) supports Holmberg’s opinion that teachers too often lack the necessary qualifications for teaching distance courses and that they seldom get professional development within the field and therefore, are reduced to trying to figure out how to manage this new situation on their own. It is only natural that teachers in this situation try to keep to as safe ground as possible, i.e. they tend to choose solutions they are familiar with, e.g. moving the classroom teaching to video conferences.

To be a distance teacher – a new situation

Except for knowledge of the subject and how to plan a course, the distance teacher must also have knowledge about how to produce material, construct learning environment, and how to teach distance courses (Wännman Toresson & Östlund, 2002). The institutions with most experience of distance education therefore have expert teams for development of course material and support functions as librarian, editor, software designer, video producer, project leader etc. (Myringer, 2002). If one of these functions is missing, it means in practice that the distance teacher will have to take one or several of these roles as well. Thach and Murphy (1995) have put together a survey which illustrates the relation between distance teacher role and competence. The overview is based on the result of interviews with 103 experts within distance learning in the USA and in Canada.

Table 1. Teacher role and teacher competence in web based distance learning.
(https://courses.worldcampus.psu.edu/facdev101/content/lesson9/lesson9_02.shtml)

Outputs (Product, service, condition, and/or information resulting from performing role)	Competencies (An area of knowledge or skill critical to production of outputs)
Be clear and well organized	Planning Skills
Plan and prepare before DL class sessions	Instructional Design
Be competent in subject matter	Content Knowledge
Establish learning outcomes/objectives	Modeling of Behavior Skills
Be personable and enthusiastic in teaching	Interpersonal Communication
Provide students with timely feedback	Feedback Skills
Facilitate information presentation	Presentation Skills
Utilize technology in a competent manner	Basic Technology Knowledge
Monitor and evaluate student performance	Evaluation Skills
Collaborate with technical/support staff	Collaboration/Teamwork
Provide a variety of learning activities	Teaching Strategies
Initiate and maintain interactive discussions	Facilitation and Group Process Skills
Know audience learning styles/needs	Needs Assessment
Encourage Peer Learning	Questioning Skills
Advise and counsel students	Learning Style and Theory
Lead instructional design effort	Adult Learning Theory
Introduce student support services	Advising/Counseling
Facilitate guest "experts" at a distance	Support Service Knowledge

Even if some of the issues in the survey above apply to teachers in classroom education as well, the survey still gives a clear picture of the complexity in the distance teacher's work and that special training and continuous professional development is absolutely necessary for teaching at a distance.

What issues should be included in teacher's professional development?

A professional development for distance teachers who have no prior experience of distance courses should cover the following issues:

- Taking the distance student's perspective
- What is special with distance learning? – Formulating a definition
- Course organization and planning
- Choosing and/or producing course materials
- How to write a study guide
- Bridging the distance by using technology
- How to teach distance courses
- How to work with assessment and evaluation

Taking the distance student's perspective

The best way of learning about the distance student's perspective is to be a distance student yourself. During the past four years, I have had the pleasure of teaching two out of six modules in a distance course for future distance teachers organized by the Swedish Institute for Special Needs Education¹. Most of the participants are teachers of special needs education. One physical meeting and a video conference is included in the course, but apart from that the participants really have the opportunity to experience what it is like to be a distance student, which is one of the most important elements of the course. After the first introductory module, the theme of the second module is to take the distance student's perspective. The participants

¹ The Swedish Institute for Special Needs Education is a nationwide authority for coordinating state support for special needs education. The Institute is a resource for people working with children, adolescents and adults with disabilities.

discuss and reflect over what is significant of distance courses from a student's perspective and how they experience what happens in the course etc. as distance students. It is very interesting to follow the amazing development the participants go through and how much better understanding they have for the distance student's situation when they gained their own experiences of what it is like to be a distance student.

What is special with distance learning? – Formulating a definition

In the third module, the development of distance education, from correspondence courses to where we are today, is discussed. With knowledge of the development of distance learning, the participants can critically analyze pedagogical issues and use of technology from a pedagogical perspective. The participants are also asked to come up with their own personal definition of distance learning and discuss that definition with the other participants. At first, they find this assignment very difficult and some of them think it is unnecessary to find a personal definition when there already are so many definitions (Holmberg, 1998, 2006; Keagan, 1986; Paul, 1990; Saba, 2005 etc). However, the participants soon realize that this discussion helps them to consider what distance learning really is, to formulate a personal view of what it means, and to realize the ambiguity of different terms used in connection with distance learning. The participants' understanding of distance learning and its conditions change dramatically during this module. In a research among 803 students in teacher training school shows that: if you are going to work with distance learning successfully, you have to know what distance learning really is (Dippe & Zackrisson, 2006). The authors even claim that a centrally formulated definition that is understood by students and can be applied by teachers is a good start to improve quality in distance learning. Formulating and discussion definitions of distance learning are therefore definitely important components of distance teacher training.

Course organization and planning



The distance teacher's competence and qualifications influence if the teacher dares to try out new ways and ideas, e.g. how many physical meetings the teacher considers necessary to maintain the quality of the course (Wännman Toresson & Östlund, 2002). An evaluation report of distance courses within the Swedish Netuniversity shows that many students find the pedagogy used in the courses insufficient (Almqvist & Westerberg, 2005). The students argue that there are significant shortcomings in the different types of teaching. Several students claim, e.g. that the teachers have used a campus course and simply put the teaching material on the platform without making necessary alterations. According to Toffler (1980 referred to in Saba, 2005) a rather frequent phenomenon is that lectures in campus education are simply moved to the internet, video conference or educational TV, when the course is moved into distance education. For teachers, it is easiest to choose the most comfortable way and the educational form you are most familiar with. Distance teachers with more experience have better knowledge of how to make use of technology and are in other ways more experienced in how to support students (Wännman Toresson & Östlund, 2002). They can also see other alternatives than physical meetings. Dippe and Zackrisson (2006) therefore propose that education organizer must clearly formulate the distance teacher's commission with demands of competence and expectations. All teachers working with distance education have to have distance teacher competence. This professional development has to be recurrent and with progression.

Choosing and/or producing course materials

Finding the right course materials for a distance course can be quite complicated and the limited space here makes it impossible to go deeper into the subject. However, the material used in campus courses are not always suitable for distance learning and sometimes copyright regulations prevent the use of already existing suitable material. To produce own material may therefore be the only solution, but it requires knowledge of how to do it and it takes time. That is the reason why many institutions have special departments who help teachers with course material production. However, distance teachers need knowledge of both critical analyse of course material produced by others and at least later on, training in how to produce their own material.

Writing a study guide

One important part of organizing and planning a distance course is to write a study guide. The study guide should be teaching and compensate for teacher's physical presence, and through the study guide, students get to know about course structure, learning objects, what goals have to be reached in a particular item, how to work with the material, schedule, time for handing in assignments, time frames, examinations, contact information to support functions and teacher, teacher response time etc. (Dippe & Zackrisson, 2006; Myringer & Wigforss, 2003). A well written study guide gives necessary support, creates confidence and serves an important purpose, especially as distance students study mainly by themselves (Dippe & Zackrisson, 2006). Particularly adult students, who often are in the situation that they combine work and studies, are more dependent on having a good overview of the course and a well planned study guide (Kvalitet i IT-stödd distansutbildning, 2003). When students cannot easily find the information needed, it is particularly troublesome for students without previous experience of studies at university level (Almqvist & Westerberg, 2005).

Wännman Toresson (2006) also recommends that the study guide could have the form of contract where obligations of both institution and student are written down, e.g. how often the e-mail should be checked, to keep a continuous contact in the group even if some of the messages are of a more social character, be aware of obligation to preserve secrecy, have some kind of agreement to make comments on others' work and time planning for assignments. The study guide should also give guidelines for communication to support interaction in the course, e.g. some kind of agreement on rules for communication and collaboration to avoid that certain students do not actively take part in the communication, i.e. they solely read messages and do not write their own messages. It is not exclusively the content in the study guide that is important but also how it is written. A nice and friendly tone is important to attract students' attention and interest, the layout should be consistent and the use of symbols for different kinds of actions as a complement to the text facilitates (Dafgård, 2001), e.g.  for reading,  for writing an assignment etc. Another important function of the study guide is that it should motivate students. Normally, writing study guides is not part of education in teacher training school and therefore, it should be a part of professional development for distance teachers.

Bridging the distance by the use of technology

Asynchronous communication² with discussion forums and text chats are frequently used today. Naturally, it is important that teachers get training in how to use these tools from a pedagogical perspective, how to be a moderator, and how to promote interaction, particularly between students since that is the most difficult kind of interaction to accomplish. Not least important is training in using synchronous communication³, since most teachers do not even know what possibilities there are of creating virtual classrooms with direct contact by sound and video. Video conference has been in use for many years, but unfortunately often with poor outcomes. Earlier, the quality of sound and picture was poor. The main problem today is that teachers do not get any or very little training in how to manage that special situation, e.g. how to work with the document camera, handle different camera angles, support lectures with PowerPoint presentations, illustrations, pictures etc. The learning activity has to be adapted to the media and therefore teachers must have knowledge of how to do it if it is going to be successful. For example, if a lecture is to be recorded to streamed video, the teacher must have training in how to perform and present in front of a camera, which is something totally different than lecturing face to face in front of students. Teachers, who are going to teach in virtual environments with sound and video as, e.g. with Interwise ECP⁴, Adobe Connect Professional⁵ or Skype⁶, need to be trained to handle that particular situation.

How to teach distance courses

When the planning phase is over, the important realization of the course remains and that part has only partly been covered by the discussion about distance teacher's different roles, but much remains to be said about how to run a distance course, keep in contact with students, actively plan work with interaction

² Asynchronous communication is independent in time.

³ Synchronous communication is communication at the same time, in real time.

⁴ <http://www.interwise.com/>

⁵ <http://www.adobe.com/products/acrobatconnectpro/>

⁶ <http://www.skype.com/>

between students, avoid drop-outs etc. In this paper the focus has been on the planning phase and one argument for emphasizing the planning phase is the significant difference between distance courses and campus courses that Holmberg emphasizes (1998). In a distance course, the main part of the planning is for the time when teacher and students are *separated* in time and space in contrast to campus courses where the main part of the planning is dedicated to the time teacher and students spend together.

Focus on written communication

The distance teacher's responsibility for creating good requirements for the interaction between students increases in distance learning. The most common way of communication today in distance courses is written communication. In Sweden, as much as 80 % of the teachers considered the communication in distance courses to be mainly written according to a report by Söderström and Westerberg (2005). This has probably several reasons. One cause may be distance education's roots in correspondence courses, another may be that is the easiest way of communication to organize practically and a third reason may be that distance teachers have less experience of communicating with sound and video, an argument that also is supported by the report. The focus on written communication makes teachers' skill in expressing themselves in writing even more important in distance education (Wännman Toresson & Östlund, 2002). Teachers' written communication affects students' way of writing and their activity. The teacher must neither take too much space, nor be too "quiet" and inactive, and a "permitting approach" is important. Since written form lacks some of the complementary information exposed in a physical meeting through facial expressions, body language etc., it is especially important that teachers are very clear in contact with students to avoid misunderstandings.

How to work with assessment and evaluation

There are a lot of special considerations related to assessment in distance education and only a few aspects will be mentioned here. One issue is how to know that it is the "right" student who performs the test at a distance. Another issue is pedagogical aspects of automatically corrected tests that are related to what kind of knowledge is being tested, what kinds of questions that can be used, and limitations of what can be corrected automatically without problems. It is especially important to continuously evaluate new forms of education to avoid that is too late to correct mistakes and make improvements. Both assessment and evaluation is therefore important parts of teacher's professional development.

Conclusion

In this paper, only some of many existing arguments have been covered concerning *why* it is important with professional development for distance teachers. The three main aspects of *what* should be included are: *planning* (material, study guide, and technology), *teaching* and *evaluating*. In order to succeed, good knowledge of distance learning is required and planning and organizing have to emphasize the distance student's perspective. Regarding the *how* aspect, there is only one way of getting the necessary knowledge that a distance teacher needs concerning what it is like to study at a distance: that is to be a distance student! The best solution would be to include distance education in teacher training school, at least a basic education, followed by regularly professional development in the form of distance courses, e.g. material production could be one issue to emphasize later on. Distance learning is increasing rapidly and often classroom education "borrows" methods from distance learning and therefore, professional development in distance education is absolutely necessary to avoid more "trial-and error" behaviour and to improve quality in distance learning.

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EVALUATION OF UNIVERSITY E-LEARNING COURSES BASED ON DATA MINING METHODS

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Abstract

Nowadays as more and more university courses and corporate trainings are held at least partly in electronic learning environment, the usability of e-learning systems becomes a crucial question. Although the principles of software ergonomics can be adapted to learning management systems (LMS) as well, not only the user interface influences the usability, but the structure of the curricula plays an important role too. To evaluate the success of these systems questionnaires and usability test are widely used, but they can tell us only what the users can tell us.

In our research we implement web usage mining as a good tool for uncovering those parts of the user activities that cannot be told by the user personally. This method is widely used nowadays on commercial websites to identify the key customers and to raise the effectiveness of web shops. These aspects can be translated to the field of learning management systems as well. With the analysis of collected web server log files we can track users' actions and by identifying typical student behaviour and matching these data with the given grades, successful learning strategies can be identified. Our first results show that qualitative and quantitative approach should be used parallel and with the help of data mining methods we can reveal more insights about the quality and usability of e-learning systems as we could before.

Introduction

The BME Department of Ergonomics and Psychology has started its first e-learning course in 2003 in the field of industrial properties. Previously we had experience in a distance learning course for more than 5 years, but due to the fast change of curricula it was a hard task to keep up-to-date the hard copy of learning materials. In the meantime there was a growing demand for electronically supporting courses. Based on our previous experience we have chosen the blended-learning form as it is a good mixture of the flexibility of electronic materials and the direct help of real-life classes. However the number of classes was reduced, the remaining ones are more intensive and practicable. Instead of the previous frontal lectures, these occasions are much more based on the dialogue between the teacher and students.

On the other hand we knew that it was not enough to ask the students about their course experiences as they will tell us only that we ask from them and they remember to. We also needed "hard" data that can reveal more about the students' behaviour and we have found it in the form of log files of web servers. Based on these log files we started to analyze the users' actions with the help of data mining software and we have identified those variables that can refer to the interaction of users with the system. (Gaudioso-Talavera, 2006)

In the following we will outline the concept of data mining in usability assessment and will give some aspect of evaluating e-learning systems. Based on the aspects we will show some preliminary results about the assessment of our e-learning courses.

Data mining – Web usage mining

For a successful product development process we always need input from the end-users. We would also like to evaluate how satisfied are they with the product and how are they performing the planned tasks with the product. This usability principle can be implemented to e-learning systems and courses as well. For product

evaluation, we use different forms of usability tests and according to Hom (1998) these can be divided in the following categories:

- Inquiry: Methods with user's participation in natural conditions.
- Inspection: Methods based on experts knowledge and experience. They try to estimate the user's behaviour without participating users.
- Testing: Methods used in controlled environment with user participation.
- Related Techniques: other methods used for usability evaluation such as card sorting or prototyping.

In the case of a website or an e-learning system we are in a fortunate situation that we already have collected data from user activities in the form of log files. These log files can be either on the web server (like access logs in Apache) or in the database that serves the website. The real value of these data is that the user interacts with the system in normal usage situation and it is accurately logged. This method is similar to video recording during usability testing with tangible products. We have a long footage of user activity, but the majority of the recording is worthless, a long analyzing process is needed. We do the same with log files, it is like mining for gold in tons of rock. (Zaïane-Han, 2001)

The method of web mining can be divided into three main categories. (Kosala-Blockeel, 2000; Liu, 2007) Web content mining is about discovering useful information on web content, web structure mining identifies the sometimes hidden topology of Web by categorizing and comparing websites. The third field is web usage mining where the users's activity is in focus. We analyse among others the frequency, recency, length and sequence of user visits. This method was used first to assess commercial websites, but recently it is adapted to any type of electronic system.

There are commercial data mining softwares that can be used for log file analysis like SPSS Clementine with the WebMining for Clementine extension. Although these systems have some built-in analysing methods, they are made for commercial websites therefore we have to customize them for e-learning systems. We should also mention that the majority of learning management systems have some kind of user tracking module that show generally the frequency of user logins and the access number of course material, but they can't do deeper analysis like cross-correlations or clustering.

The following table shows some differences between the important questions of commercial and higher education websites.

Table 1: Data mining questions in the private sector and their higher education equivalents (Luan, 2004)

Private sector questions	Higher education equivalents
Who are my most profitable customers?	Which students are taking the most credit hours?
Who are my repeat Web site visitors?	Which students are most likely to return for more classes?
Who are my loyal customers?	Who are the "persisters" at my university/college?
Who is likely to increase his/her purchases?	Which alumni are likely to make larger donations?
Which customers are likely to defect to competitors?	What types of courses will attract more students?

Based on our own experience we can add one more important difference. Whereas we have little chance to know personally the visitors of a commercial website, in case of higher education e-learning systems we have much more opportunity to get a more exact idea about the needs and motivation of our users. In the recent stage of our research it seems that solely the web log data is not enough to have a clear idea about the users' motive due to many reasons. For this reason we keep an eye on the e-mail and forum messages that are sent to the course coordinator during the semester. Furthermore we ask our students at the end of semester to fill a questionnaire about their course experiences and we try to match the quantitative and qualitative data.

Quality aspects of e-learning courses

In order to evaluate e-learning systems we have to know what are the important characteristics of such courses. There are several ways to categorize these aspects, here we use the distinction of the eLSE (e-Learning Systematic Evaluation) methodology (Ardito et al., 2006) that is based on ISO 9241 standard.

Efficiency

The dimension of efficiency can be interpreted in many respects. First of all, we should consider the economical efficiency of generating and supporting e-courses. Nowadays more and more university courses and corporate trainings are held at least partly in electronic learning environment. Their content is prepared in specialized software and they might run in exclusively e-learning hardware environment. It is often necessary to have a resort to the help of a content building expert. These elements can raise the cost of preparing our course, but on the other hand we save the price of printed materials. We can also mention that using of electronic distance learning system saves time and money – as it is not necessary for participants to gather together at the same time in the same place.

We can interpret efficiency from the students' aspect as well. They feel that an e-learning system efficient when they found that it provides all the necessary information needed for the preparation to the exams.

Effectiveness

In an electronic learning environment, we can observe different attitudes compared to a traditional course. Students have the opportunity to use different communicational channels to discuss a topic with the teacher or other students. Teachers must consider the effects of using the electronic learning environment – we all use different strategies when learning from a book or using a computer or multimedia content. Asking the users we have discovered that effectiveness is highly influenced by the tutor's (teacher's) attitude, rational division of the content and the design of user interface.

Satisfaction

Students will like the course, or use the course materials many times if they are satisfied with the rate of the time and “energy” they have invested and the utility of knowledge they have acquired. Usually we have experienced two aspects of satisfaction – one, when the user was satisfied with the learning system (LMS), and the other when he liked the curricula.

Surveying our users' satisfaction by using questionnaires we have noted that students prefer simple, well-arranged surfaces and brief contents over verbose and over-animated ones.

User satisfaction highly depends on how personalized the system is. We can achieve high level of personalization if we monitor the previous activities and give relevant feedback to it. For instance a user could receive a message to read a chapter of the given materials, because those users, who have read that, received a better grade. A more typical user behaviour is that they leave the learning to the last days before exam. A personalized system can send a message to a lazy student well before the test to visit the learning management system in order to prepare for the exam in time. These personalized messages are based on the recorded log data.

Application of data-mining methods for evaluating e-learning courses

As we have mentioned earlier there is correspondence between web usage mining in commercial and e-learning websites. The five main goals of data mining can be interpreted in evaluating e-learning systems. (Zaiane-Han, 2001)

1. Association - looking for patterns where one event is connected to another event
2. Sequence or path analysis - looking for patterns where one event leads to another later event
3. Classification – Differentiation of events or users in predefined categories.

4. Clustering – grouping users or events without previous knowledge of categories
5. Forecasting - discovering patterns in data that can lead to reasonable predictions about the future

As we can see the above mentioned methods are getting more and more complex as we are stepping downwards on the list. Clustering and forecasting are often based on genetic algorithms or neural networks therefore deeper research is needed to identify them.

We have translated these questions to e-learning systems:

- When do the student log in?
- How many times and how often do they download learning material and solve tests?
- How much time do they spend in the system on each activity?
- Which are the most frequently accessed materials?
- Where do they start studying? At which point do they leave the system?
- Is there any typical sequence of learning among the students?
- Is there any connection between activity and results?
- How active the tutors are?
- How often do they use communication channels? (Chat, forum, e-mail)
- How can we match the data mining results with the answers given in questionnaires?

In the following due to the restriction of space we show two examples of successful usage of log file analysis. It was done on MySQL database files provided by the Moodle LMS that hosted this course.

Analysing usage frequency of learning materials

The analysis of usage frequency of different learning materials is a relatively easy, yet powerful tool to answer pedagogical and usability questions. The authors of learning materials has an idea about the importance and difficulty of each chapters therefore the frequency data can tell them whether the students have used the system according to the plans or not. The extraordinary low or high value can show us if the students were not interested in or had difficulties accessing the files.

In our practice we had an experience, when frequency analysis revealed a usability problem. For one of our courses we have prepared test questions in each chapter for self-checking. The speciality of these questions was that the final exam is partly based on the questions that can be seen in the exercises so the student are highly motivated to solve as many questions as they can. As we had a glimpse on the data there was an extraordinary high number of test completions for one of the chapters. The analysis showed that the course coordinator has set accidentally a 15 minutes time-limit for test-completion which was far too short to solve all of 50 questions. Therefore the students accessed the test again and again to see more and more questions.

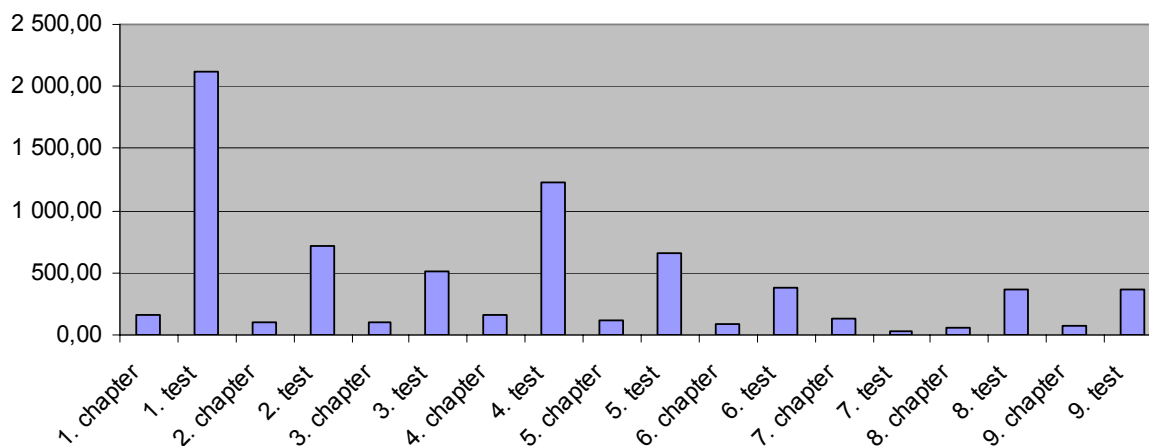


Figure 1: Access frequency of chapters and related tests. Values of Test 1 is extraordinary high.

Association analysis of user activities and grades

To identify successful studying behaviour we have checked whether the number of learning material access and test completion is in any connection with the grades given at the end of semesters. Our hypothesis was that the more the students read and the more the test they fill, the better grades will be given. To answer this question we have correlated the average number of chapter access and average test completion with the semester-end scores.

The results of this analysis only partly verified our hypothesis. There was a significant connection between test completion and the score (Spearman's rho was 0.613, significant at 0,000 level!) but there was only a weak and not significant connection with the number of learning material access. These results showed us, that those students were more successful on the exams, which completed more test questions. However we have to be careful about the conclusion. This only shows us, that the successful students received better grades, but it doesn't guarantee that they have gathered a permanent knowledge. They might have prepared themselves just for the exam, but didn't remember on the answers a week later. This leads us to the field of examination which is out of the scope of this paper.

Conclusion, further steps

We have just started to utilize the capabilities of data mining in e-learning, but the above mentioned preliminary results showed us, that we have a powerful tool that can help us to evaluate e-learning systems and identify typical user behaviour. With the web usage data we will be able to have more information about the usability and effectiveness of e-learning systems and it helps us to improve the courses that are running on the World Wide Web.

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TEACHER COMPETENCE AS EVALUATED BY STUDENTS OF TOURISM AND HOSPITALITY PROGRAMMES

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Abstract

This paper is developed as insight into one of the tasks of the author's doctoral programme, and it discovers the variety of opinions of observers about the competence. The paper is based on two separate research projects. In 2006 tourism specialists and managers of tourism enterprises were interviewed and in 2007 students were surveyed. The data obtained complements the theoretical data studied by the author. The author would like to emphasise that the notion of competence regardless of its frequent use, is being interpreted in a variety of ways. The point under discussion is what kind of competences do teachers need when involved in preparing tourism specialists. The conclusions will indicate that the enterprises expect different kind of competent employee than the students expect. The conclusions will discover what according to students is a competent teacher, what is most important in the work of lecturer and in their attitude towards students.

Introduction

The turn of the century has brought substantial changes in Latvian economy. Effective use of resources, creative attitude, and competent action has become the basis of successful operations of any branch. In the environment of increasing competition huge role is played by the quality of work delivered by the personnel, and that is influenced by many factors, including the competence of the staff. Even though educational industry differs in many aspects from other industries still much of the mentioned refers to them, too. The author has worked in a private educational institution while studying at a state educational institution and this experience allows comparing and seeing differences in work organisation, planning of material and human resources. The time of changes has left impact on the thinking of individuals and their values. For those involved in teaching it is important to ensure professional competence. Research on the competence of college teachers of Latvia is one of the main interests and doctoral dissertation topics of the author. This paper will focus on the first year student of The School of Business Administration Turība and their perception of competent teachers. It has been interesting to observe how very differently scientific literature talks about the competence, how students talk about it and what managers of leading tourism enterprises talk about it.

The aim of the paper is to establish the outlook of tourism and hospitality programme students on the competences of their teachers. To achieve this goal the students were surveyed as to what would motivate them to study hard and to learn the skills necessary for their chosen profession. In the course of the research theoretical literature was studied, as well as empirical methods used: interviews and surveys. To illustrate the findings graphical diagrams were constructed.

Materials and Methods

The basis of the paper is analysis of literature sources using monographic method. Author uses scientific papers and literature on the topics of competence published at the end of the twentieth century and the beginning of the twenty first century. The practical part establishes the outlook of students – first year students in tourism and hospitality programmes – about the criteria of teachers' competences. This group of respondents consists of 259 students aged from 18 to 21, most of them are full time (day) students, 4% of respondents were older than 21, among them also part-time (evening) students. More than 60% of respondents are coming from Riga and other big towns, the rest are coming from small towns and countryside. The research was done in May 2007 in The School of Business Administration Turība. Every student received a handout prepared by the author that listed 50 possible criteria for the competences of a college teacher (lecturer). The task of the student was to select eight the most relevant criteria and to give a brief explanation for their choice. In the next stage of the research the students had to work in groups of 5 to

8, discussing their choices and together selecting 4 the most relevant criteria. At the end of the project student had to present their findings and to point out 3 most relevant criteria. The author gathered all sets of criteria that each student group presented as the most relevant and important. The author noted the interesting fact that the criteria were similar to those that the tourism enterprises list as competencies for employees of tourism business according to research carried out in 2006 interviewing 52 managers of tourism enterprises. The goal of this previous research was to establish the expectations of tourism industry for the graduates of schools of tourism and hospitality.

Results and Discussion

Variety of interpretations of the notion 'competence'

The notion of competence in the Reference Dictionary of Educational Terms (2001) is defined as the necessary knowledge, professional experience, insight into a certain field, question, and skills to apply this knowledge in certain actions. One's competence is judged by surrounding people, colleagues, partners, society. Svence (2003) thinks that teacher's activities are influenced by three factors: competence, resources, motivation. Maslo (2006) quotes the theory of German scientist Ergl about eight competencies necessary to integrate oneself into society: self-competence, social competence, value competence, responsibility competence, survival and self-sustainment competence, innovative competence, culture competence and nature competence. Danish researcher Jergensen P.S. discerns three aspects of competence: qualification, activity and personality aspects. He emphasises necessity to develop professional competence of college teachers, as well as the competence to change and social competence. Even though the professional is the basis, one also needs to be able to change when circumstances require, to cope with social situations that an individual has to encounter.

Competences develop successfully by developing responsibility, flexibility and communication skills, so states Aizsila (2007). Responsibility is capacity to take consequences for one's actions, to be able to foresee the results and consequences of ones actions. Flexibility involves ability to change oneself. The skills of communication can be defined as ability to be understood and to understand others. It is important to realise necessity to raise one's competence in all these areas. Similar idea is expressed by Maslo (2006), who stresses that requirements are constantly changing as the society itself change constantly. Contemporary individuals need motivation to develop their competence. Wilson (2001) classifies competence according the three areas of human activities: personal (communication skills and tolerance), professional-technological, intercultural (international experience, language skills). Renard (2001) emphasises that 30% of the knowledge that teachers need to teach in the next ten years is not yet discovered therefore he advises to return to the basic competences that teach *how to act* to turn knowledge into actions. He emphasises learning skills, IT user skills, tolerance and empathy. To establish competencies necessary for tourism specialists Sala (2004) has analysed professional standards in Professional Standards Register and Professions Directory of Republic of Latvia. According to those, tourism specialist of 5th level needs: cognitive competence (ability to use theoretical knowledge in practice), professional-technological competence, personal and intercultural competence.

Personnel competence criteria according to students and managers

As indicated in theoretical basis, professional competence can be evaluated from different points of view, moreover, different groups of observers can arrive to different evaluations. For example, a college teacher who has received esteemed scientific degree, has high regard from the management of the institution, is not necessarily always so well acclaimed by students. The research has not confirmed the claim that students value higher teachers that have less demands for them.

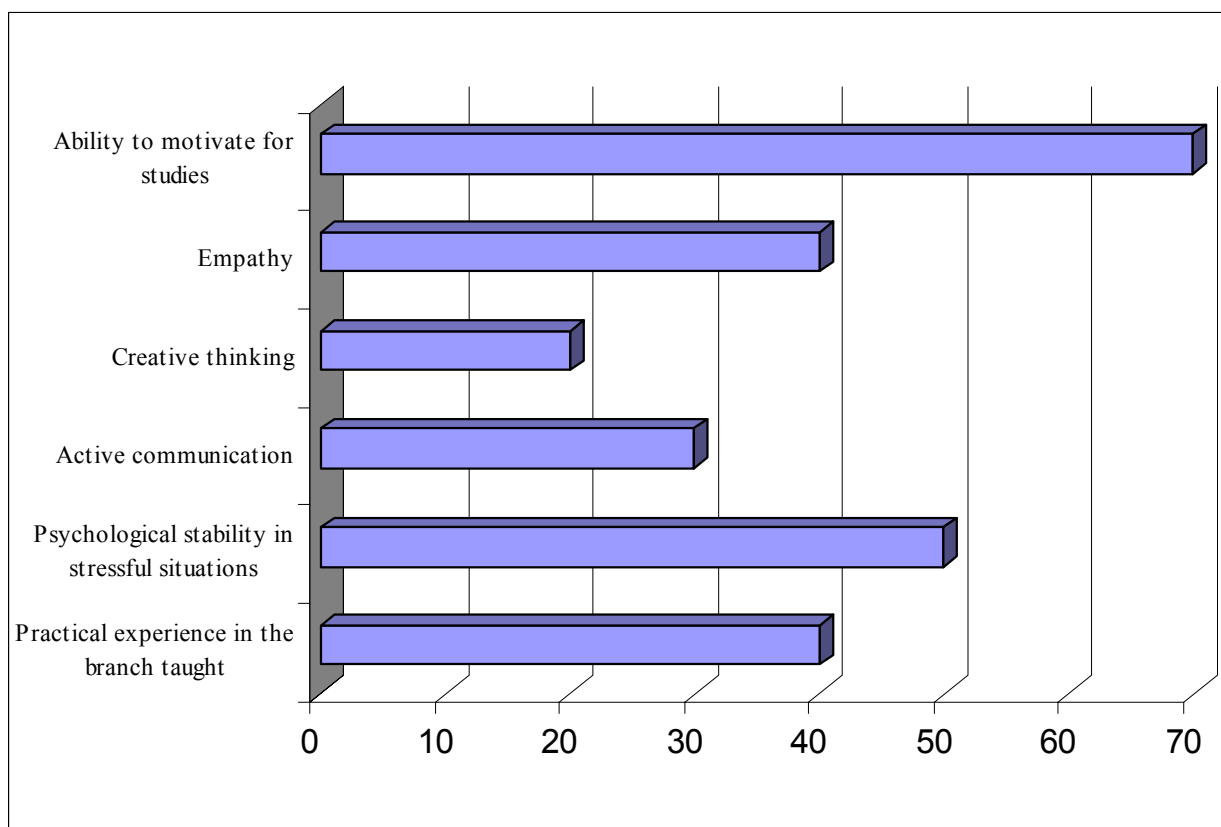


Figure 1: Characteristics of professionally competent college teachers (frequency of mentioned criteria in percentage)

The diagram gives visual illustration of the opinion of first year student about a professionally competent teacher. The management of educational institutions would do well to take into account students' opinion expressed here when recruiting academic staff and developing motivation schemes for them.

For comparison the author offers the second diagram that describes the opinion of managers of tourism enterprises about the skills and abilities for successful employees in tourism enterprises.

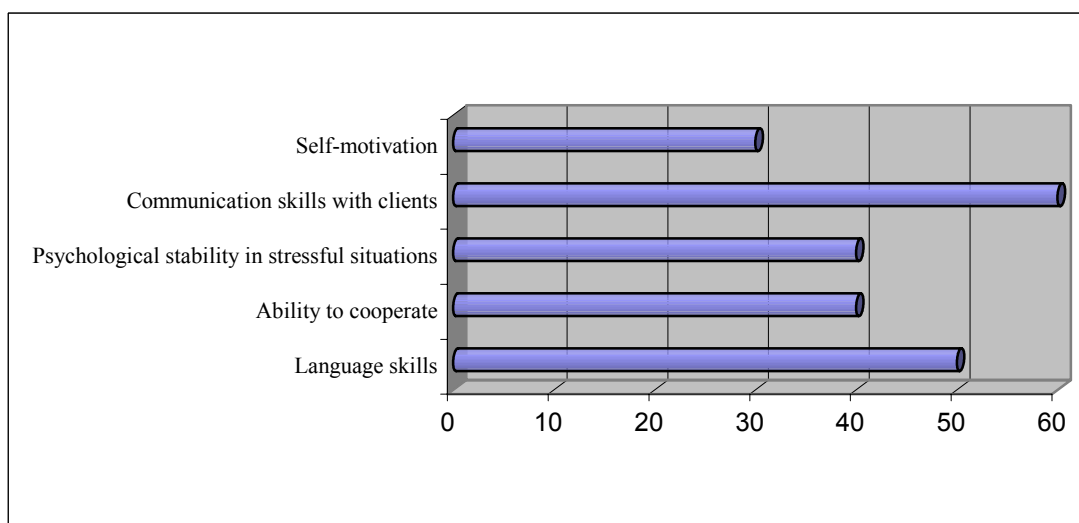


Figure 2: Most important competences for tourism specialists

AS can be seen from the diagrams, several competence factors overlap regardless of the fact that data was gathered from two different research projects, from two different groups of respondents.

Conclusions

There are no universal criteria for evaluating professional competence of college teachers.

The quality of college teachers is influenced firstly by inner and external motivation; professional competence and availability of resources is less important.

The management of educational institutions pay main attention to the presence of formal educational level – professional competence, while students value higher social competence.

The students emphasised that the most important competence of the college teacher is their ability to motivate them for studies. This response dominates 70% of answers.

It is still to be researched whether the students expect the teacher to motivate them for the particular subject they teach or for their whole study period (and even preparation for career) in general

For teacher and tourism professional alike it is necessary to be able to stay calm in stressful situations. 40% of respondents in both surveys indicated this competence as vital.

30% of respondents indicated that teachers need excellent communication skills. It is important to maintain the quality of communication with both – students and colleagues alike.

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THE USE OF WEB-BASED SYNCHRONOUS COLLABORATION TOOLS FOR THE TEACHING OF SOFT SKILLS

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For more than a decade, engineers, computer scientists and others working in the hard sciences have been utilizing Web-based real-time online collaboration tools to share knowledge and skills without needing to be located at the same physical place. However, the use of such tools is still rather rare in the case of trainers teaching softer skills. In this paper we will discuss how some of the techniques used with success in the course of individual coaching and group distance training courses with locally and remotely located U.N. staff have contributed greatly to the effectiveness of our trainees' learning process.

Initial Pilot – Distance End-User Training in Office Automation Software (Paradox™ 9)

In the spring of 2004 we were asked to provide a group of individuals at the European Headquarters of the United Nations Office in Geneva, Switzerland, with end-user training in the referential database program, Paradox™ 9. After spending some time searching for a competent locally based trainer, it became evident that such a person simply was unavailable, and so we widened the scope of our search to the international level. After some time, we finally found a person with the right profile in Cape Cod, Massachusetts; however, as a trainer/developer in the middle of several major projects at the time, it was impossible for him to come to Geneva for the week necessary to train a group of five trainees. Moreover, being quite busy with their normal office workload, the trainees themselves expressed a certain reticence to being forced to remain away from their offices for an entire week.

For several years I had been experimenting, on both a personal and professional basis, with a wide range of synchronous ISDN- and Internet-based online collaboration tools—everything from Cornell University's black-and-white CU-SeeMe to White Pine Software's commercial version thereof, to Microsoft NetMeeting™, to Intel ProShare 500™, to Learnlinc™ by Mentergy—and when asked what solution we could propose to the question of how to get the five persons trained, I put forward the idea of using Learnlinc™ to link the trainer sitting in his home on Cape Cod with the five trainees sitting together in the U.N. training facility. As the trainer/developer needed to have at least half of his workday free to deal with clients and local trainees and our trainees needed to have half of their workday free to deal with their normal office workload, it was decided that we would hold the courses between 2 and 5:30 p.m., Geneva time—i.e., 8 to 11:30 a.m. Boston time—five days per week over a period of two workweeks.

As the trainer in the U.S. was unfamiliar with how to use a synchronous collaboration tool, it was necessary, first of all, to train him in the use of the product. As funds did not permit my traveling to the U.S. to train the trainer in the use of Learnlinc, it was decided that we would use the Learnlinc™ itself to distance train him. Thus, during the course of six or seven real-time online training sessions between Geneva and Cape Cod, the trainer was brought up to speed in the use of the system. And by the time he began the course he felt more or less at home with the product's various features (application sharing, real-time text chat, transfer of the floor to individual participants requesting this, creating multiple-choice questions on the fly, remote control of a user's mouse and keyboard in order to walk them through a particular procedure, using a real-time trainee survey tool to obtain information instantaneously about the pace of the course, whether or not trainees had understood the explanation of a topic, etc.).

As the tool's VoIP (Voice-over-IP) feature was found, for various reasons—mainly network load on our site, but sometimes generalized Internet congestion as well—to be inadequate, we decided to use a traditional telephone connected to an amplifier and high-quality speakers to create the illusion of a physical trainer's being present on site. To further reinforce the illusion, it was decided to include a digital photo of the trainer and to project his remote screen throughout the ten days of training using a data projector on a large wall-mounted movie screen at the far end of the training room. This is what the trainees present in that room saw on a screen approximately 1.5 by 2.25 meters in size during their sessions:

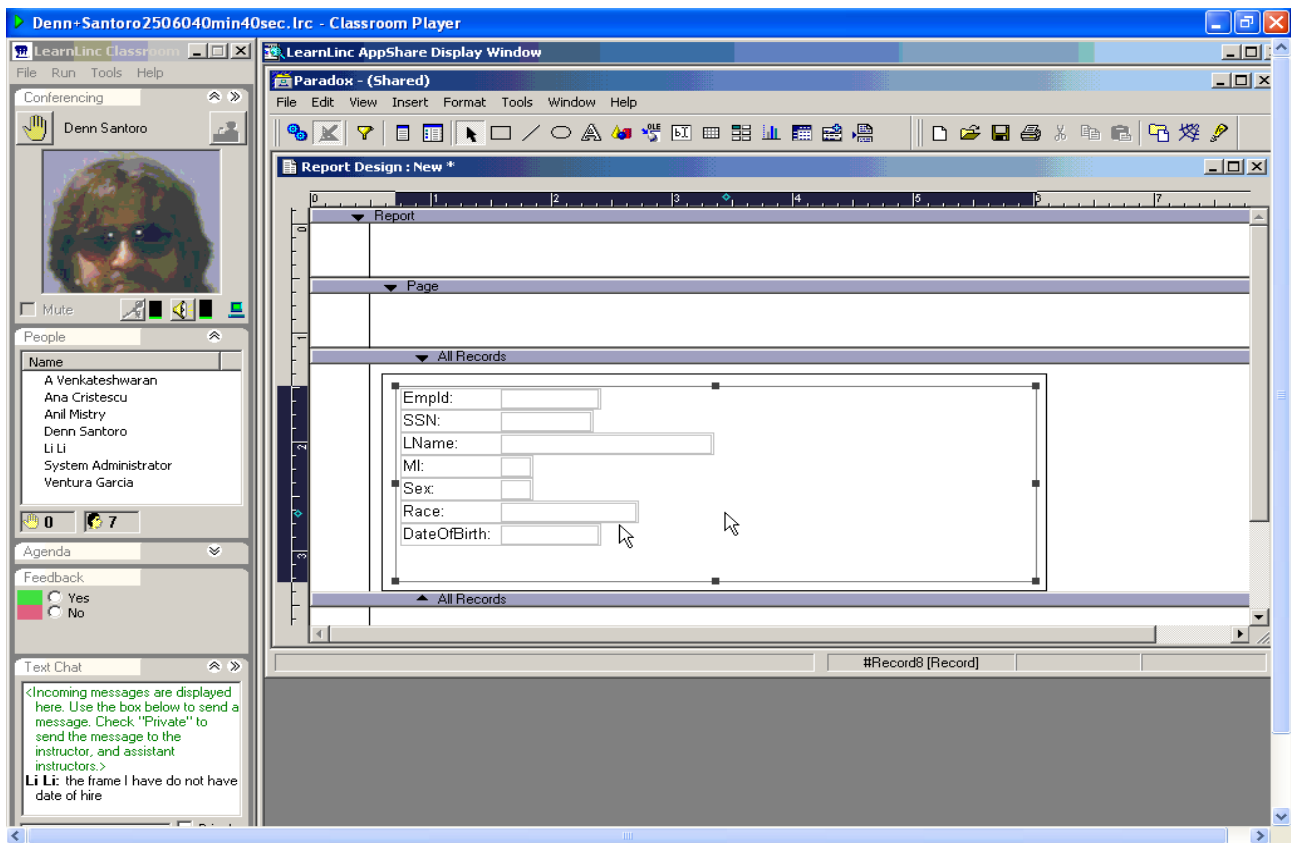


Figure 1

In the left central pane of the screen we see the names of the five trainees sitting at their individual workstations. (The sixth name, that of System Administrator, is my workstation; I will speak more about the important of my presence in the room during the training sessions in a moment.) Of course, the trainees *could* have been sitting at their workstations in their individual offices, but this would have meant: 1) additional work for our team of very busy computer technicians; and 2) training the trainees in the use of the VoIP feature at an extra familiarization session. Moreover, as this was the first time we had experimented with this form of training, it was decided that the best approach was to group all five trainees together in one room. Another advantage of this approach was that it enabled the more able trainees to assist the less able ones when necessary without interrupting the smooth flow of the course. In the lower left pane of the screen shown above, we see a text-based chat comment by one of the trainees, informing the trainer that she is missing some data she should see on her local version of Paradox™. On the central portion of the screen, the trainees see the shared version of the trainer's version of the software and areas he can point to electronically using either the normal Microsoft mouse pointer or a large blue pointer incorporated into the synchronous collaboration product. (In general, only the small pointer was used, since, when magnified and projected onto the movie screen it was sufficiently visible and far easier to use than the large in-built electronic pointer.)

At the outset of the course, trainees were told that if they should have any questions of general interest to the group they should feel free to move out of their seats and walk up to the amplified telephone console to pose these to the trainer. But as most trainees were wary of getting out of their seats and walking up to the front of the room, picking up the amplified telephone receiver and posing what might be considered by certain peers to be a basic, or even silly, question, they soon started using the private chat feature of Learnlinc™ as their preferred channel of communication, trusting the trainer to treat their questions discretely. (Indeed, whenever he felt a question might be of interest to the entire group, he would introduce his explanation with the words: "Someone in the group just asked me a very interesting question....")

After sitting in on the first session as a passive observer, it was decided, in consultation with the trainer, that to improve the effectiveness of the training, it would be useful to have present in the training room a moderator/assistant completely outside the group, who could help individuals having problems following the trainer's explanations without obliging a member of it to take time out of his/her exercises to help their

colleagues. It was I who fulfilled this role, and the presence in the room of this moderator/assistant, serving as a human interface between local and remote sites, with continuous direct contact—by text chat, land line or cell phone—to the trainer contributed greatly to enhancing the flow of the course. As trainees had their own individual versions of Paradox™ 9 running on their workstations, it would have been difficult for the trainer to devote sufficient attention to each person who might encounter a problem; one of my major tasks was to troubleshoot such problems, contacting the trainer by text chat or phone to explain the “situation on the ground” whenever I was unable to resolve the problem myself.

Applying a Synchronous Online Training Approach to the Language Training (Administrative/Report Writing)

Trainee feedback following the end of ten half-days of training was quite encouraging, and after a series of two more courses of the same type, it was felt that we might be able to use the same synchronous distance training approach with our Administrative/Report Writing courses. Initially, we piloted this idea with staff serving in Geneva; but subsequently we soon expanded our activities to include staff working in the field: initially for Following the success of a pilot course in Geneva involving both one-on-one coaching and a series of virtual group seminars, it was decided to expand our activities to include U.N. staff based in Kunduz, Afghanistan (UNAMA (United Nations Assistance Mission to Afghanistan)) as well as in Kathmandu, Pokhara and Biratnagar, Nepal (OHCHR-Nepal (Office of the High Commissioner for Human Rights, Nepal)). The only difference being that while in the case of Geneva-based staff it was possible to use our United Nations Office at Geneva Audio Conferencing System to deliver the training, in the case of trainees located at remote duty stations we had to replace the POTS-based audio conferencing with Skype™ for audio—which meant that we were now automatically limited as to the number of online trainees who could participate in a given session.¹

Lessons Learned

During the course of the past three years we have learned much about what works and what doesn't when it comes to synchronous online training. First of all, it is only when there is a *real need* for such a training approach that it can work. Synchronous collaboration tools should not be a technology looking for an application to prove its usefulness, but, rather, a technology capable of providing a solution to certain specific training needs in certain specific situations. This was the case in our initial pilot training course in Paradox™, for which we had no other alternative for training our clients. Second, it is essential to start with a group of manageable size. One-on-one coaching is probably the easiest way to start insofar as the trainer can far more easily adjust his/her pace to the needs of a single trainee rather than to an audience with inhomogeneous skill levels. Initially, we failed to take this into consideration, and it was quite difficult for the distance trainer, who himself was new to using Learnline™ in a real-life classroom situation, to adjust his pace to the varied levels and abilities of the participants. (This was one of the reasons for its being so important to have a moderator/assistant present in the room throughout course.) Third, it is essential to have access to competent computer technicians on both the local and remote training sites, as well as to the network manager(s)—especially important in the case of trainers/trainees whose computers are connected to the Internet from behind a firewall. Having good relations with the network manager(s) is also essential should a training department ever decide that it was more cost effective to host the actual synchronous collaboration software on its own server, since it is the former who is generally responsible for deciding which ports he/she agrees to open on the company's/institution's firewall. Fourth, given the uncontrollable nature of network load within an institution and, at times, on the Internet as a whole, it is essential to maintain a reliable backup communication channels, both for data sharing and audio. We have found that the simplest way of doing this in the context of our writing course, for example, is to always have a hard copy or electronic copy of the student's work at hand and a landline or cell phone at both the local and remote sites that can be used during the rare times when the VoIP (audio) and/or synchronous collaboration tools (data sharing) happen to fall over, which in our experience occurs approximately 5 to 10% of the time. The disadvantage of using a cell phone, apart from the problem of trying to hold it to one's ear and enter data on

¹ i.e., five, including the trainer. Which turned out to be an ideal number, as anything over that number we found in during our Geneva pilot to be very difficult to manage.

the keyboard at the same time, is, of course, cost. The problem of using an electronic or hard copy for online coaching in writing skills is that the trainer is unable to verify that the trainee has, in fact, understood and made the right changes to a word or passage being discussed. (Certainly the main advantage of using the synchronous collaboration tool for data sharing is that the trainer can instantaneously bring the trainee who might have misunderstood an explanation or suggestion back on track.) Fifth, in the case of trainees working from their desk inside a company or institution, it is essential to inform their boss and colleagues that, despite appearances, what they are engaged in while sitting at their workstation with a pair of headphones on and talking into a microphone is, in fact, serious work. This is especially important in today's world, when certain employees might use the same set-up to talk with friends or family during work time using Skype™, Microsoft Messenger™ or a similar tool.

Advanced Techniques for Enhancing the Learning Experience

Given the fact that both the trainer and trainee(s) are not located in the same physical place, it is essential for the former to try and bridge the distance barrier separating them. We have found that one way to help break down this barrier is for the trainer to pay such close attention to what is going on on the shared document that it creates the comforting illusion of his/her being right there next to the trainee(s). Of course, this requires a great deal of concentration on the part of the trainer, and after twenty or thirty minutes of staring at the computer screen it can be quite exhausting. But in terms of reinforcing the psychological bond between the persons sitting at the two sites it is definitely worth it. Moreover, while it might sound somewhat puerile at first glance, the illusion of proximity can also be enhanced by the trainer's engaging in an activity such as audibly sipping his/her coffee, munching on potato chips (or, better, on a more healthful mixture of nuts). Such background noise tends to lead to questions on the part of the trainee about what the trainer is doing and help strengthen the psychological link between the two. Asking questions about other background sounds—honking car horns, thunderclaps, shouting in a hallway, etc—can also serve to strengthen the bond between trainer and trainee(s). For example, often when working with our trainees in Nepal, we will hear the shouts of a demonstration in the streets. Rather than considering this as a mere distraction, as in a traditional classroom training course, we sometimes use it as a take-off point for a discussion of the current socio-political situation in the country. This not only gives the trainer a better sense of the political situation reflected in many of the documents produced by the trainees, but it also strengthens the psychological bond between trainer and trainee(s), giving the former the impression that he/she is actually there on the ground. Indeed, I have found that after an entire trimester of working with my trainees we will often continue our relationship via e-mail, and on more than one occasion we have met for a real-world lunch or dinner during a conference or training session of theirs in Geneva. Even more important than in a traditional classroom environment, a good dose of humor is especially important in the case of real-time distance training. And it is often surprising, and comforting, to discover that a remote trainee whose cultural background is supposed to be quite different from the one's own will often belly laugh about exactly the same things the trainer finds funny. Finally, since Skype™ or the in-built VoIP feature of Leanline™ is sometimes less than 100% perfect, we have found it important for the trainer to repeat a comment several times before it is understood. Here, for example, is a typical trainer/trainee exchange:

- *Trainer*: “OK, Joshi, now why do you think I highlighted in yellow the sentence: 'The OHCHR representative is trying to make an appointment to visit the prisoners for the past several weeks.'?”
- *Trainee*: “I didn't catch all of what you said. Skype is acting up again this morning.”
- *Trainer*: “Sorry, I said: “Why do you think I highlighted the words 'is trying' in your sentence?””
- *Trainee*: “Highlighted *what*?”
- *Trainer*: “Is trying....”
- *Trainee*: “Ah.OK.... The connection really is bad today. Hmm. Let me think....”

Obviously, even a half hour or more of this sort of communication can be quite frustrating for the trainer and trainee. And fortunately it is a rather rare occurrence. But even when this sort of thing happens, the output in terms of a session's pedagogical effectiveness is still worth the extra input needed to get the message across.

Again, audio quality tends to be less than satisfactory around 5-10% of the time. However, at times it is so poor that even repetition is not enough. At such times the trainer must resort to typing in comments in the

form of text chat. Although laborious, the possibility of resorting to this feature of Skype™ or Learnlinc™ means the difference between continuing a session—though with much considerably greater effort—and having to simply call it off.

This can be done either within the text chat box incorporated in the synchronous collaboration tool itself or within Skype™²

Use of Synchronous Collaboration Tools with Participants Located at Different Geographic Locations

Thus far, we have discussed a one-to-many scenario in which the trainer is located at one geographic location and the trainees are grouped together at a single remote location; we shall now turn to a scenario in which the latter are not grouped together, but, rather, are located at a various different locations within a building, city, a region or anywhere in the world.

Here is an example of what my screen might look like during the course of a typical one-to-many group writing seminar, for example:

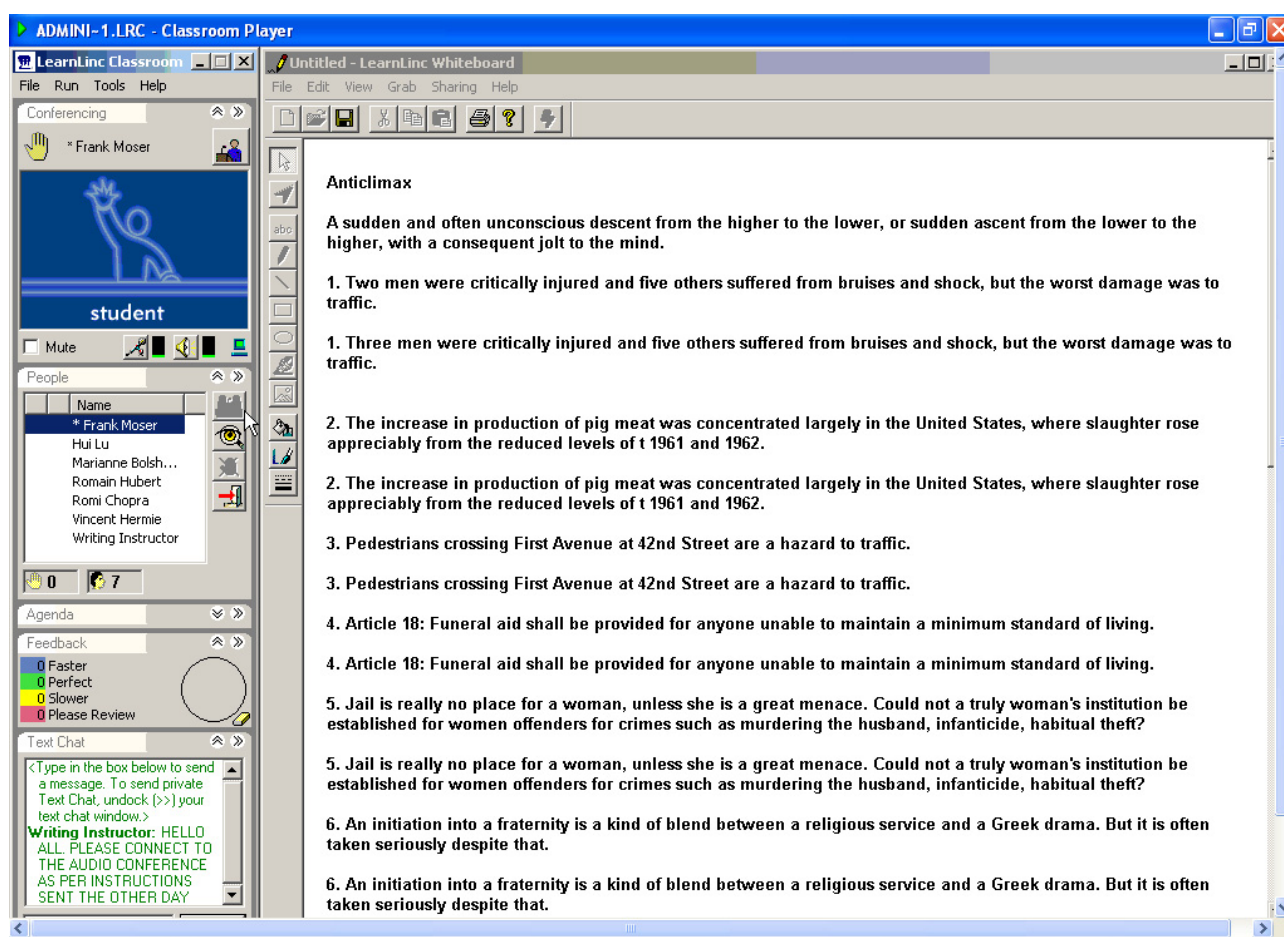


Figure 2

² The advantage of using Skype™ for this is that each time the trainer wishes to point something out to trainees, the latter are sent a signal in the form of a flashing rectangle on the task bar—this, even if Skype™ should be minimized. Which is not the case with the text chat facility built into Learnlinc™, for example.

As we can see in the small pane in the left center of the above image, here there are six trainees logged on to the synchronous collaboration system. A message in green in the lower left pane informs all trainees entering the virtual classroom that they are to connect to the audio conferencing system, following instructions they have received by e-mail several days prior to the event. In case of any technical difficulties, obviously once the student has logged on to the synchronous collaboration tool he/she can make contact via text chat with the trainer for assistance. Of course, the teaching approach used here is simply the modern electronic version of what has gone on in a real-world classroom for centuries, with the trainer eliciting input from one student after the other to improve a sentence written on a physical blackboard or whiteboard. The main differences between a real-world scenario and a virtual one is that: 1) participants are allowed to actually modify the sentence; 2) their classmates can intervene and modify those modifications in real time; and 3) the entire session can be recorded and sent in the form of an e-mail attachment to all participants following the end of the seminar. Obviously, the virtual online teaching scenario has significant advantages over a real-world one; however, if it is to be effective, even more than in the real-world scenario, it is important that the trainer make a constant effort to draw everyone—including, no, especially, the more reserved members of the group—into the discussion and that he/she be sure to compliment trainees verbally or via text chat on any useful suggestions made. The simple fact of there being a running voice or text chat commentary present throughout the sessions does much to break down the distance barrier and humanize what some participants might initially consider to be a next-best form of training—which is far from the case.

In this paper I have tried to share some of the lessons learned during the past few years of implementing synchronous distance training with trainees in Geneva, Afghanistan and Nepal so as to help those just starting out in this area to avoid some of the pitfalls inherent in this new training approach. The subjects covered are by no means exhaustive. And we are constantly learning ourselves. But as the trimesters go by, we are beginning to feel increasingly comfortable with this method of course delivery in the context of our distance learning program and will undoubtedly be expanding its use to other areas in the years to come.

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TRAINING OF VIRTUAL TRAINING PERSONNEL

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Abstract

One of the most rewarding experiences in education is the training of future training personnel. At the Polytechnical University of Valencia (UPV), and especially from the Centre for Continuing Education (CCE) we aim to invigorate the university community, offering innovative and quality Permanent Learning services to promote the development of our socioeconomic environment. Hence, one of the challenges that particularly concern us due to its direct implications in society is how to train teachers at our schools of today and for the future in the new teaching of technologies and the various technical approaches using virtual environments.

After years of experience in online teaching, we are proud to emphasize the agreement between the UPV and the Valencian Government for the training of 200 future e-learning **tutors**. This agreement takes place as a result of the legal obligation to annually train 3,000 career civil servants or newly entrants in the educational sector in the field of risks-at-work.

Consequently, an “Online Course Production and Teaching” course was developed, stressing the four paramount areas of online training: pedagogical area, social area, organizational area, and technical area. Their objective was to boost skills within the virtual teaching environment and to promote technical and teaching procedures in the management, design, production and the teaching of an online course using the CCE-designed platform. The course took place in three centers, one in each of the three provinces that make up the Valencian Autonomous Community during a period of three months.

One of the compelling features of the course consisted on the development of simulation roleplaying, where a real **online course** is temporarily adjusted to group dynamics: the different participants adopted different roles to develop the key aspects of Tutoring and Mentoring from different perspectives. Empathy and the understanding of the different roles were given priority, allowing the acceptance of different attitudes from other participants and solving the conflicts that were generated. These dynamics allowed us to analyze the key points for a person to develop tutor skills, improving the motivation of the agents implied in e-learning and thus making the learning exercise a success.

Once roleplaying finalized, the participants began a debate and drew conclusions, of which we highlight: e-learning must be considered as a tool in the hands of training personnel and tutors, and not a tool for the student to learn; tutors must personalize the learning as much as possible; the use of intercommunication tools in an online course is paramount to mitigate the feeling of loneliness inherent to studying an online course.

Introduction

Training is one of the key elements in the growth of a modern company. One of the most rewarding experiences in education is the training of future training personnel.

At the Polytechnical University of Valencia (UPV), and especially from the Centre for Continuing Education (CCE) we aim to invigorate the university community, offering innovative and quality Permanent Learning services to promote the development of our socioeconomic environment.

The generalized use of the new information and communication technologies has allowed the opening of online training to the economic and social sectors in developed countries. The Centre for Continuing Education at the Polytechnical University of Valencia has been offering this type of training since 1996, developing related activities in both course and distance learning.

Through different innovation projects and agreements with other organizations, the UPV has been able to co-produce and undertake online training. Progress has been immense, and we have certified over 10,000 students. This has contributed to higher professional qualification levels - students, institutions and companies benefiting from the effort.

One of the challenges that concern us particularly due to its direct implications in society is how to train teachers at our schools of today and for the future in the new teaching technologies and technical approaches using virtual environments

The UPV boasts a specifically-designed tool called BUDDHA, designed by the CCE for the creation and management of learning contents within an online platform. Contents can be virtual courses or communities. This tool is extremely useful: it creates contents in a fast and agile manner, as text or as images or videos. It is developed in Java and contents are exportable in Scorm format (Sharable Content Object Reference Model), the standard management system for managing structured learning objects.

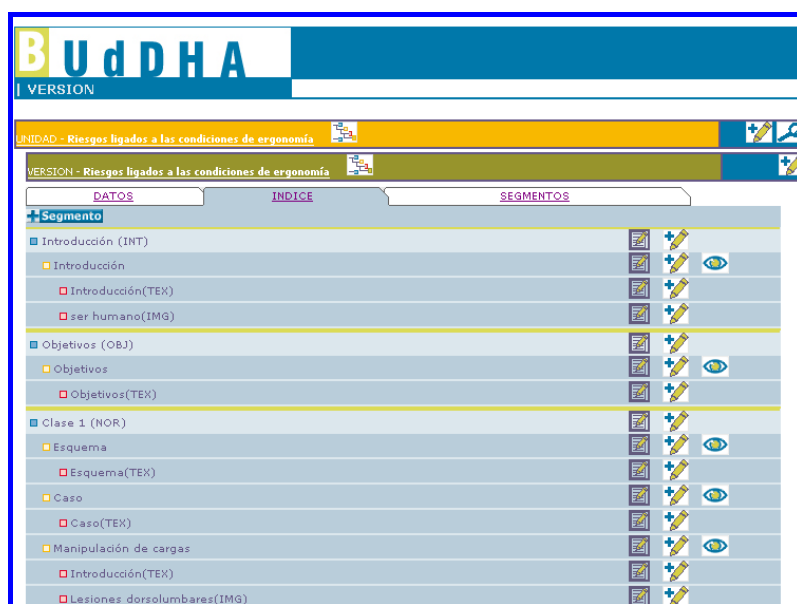


Figure 1 Buddha tool at work

The **virtual management online platform** displays a list of learning materials. Course management and teaching takes place here through Poseidon, a contents management database.



Figure 2 Virtual communities platform

A little history

With the birth of the first computer communication systems, some educationalists (Harasim, 1990) proposed a new learning domain: the so-called *online* education, that combined some of the traditional distance learning features (originally, by correspondence) with the intense communicative interaction that takes place in the actual training. Their core hypothesis was that the new media, especially computer networks, could enrich remarkably the interaction between teachers and students and among the students themselves; it could also make an “industrial process”like education , for example, more flexible and more personal in its distant learning modeand allow the introduction of previously unheard-of learning strategies due to mass media availability.

With regards to the teaching phase of the online training process, we will focus our paper in the development of the **tutoring/facilitation** functions which are essential for the good operation of the course and to mitigate the feeling of isolation (one of the paramount reasons for leaving the course). In this process, we find three **personal profile types** that develop different roles:

Tutor: The person in charge of resolving all queries, of providing solutions to academic problems, the facilitator, guide, adviser, motivator and chair of all discussions among students.

Mentor: The person in charge of supervising and tracking student progress (if they get on the course, if they visit the different web resources, etc.). It is also the person in charge of organizing physical meetings at the beginning of the course to inform students and to provide passwords and resources, as well as to solve potential non-academic issues.

Computer technician: It is the person in charge of resolving all technical problems that arise during the training period.

In this methodology, the figure of the TUTOR becomes essential, since the tutor’s behaviour during the course is an essential factor to ensure that a technology-oriented learning environment favours the student. In a virtual environment, quality, variety and interaction dynamics, as well as the enthusiasm and the consecration of the tutor, besides the design presentation and accessibility of the course, are paramount to retain students and to make them feel part of a learning environment (Chaupt, J.M, Vitalia Corredor, M y Marín Muñoz, G, 1998)

We must therefore consider a series of questions: What abilities must the tutor have? What characteristics does the person need to work in virtual environments?

It is not our intention to make restrictive statements. However, our answer is based on our experience in distant learning, and consequently we consider that the tutor must concentrate on four basic areas (Berge and Collins, 1995)

- **Teaching area:** The tutor is a facilitator to all the knowledge directly or indirectly comprised in the course. To this end, he/she must design dynamic teaching mechanisms, in accordance with the flexibility provided by the technology.
- **Social area:** The tutor has to create a friendly environment in the virtual classroom, has to encourage group cohesion and help students to work together in a common project.
- **Organizational area:** The tutor must prepare the course syllabus and, above all, the different interactions tutor-students, student-student, student-other experts.
- **Technical area:** The tutor must encourage technology transparency for students to focus their attention on the course, as they cannot let themselves be distracted by the potential hardware complications nor training programs.

Training of virtual training personnel. Role-playing

After years of experience in online teaching, we are proud to announce the agreement between the UPV and the Valencian Government for the training of 200 future e-learning **tutors**. This agreement takes place as a result of the legal obligation to annually train 3,000 career civil servants or newly entrants in the educational sector in the field of risks-at-work.

The agreement was reached as a result of the Valencian Government's effort to have all career civil servants or newly entrants trained in the prevention of risks-at-work, as stipulated by the Risks-At-Work Act 31/1995 dated 8th November (Official Gazette no. 269 dated 10th November), which establishes a series of general obligations for the employer who must offer protection:

“To guarantee that each worker receives sufficient and suitable theoretical and practical training, in prevention, both at the time of his/her hiring... and when changes in his job functions take place”.(article19).

Order dated 18th June, 2002 by the Culture and Education Department (*Conselleria de Cultura y Educación*) by which the structure of the Service of Risks-At-Work Prevention in the Teaching Sector (DOGV No. 4.293, dated 16-07-2002), establishes in article 8 that

“the Directorate General for Education Innovation and Planning and Linguistic Policy will be in charge of programming, executing and appraising a training plan in the field of risk prevention for teaching staff”.

The plan will be applicable during academic years 2006/2007 and 2008/2009 and includes the training programs of almost 3000 career civil servants or new entrants that are required every year.

The Polytechnic University of Valencia agreed with Culture, Education and Sports Department the preparation of the risk-at-work course, helping, the experts in the field at a pedagogical level and more importantly, the **training of the personnel that would tutor this course for future career civil servants**.

For the training of the tutors, the course “**Production and Teaching of online courses**” was developed. 20 school hours were planned in three teaching centres located in the Valencian Community.

The primary target of the course was that the addressees of the training needed skills and were able to apply technical and teaching procedures in the management, design, production and teaching of an online course via the platform.

After the training, the student was able:

- To identify the general aspects of remote training by Internet.
- To understand the theories and pedagogical models used by CCE.
- To analyze the key points in adult training.
- To use and to evaluate the minimum elements that compose an online course.
- To handle the technological tools that the management platform offers (Poseidón) and the production and teaching platform (Buddha).
- To create a teaching unit as a production example.
- To evaluate the most common errors in the production of a course.
- To differentiate the roles in course tutoring .
- To assess simulated teaching situations, adopting the different roles therein.
- To draft a good practices manual for use in tutoring-mentoring.

One of the compelling features of the course consisted on the development of simulation roleplaying (i.e. a real situation). The different participants adopted different roles that developed the key aspects of Tutoring and Mentoring from different profiles. The intention was to adopt the roles of the agents implied in the development of an online course, working the empathy and understanding of the different roles and allowing the acceptance of the different attitudes from the others and solving the conflicts that are generated.

Two groups of 7 people took place in the workshop. Several people played the roles of the different types of students, four people were tutors and one was the mentor of the course. Course dynamics were based in the Poseidon course management platform. A training unit based on David Kolb's learning model was used. **Communication tools** were e-mail, the platform's forum and the notice board (static communication tool that allows to the tutor and the mentor to notify students).

Two computer rooms were necessary as infrastructure, one in which the students were located, each one playing his/her role and another room where two tutors work, on a 1-to-7 ratio. Usually, not all students have the same reasons for training, the same attitude and the same technological skills. Consequently, we experimented with the different attitudes, experience and skills that we would normally expect from students in a real online course. We applied **extreme circumstances and analyzed** how the tutor should work to channel the course and succeed on student training.

Our aim at this workshop was to test first-hand the functions and roles played by both the tutor and the student during an online course, focusing in the tutor figure as key for the success in a training program or course. The objective was to let the participants find and experience the key points to perform tutor duties, improving the motivation of the agents implied in e-learning, and thus succeeding in the learning objectives.

Conclusions

The tutor acts as a learning facilitator. Three additional roles are included in the tutor's main dynamizing function (*Mason, 1991*):

- **Organizing role:** establishing the agenda (objectives, timetables, procedures, standards). The person must show skills as a leader and promote group activities and engagement.
- **Social role:** creating a pleasant learning environment, engaging students in the Project, constantly interacting with the students, positively tracking all activities they undertake, asking them to express their feelings when necessary.
- **Intellectual role:** as teaching facilitator, the person must be able to focus discussions towards the crucial points, ask questions and answer students questions, encouraging them to make and elaborate on their comments and input.

Once the workshop sessions finalized, a **debate** with the participants was took place with the aim to analyze the difficulties faced by each role. Conclusions were as follows:

- E-learning must be considered as a tool in the hands of training personnel and tutors, and not as much as a learning tool for the student.
- Tutors must make the learning process as personal an exercise as possible.
- The motivation is an important factor for the accomplishment of an online course.
- The use of intercommunication tools in an online course is extremely important to mitigate the feeling of loneliness inherent to an online course.
- e-Learning saves travelling time and attendance to classes, but it does not save study time and work. We do not have to *sell* the idea that online training can take place without effort since we will be harnessing the abandonment of the courses and this may cause some to think that e-Learning is not efficient.
- The human element is key for the success of the training process.

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THE ROLE OF THE ONLINE LEARNER: TOWARDS A MODEL FOR LEARNING IN THE XXI C

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Learners in Online Learning

Information, Knowledge and the Net cannot be considered as driving forces of the XXI c. without also adding Learning to the equation, as the former cannot go without the latter. In our Learning Society (Hargreaves, 2003, p. 11), learning is and will be increasingly present in all spheres of life, in various ways of delivery, and in all stages of human life, from early childhood to retirement. Formal learning mostly confined to a certain period in human life, as it was in the Post-industrial Society and before, is almost gone; emphasis is on the construction of knowledge by the student rather than on knowledge being transferred by the teacher, the student is considered to be at the centre of the educational process, learning in collaboration, not in competition, with classmates, and learning is increasingly taking place online.

An online learning environment (OLE) is of a technological, digital nature in the first place, but beyond that is above all a relational “place” (Ardizzone & Rivoltella, 2004, p. 108), where learning is not instructive, but constructive. And it becomes too a “common endeavour” (ib.) where reciprocity and trust is one of the main elements. Thus, under these conditions, participants in education necessarily have to adopt a role, “play a part” in a way, which fits prevailing conditions and with which success in learning online is attained. This role becomes a valuable skill, to be applicable to different domains, a skill which is desirable in the citizen of the XXI c.

Students’ traits under the role of the online learner are no longer those required by the Post-industrial society of the XX c.: students graduated from secondary school or college who would start working to occasionally, if ever, carry on in-service training or formal education. Students in the role of the online learner at the beginning of the XXI c. have a different profile, as they tend to come from varied ethnic and cultural backgrounds, the average age is older, with increasingly more mature students with job and family commitments taking online courses offered by their firm or by a university, these students are mostly part-time, therefore having their own timing to complete graduation or finish the programme, unlike the timing foreseen by institutions, and they bring consumer-like expectations and behaviour, which can help increase quality but can also become conflicting. Online learners’ traits have been described and studied by a good deal of authors, for instance Levine & Sun (2002), Pallof and Pratt (1999, 2003), Piskurich (2003, 2004), Flores (2004).

The Role of the Online Learner

A role is a set of supposed, expected actions and observable behaviour which humans internalize and apply in order to succeed in certain domains or situations in life. Putting it like this it seems more complex than it really is, since we humans adopt, perform and discard various roles during our lifetime. Participants in every educational setting in human history have played a role according to what was expected of them and to what they wanted to achieve. Most practitioners, researchers and educational authorities will agree that the role of the teacher or instructor in an online setting is in some respects different to the one in a face-to-face situation, with some features of its own.

However, the role of the online learner is still largely ignored or minimized. Online learning programmes, in our opinion, will not achieve maximum quality without providing students with information and training as to what is expected of them in their role of online learners and how the role will contribute to their success. Against this it could be argued that digital natives in the XXI c. (Prensky, 2006), unlike digital immigrants, would not require such attention and effort since they have grown used to the ways and technology of the XXI c. But this is to see things mostly under a technologist perspective. Even if online students are masters in the use of e-mail, blogging, social networks, etc., learning and communicating go beyond the use of

technology into mastering expertise on how to learn, how to help classmates, to get help, to learn from them and with them.

In the published research on the online learner there is talk about the role of the online learner (Berge, 2000; Meyer, 2002, p. 42) but findings and theory are scattered and unstructured. In most instances it is manifested in the number of conditions and actions to be a successful online learner, mostly from practitioners and researchers, rarely from students' own point of view (Howland & Moore, 2002). To the best of our knowledge there has been no attempt to formalize the skills and characteristics that would make up an integrated and global description of the role of the online learner, except perhaps the one attempted by Birch (2001). Some traits of Birch's classification are included in the model we put forward below, which, other than a recipe for success in an online learning setting, accounts for the role of the online learner as a set of skills, traits and actions which make up conditions required to learn successfully online.

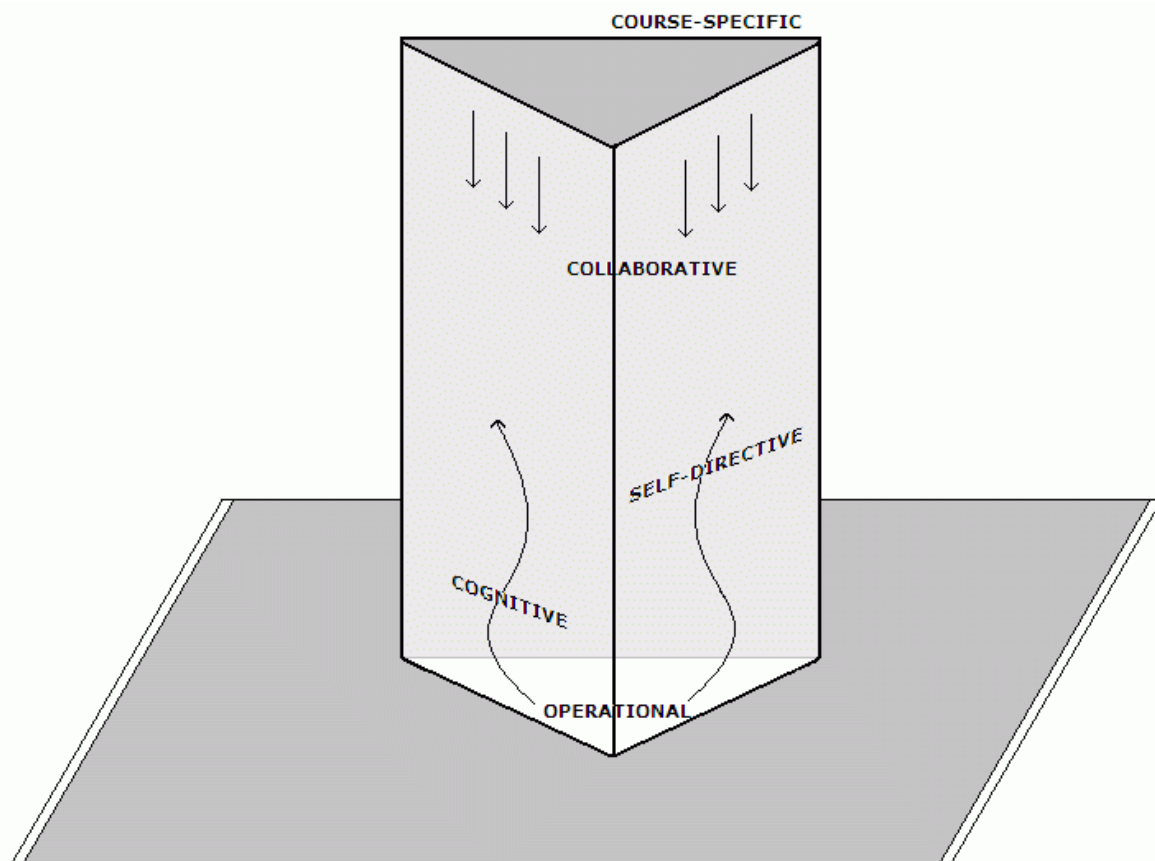


Figure 1. Model of the Role of the Online Learner.

This model, as a graphic representation intended to show the structure of the role of the online learner and the dynamics among its elements, attempts to represent the existence of 5 sets of skills as the five sides of a triangular prism. But the prism sides are more than a spatial representation of those sets of skills, as they are also a way to visualize the relationship among them: *operational* skills are at the bottom to represent the set of “technical” and “navigational” skills that every online learner has to apply, where the rest of skills are built on, namely the ones applied to learn course contents (*cognitive*), for communication and collaboration (*collaborative*), and those put in practice by the learner internally (*self-directive*), with increasing competence. At the same time, desirable or required skills and strategies specific to the course contents or a field of knowledge (*course-specific*) exert an influence on self-directive, communicative and cognitive skills and traits. While operational, cognitive and collaborative skills are considered cross-curricular, or generic, to all learning online, course-specific are course, subject or field-related, and that is why the course-specific side is at the top, as the set of skills that would influence the rest and also as the set more likely to vary from one course to another, from one OLE to another. This can also account for elements which would make the model to be more suited to specific instances of online learning, thus to variations in the role of the online learner.

Operational

Skills related to the use of ICT tools, both inside and outside the OLE. These are basic skills on which to start applying or developing the rest of traits of the role. However, it should be noted that becoming a proficient user of these tools will not necessarily result in a higher level of proficiency as an online learner.

- Adequate expertise in the use of ICT tools for communication and for information retrieval.
- Satisfactory knowledge of facilities and navigation throughout the OLE.
- Reasonable proficiency in searching on the Internet.

Cognitive

- Skills, strategies and actions acquired or applied in order to learn course content.
- Know how to access course info such as course plan, course programme or study guide.
- Know how to go about course materials and get the most of them.
- Know where other resources are, and how to retrieve them and use them.
- Know where help is available, and ask for it if necessary.
- Provide help to classmates or teacher, and at the right time.
- Study in a reflective way and with critical thinking.
- Prepared to apply knowledge or to look for ways to apply own knowledge.
- Connect to the OLE regularly.

Collaborative

- Skills and actions for communication, collaboration and to relate to classmates and teacher in an OLE.
- Be willing to communicate, and to express one's ideas, opinions, feelings.
- Write efficiently for comprehension and communication.
- Capable of engaging classmates in learning or in group work.
- Participate in class discussion and class activities.
- Be prepared to negotiate meaning and to strive for consensus or agreement.
- Be prepared to seek feedback and learn from it.
- Be prepared to give feedback in order to learn.
- Be aware of the classroom or the OLE as a community of learners.

Self-directive

These are skills and attitudes related to one's own self-management, self-monitoring and self-appraisal when learning online. What a learner is, what she or he does, how much thinking puts into learning, her or his feelings and emotions are just as important, if not more, than skills directly applied for learning contents or how to use ICT tools and course resources.

Personal traits for learning online:

- Be prepared to take into account classmates' and teacher's ideas and criticism.
- Be prepared to learn from teacher and classmates.
- Be prepared to learn from one's or other classmates' mistakes.
- Be responsible for one's own learning, which means being autonomous and proactive rather than reactive.
- Originality of one's work, without cheating or using someone else's work.
- Resilience to failures, disappointment and uncertainty.

- Tolerance towards other learners' opinions, their ways of expressing themselves and working.

Strategies for learning online:

- Organize and manage one's resources adequately, particularly time.
- Negotiate or agree about time and amount of dedication to learning with family (spouse) or with workmates (boss).
- Set own learning goals.
- Set up own learning plan or learning contract.
- Self-discipline: adhering consistently to one's goals and one's time scheduling.
- Self-motivate, giving treats to oneself if necessary.

Thinking and reflection that learning online entails:

- Be informed about what to do to prevent frustration.
- Self-monitor one's efforts, actions and progress.
- Learn from mistakes (own and others').
- Check out own efforts against one's goals, learning plan, learning contract and time schedule.
- Think of ways to improve one's organization and management of learning.

Course-specific

Skills and actions suited to learn course contents online or know-how specific to the course, subject, degree or field of knowledge in an OLE.

For instance, for online language learning these could include:

- Use the language learnt in your mails and chats with classmates and teacher.
- Read as many of your classmates' contributions to class discussions and class activities as you can.
- Make a note of new or interesting expressions and vocabulary used by the teacher or classmates.
- Participate with ideas, opinions and experiences in class discussions, go beyond being a mere reader.
- Identify good users of the language among classmates, and save their mails or spoken contributions to learn from them.
- Prepare beforehand synchronous sessions to be attended.

Conclusion

The online learner is an important enough element in OLE for teachers and institutions to provide their students with information and training on what skills and traits are involved in the role of the online learner. It is simply not right that online learners are left alone to learn about how to best learn and perform online by means of trial and error. An adjustment to their role is natural and gradual (Kinsel et al., 2004), but above all, learners should have access to knowing what is expected of them, what to do to best learn online, and what learning online entails. Given the pressure experienced by online learners, given the transition we are undergoing from a Post-industrial Society to an Information Society, given the new reality of lifelong learning, teachers and institutions should make sure that students learn about the role of the online learner not by means of instinctive acquisition but through purposeful effort. The model put forward by the authors is intended as a contribution to that effort.

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E – LEARNING: EXPERIMENTATION IN EXPERIENTIAL LEARNING?

A PROPOSAL FOR “BLENDED LEARNING” IN PRIMARY SCHOOL.

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Introduction

Experiential learning processes in primary school education offer an interesting deviation from the traditional learning paradigm. Not only are they attractive to pupils involved by offering learning and entertainment in field trips and outdoor activities but they can also provide the framework for incorporating new theories of learning in school, as they imply both “hands – on” and “minds – on” involvement. In the past decade, pioneering programmes of experiential learning activities are in action in our school. Without questioning the beneficial influence of these activities on the social and personal development of the students, effort has been made to enhance learning by coordinating these activities with the national curriculum and teaching in the classroom. In the last two years, we have tried to enrich these programmes with an interdisciplinary approach and ambitious cognitive objectives¹ by using technology. However, successful switching from the traditional teacher – centered model for learning, to a more flexible model where technology is also used, cannot be taken for granted. There is always a gap between the vision of the innovation and what happens in practice. At times, equally traditional models tend to be reproduced with technology at the centre – as the omnipotent source of “knowledge” and information. New tools have to be developed by “progressive practitioners” who are members of the learning community. With this in mind, we present a proposal for “blended learning”. Effort has been made to incorporate ICT and experiential learning in developing inquiry scenarios². These programmes are intended to offer good practice solutions³ to the learning community (teachers and pupils) and to serve as examples for them to design their own solutions when confronted with similar problems.

The context

Experiential learning activities in our school were introduced ten years ago. Students are engaged in various activities such as field trips, harvesting and fruit collection, visits to archaeological sites and Museums, cave explorations etc. Young pupils are presented with new opportunities of “directed living” and are engaged in concrete activities through which they learn how to learn.

Living in a country with a cultural heritage offers a lot of opportunities for the development of experiential programmes. Sites renowned for their archaeological and cultural interest such as the Acropolis and Parthenon, the Ancient Agora or Ancient Eleusis in the suburbs of Athens, are suitable for a day visit. Olympia and Ancient Epidauros or Mycenae, are easily accessible, although they require that the students stay overnight. Day trips to small islands of the Saronic Gulf or longer trips to the Cyclades are easily made during autumn or summer. The prevailing element in all these programmes, besides the development of a warm and friendly relationship between students and teachers⁴, is to promote experiential learning through various activities: Sports and games “in the way of the ancients”, role playing activities, “mock” trials and debates, survival and orienteering, preparation of ancient Greek meals, theatrical plays *in situ*. It must be stressed though, that in order for the students to make the most from the programme, good groundwork is required beforehand. This is usually done by making connections with the national curriculum. For example the Myth of Persephone, taught in 3rd grade Mythology is related to the visit to the Archaeological site of Eleusis. Prior to the visit, students have been planting narcissuses – the flower that tricked Persephone, and have been drinking fresh fruit juices – a simile for kykeon, the drink of Eleusinian mysteries. They are

encouraged to write dialogues or theatrical plays that would be presented in the archaeological site. The same kind of preparation is carried out in similar programmes: Every day life activities in Ancient Greece, the Olympic Games, Healing in the Temple of Asclepius in Epidaurus, orienteering, contours, measuring the age of trees.

Attempts for innovation using technology:

During the last two years we have been reshaping the educational material accompanying these programmes, using computer technology. Thematic presentations have been prepared for the majority of the subjects covered. Although this step is not a panacea for learning, it has contributed considerably to the more efficient carrying out of the programmes. Students can easily trace their path through an archaeological site using the animation and hypertext capacities of Power Point. They are able to restore and reconstruct the site from its ruins by moving and superimposing pictures on a background. At the same time, they are able to connect facts and information related to the particular period, or photographs of works of art or Museum exhibits. In other cases, students, using simple commands of the Power Point leave snail like traces on a map, drag “tags” with names of monuments and hyperlinks to photographs or saved internet links. Taking into account the positive attitude of students towards computers and the fact that the presentations are sometimes visually engaging and “directed” following narrative scenarios, we must admit that the interest of the students to the “academic” part of the programme increased, and precious teaching and learning time, previously wasted in vague descriptions or *in situ* teacher – centered guiding is used more efficiently.

This educational material has been tailored for the needs of our school and Power point has served our purposes fairly well. Switching to more powerful software has been suggested and we have explored the possibility of collaborating with a software company in order to “polish” and update the presentation. This thought has been abandoned, for epistemological and aesthetic reasons. The “primitive” creation that we have achieved looks more appealing and interesting than a product that would not be created by ourselves and for our purposes⁵. However, there is still the problem of a wider distribution of the material, for use by other schools that remains unresolved.

Second phase of innovation – a proposal

The second wave of innovations may come from the participation of a member of the Department of Educational Research & Development of our school in a workgroup of the Educational and Developmental Initiative of eight Educational Foundations in Greece⁶. This action is aimed at developing a system of management of information that will be used by teachers and other educational organizations. Creating lesson plans is a means to take advantage of the product of the Educational initiative. The action of the workgroup was coordinated in order to ensure the quality of the material produced by taking into account modern theories of learning and incorporating the basic skills and competencies⁷ and the interdisciplinary approach to learning⁸.

Taking this opportunity, we have tried to revisit a part of the work done for the experiential learning presentation in order to design a group of lesson plans where learning will be created and not transmitted and where inquiry and “web – quest”⁹ will be the basic educational tool.

We selected to work on a programme of experiential and recreational learning related to the island of Milos. The programme is carried out in the month of June. Milos is not only set in the blue waters of the Aegean, bathed in radiant sunlight and scattered with small white houses. It is almost entirely a volcanic island and is able to impress the visitor with the extraordinary images of its landscape. “The colours and morphology of the geological phenomena... the coastlines, the gulfs, the cliffs, the gorges, the hills... are unique and it would be difficult to tire of gazing at them”. It has been inhabited since the Neolithic age (7000 B.C.) and developed more rapidly than the neighbouring islands because of the black glass-like volcanic rock called obsidian which was used by the «Melians» to make tools and weapons. From the beginning of the bronze age, (2800 - 1100 B.C.), the island played an extremely

important role in the Cycladic world, centred at the ancient city of Philakopi, which in fact gave its name to an entire archaeological period.

It is also known that in their attempt to remain neutral during the Peloponnesian war Melians were punished by the Athenians who, in 415 B.C. put all the old people to death and sold the young men, women and children into slavery.

An example of the creative era at a later period of history (Hellenistic period) is the famous statue of Venus, (at the Louvre Museum in Paris).

An archaeological museum, a folk museum, a mining museum, and the magnificent Christian monument of the catacombs, with 185 meters of galleries dug in volcanic tufa where the first Christians met in order to perform their ceremonies, provide endless opportunities for experiential learning.

During the first attempts for innovation using computer technology, a CD – Rom with a menu of five thematic Power Point presentations was prepared in order to serve the purpose of the programme, i.e the indoor groundwork. The presentations, since they are addressed to age 10 – 12 pupils, although they mostly follow the linear flow of a presentation, enhanced the interest of students in the programme. Being shaped in the form of narrative scenarios made them appealing to the students. However, using them as “the” educational material is still reproducing the traditional scheme “source of information” to “receiver” and does not incorporate inquiry. We hope that revisiting the previous work in the light of new theories of learning will contribute to the formation of a new learning environment where the transfer of information will be replaced by its quest in the web¹¹ One of the strengths of using the web as a learning tool is the relatively low cost and the availability of the information for many schools to use and share.

A group of six lesson plans, articulated around the central theme “Milos – an island of the Cyclades”, has been created and will be available for download from the portal of the “Educational Initiative”. Teachers and students are provided with a meta-structure which is necessary for inquiry to unfold¹². Everything is designed in order to facilitate carrying out small scale investigations using the web and to report and analyze the findings. Additional material is offered such as hyperlinked power point presentations and worksheets. Students are to evaluate the progress by completing comparative tables, filling in gaps and answering open ended questions. The experiential component is still there. Bodily – kinesthetic activities are suggested, orienteering exercises are performed and topics for discussion begin from open – ended questions, creative scenarios are produced, “mock” alarm situations are revived, responsibilities are assigned and assumed, cooperation is honoured.

In the following table an outline of the six lesson plans is presented. A brief summary of the previous work – narrative scenarios – is given in the left column while sample activities from the programme of inquiry are in the right column. Nevertheless, there is not a clear-cut distinction between the two columns as parts of the old work are used at times as additional material, to initiate an inquiry or an experiential activity.

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APPENDIX

MILOS – An island in Cyclades

Experiential learning programme Grid of activities

A. Obsidian of Milos

Obsidian is a naturally occurring glass produced by volcanoes. Items made from this material had utilitarian and ritual uses. In 1968, obsidian was found at Franchthi cave, in Hermionid at a distance of 80 nautical miles. This finding has provided evidence that navigation was possible from 8000 BC. Millennium B.C.

The Mystery of the black stone (PPS)

(Narrative scenario – PPS)

Archaeologists in the Paleolithic habitations at Franchthi cave, in Hermionid are puzzled when they find obsidian from Melos. This is completely out of the ordinary, unless people could cross the sea, i.e. if navigation was possible from 8000 BC. In order to test this hypothesis, they try an experimental journey with papyrella, a model of one of the first ships that crossed the Aegean, made from papyrus and using oars. Methods of dating a mineral are presented with hyperlinks and the presentation concludes with a slide show of later examples of navigation in (Bronze Age and Classic period) the Aegean.

B. Catacombs of Milos

Christianity was established in Milos from the 2nd century A.D. due to the presence of a prosperous Jewish community. A Christian community cemetery dating from the end of the 2nd century A.D. It consists of a system of three underground chambers where Christians performed their religious duties and found shelter during the persecutions.

The farewell of Mark

(Narrative scenario – PPS)

A Roman patrician lady is worried because her Christian fiancé, Mark, is in danger because Christians are being prosecuted by the Roman Emperor Diocletian. Mark is advised to hide in the catacombs of Melos. Photos of the galleries are shown and the history of the catacombs is presented.

The travel of obsidian

(Inquiry scenario – blended learning sample activities)

Students perform a guided search in the internet and worksheets. They cover subject areas such as volcanoes, melting of lava and the formation of volcanic glass. They learn about the working and using of tools in Stone Age. Since the finding of obsidian corroborates the existence of successful navigation in the Stone Age, they mark the existence of transposition on a map and they relate the existence of transposition to their needs. They collect information about papyrella (material used for the construction of the first ships) and travel). They create their own scenario with this experiment and are invited to assume and assign responsibilities (provide information and to write a “deck diary” for it.

The catacombs of Milos

(Inquiry scenario – blended learning sample activities)

Students perform a guided search in selected internet sites and answer multiple choice questions in order to test their understanding of the construction, dating, and use). They are asked to answer a hyperlinked excerpt from a children’s book related to the construction of the catacombs in order to prepare a slide show presentation for the catacombs.

They are presented with the story of Mark (hyperlinked PPS) and the story of his escape towards the catacombs and a description of the catacombs.

C. Venus de Milo

The Aphrodite of Milos, one of the most famous works of ancient Greek sculpture, is displayed at the Louvre Museum during the Ottoman occupation by a peasant and sold to the French ambassador in Istanbul. Contemporary artists are (Lynch et al) and its impact on popular culture is renowned (many works of fiction depict humorous explanations on how

Venus of Milo

Venus of Milo is now in the Museum of Louvre

Thematic presentation – PPS

(Inquiry scenario – blended learning sample activities)

Pictures of the famous sculpture in the “sale de Venus de Milo” in the Louvre Museum are shown and the history of its discovery and transportation is accounted for. The original position of its hands is discussed and photographs which reflect the influence of this sculpture on artistic creation (restoring the amputated hands, collages, posters etc)

Students use the internet and the power point presentation to explore the aesthetic value of an art object and/or its fame. They “meet” the statue when approaching the famous statue in the “sale de Venus de Milo”. They draw results on the profile of the visitors, their nationality, their visit to the Louvre and Paris. They relate literary texts, poems and artworks encouraged to deal with the themes of loneliness, glory, honor and cultural heritage. They use the information they have gathered for a kinesthetic exercise and to contribute to the speculation of the missing arms.

They visit the website of the Tactual Museum (for the blind) to appreciate a work of art.

D. Lets travel to Milos

The journey to Milos

Lets travel to Milos

D. Lets travel to Milos

Thematic presentation – PPS

(Inquiry scenario – blended learning sample activities)

The journey to Milos is traced the map. With a simple menu of action buttons, various *in situ* activities are summarized and described: How do fishermen name their boats, with what lively expressions they advertise their products, how one can make a collection of rocks and minerals, how to prepare for the trip, “deck diary” etc.

Students will acknowledge that traveling across the sea involves weather, the wind etc) and human skills and knowledge can make a difference.

They use the internet to collect information on various nautical terms in the Aegean sea. Depending on their digital skills, they create a presentation about the nautical history of Greece (from ancient times to now) matching the picture with the ship in a worksheet.

They learn about the wind as a source of energy and its velocity/intensity/direction. They discuss the impact of a storm and legends related to a departure postponed due to a still

Students become acquainted with the geological diversity of the world. They find curious geological formations from the web and they give them names. They give color. They locate the Volcano on a geological map and they find the “identity profile” of the volcano. They observe volcanic eruptions and they receive information on the formation of a volcano and on the internal structure of a volcano in volcano terms. They receive instructions on how to make a volcano erupt. They work cooperatively in order to simulate a volcanic eruption.

Rocks and Minerals of Milos

Milos is an “open” geological museum.

Rocks and Minerals of Milos

(Inquiry scenario – blended learning sample activities)

Students identify minerals and rocks of Milos by downloading a list of minerals and rocks from the Mineral Museum of the University of Athens. They name them using metaphors (green artichoke for malachite, etc.). They use this inventory and work cooperatively in a model of “tagging” in the Mineral Museum. (based on a real event in the Mineral Museum of the University of Athens)

They collect information on the formation of minerals, fossils, and conduct simple experiments of classification of their hardness.

TEENAGERS' EXPERIENCES OF NETWORKED LEARNING FOR SUSTAINABLE DEVELOPMENT IN THE ICT-EXTENDED GLOBAL CLASSROOM DESIGN, DEVELOPMENT AND RESEARCH ON YOUNG MASTERS PROGRAMME ON PREVENTIVE ENVIRONMENTAL STRATEGIES AHEAD OF THE GLOBAL YOUTH CONVENTIONS 2000–2008.

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Introduction

Youth as stakeholders outside the university challenge the academic world and offer a unique opportunity for dialogue on the role of higher institutions in an overall societal transition towards sustainable development (Nordén, 2005a). To increase the understanding of how successful learning processes could be designed and carried out as outreach at the university, the Young Masters Programme (YMP) might serve as a learning example.

Across the globe young people - through networked learning for sustainable development - are exploring a global learning space with new ICT-mediated ways of communication. Including global interaction with ideas and descriptions, a transdisciplinary approach focusing on social, economic and ecological dimensions of the teenagers' daily lives is experienced. Youth from different countries and cultures are working with a common content in the global room, the extended classroom. These global meetings are also cultural meetings and they take place in the globally extended classroom. The issue is global as well as local. The students hover between two extremes (Nordén & Hansson, 2006a).

Within the decade of 2005-2014, the UNESCO (2005) notes the importance of transdisciplinarity in projects as an effort in creating a culture of peace. The knowledge building among the high school students - how they will act, which lifestyles they will adopt - will be influenced by the way they learn to think about sustainable development. Pathways towards education for sustainable development (ESD) could be promoted by the recently recognized relationship between sustainability and transdisciplinary education, research and thinking. Global learning for sustainable development should ultimately include dialogues of alternative worldviews, ethics, and the role of humans within ecosystem.

The International Institute for Industrial Environmental Economics (IIIEE) at Lund University has been working with the education of young students between 15 and 18 years old in what is called the Young Masters Programme (YMP), which has so far reached out to some 7000 students in 120 countries since the start 1999. The course is supervised by the IIIEE and free of charge. For the optimal support of the high school students during the YMP online, it is preferable to have a team of teachers of different subjects at each school working across the disciplines as mentors to facilitate each study group (Nordén, 2005a).

In the research project "Learning in the ICT-mediated University" at Centre of Learning Lund, we try to analyze and describe the ways in which the high school students have experienced their learning process in the field of learning for sustainable development in the YMP, using a phenomenographic approach to the research (Marton and Booth, 1997). We are focusing in particular on the ways in which the meeting between the course content, the multicultural discussions and the students' own life-experiences constitute a context for learning, with emphasis on the diversity that is supported by the course.

The YMP seems to be of great importance to the students as individuals and as members of both the local and the global society. In the YMP teenagers explore a learning environment with new ICT-mediated ways of communication including global interaction with ideas and descriptions, and the transdisciplinary approach focusing social, economic, ecological and ethic dimensions. The online communication with global meetings seems to particularly catalyse the teenagers' commitment for – and their learning process with issues such as preventive environmental management strategies within the framework of university outreach development – in a more sustainable direction (Nordén, 2005b; Nordén, 2006).



Figure 1 Young Masters awarded certificates by Birgitta Nordén, Director of Distance Education YMP/GEYC HIEE, Lund University, during a ceremony at the Ministry of Education in Dubai Municipality (2006).

The learning activities in the first part of the YMP online “Sustainability – what?” introduce the dimensions of sustainable development. It lays a foundation for the second part of the YMP, sustainable solutions “Sustainability – how?”, dealing with preventive environmental strategies. The high school students learn about biodiversity, gaining an understanding of the complexity of ecosystems and their natural balance, as well as social, economic and environmental challenges. They begin looking at their world from the perspective of sustainable development. By learning about Agenda 21, they join international efforts in planning improvements and will be able to take a stand on sustainability issues. The high school students share their findings from the flexible learning activities and present their result in forum discussions and chat, and get feedback and comments from one another in varying ways. The teenagers find out how various actors in society are linked together, taking into consideration the role of consumers, design for environment and product development, construction, and the total life cycle of a product in order to address sustainable development. They learn to go to the source, instead of focusing end-of-pipe solutions. In an optional part 3 the students apply the concepts they have been learning about to real situations in their local surroundings in a project. This also serves as a preparation for part 4 – participation in a convention – for the high school students, who initially only communicated online. During the last part, the convention, they

could meet, swap experiences and discuss their sustainability projects face-to-face during the Global Environmental Youth Convention (GEYC), which is arranged every second year. The first convention, GEYC 2000, took place in Lund, Sweden, and the two following conventions were in Turin, Italy, and Alexandria, Egypt, respectively. The GEYC 2006 took place in Dubai in the United Arab Emirates in December 2006. The overarching theme was “Peace and Sustainable Development”. Thereafter the YMP continues towards the GEYC in Beijing 2008.

According to the result of our *Learning in the Extended University* (LiEU) research of the YMP online (Hansson and Nordén, 2005), it manages to fulfill two of the proposed objectives of the United Nations Decade of Education for Sustainable Development (DESD). They are (1) to provide space and opportunity for refining and promoting the vision of, and transition to sustainable development – through all forms of learning and public awareness, and (2) facilitate networking, exchange and interaction among stakeholders in the ESD (UNESCO, 2005).

One strategy recognized to implement the vision of an initiative as far-reaching and broad as the ESD is the use of information and communication technologies (ICTs). ICTs are “the lifeblood” as means of the basis of the “knowledge economy” in ways that fewer natural resources are used than earlier for information transfer and use in purpose to generate wealth (Nordén & Hansson, 2006c). When accessing interactively over the web, the meaning of sustainable development within the YMP online learning becomes more useable and learner-friendly. The ICT offer new modes and new spaces of learning. Options of individual pace, assignments, feedback and interaction are offered in varying ways (Nordén, 2005b). The ESD can be widespread. Where learners have access to ICTs a global dialogue can be provided. For example isolated youth of island communities are linking worldwide via ICTs, sharing experiences and concerns, building consensus and mutual support (UNESCO, 2005).

Through the YMP online course a global network is developed within which the high school students work across national and cultural boundaries, boundaries that have to be met and crossed across cultural differences (Nordén & Hansson, 2006a). Different conceptions and different meanings of what are apparently similar concepts have to become the object of reflection, and this gives rise to knowledge formation (Pierce, 1934; Bateson, 1972; Hansson, 2000).

The teenagers repeatedly say that *knowing* is a pre-condition for working towards sustainability. The ways in which this condition is expressed differ, in more or less scientific terms, or in more of an everyday language (Hansson & Nordén, 2007). The high school students are learning about conditions in all nations globally through the students living in these countries. They take part of texts formulated by the youngsters of the same age. They reach information which otherwise is hard to find. Somebody expresses that this is knowledge at non-political level (Nordén & Hansson, 2006d):

“The high school students are more frank and the people who live in the country maybe know it better than the experts, cause they live it in real, and give a different aspect from the experts who give the statistics. But don’t give the REAL status of people and life. Still, the Experts’ research is very important, but I can know about researches from any where, the Internet or your library, but I can know about the people opinion ONLY from here in our Forum Discussions”.

The different meetings encouraged the young people to reflect more on attitudes, to realize how their own actions and the actions of other people affect the environment (Hansson, 2004). In particular on the ways in which the meeting between the course content, the intercultural discussions and the students’ own life-experiences constitute a context for knowledge formation, with emphasis on the ICT-extended global classroom that is supported by the course.

First of all, the high school students are young people meeting one another as young people do, living in a global – but single – world of youth and the problems with environmental, economic and social challenges. Secondly they are meeting in the course, around the common issues of sustainable development as brought into question in the course; and thirdly they are meeting as representatives of different cultures with different assumptions and values wealth (Nordén & Hansson, 2006b). The context of learning is particularly interesting in the diverse situations that online learners are in and the diversity that the course itself incorporates (Nordén & Hansson, 2006d).

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MOTIVATION AND DROP-OUT, THE TUTOR AS MANAGER OF RELATIONSHIP, DYNAMICS IN VIRTUAL LEARNING COMMUNITIES.

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Motivation and drop-out, the tutor as manager of relationship, dynamics in virtual learning communities

Although technological tools progress always more and more, offering new development prospective for l'e-learning , the drop-out level in e-learning projects is still too high. Also without the presence of drop out with out a right motivation , the quality of learning process is often scarce and can't be guaranteed. In many cases this is due to a wrong or nothing perception from the student of opportunities that life long learning can offer. In others cases, just because the e -learning is considered cold, a bit human and too impersonal so, there is a previously refusal from the student to approach in a correctly to a learning course realized in E-learning modality .

In this case the tutor plays an important role avoiding the abandonment from the student to the formative course. This implicates a new vision of the tutor's role who is promoter of new learning form using faithfully techniques which stimulate the descent. In many e-learning projects in already in act a role assumption. Tutors focus their attention on the student, they observe and manage the different state of mind of the person in question and stimulate his learning "dressing cloths" of observers and managing relationship. The following chart shows briefly competences that the new imagine of the tutor has to make own for each aspects involved in the training process.

Table 1

Categories	Competences
Psychology	Andragogic Knowledge Management of inside Psychological aspects of the descent Know how to anticipate uneasiness moment Know how to manage the emotions How to motivate the descents
Sociology	Communicative abilities
Problem solving	Analysis abilities and problem solving
Didactics Strategies	Based on trainer/descent relationship Psychological Competences

To be able to form in an optimal way it is essential to know the descent learning formalities. From about twenty years, burdens researchers macaws completing searches to put to fire the distinctive lines of the andragogic, a still little diffused disciplines but that it constitutes the necessary point of departure for the development of new of effectiveness of the adult formation. The Tutor must know of those the factors of specificity that the adult learn. The need of know: Adults feel the demand to know why it is necessary to learn something before undertaking the learning. Tough has discovered that when the adults begin to learn something for their account, they invest a considerable energy in to examine the advantages that will draw from the learning. The itself concept of the descent: The adults are available to learn what they need to know and to know how to face situations of their real life. In contrast with the orientation focused on subjects, characteristic of children, the interest of adult is

focused on real life. **The Motivation:** it is wrong thinking that adults are available to learn just because they wish to advance their career level and so on, the real soft are the inside pressures: the self respect, the life quality, the job satisfaction .

Management of psychological aspects of the descent

The Tutor must be able to manage those aspects that are psychologically internal and inter-individual of the descent .Often, to such aspects it is given a marginal importance but if they are managed not correctly , they can hinder and they can influence the learning activity of the descent .

The principal psychological aspects to which the Tutor must pay great attention are:

- Self-respect
- Anxiety from presentation
- Stress
- Empathy
- Groups dynamic

The tutor has to sustain the student in the instance in which he presents problems related to themes of psychological characters described above and look forward solutions, tools that allow to solve that requirements. In the detail, the objectives that the Tutor is set towards the descent, are the followings:

- to acquire awareness of the own emotional state , to recognize them and to know how to manage them;
- to power the motivation and the self-respect;
- to develop more expectative of effectiveness;
- to manage the lost of creativity caused by the stress and anxiety effect;
- to consider the advantages of getting the new role;
- to manage the stress change;
- to power the cognitive and behavioural abilities, in order to go over the uneasiness situations
- to encourage the member to express their ideas;
- to favour the development of social competences;
- to encourage each single descent to collaborate with the others members of the community;
- to manage social anxieties in groups: competitions and oppositions, aggregations and isolation;
- to improve of manage interpersonal relations;
- to know how to anticipate uneasiness moment.

The Tutor must be able to foresee, to recognize and to set remedy to the moments of confusion and difficulty of the descents. The modalities to use are the following:


- Training (coach): he intends an assistance online, through the dispatch of messages in answer to specific questions; a coach foresees a total or partial assistance on determined matters.
- Suggestions: through expresses you tell electronic in degree to suggest to the descent as to increase his own productivity, make quickly and facilitating some phases.
- References online: he intends an alphabetically list structured of practical-theoretical contents as the glossary, exercises resolved in reference, virtual bibliography; this tool stimulates the auto-learning proposing to the descent the synthesis of the principal aspects, the alphabetical lists of reference, the examples and the illustrations of close examination.

- Simulations: they are experiences that reply the principal characteristics of a complex situation and that they leave the possibility to experiment the result of the decisions of test to the descent; useful to hypothesize the relationships interpersonal, or to experiment all the functionalities of the programs software.
- Tutorial: they are frame of connected lessons to the matter in examination, chosen by the Tutor, with the integration of suggestions on the formalities of practical application, to immediately furnish an usable competence to the consumer in the exercises; this technique constitutes a valid alternative to the guide online, to prefer for immediateness, for contained pragmatically.

Management of emotions

Fundamental assignment of the Tutor is to reduce the negative emotions of descents and to stimulate the to emerge of positive emotions.

Table 2



Frustration - Enthusiasm	Frustration	Perplexity	Confusion	Intuition	Illumination	Enthusiasm
Trust-Anxiety	Anxiety	Preoccupation	apprehension	Calm	Satisfaction	Trust
Shame/ extroversion	Shame	Fear	uneasiness	Interest	Curiosity	extroversion

Negative emotions , on which the tutor has to focused his attention are:

- To anticipate difficulty and critical moments of the discente developing inside the first e-mails, interviews of prompt and of survey of problems;
- To develop a reassuring action on the descent putting in evidence those that are the advantages of the distance learning;
- To encourage and to the share in the Virtual Classroom, to the discussions on the forum so that to increase the affiliation to the group;
- To invite descents to use the FAQ or the Glossary.

For any explanation it is better to use the tools of asynchronous (e-mail) communication in such way to allow the descent to save and to constantly consult the received information. In the email of invitation in the Virtual classroom, the Tutor must explain the formalities of share, times and carrying out of the activity so that the descent doesn't feel more still him disorientated in the use of the tool.

Anxiety and apprehension

These emotions are in partnership to the delays of system, to the perception of incapability to check it, to the sense of dismay not to know whether to go neither thing to do, to the permanent maintenance of information concerning if same and his/her own didactic results and to the possibility to make her public. The Tutor will therefore owe to:

- to present from immediately, the reservation of the results of every course, the importance of the enrichment that is gotten by a course of formation and the total absence of judgment from anybody;
- write down e-mail without any sanctions evaluations;
- to remember the opportunity to be able to choose among different forms of communication (synchronous, asynchronous) so that to increase the trust and the desire to use such tools;

- to estrange the attention of descents from the worries so that can be assembled on the assignments by to perform;
- to possession great patience for the slow times of the descent. The learning of the anxious ones is characterized in fact from a great due slowness to the fear to commit mistakes.

Shame, Timidity and Introversion

These emotions are connected to feel inadequate, not endowed with the necessary abilities to study and to learn online. The Tutor will owe therefore:

- to stimulate the curiosity on the specific matters, to furnish articulated bibliographies, to point out the places where to inquire on the technological novelties;
- to furnish explanations and close examinations on the contents and to appraise the activities of exercise proposing, if necessary, examples and documentation of support;
- to valorise the individual resources inside e-mails and never in Virtual Classroom so that to avoid to create the student-model;
- to create a relaxing and informal atmosphere. To reassure whenever the descent around his/her own availability and presence every needs it, especially in the initial phase;

The e-Learning brings to good results if he is able to reduce the negative emotions and to increase those positive. The positive emotions to which the Tutor must pay particular attention are the following.

Enthusiasm and excitement

These emotions are tied up to a way to learn different in comparison to those traditional, to the contents, particularly interesting and profits also for his/her own profession, and to the possibility to establish new contacts and bonds.

Tenacity

This emotion is tied up to the motivation to the attainment of objectives. A behaviour is motivated to the result if it extends to the auto-evaluation of his/her own ability and precisely to the comparison with the standards of value that deal with reaching or to overcome. The descent wants to understand up to where its ability pushes him and therefore he hocks particularly.

Optimism

This emotion is tied up to the hope, agreement as the conviction to have is the wish both the means to reach the purpose. The prone descent is to the hope are established objective more ambitious and they know how much you/they must undertake for reaching them, they are less subjects to the discouragement, less anxious and they suffer less above the emotional plan. Optimism is an attitude that prevents the individual to sink in the apathy in front of new or difficult situations. Optimism brings to attribute the own failure to details that can be modified so that to guarantee him good results in the future attempts, while pessimism brings to assume him the guilt of the failure, attributing it to aspects or durable circumstances that they doesn't have the possibility to modify.

How to motivate descents

Taking back the points hinge of the andragic is not possible to think about being able to do formation or to hock the descent in the processes of search / rediscovered / reinvent ring/ reconstruction, if they is not motivated. The descent must be motivated because what they learn must respond to one need of theirs, possibly lasting. The absence of motivation causes a dispersion of the attention of the listening and of the appointment. s Freinet said: You can bring the horse to the source, but if the horse doesn't want to drink, he doesn't drink."

But if also he succeeded in making to drink the horse and to make to learn the descents, would serve few, rather it would be self-defeating. There is in fact the risk, strong and consistent, that forced to learn, the descent only learn to hate the formative course.

In every moment of the whole run, the first worry of the Tutor is, in order of time and importance, that to motivate the descents. He always has to keep in mind that the learning can be originated and sustained above all by the intrinsic motivations, that is from the desire of competence, the need of identification and the need of reciprocity.

The wish of competence is a constitutive characteristic of the adult. The Tutor must make trust on such characteristic, that is on the innate need to become skilled in the execution of the activities that you/they develop him. And' known that it takes an interest above all us some things that he succeeds in doing well and above all where the possibility is had to do well and activities are abandoned in which success is not had. The Tutor owes therefore to suitable situations to create possibilities to the descent, so that them has the possibility to be successful in the execution of the developed activities so that the result increases their motivation to continue to undertake in them: success strengthens the motivation, while the failure emotive. The need of identification is one of the aspects that it characterizes the descent. They introduces in fact a strong tendency to mould themselves and to own aspirations on the model offered by the Tutor and by the other colleagues. The Tutor must present therefore as I model to imitate and it must induce the comparison and the interaction with the whole group class so that to stimulate every descent to imitate who more expert than him is.

The need of reciprocity is an aspect that must be faced especially in the environment collaborative in how much the thick of the descent feels the need to answer in way suitable to it attended her that the other ones feed in its comparisons. The Tutor obviously has to try not to get heavy the descent with expectations until too much binding but to furnish objective attainable.

In specific the Tutor must be able to:

- to create the conditions so that the descent warn the need to learn the advantages and therefore the taste to learn;
- to underline the general advantages of e-learning:
 - The possibility to follow the lessons each day
 - Interactivity
- The possibility to proceed in base the own learning rhythm;
- stimulate the curiosity of the descent;
- to offer some challenging, but attainable objectives, offering some incentives, stimulating the developing of the reflection and of the personal abilities.

Sociological Competences, communicative abilities

The Tutor puts the techniques of communication that allow to entertain the descent into effect and to avoid the dispersion of the attention and the appointment. Besides it knows of those that is the specific characteristics of the communication mediated by the computer, (CMC).

Public Speaking

We believe that the to entertain the people or in an auditorium in a pleasant way both the fruit of innate ability; in reality the ability to structure and to transmit an effective communication, communicating the impact, it depends on the fact that the chairman, more knowingly, uses with ability and effectiveness techniques and shrewdness. The knowledge of the techniques of Public Speaking they simply allow not the Tutor to talk to the own descent but to communicate and to develop those abilities that allow him to face, in any moment, every type of communicative situations. Expert of Public Speaking the Tutor will be therefore able to:

- to understand the profile of his/her own audience;
- to put the strategies and the secrets of the best oratories into effect;
- to use the techniques of improvisation so that to always know thing to say;
- to manage the stress, to avoid therefore the excessive tension;
- to organize the discourses in bright, convincing and explanatory way.

Problem Solving Abilities

It's possible that the descent meets some difficulties in the carrying out of his own assignments and doesn't succeed in reaching the preset objectives. The Tutor must have the ability to glimpse and to understand the problems and to undertake decisions among the various hypotheses of solution. The art to resolve the problems is composed of different abilities. They are all in some measure gifted of it, but it is well difficult that we have this qualities. The Tutor must be a rigorous observer, a strong reasoned, a creative spirit and, at the same time, a person endowed with extraordinary practical sense and of fulminating ability of improvisation.

The Problem Solving (technique in to resolve the problems) is an essential tool in the organizational trial and in the management of the descents.

Although a process of Problem Solving includes numerous passages that can variedly have woven and integrated between them, we can altogether divide it in 4 phases:

- First phase: The Tutor has the assignment to identify the problem / objective;
- Second phase: The Tutor must produce some possible solutions;
- Third phase: The Tutor must choose, to appraise and to plan the solution;
- Fourth phase: The Tutor performs the plan and currency the results.

The first phase serves for knowing well the nature of the problem and the objectives. It implies an observative and cognitive attitude. To know, however, has here an ampler meaning of that normally attributed to this word. It doesn't deal with a superficial knowledge, but to have access to the deepest aspects of the situation, deals with knowing-again the authentic needs, difficulty and demands of the descent , to analyze the situation, to pick up the data to individualize the criticises.

The second phase is decidedly the most creative of the Problem Solving in how much it has as I sweep that to produce possible solutions. You ask for an attitude that leaves free field to the thought and allows to surrender him to his/her own visions, intuitions, feelings and even emotions. In this phase it is important to leave the free mind to apparently connect between them distant elements, to have access to his/her own resources and to also formulate those hypotheses that we would normally exclude because apparently few realistic or incompatible with our ideas leading. The search of solutions, in fact, asks at times for the abandonment of some convictions that you/they have driven us in precedence or their integration or change. If the problem is defined, every decision halves the field of the ambiguities and door toward the solution of the problem.

The third phase has the purpose to produce some real plans of action detailed. It implies a realistic and critical attitude. When ideas become projects, it is important to appraise their degree of realism, that is their impact with the reality. The fourth phase is the execution of the plan. Its purpose is of the project to make real and includes the empirical evaluation of its effectiveness. It is characterized by an operational mental attitude, practical, executive.

Didactics Strategies

The Tutor is able to effect determined didactic strategies in relationship to the individual differences that every descents introduce.

Strategies based on Trainer / Descent

Beyond the homogeneity or the heterogeneity of the virtual class, it is underlined in the activities of collaboration online the single participants have the tendency to develop a vast range of virtual personality. They obviously are not easy behaviours to manage, kind if the case wants to be contemporarily foreseen all; the goal priority points however to prevent that every fossilizes him on the initial attitude and to try to gradually modify his/her position. Assignment of the Tutor will be therefore that to recognize the virtual identity of the descent driving him to its formative iter .

According to the attitude assumed by the descent , the Tutor must assume a suitable behaviour keeping in mind of the different specific objectives of learning (OSA).

UNIVERSITY STUDENTS FACE THE NEW VIRTUAL TOOLS: NEW PERSPECTIVES

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Blogs. Questions for a world wide debate

The blog phenomenon is not a media revolution undercover. Blogs are present in all scientific discussions, in the web communication and in any act of conversation in general (Varela, 2004). In spite of this, or may be because of it, people look for the identity and quality of this new media offer which is characterised by making the receptors disappear to turn everyone into a potential communicator (Bartolomé, 2005). People look for the relationship between blogs and the traditional media. Blogs have a journalistic and instructional identity, so they have much in common with journalism or the teaching institutions. Blogs can complete them or sometimes substitute them (Bartolomé, 2007).

Taking into account that there is not much research carried out about Weblogs, some studies reveal that what is valued in blogs (Lozano, 2007). Those are examples of the results obtained:

The exclusivity of the information 80%, which offer better perspective 78%, their rapidity 66%, sincerity 61%, the exclusivity of the information 58%, the personal opinion of the author 57%, the participation in discussions 43% (Copeland , Henry [http:// www.poyinter.org/contest](http://www.poyinter.org/contest)).

The topics which have been more studied are related to:

- Content analysis
- Data interpretation
- Situation of fairness which is created in the population
- The evaluation carried out by the users about important elements such as credibility and quality.
- How to complement journalist and weblogs.
- How to integrate weblogs into professional journalism
- How to use blogs in long life learning

According to some current German research (Theunert and Wagner, 2006; Neuberger, 2007) , the most evident data obtained about weblogs are:

Table 1

Aims of weblogs used by press writers			
Aims	Frequently	Seldom	Never
Ideas	42.4	48.5	9.1
Current events	31.0	24.1	44.8
Weblogs as an object of information	28.1	46.9	25.0
Reports of witnesses who can be quoted	18.2	66.7	15.2
Context about themes	17.6	47.1	35.3
Critics made to companies and politicians	15.6	43.8	40.6
Echoes about information	13.8	44.8	41.4
Reports which can be quoted	12.9	51.6	35.5
Spread of opinions	12.9	32.3	54.8

Table 2

Comparison of characteristics and quality between journalism and weblogs. Sample 86 people. Chief editors in National affaires section May-July 2006.			
Questions	Related to weblogs	Related to Journalism	Related to both
Personal perspective of the author	90.7	4.7	4.7
Access of users to the sender	63.1	10.7	26.2
Intensive discussions about some topics	45.2	8.3	46.4
Wide array of opinions	34.1	12.9	52.9
Commentaries about current affaires.	27.1	30.6	42.4
Controversial daily topics	16.5	31.8	51.8
Multiple information	14.1	50.6	35.3
Entertainment	11.8	32.9	55.3
News	10.3	52.9	36.8
Deep treatment of the topics	7.1	72.9	20.0
Follow up of the information	7.1	78.6	14.3
Information about services	5.9	70.6	23.5
Neutrality	1.2	94.1	4.7
Relevance of the information	1.2	80.0	18.8
Accuracy in the information	0.0	94.2	5.8
Credibility	0.0	90.6	9.4

We have researched in the Journalism faculty, asking a group of 23 students about blogs. They have a double role as they are active and passive users of blogs, and are sensitive towards the question to be debated.

Methodology of the empirical research

The concept, uses and functions of the blogs may seem at the beginning diffuse, and we try to find their limits and conceptualisation. The common characteristics are limited to a few things such as: chronological order of periodicity, number of participants, etc. After having reviewed the pertinent literature, we have started with the technique of discussion groups first and then we have carried out with the students their autobiographic reflection, in order to know the way of thinking of the two groups of young students of Communication. The samples were 25 and 50 people, aged of 23, both

male and female. They all live in Madrid, although come from different parts of Spain, equally representing urban and rural areas.

Results

Concept. About the concept of blogs, students say: “Blogs are Internet spaces created to allow a person or a group express freely. The author thinks of a question, publishes it, and s/he gets immediate feedback with the comments of the readers (1). They are web sites where people can daily write the information that they consider interesting (2). Blogs are like web pages where any person, who does not need to be a professional journalist or communicator, tells both in a subjective and objective way, some aspects of current reality (3). Blogs allow bidirectionality (4). They are web pages which contain diaries mainly written by journalists who talk about current topics (5). They are internet sites which contain web sites where topics are discussed and commented by the jeans of more or less large commentaries (7). They are diaries, a person’s personal page published in the Internet (8). They are spaces in the Internet designed for the interaction among persons through debates and opinions about the topics shown there (11)”.

Types of blogs. Blogs are not exclusively *text blogs* where people just write any kind of information. There are other types of blogs, such as *photoblogs*, *audioblogs* and *Vblogs* (or video blogs). The first ones have pictures which accompany or not some texts. Audio and Vblogs contain audio and video which can be downloaded in mp3 and mp4 files. Apart from this basic distinction, there are other types of blogs according to the aim of the author: *Company blogs* where products are advertised and promoted (17). *Newspaper blogs*, characterized by having a blog for every specific topic (20). Example: *20 minutos* (23).

More well known and used blogs. Communication and journalism students who participated in this study used the blogs of the newspapers, where the most current events are treated are: *El País’s Blog* . *El Mundo’s Blog* . Blogs about Music. *Nesemu.blogic.es* : A blog from a UCM lecturer where current topics are daily analysed and the readers can leave a post it (2) It shows opinions about the main current events and short fiction stories. (3 , 10, 11,12, 19.) It offers links and bibliography, documentation about the topics, legislation.. (20). The blogs which we use are those created by friends and colleagues, as they write what worry them more, what they like, their favourite pictures, their favourite music, and the readers comment on those topics. (4) . Space where a video can be downloaded (13). *Blogger.com*. Blogs with updated information where the latest news are commented. Vlogs, Blogs with audiovisual information. *Floggs* , which are Blogs created by companies to publish their products but which look much alike normal blogs. *Flog* means *false blog*. *Journalistic blogs* and famous writers’ blogs. *Newspaper blogs* which allow debate on the hottest topics through comments on the topic or on other people’s contributions (10). *Fotolog*, espace where commented pictures can be found (13). The blogs from the different newspapers are meant for following up the international conflicts. Those allow to deeply know the situation. Some contain multimedia elements such as videos what increases their transmission capacity. In addition, the web surfers can leave their comments contributing to interactivity and bidirectionality of information (14). *El mundo de mini*. It is a music blog where you can download “podcast” from very interesting groups who are not very famous or well-know by the general public.

(15). Journal *As*’ blog dealing with sport topics that cannot be treated in the paper version. Internauts have the chance to discuss about the topics appearing there (15).

Confidente . Political news which are daily updated. *Con lápiz y papel*: Political information which is updated weekly. *El ojo*. Blog on literature whitout regular updating.

Crónicas galaicas: socio-political actuality that is daily updated (16)

Uses of blogs. The opinons of students on the use of blogs have revealed interesting answers. They say: “I use blogs to see the opinions about a certain topic (1), for updating about current events (2), to

read and check the perceptions of the existing world (3). Blogs are useful to sep the contact with people who I cannot see every day, my friends, people I share musical interests with but who I have never met, etc. (4). Blogs are useful for considering some aspects of the news which are not treated in the digital versions nor in traditional journals (7). I read and keep the information and photographs (8, 9). I check blogs up to learn more about relevant news. I sometimes write comments on them (10). I think about some topics, I learn more and I share my ideas (11). Blogs are used to discuss some press articles (12, 13). I use blogs to read and even to find job offers and training information. Photoblogs are useful for meeting my friends when they are away. We can interact and share what we think or how we feel (14). I get information about social, political or economical topics and the diverse opinions about them (15). Blogs are used to contrast opinions and share versions of the Spanish political reality (16). I usually see the pictures although some times, and every time more and more I look for information for some classroom assignments about specialised blogs (17). Blogs have informative uses on certain topics, such as the case of the parking collector machines in Madrid (18). Blogs have an informative utility which complements education, because it can be very useful to fulfil people's own curiosity to know more about certain topics (20). Blogs allow reading the articles and maybe the comments (20). Blogs serve to get informed about the daily news (23)".

Advantages of blogs. Students say that blogs are "easy and quick to read (2, 21). I think they are very good means for creating and increasing free expression (3 , 17). They are highly interactive.(4). Their contents are very flexible (4). Their contents are very varied (4, 6). The access to the information is very quick (5). Opinions are varied (7). Blogs can be accessed round the clock (7). Blogs allow to look for more information (7) . They are easy to find (8). They have links with interesting sites (8). Blogs make easy to know other people who share the same interests (9). Blogs allow to share knowledge among many people (9). Blogs allow to give your opinion (10). Blogs provide many points of view which allow to look at the topics with a certain objectivity (10). Blogs develop analytical skills (11) Blogs enhance dialogue and communication among many people. (11, 13), Blogs are places for debating, commenting and sharing interesting topics (12). Blogs are the place where you can read what people think (13) or discuss hot topics (13) or get rid of your stress and bad feelings (13). Weblogs are a new way to learn and participate in information (14) because you can find many links on the same topic (16). Blogs fulfil my curiosity (18). You can see different points of view and debate about the topics which interest us (19,23). They have the advantage of helping with the specialization on a topic (20). They allow interactivity (23) and instantaneity (23). "

Difficulties found

The week point of blogs, according to the sample of students are:

Much information comes from unknown sources, so it can be misleading or wrong because the authors are anonymous (5). Some times the information does not have to be 100% true (6). Many authors are amateur writers (6). If people write a comment or entry, can be censored by the author who eliminates his or her comment, restricting the contributor's freedom of expression (9). Sometimes, I do not know the context of the topics, they I sometimes do not send any comments (10). There is not much information about Latin-American countries (10). Sometimes the blog is overcharged with opinions which cause a dispersion from the original intention of the author or the central topi (11). I wish to read well know blogs without advertisements (12). I do not have any time to read blogs or comment on them (13, 14). Some blogs I like are not Spanish and I would like to understand everything they say (15). I wonder about the reliability of the data shown (16). The information which comes from an individual might not be very reliable or might even be false (17). Blogs have to be careful with language and opinions in order not to disturb nor offend people (23).

There are people, however, who say they have not found any difficulties in blogs, as they are relatively easy to use. The main references to difficulties have to do with contents.

Quantitative analysis of blogs

The data obtained in the former analysis allowed us to design the following model to study the variables which can be found in blogs. The uses of blogs have been a key issue in this research. The questionnaire was administered to 50 male and female. University students.

Gender variable. Regarding the variables considered, we can see that female students access the blogs mainly for entertaining (68.3%). Training is the second reason (35.1%) and finally for educational purposes, only a 8.1% use this resource. Female students work or play with blogs mainly individually (78.37%), leaving a small percentage (10.81 %) of the use together with other people.

Male students who use blogs for entertaining are even more (81,8%). Then, they use it for training (45,45%). They also like to work with blogs alone (72,7%), as only 27,27% of them prefer to work collectively.

The results of the survey carried out with the group of students were:

Table 3

	YES	NO
Blogs are easy to read	76 %	24 %
Blogs facilitate free expression	87 %	13 %
Blogs facilitate interaction	85 %	15 %
Flexibility of contents	94 %	6%
Blogs present a wide array of opinions	85 %	15 %
Blogs allow to get more information about something	81 %	19 %
Blogs help me improve my training	72 %	28 %
Blogs help me obtain more information		
Blogs help me meet other people	85 %	15 %
Blogs help me keep in touch with friends	80 %	20 %
Blogs help me give my opinion	83 %	17 %
Blogs help me Fulfil my curiosity	84 %	16 %
Blogs help people dialogue	85 %	15 %
Blogs are a good place to debate	92 %	8 %
Blogs help me get to know the news better	74 %	26 %
Blogs allow to find links with other blogs	82 %	18 %
Blogs help me specialize	84 %	16 %
There is sincerity in blogs	68 %	32 %
In blogs, one can believe what one finds	71 %	29 %
You get new ideas thanks to blogs	72 %	28 %
In blogs, I can find apolitical critics	85 %	15 %
I find topics for my academic training	85 %	15 %
I find topics for my personal growth	70 %	30 %
They create more inequities	85 %	15 %
I find entertainment	75 %	25 %
I find information about services	70 %	30 %
I find accuracy in the information	49 %	51 %
Blogs help me think reflectively	78 %	22 %
Blogs help me think in other people	73 %	27 %

Open questions

Weblogs and professional journalism have a complementary relationship. They are not concurrent. Blogs cannot inform in a universal and continuous way. We have to consider that profession and participation are not excluding each other (Sevillano, 2004). Blogs and their connection with the information allow us to foresee a future where more and more people can access new ways of intercommunication, where we could find communication and education environment which would be more attractive and useful, which at the same time, facilitate social cohesion and reinforce the relationship with the professional life. We would also like to see how blogs contribute to establish links with research, help develop an entrepreneurial spirit, reinforce the relationships with society, increasing mobility and interchange by reinforcing cooperation (Villar, 2005).

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THE ROLL OF MULTI-SITE EDUCATIONAL COLLABORATION

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Introduction

Education is regarded to be a key to economic growth and social cohesion and the right to receive an equal education is regarded as a fundamental human right by UNESCO and OECD. The purpose of distance education is to realize the equality of education. The educational programs in ordinary distance education systems are broadcasted from a centre, which tends to be also a network centre and the subjects will be selected to collect as many students as possible. Subjects that collect fewer students are difficult to provide in those systems. But subjects so advanced or so specialized, for example, are not always popular. The number of students, lecturers or participants does not mean the importance of the subjects.

Because many professors, researchers and students who are interested in such subjects are scattered across many universities, it is important to collaborate with each other and to share these scattered resources and needs. As Gatliff argued the effects of the collaboration, the lack of faculty strength in each field at each institution can be covered by faculties in other institutions by collaboration[4]. And undersubscribed courses on the individual campuses can be held as joint courses with other universities.

The encounter with different ideas is important for students to improve their understanding[1]. The activation and consolidation of knowledge through interaction with others is often observed[3]. The importance of knowledge construction or capacity building through mutual interaction is noted in many literatures. In such context group interaction has significant effects for students. The interaction is important in education. The importance stays also in distance education. The interaction is desired to be done as naturally and freely as possible like in a classroom even in the remote conditions. Although the efforts for pedagogical design and presentation are required, educators can adjust to students of different learning styles and different aims including skills, knowledge or understanding that may require different ways of teaching. The higher media naturalness enabling synchronicity, facial expression and body language gives participants fluency and physiological arousal[6]. Easy dialog, feed back and interaction can be easily provided by video conferencing system because of its higher naturalness. And many examples can be seen in the world including a practical example of a videoconferencing network using terrestrial network ICN[10] in USA.

This way, the natural multi-site collaboration system between many independent educational institutions with equal capacities and functions will contribute to the improvement of educational quality effectively by rapid introduction of reciprocally supporting and also relative and competitive collaboration environment.

Terrestrial infrastructures including the Internet efficiently cover densely populated urban areas. But sparsely populated areas tend to be covered at a much slower rate than such urban areas. Education has to be provided equally to the students and research activities have to be possible equally even the students or researchers are in a remote condition. Satellite systems can easily cover wide areas with dedicated channels of reasonable bandwidth without concern for the condition of the terrestrial infrastructure. An inter-university collaboration network was realized and has been operated under the name of SCS (Space Collaboration System) since 1996[7]. Through various collaboration activities using SCS, lessons have been learned among universities.

This article discusses the importance of the multi-site collaboration between educational institutions using actual operational results of the large scale natural collaboration system SCS and other

international collaboration experiments; how the collaboration system enhanced the educational collaboration and how it contributed to the educational improvement.

Natural multi-site interaction

Kock proposed media naturalness hypothesis and argued the elements of the natural communication including a high degree of synchronicity and transmission capability of facial expressions and speech. [6]. We feel comfortable if we use natural media when we communicate. Realization of such natural collaboration environment for universities is important. The collaboration through network requires equivalent communication capabilities for all sites. To take the group collaboration through the network into consideration, additional functions have to be included to realize the natural environment as the interaction capability with plural sites and the transmission capability of plural images.

In the design of the SCS, a video conferencing function with multiple pictures of sufficient quality, and unrestricted participation by independent sites are considered to be necessary. To facilitate natural interaction, every station was designed to have multi-channel handling capability. Two 1.5 Mbps channels of simultaneous transmission capability were given to each station for two different pictures, a lecturer's face and his material, for example. And three channels connected to CODECs can be shared among universities participating in a session. Any number of parallel sessions is possible. Economical multi-site operations became possible by sharing these three channels for a session. Easy channel switching is performed by the control signal initiated by the chairman station in the session. The equality of sites was realized by giving transmission and chairman function to all stations. Any number of stations can join a session and speak equally on a channel-on-demand basis. In effect, large symposiums with presenters at different sites among several tens or more than 100 universities have been commonly held in SCS with ease.

Actual collaboration between universities

The operation of SCS started in October 1996 and a total of 150 stations were installed in 120 higher education institutions; universities, colleges, collaboration centres, etc., by 2000. A variety of education and research collaboration activities have been performed on the SCS network for more than 20,000 hours in over 8,500 sessions have been accumulated. Sessions for course exchange were 47% and sessions for research workshops were 19%. Course exchanges, research workshops and symposium were 70% of total collaboration activities. As multi-site participation is possible on SCS, the cumulative number of universities that have participated reached more than 47,000 sites. Lectures were shared with an average of 4.4 universities and symposiums were with 13.3 sites. About 20% of the sessions for course exchange were with more than 4 sites but those for symposium were with more than 20 sites. There were many activities with several tens of sites, including those with more than 100 sites. The total number of site-hours has amounted to more than 126,000 station-hours [8].

Many universities could approve credits for distance courses from outside "fellow" universities. Typical examples of course exchanges up to now are as follows; 15 periods of "Communication study" class among Sapporo and Kushiro campuses at Hokkaido University, 12 periods of "Modern IT" class between Keio University and Waseda University, 12 periods of "Regional Environment" class among Obihiro University of Agriculture and Veterinary, Hokkaido University of Education, Hokkaido University, and Kitami Institute of Technology, 9 periods of "Pedagogies" class among 33 universities including Joetsu University of Education, Gifu University, Nagoya University, Osaka University and others, and 14 periods of "Venture Business" class among 7 universities including University of Electro Communications, Utsunomiya University, Gunma University Suzuka College of Technology, and others. Collaboration courses in a wide area from mathematics, information science, engineering, medical science to education, language education, and literature were held and it became possible because many universities could participate with equal functions and capabilities and the multi-site collaboration environment was available.

Effects of educational multi-site collaboration

An increase in the number of courses to choose from was evaluated as a benefit for students as Gatliff mentioned[4]. The lack of faculty strength in each field at each institution could be covered by faculties in other institutions by collaboration and undersubscribed courses on the individual campuses could be held as joint courses with other universities. Moreover, a broader outlook through interaction was stimulated as indicated in the user's response; "SCS has provided students with the opportunity to compare educational systems and contents as well as providing professors with the tools to teach remotely". Practical benefits for lecturers were naturally described in various ways; SCS contributed to "decreased travel when giving classes", "a reduced load for professors" and the provision of "enriched experiences through collaborative activities with other universities". Many users referred to the effects on faculty members, such as ample opportunities to experience, study and reflect on the distance education itself through SCS. Professors are not only educators but also researchers. Research workshops or conferences with researchers in other universities could be easily held and the feedback from outside were effectively used. The flexible and natural multi-site collaboration environment was useful for students, educators and also researchers in a campus.

Designed interaction and student involvement raises the level of course satisfaction as described in [2]. There were many papers that pointed out that "educational benefits depended on carefully designed pedagogy rather than the media itself". The need to involve remote students in classes was expressed in many reports on successful experiences: "Students evaluated classes highly when the classes were carefully designed to allow them to share with their lecturer." Many reports pointed out that students raised in different educational environments and specialties could join the common course or discussion through SCS, and that those experiences stimulated and increased their motivations. Encounter with the diversity of ideas improve students' understanding[1]. Not were only students motivated by the interaction with other outside classes or professors, but the professors themselves were also similarly motivated by watching classes done by other professors at different universities. This is also one of the valuable effects of the collaboration with different institutions.

The excitement typically represents one of the important features of the natural media. It was also observed in international collaboration experiments linking two networks of SCS and other experimental network, Post-Partners network for more than 70 times. In those experiments, Japanese universities enjoyed collaborative courses with Thailand, Indonesia, Philippine and Malaysia. A virtual face-to-face discussion gave emotional impacts to students. And it gave motivation for mutual understanding and further learning. Cultural diversity gave positive effects[9] and so did multi-site, multilateral interaction. Preparation with students leads to successful sessions. Mild understanding of the difference of cultures and systems is also important for International collaboration. These experiences will also contribute to the improvement of education by accumulating widely the actual educational know-how.

As SCS provided a virtual environment in real time similar to face-to-face classrooms, two-way features and the ability to see others in a group, common problems in synchronous distance education were observed in some group-to-group course sharing activities. Complaints regarding the need to arrange classes, curriculum, schedule, and prepare for classes and also some unforeseen accidents were reported. Classroom conditions including equipments were arranged by each university and therefore differed from university to university; such as different cameras or monitors, different layouts including the touch panel controllers for video signal and site switching. Because these conditions are unfortunately directly related to the system interface, some negative responses regarding the system by the users were mixed. Some reports referred to the need for assistants, such as "at least one person is needed to handle the controllers in order to provide courses of higher quality", although one-man operation was targeted in the design of SCS and one third of the sessions were actually operated by lecturer alone. Insufficient or inadequate focusing, lighting, camera operation, or audio level adjustment was often experienced especially in the earlier phases of operation because the system is not operated by audio/video specialists but by ordinary faculty members including lecturers. But it is important to note that many of them would not have had these experiences if the easy collaboration

environment had not been realized. The accumulation of these experiences will contribute to the improvement of education.

Summary

The actual results of more than 126,000 station*hours of collaboration sessions and many published reports on the collaboration activities achieved between universities in Japan showed the significance of natural multi-site collaboration among independent educational institutions and the effectiveness of the system that allows easy collaboration. Realized condition benefits students and faculties in universities. Students can attend outside important activities easily and they are stimulated by the diversity of ideas and culture. Faculties can exchange ideas and experiences easily with each other even staying at their own sites. A natural multi-site collaboration system which links independent educational institutions in a country with equal capacities and functions will contribute to the improvement of educational quality by rapid introduction of reciprocal supporting functions and relative and competitive collaboration environment.

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STEPS OF SKILLS – CREATING A LIFELONG LEARNING ORGANIZATION IN THE CARE OF THE ELDERLY

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Background

”Steps for Skills” is a government appointed, multi-year national initiative to support municipalities’ long-term quality and skills development in health and social care for older people¹. The purpose of the Steps for Skills is to improve the internal quality of health and social care. This will be achieved by developing the skills of the staff working close to older people. In the period 2005-2007 a total of more than one billion kronor will be awarded to municipalities that want to enhance staff skills and improve services. Awards will be made on the basis of applications from municipalities².

Courses at Stockholm Institute of education

During the year 2006 two courses for “Steps of skills” –initiative were implemented at Stockholm Institute of Education (SIE) in collaboration with Ministry of Health and Social Affairs's national investment on skill development within the geriatric care. The participants were recruited from those six municipalities that participated in Steps of skills pilot projects. Tutor education during the spring of 2006 had 23 participants. The education during the autumn had 43 participants.

There were four different staff categories within the geriatric care that each was involved in our educations:

- tutors, a new role with pedagogical responsibilities (mostly assistant nurses)
- operating chefs with responsibilities for the organisations and local units
- elected union representatives with focus on the staff’s working situation and the skill development of the staff
- teachers - with the assignment to develop the geriatric care's pedagogy and with responsibilities for learning

The courses' common aims were to give the participants:

- deepened knowledge about the workplace as a learning organisation
- knowledge about the pedagogical content in College Coaching and the Learning Dialogue
- resources to develop the geriatric care's organisation and individuals and groups in it
- to become familiar with net based learning environment

The content in the courses connect with the experiences that the participants have from the work within the geriatric care and from current research and literature. The content concerned also the staff’s competence needs and skill development. It concerned the production teams' need of education and the participants' individual needs. It included also analysis of intentions, visions and action plans but above all of the concrete activity. The participants learned also about the digital technology's

¹ Kurserna ingick som delkurser i masterutbildningen IKT, lärande och pedagogiskt arbete. 60 hp. LHS

² Bjessmo, Lars-Erik, Karlsson Ulla; Handledarutbildning inom äldreomsorgen. UKL. LHS 2006.

importance for learning and work. We linked the practical experiences of Learning Dialogue to pedagogical literature about leadership, colleague tutoring and activity development³.

A very important element in the education was to implement a project activity on your own working unit with your own staff members. This project was to illustrate experiences of building up and to develop learning activities at work.

The courses were carried out both through physical and digital meetings. Between the campus seminars, the participants met on web seminars. The courses were built thus on two different learning environments; one physical and one digital. During the physical meetings, the educational methods were the same as during the digital meetings.

A detailed study plan for the entire course was prepared. It shows with clarity how the course is built-up and what educational methods are to foster the skill development. The aim was that the participants not only would have theoretical and methodical knowledge. They would also need to be able to use the new educational role that they were to become familiar with. The course included elements of educational ICT i.e. knowledge about how electronic tools can be used for the learning activity⁴.

During the course's time and after the completed course, the work was evaluated with an electronic tool in aim to develop and to improve the shapes and the methods for the skill development.

The participants have continuously been examined. After each web seminar both common and individual contributions documented on our virtual platform were presented. We wanted to thereby to emphasize the process's importance for learning, not only the end product's. During the ultimate campus seminar the participants presented both verbally and in written reports what they have learned. They presented various proposals to improvements for skill development. Our experiences, as does the collaborative theory about learning, say us that the link between physical and social activities and the digital presence has had importance for interaction⁵.

The educational tools on our virtual platform were exchanges of experience, literature analyses, written contributions, responses and discussions. The communication on the platform was flexible i.e. independent of time and place. The communication grew forward through participants' own questioning where argumentation and responses were included. The documents on web were preserved and developed over the time. During the course's time, the participants had mutual access to each others' communication, documentation and learning. On the platform enables text, picture, sound and multimedia presentations to be published.

An important learning resource during the studies was the participants' own work experience. It meant that the participants actively worked with analyzing their work experience and other participants' experiences in the light of educational/ didactic theory. We strove after doing the study circles heterogeneous compound so that different experiences were represented in the groups. The participants in the study circle shared the responsibility for learning and the interaction in the group. The task to lead and to summarize the group's work circulated among the members.

The meaning of the course was that the studies were to be anchored in the occupational role i.e. the professional thinking and acting⁶. Theories about learning that focuses on practice communities has quickly won territory within educational research. The researchers Jean Lave and Etienne Wenger has presented a model for the situated learning where they emphasize that learning can be linked to

³ Bjessmo, Lars-Erik, Karlsson Ulla; Att bygga kunskaper. Häftet för didaktiska studier nr 75. HLS förlag.

⁴ Koroma, Eeva, Karlsson Ulla; Studiehandedning för handledarutbildning inom äldreomsorgen. HLS.

⁵ Scardamalia, M.; Collective Cognitive Responsibility for the Advancement of Knowledge (2002). (I Smith, Barry, & Bereiter, Carl (Red.), Liberal education in a knowledge society. Chicago, Illinois: Open Court.) s 67-99.

⁶ Wenger, E. (1998) 'Communities of Practice. Learning as a social system', Systems Thinker, <http://www.co-il.com/coil/knowledge-garden/cop/lss.shtml>. Accessed December 30, 2002.

participation in what they call practice communities which can to be both institutional and spontaneous.

From a course evaluation can we read following participant's comment concerning the task to summarize a discussion:

"In my group we have been precise with the fact that we should all the time return to the issue we chosen to discuss although we have given ourselves time to fly out". To summarize and to speculate on if the issue is responded to or not, to write comments on the discussion, is very important to learn in order to see the whole picture, to learn to have a global approach."

According to the theory about the Computer Supported Collaborative Learning the participant is considered as an individual with potentials, perfectible capabilities and knowledge. An education on the basis of this perspective on learning and learners requires practical experiences on work, activities of various kinds. Knowledge builds on the relation between the thought and the activity, between to learn and to do, between theory and practise. It is not only about process of learning itself but also about knowing how knowledge is built up and what the conditions are in order to modify and through aware reflection on equal basis take part in process of learning and the Learning Dialogue⁷.

Concurrently as the course participants been in work has the organisations' human capital developed. The skill development has lead to a load of new both practical and theoretical professional skills.

The Learning Dialogue method

The educational method, the Learning Dialogue, is one now common method for tutoring and coaching. The aim of the method is to, in a structural way, formulate questions around a professional activity, to lift up the resemblances and differences for discussion, thus not primarily in order to find solutions or just complete the tasks. The answers and the solutions are more associated with the implementation of practical experiments. Learning Dialogue is characterized more of a dialogical approach on learning than one of defending a thesis run-up. The dialogue is carried out in group where everyone takes part in the conversation and all the ideas and thoughts become visible i.e. they will all contribute to mutual learning and everyone involved share the responsibility so that the dialogue goes on. It is important to have an attitude and an understanding for the conditions of the activity and to making the participants' relationship to the activity visible.

The dialogue is to alternate between different levels on learning; activities, experiences, values and theories. The aim is that the group develops a common attitude to its professional role. From a perspective more characterized of authenticity, anchored in reality, the learners' practical experiences and even the attitude to change, development and hopefully improvement develops⁸.

An educational method for learning requires tools. The tools for the Learning Dialogue are: listening, asking, structuring in levels and different perspectives of organizations. Reflection is of grate importance as is the documentation of the participants' reflections. The participation in the dialogue is central. Everyone in the group is to present their thoughts.

⁷ Koschmann, T.; CSCL: Theory and Practice. Of an emerging paradigm. 1996. Mahwah. New Jersey.

⁸ Följande böcker med Lärande samtal som tema ingår i kurslitteraturen:

Ellström, P.-E. & Hultman, G. (2006). Lärande och förändring i organisationer : om pedagogik i arbetslivet. Lund: Studentlitteratur.

Eriksson, G. (2001). Arbetslagsutveckling och lärande samtal. Karlstad: Regionalt utvecklingscentrum, Skriftserie1.

Lauvås, P. m.fl. (2005). Handledning och praktisk yrkest teori. Lund: Studentlitteratur. (384 sidor, valda delar: 250 sidor).

The participants' reflections on the education

We choose here to show some glimpses of the course for tutors where the participants in their final report present their view on “The Steps of Skills” education. The quotations are selected on the basis of the description we done around the method of dialogue that the participants learned to apply on their workplace where their task has been to develop the skills of the geriatric care's personnel.

“This course has meant hugely for me, I have developed as a person. Through all these meetings with different people, through knowledge that I have achieved through literature and above all through the Learning Dialogue. All this has got me to see people, situations and events with new eyes and from other perspectives. My focus, awareness has increased, my self-confidence has grown and I have become a safer person. I have got a greater desire to learn and to acquire knowledge.”

This quotation is representative for how the participants describe their personal and professional development. The course has built up their self-confidence in the new role of a tutor and the perspectives on working practise has been stimulating and motivating. The participants have both recognized and developed their own base of experience. They have felt that they have been part of an important phase of development in the geriatric care and their own working role has been reflected in other persons' experiences.

Learning Dialogue with its experience and practise based content, where everyone shares their learning with each other and thereby is participating in a developing process, has created strong motivation. It has simply been exciting to attend a course. Particularly exciting has been the keeping of the log where the week's work becomes an object for reflection. The digital study room and its openness in what has been documented means that the course becomes a meeting place for learning and developing of the tutor role.

The digital rooms are not the courses' only meeting places. Many of the participants describe also physical meetings with managers, with colleagues and with teachers i.e. persons that have importance for how their work will be planned, to be implemented and to be evaluated.

One of the participants writes this way about her future role in a big system of roles:

“As a tutor, my role is to complement teacher's work through among other things Learning Deliberations, support students in different situations in their practical activities and make space for reflection in and around the experience. I will also try to attract my fellow-workers to this investment and to get them to share of their knowledge, thoughts and ideas. There is an extremely big silent knowledge in the care personnel that should be lifted forward and to be used in the work. It is a part of my work to stay up and to question which actions I take. How will I act in order to function as a good tutor?”

The link between education and activity on work contributes to the fact that the course is experienced as worthwhile, stimulating and meaningful. Someone writes that she became aware about her own attitude and thereby now can influence her own understanding and her actions.

The participants have detected how the road to understanding goes through practical actions. Therefore, the course task, to implement Learning Dialogue method in a working team on your own unit is an important aspect in acquiring knowledge about the role of the tutor⁹.

⁹ Bjessmo, Lars-Erik, Karlsson, Ulla; Vägen till lärande går med nödvändighet genom handling. FoU-rapport. LHS.

Analysis of collaborative learning

Learning Dialogue and College Coaching are educational methods that permeate our campus meetings, the distance learning and the practical part of the education. The findings we here present and that also illustrate the education's results are seen from the participants' perspectives. The flexibility in time and place, that the distance learning make possible, is one of many factors that influenced to the result. Participation is not scheduled or connected to a certain room, adaptable conditions make it possible for the participants to choose when they want to carry out their studies. The flexibility is characterized also of the fact that the communication in this education is horizontal. The course's structure is adapted to the participants' professional situation and their individual needs and it is characterized of equal relationships between participants where hopefully each and everyone become visible.

During the education different organizations/working units with different needs and conditions meet and that makes it possible for dissemination of alternative forms of education within the care of the elderly as regards contents and arrangement. This flexible structure on the education has on a clear way contributed to that different shapes for skill development got dissemination and been compared with each other¹⁰.

The documentation is an of the corner pillars in the course. It has clearly been exciting to follow the process shaped in the fellow participants' texts. Unlike the printed word in the literature has the texts in the course been written over the time and been accumulated gradually.

When we designed courses in order to carry out the learning activities on three levels:

- an individual level
- an interactive level and
- a practical activity level

The individual activity

The active level is as the study plan prescribed. The students have during three seminar periods been activated in various way. They have been active in the study circle and in their own study room with the log and on the whole done tasks that they got. They have in other words been diligent participants as they done what they been expected: written work logs during the entire course, done literature tasks, responded to questions, participated in discussions, given response on each others contributions etc.

This level reminds largely about the traditional individual learning that permeate all education from basic level to academic level. Our assessment is that at distance learning it is important to have a clear and surely well thought-out methodical approach. This is essentially a crucial level so that the participants in the course get started, becomes participating and do their tasks. A person's absence is easily detected by an empty file.

¹⁰ Malmberg, Claes; Kunskapsbygge på nätet. 2006. s 44.

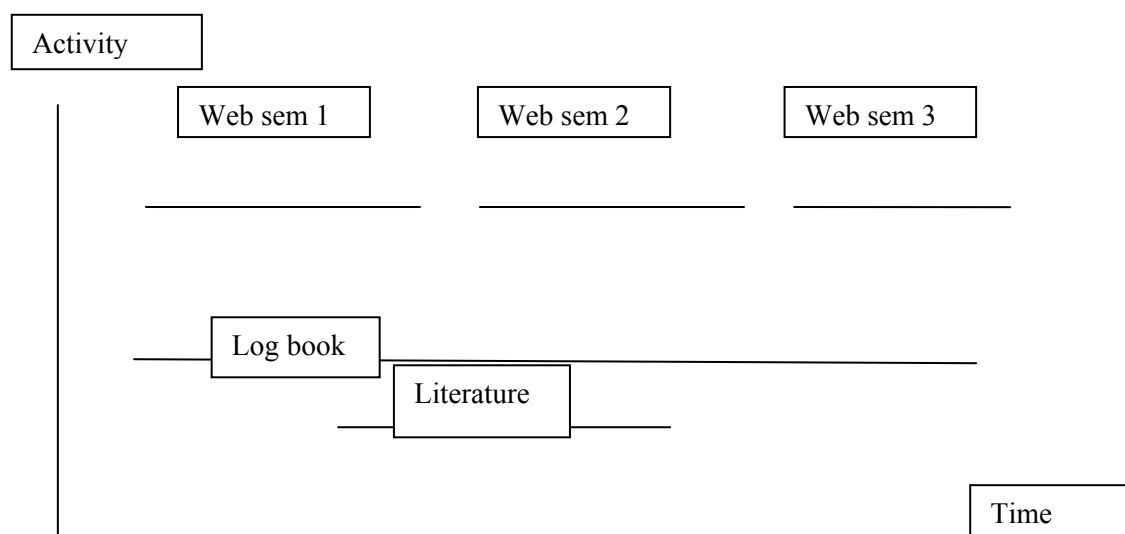


Figure 1 Model

The interactive level, learning networks

The interactive level has created motivation, been exciting and instructive. The participants have pursued a row of deepening discussions on the course's theme, the tutor role and the Learning Dialogue, that has given new knowledge and new experiences. The new has been to see how the interaction is grown forward over the time, to see how the communication goes in different directions between participants in same study circle, between participants that have visited others' study rooms, between representatives for different categories of professions etc. A deep study of all these directions shows how the activity from individual participants varies in amount and quality¹¹.

Notable is that several discussions are on simultaneously and that the participants go back in order to see what has happened over the time in this interactive group learning. Compared with traditional education with seminars and literature studies this becomes an entirely new educational environment. The participants take part of each others' education for an extended period of time not only during that limited time that the moment stands at one's disposal at the physical assembly¹².

A practical activity level

During the course the participants has had the task to plan, to implement and to reflect over a project based on their professional work. They have with curiosity and encouragement in a constructive way followed each others' project works. They have not only had an opportunity to take part of an final presentation but they have even been able to follow an entire process and moreover support each other in this process. The "reality near" content has given the studies its legitimacy, credibility and usefulness. There has been a feeling of recognition but at the same time a questioning of this recognition.

¹¹ Bjessmo, Lars-Erik, Karlsson, Ulla; Vägen till lärande går med nödvändighet genom handling. FoU-rapport. LHS. s. 89-115.

¹² Scardimalia, M. m. fl.; Computer-supported intentional learning environments. Ur Journal of educational computing research. 1989. Vol nr 5. S. 51- 68.

The support for learning

The three levels for learning have markedly contributed to an analysis of the geriatric care's activity and to development and renewal. The digital technology in itself has made it possible for learning meetings between participants and the use of the asynchronous communication has strengthened the mutual learning.

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CRIMCITY – EXPLORING ISSUES OF CITIZENSHIP AND CRIMINALITY USING VIRTUAL 3D ENVIRONMENTS

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Introduction

The CrimCity 3D software package was developed as a European Commission project under the Minerva programme and was designed to support the Personal and Social Development (PSD) curricula of the partner countries through the development of an interactive computer package. Partners were university departments from England, Germany, Poland, Lithuania, the Czech Republic and Austria. The project ended in autumn 2006.

CrimCity was originally conceived as an initiative to support a range of measures to design against crime. A 3D computer model was created as the context within which young people could be encouraged to confront the consequences of crime and to explore ways in which anti-social behaviour could be converted to pro-social effort. The package comprises a 3D software environment supporting a number of game-like modules designed to encourage pupils to engage in community development issues through simulating practical and constructive involvement with their communities. It is game-like in the experience it offers.

The value of game-like computer packages to support learning and teaching in UK schools has been recognised by lead educational ICT (Information and Communications Technology) organisations such as BECTA (British Educational Communications Technology Agency) and NESTA (National Endowment for Science, Technology and the Arts). In addition, researchers from the fields of socio-cultural psychology, literacy studies and cultural studies have all argued for a re-evaluation of computer games as powerful learning resources in young people's leisure lives [1-3, 6]. They are seen to attract and engage young people to learning who otherwise are seen as disaffected and disinterested in formal education.

The CrimCity Software package

CrimCity comprises 4 separate modules. Two are design packages. The other two encourage users to engage in problem solving activities experienced by police personnel in the course of their work.



Figure 1: Screen, CrimCity Bulletin Board (linked with the 4 modules)

Module 1 presents the user with a vandalised urban playpark. Through reading information screens the user is asked to consider the consequences for local amenities, their management and sustainability when faced with acts of vandalism. The screens present the user with the task of designing a playpark against four criteria: cost (a set budget is given), appearance, safety and security considerations. Users then drag and drop objects from a library into the 3D environment. They explore the environment and then are asked to self assess.



Figure 2: Screens of module 1 & 2

Module 4 presents a similar situation but in the context of a shop that has failed due to theft caused by poor security. Users are encouraged to learn and apply advanced design considerations relating to shop security such as sight lines of display units, sitting of check-out counters and closed circuit television coverage. They are confronted with the need to consider the conditions in which community shops can be sustained.

Module 2 offers the user the chance to act as a forensic officer investigating two burglaries. Exploring 3D domestic housing environments they discover clues left by burglars. They fill in evidence forms using a wealth of data provided by incident investigators and form hypotheses which can then be tested against an account of the back history of the incidents.

Module 3 has the user identifying six stolen objects found in a bag by the police and investigating their back histories. Witnesses are 'interrogated' and, as in the other police-based module, reports are filed and hypotheses made. Both modules are highly interactive and make extensive use of the scope offered by the 3D environment.

Evaluation of the CrimCity Learning Environment

Research Design

After interacting with the software package both students and teachers, as the end-users of the developed software (the target group) were to be asked their personal opinion about the learning environment.

In order to collect data on the usability and acceptance of the developed software package we designed a standardized questionnaire for the students. Besides personal data, the questionnaire contains items that cover different aspects of the first impression, the ease of use, the content and the usage of CrimCity in a classroom setting. Most questions were based on a 6-point Likert scale. The aim was a statistical analysis of the responses in order to obtain results that will help in improving the software.

A guided interview was used as the method to evaluate the opinions of teachers, education advisers and academics. They covered the following aspects:

- The suitability of CrimCity as a teaching instrument for crime prevention
- The perceived strengths and weaknesses of the CrimCity software
- Recommendations regarding the age profile of the target group
- Observations on the curriculum aspects that CrimCity supports [4]

Sample

275 students from different schools filled in the standardized questionnaire. The sub sample „expert interviews” consists of 15 interviewees in the five European countries (England, Germany, Lithuania, the Czech Republic and Austria).

Principally, we separately analysed the data for the students (quantitative data and qualitative data) and for the teachers (qualitative data). For the analysis of quantitative data we used the software SPSS (Statistical Package of Social Science).

Results

In the following we primarily present the quantitative data of the student questionnaire.

Overall Reaction

The first topic of the questionnaire concerns the overall reaction of the students to the CrimCity software. The rating was measured according to a six point Likert scale. In general the participants looked upon the software very favourably.

Table 1 Descriptive Statistics for Overall Reaction to the CrimCity-Software

The tool was	F	Md	P25	P75
1. bad-excellent	275	4,5	3,7	5,2
2. frustrating-satisfying	248	4,7	4,0	5,4
3. boring-fun	246	4,8	4,0	5,6
4. uninteresting-interesting	273	5,0	4,1	5,7
5. unrealistic looking-realistic looking	273	4,2	3,1	5,2
6. confusing-clearly to use	274	4,8	4,0	5,6

From all given parameter, the fifth „unrealistic looking - realistic looking” has the lowest rating (Md=4,2). The best rating is to be found in the dimension uninteresting-interesting (Md= 5,0).

Differences: Gender and Age Group

Additionally we split up the student sample (sex: male, female; age group: ≤15 years; ≥16 years) in order to compare the different groups. To sum up the results: In all six dimensions differences between male and female are not significant; the rating data (medians and inter-quartile ranges) are nearly equally distributed. Nevertheless we found significant differences between the two age groups. Figure 3 makes these differences evident.

The older students (16 years and older) rated the scales less positively than the younger students. Significant differences are to be found in the following three dimensions (bad-excellent $p=0,000$; uninteresting-interesting $p=0,000$, unrealistic looking-realistic looking $p=0,020$). Statements relating to the dimension frustrating-satisfying as well as to the dimension boring-fun are not possible, because of missing data.

The tool was:

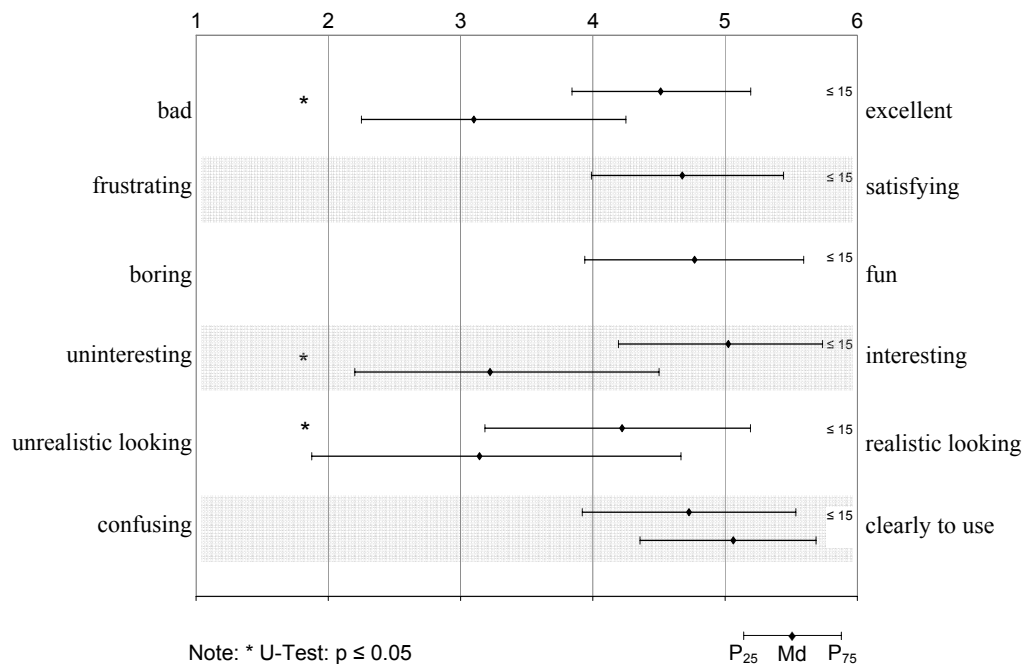


Figure 3 Overall Reaction to the CrimCity-Software by Age-Groups (≤ 15 years; ≥ 16 years)
Medians and Inter-Quartile Ranges

Ease of Use:

Another battery of questions relates to the software usability measured according to a six point Likert scale (strongly disagree - strongly agree). The analysed data confirms good software usability (no differences between male and female students). Older students (16 years and older) found the orientation ($p=0,002$), the navigation ($p=0,020$), and learning how to use CrimCity ($p=0,000$) easier than the group of the younger students (15 years and younger).

Table 2 Descriptive Statistics for Ease of Use

	F	Md	P ₂₅	P ₇₅
It was easy to learn using CrimCity	275	4,9	4,1	5,6
It was easy to correct errors and inputs	274	4,5	3,6	5,4
It was easy to navigate the program	274	4,7	3,9	5,5
It was easy to orientate oneself in the virtual environment CrimCity	273	4,5	3,7	5,4

Using CrimCity at school:

In this section, we wanted to know if students would like to use CrimCity again after they have worked for the first time with the package. In order to analyse the data of this question we asked at first about their general opinion on using computers at school.

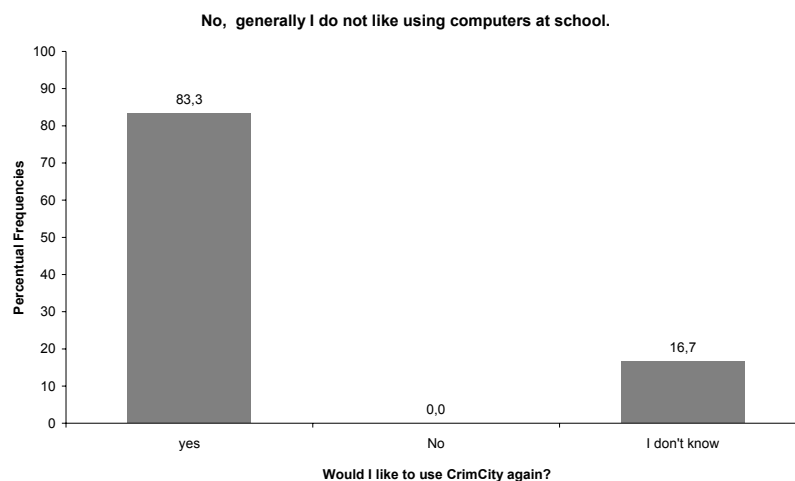
Most students of the sample (90,9%) generally like using computers at school, just 6,2% indicated that they do not like the usage of computers at school (no significant differences between male and

female). The next figure shows the data of students who like to use computers at schools in relation to the data of the second question 'Would I like to use CrimCity again?'

As was expected the pupils who like using computers at school would like to use CrimCity again (85,5%); just 6,3% indicated that they would not like to use CrimCity a second time.

We expected that students who do not like using computers at schools would not like the computer based tool CrimCity. However, the next figure shows the exact opposite.

Surprisingly, 83,3 % of students who do not like using computer at schools indicated that they would like to use the computer based tool CrimCity again. Not one of that group stated, „I do not want to use CrimCity again” (no differences between male and female students).



Fiure 4: Percentage distribution of the comparison „No, generally I do like using computers” and „Would I like to use CrimCity again”

With the following question „After having worked with CrimCity, do you like to deal with crime prevention further” we wanted to know if the software arouses interest in the subject matter.

The distribution reports that the older students especially do not like to deal with crime prevention further after having worked with CrimCity. The percentage distribution for the younger students looks better. Explicit differences concerning gender (male, female) are not to be found.

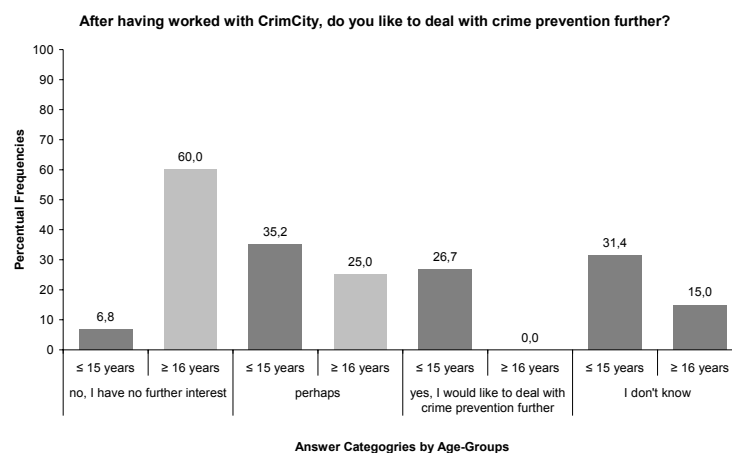


Figure 5: Percentage distribution by age of the question: “Do you like to deal with crime prevention further?”

Conclusions

The evaluation of the CrimCity-3D-software has been completed successfully following the appropriate standards of a social scientific evaluation [6].

The results demonstrate that the software was estimated of fine quality and adopted by the students in a favourable manner. More specifically it is appropriate to differentiate between user groups in relation to their age. Whereas pupils younger than 16 years like the software very much, older ones are somewhat more critical. Concerning sexes, a difference was not detected.

The qualitative data delivers some recommendations for the usage at school. So it becomes obvious that a pure usage as independent learning system [5] is less suitable. Preferred should be embedding the software into a teacher guided learning scenario. Whether the teacher training delivers already the appropriate access for such an adoption has not been tested yet.

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EASY BLENDING: PERFORMANCE SUPPORT SYSTEM FOR BLENDED LEARNING IN HIGHER EDUCATION

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In current pedagogical discussions the term blended learning is usually used to describe the condition where trainer combines two methods of delivery of instruction, i.e primarily face-to-face and some technology-based modes. However, the present meaning is also more about engaging the students of the contemporary generation by using new modes of delivery. How can the lecturers from the traditional European universities' setting face the shift in instructional strategy to new ways of delivery? The main educational weakness of the current dual-mode approach in traditional universities is according to John Daniel (1998) teacher-centeredness that attempt to multiply teaching effect by just using technology without changing the system of studies (e.g. replacing lectures by text in web). Blended learning has been found to be a viable and effective approach to deliver high-quality, up-to-date, on-demand learning solutions in the face of diminishing education budgets in higher education, further education or business education (Thorne, 2003; Valk, Seene & Pilt, 2001).

However, experience has also shown that blended learning solutions often do not live up to the potential of the approach or fail to produce the intended results because administrators, instructors and learners are lacking the relevant technical, methodological or organisational knowledge and experience (McLaughlin, M. & Mitra, D. 2001, Dirckinck-Holmfeld 2002). Educators and trainers coming from a traditional teaching background often find it difficult to integrate ICT and expand their methodological repertoire to meaningfully combine learning activities during face-to-face, live e-learning, and self-paced learning They tend to resist changing established and proven instructional patterns unless they have experienced the possibilities of alternative methodologies for themselves. The challenge is thus how to integrate virtual and face-to-face learning, and how to integrate the idea of communities of practice, professional development and problem and project based learning. The need for a European initiative for exchanging content and good practice examples has also been highlighted in the position papers from the eLearning Industry Group (2005) "Developing eLearning Communities in the EU" and "i2010: Fostering European eLearning Content to Make Lisbon a Reality".

Implementing blended learning in pro-active way creates real change in educational processes, it helps to use time and other resources more effectively and find solutions in complicated situations (big classes, overlapping of schedules, part-time working student-body) e.g. using web-based forums for seminars in case of big groups or using video-lectures for part-times students in order to save time for face to face discussions. Current presentation is representing the European project called B-Learn which primary aim was to achieve this by offering realistic success-stories and research results on blended learning and tools (EPSS) for making design of blended learning easier for teachers. In the Lifelong Learning perspective our intentions with developing the EPSS are mostly concerned with the way we design our teaching, how we choose new tools for content development, and how we learn to share our teaching experiences. The underlying idea for the EPSS is to initiate the change in learning and teaching paradigm in a proactive way, allowing the lecturers to easily design their courses without spending too much precious time on classroom lecturing and even without much intervention from technical staff of the institution.

Blended learning: mapping the theoretical perspectives

The concept of blended learning is multi-faceted and often confusing. Various sources refer to blended learning as the next big thing that will replace "e-learning". Within the higher education context

blended learning is not a new phenomenon. What is new is rapid increase and variability of possible components in a blend, especially in relation with Web 2.0 and E-learning 2.0. The institutions must decide, through selected criteria, how these components should be blended to produce a fruitful mix. A blended course must constantly determine the balance between face-to-face and technological components in using blended learning as a didactical method. The use of technology, however, does not automatically make any teaching process pedagogically better, the teachers have to take care that the process is pedagogically sound. There are several ways to integrate blended learning within traditional universities. This calls for educational designers to be sensitive.

There are numerous articles and books dealing with the theory of blended learning. The term it selves is referring to diverse aspects of learning and teaching. When studying the term it is obvious that there is not only one definition or approach referring to the term. Another feature accompanying the phenomenon is that the term blended learning has no clear translations in other languages. The question could then be if other cases investigating and researching similar questions, not defined as blended learning, are still dealing with blended learning? The answer to this question is obviously positive – it is not about the term, but about the practical handling of one's teaching.

Blended learning is not only to blend different media. In designing, developing and delivering different types of blends - component, integrated, collaborative or expansive – the learning outcome must be in focus. This can not be investigated without a look at the learners, the culture, the learning resources, the electronic infrastructure, the scalability and the maintainability of the proposed solution. Blended learning allows to benefit from the advantages of both traditional and modern ways of learning in higher education, and make innovation in otherwise traditional university teaching easier and acceptable. Integrating research and practical examples offers good bases for initiating change in universities that, by definition, are based on research.

As we can see the field of blended learning is diverse in its nature and it investigates several different aspects of the learning process and environment. The supportive theoretical framework for users of blended learning therefore have to contain models on how to blend materials, descriptions of instructional methods and the criteria for selecting between these. Though using the equivalent term, the main focus differs from discourse to discourse, from project to project like integration of technology within the teaching, perceptions of blended learning, the experience and the results of communication and social relationship, the effects on the didactics within traditional teaching or the organizational changes based on blended learning. Our theoretical discussion therefore includes the practical side from everyday work of blended learning users. B-learn project has introduced meta-analytical research reports where both theoretical and practical examples are presented. The B-Learn project, funded by the European Commission under its SOCRATES – MINERVA programme, is designed to offer a number of tested ways that integrate traditional learning methods with methods offered by new technology, especially social software and other applications associated with Web 2.0 concept. The primary target groups of B-learn project are the users of blended learning (teachers, students, instructional designers, educational technologists) mostly from higher education institutions, but from other types of institutions as well. First of all our intention is to offer our prospective users a simple, but effective, fully equipped web-based support application that solve meaningful problem of get started with one's blended learning.

The Practical Illustrations for Blending

Whatever area of teaching one might stem from, is it higher education or schools, commercial training or life long learning in folk schools, the prospective user of the blended learning will need practical examples and practical assistance more than searching for the theoretical perspectives of pedagogy and technology. Therefore the B-Learn project also is about collecting and presenting the good practice from various European educational institutions. The cases collected are genuine courses, modules and programmes, where Blended Learning has been successfully integrated in the ordinary traditional curriculum. The cases cover examples not only from technological sciences, but also from humanities, educational and social sciences and life sciences. These case descriptions provide basic information about the topic, pedagogical aspects, use of technology, blending methods and evaluation of the outcomes for each case.

The main purpose of presenting our case studies is to encourage individual teachers, professors and faculties to experiment with ICT in an innovative way, so that higher education organisations can benefit from the obvious advantages new technology provide for teaching and learning. First step can be as simple as adding email discussion list into traditional series of lectures, so that there will be more interaction between the lecturer and students, as well as between the students. An ultimate, totally blended innovation could be for example a course where video conferencing, Wikis, digital camera, mobile phones etc. are used to facilitate face-to-face research seminar where the students can be present either in person or virtually. Technology exists, and is also often already available in many universities, and at low cost (if not free). The only obstacle – or excuse – for not using the modern learning technologies is usually the lack of imagination which is often disguised into lack of time, or lack of skills. The latter is often easily corrected by asking help and support from the university learning technology unit (yes, there is one in your university as well). And in the long run, a successful Blending will give the teacher more time to focus on relevant parts of the teaching processes. All the collected cases are described in two different formats – short descriptions to get the first overview and long format to view more closely the specific components of the particular course. After the finalization of the B-Learn project all the collected course descriptions will be available for users to view and make use of the good experiences.

Making the blending easy. Performance Support System for higher education teaching

The main innovation element in the project B-Learn is the creation of EPSS for blended learning course design patterns. Gery (1991) has defined EPSS as „an integrated electronic environment that is available to and easily accessible by each employee and is structured to provide immediate, individualized on-line access to the full range of information, software, guidance, advice and assistance, data, images, tools, and assessment and monitoring systems to permit job performance with minimal support and intervention by others“. EPSS guides teachers in their real instructional design process. Teachers can choose the relevant technologies and methods for their courses with the help of examples from experts and fellow teachers from different institutions; create the syllabus, timetable and instructions for the course learning process which assist students in their independent learning process. EPSS is the web-based tool which is the repository of good examples and instructions. EPSS offers standard solution for each instructional design situation and more-over it can be easily localized to meet the needs of particular cultural, pedagogical and language settings.

There are number of alternative structures of EPSS available in the field of training. There are as simple as quite regular web-pages with some interactive help materials available as well as well-developed systems with intelligent electronic assistants available. The EPSS of the B-Learn was designed basing on the belief that the trainer in the higher education institution with modest e-learning experience most of all needs the practical examples about how to get started and even more practical assistance on how to create one's blended course with smallest consumption of time and other resources. And what is distinguishing the EPSS from any regular training targeted web-page or environment is the way of integration of the information and practical tools. The electronic system is

created in a way that all the information and help the user needs is presented in a structured manner – explanations, definitions, demonstration of study cases, all other resources are well-labeled and tied/linked so that user can perform in a logical and integrated way.

Designing the B-learn EPSS

We used participatory design approach and paper prototyping in order to conceptualize the structure and functionalities of B-learn EPSS. Few separate user stories were created in order to map the functionalities one user-friendly support system must have. These scenarios were fictional writings with the intention to describe the use of EPSS from the perspective of „informed user“ in real-life context. The scenarios served as an input for design sessions and also for writing more detailed user stories. All these elements and workflow phases were drawn from participatory software design approach. The scenarios included for example the “Switcher” (an instructor who has got some practical skills of teaching with e-learning elements, but in very limited manner. Now one has to change the learning platform and uses EPSS as assisting platform); “Beginner” (a fresh-starting lecturer with being new to anything both about e-learning as well as pedagogy), “Expert without e-learning experience” (experienced higher education lecturer who does not have any e-learning experience, more-over, one’s ICT skills are moderate as well and thus one appreciates a lot the multimedia tutorials and simple step-by-step guides that help her get acquainted with blended learning); “Community support” (young instructor who belongs to new generation that uses the electronic communication and information services on daily basis: instant messengers, Web-based video- and audio-conferencing tools, community portals, blogs and wikis. For using the same tools in teaching one values the opportunity of seeking for help from blended learning community).

Basing on different needs of various users the final functionalities of the EPSS were designed. The multilingual prototype of Web based EPSS was developed using service-oriented architecture. It contains a blended learning handbook, research reviews, tutorials, templates, best practice examples, and glossary. The content of EPSS is released under Creative Commons license which means that everyone is allowed to modify, localize, distribute and use it if they refer to the authors of this product. Any user can suggest chapters to the handbook, comment handbook articles, add terms to the glossary, propose new templates, etc. The proposed materials will be viewable to all users, but they will carry the mark of preliminary material until accepted by advanced user.

The central component of the EPSS is the templates tool of the support system. The templates (for example roster, study-guide and syllabus in the 1st version of the system) are basing on the stages of the course design and by stepwise filling in these templates user can end up having the blended learning course materials ready to be either exported to a suitable learning environment, shared with the EPSS community, or – if user finds it preferable – also practiced onsite.

As the user finds the particular template useful for her/his blended learning course, she/he only needs to fill in the fields and save the product. Or one can go further and create new templates basing either on one’s particular needs or good idea gained for example from the good practices section of the portal. All the new materials created can be both saved and published in the personal or public spaces offered by the system. Every user has own portfolio as a part of the system, and all the filled or partly filled templates can be organized in a course basis.

All the practical activities performed in the templates module can synchronously be accompanied with background and supportive materials relating to theoretical aspects of particular teaching method or topic, practical examples of using the particular method, and references to additional materials. All the materials are systematically tagged and all this is also supported by a Search tool that makes it easy to find required material. One purpose and benefit of supporting materials made available in the EPSS is to allow for a linguistic mapping of the blended learning content as users will have the cross-tagged materials that will be updated and linked further in the course of the portal management.

Users are also encouraged to insert materials or re-design the templates according to one's needs. Various user-profiles allow the users to choose the most appropriate mode to accommodate one's needs. One of our intentions with developing the EPSS was to create a living community of Blended Learning Experts and Users to share knowledge and experience regarding the implementation and evaluation of blended learning methodologies. EPSS can be very useful for thematic networks or for communities, as everybody can produce and share common knowledge. EPSS can also contribute to the development of core prerequisites for running and implementing blended learning programmes and through this contribute to the enhancement of awareness of lifelong learning and competitiveness in Europe. The collaboration in the virtual learning network can help to develop an integrated and interrelated understanding of the blended learning problems, and learn and share the possibilities for creating blended methodologies.

Interactive Mode for the Presentation

We are hereby proposing the presentation for the parallel workshop (tutorial) The Future of Schooling – the Open Classrooms of Tomorrow. The aim of the current paper presentation is to introduce the advantages, recent developments and challenges of blended learning and to involve the participants in hands-on activities with a new web-based EPSS tool that provides support to teaching staff in the process of designing the blended learning courses. We are also going to introduce the theoretical foundation underlying the technical development of B-Learn EPSS: the results of the meta-analysis of the research on blended learning and summary of the blended learning case studies from 6 different countries.

We propose to have an open and hands-on presentation of the EPSS within the EDEN Sixth Open Classroom Conference. The participants of the open classroom conference can, with the assistance from the moderator from the B-Learn consortium join the discussions and experiment with the newly-designed EPSS solution for creating blended learning courses. After the short presentations introducing the background and the elements of the EPSS all the participants will have the opportunity to participate in a role play based on the typical scenarios of using the B-Learn EPSS. As our intention with designing the EPSS was to assist lecturers with none or few blended learning experience to develop one's course so that it can address the particular learning needs we find it really valuable to give our audience the possibility to have their say about the functionalities of the portal.

During the workshop there will be conducted a short role-play that will help our audience to get familiar with the elements and features of the EPSS as well as collect the feed-back about present as well as possible new elements to be developed in the future. The audience can act in small groups with special role-model to perform, but underlying characteristic of all these roles is "beginner in blended learning". Every group can build the specification of possible problems arising in their courses as well as features they would expect the electronic assistance system/portal to have and share the outcomes with the audience. In the course of the role-play the features of the system can be discovered in a hands-on way. The conductors of the role-play will present the best ways to employ the electronic system to meet the needs of the users. The role play will also have a Learning-together benefit as the developers of the EPSS will be able to collect the data from the potential users for further advancements.

A more detailed description of the project B-Learn activities, including the designing and developing of the EPSS can be found in the project portal (<http://www.ut.ee/blearn>) and in a wiki-based collaboration environment Trac (<http://trac.htk.tlu.ee/blearn>). The final version of the system will be ready by September 1, 2007. The beta-version can be followed along at <http://www.ut.ee/blearn/136874>.

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OPEN ELEARNING CONTENT OBSERVATORY SERVICES (OLCOS)

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Growing Interest in Open Educational Resources

Presently the benefits of open source software in education are apparent and widely acknowledged. However, this is not the case with respect to the concept of Open Educational Resources (OER), but this too is a subject of growing interest worldwide.

“At the heart of the movement toward Open Educational Resources is the simple and powerful idea that the world’s knowledge is a public good and that technology in general and the Worldwide Web in particular provide an extraordinary opportunity for everyone to share, use, and re-use knowledge. OER are the parts of that knowledge that comprise the fundamental components of education – content and tools for teaching, learning and research.” (William and Flora Hewlett Foundation¹)

The term Open Educational Resources was first adopted by UNESCO in 2002 and refers to “the open provision of educational resources, enabled by information and communication technologies, for consultation, use and adaptation by a community of users for non-commercial purposes“. Resources comprise “three major areas of activity: the creation of open source software and development tools, the creation and provision of open course content, and the development of standards and licensing tools“.

Recently, the OECD’s Centre for Educational Research and Innovation (CERI) has published an international survey on OER focussing on higher education (OECD/CERI 2007). UNESCO’s International Institute for Educational Planning (IIEP) has facilitated a Community of Interest in OER². And various organisations and foundations support portals, repositories and studies in the field of OER.

Project Basics of OLCOS

In this international context the project “Open eLearning Content Observatory Services“ (OLCOS) promotes the concept, the production and the usage of open educational resources. It is co-funded by the European Union’s eLearning Programme (1/2006-12/2007). OLCOS advocates the use of OER for open educational practices that are most likely to allow for learning experiences that are real, rich and relevant. The target groups of the project are developers and users of OER, educational institutions and e-learning institutions, all looking for information how to implement and establish this concept strategically in their institutions. Partners working together in the OLCOS project are:

- ecmc - European Centre for Media Competence (Germany)
- EDEN - The European Distance and E-Learning Network (UK/Hungary)
- FernUniversität in Hagen (Germany)
- Mediamasteri Group (Finland)
- Open University of Catalonia (Spain)

¹ <http://www.hewlett.org/Programs/Education/OER/openEdResources.htm>

² <http://oerwiki.iiep-unesco.org>

- Salzburg Research Forschungsgesellschaft (Austria, project co-ordinator).

The OLCOS project considers Open Educational Resources to be an important element of policies that want to leverage education and lifelong learning for the knowledge society and economy. However, the project also emphasises that for achieving this goal it is crucial to promote innovation and change in educational practices.

In particular, OLCOS warns that delivering OER to the still dominant model of teacher-centred knowledge transfer will have little effect on equipping teachers, students and workers with the competences, knowledge and skills to participate successfully in the knowledge economy and society.

The main objectives of the projects are:

- to provide organisational and individual e-learning end-users in Europe with orientation, perspective, and useful recommendations (Roadmap),
- to provide the end-users with easy, but intelligent access to practical information and support services in the creation, sharing, and re-use of open e-learning content, and
- to establish a larger group of committed experts throughout Europe who not only share their expertise with the project consortium, but also steer networking and clustering efforts and, finally
- to foster and support a community of practice in open e-learning content know-how and experiences.

OLCOS Results

In order to achieve the objectives OLCOS has produced (respectively is presently working on) a number of documents and tools. All news and links to the following results are accessible from the OLCOS homepage at www.olcos.org.

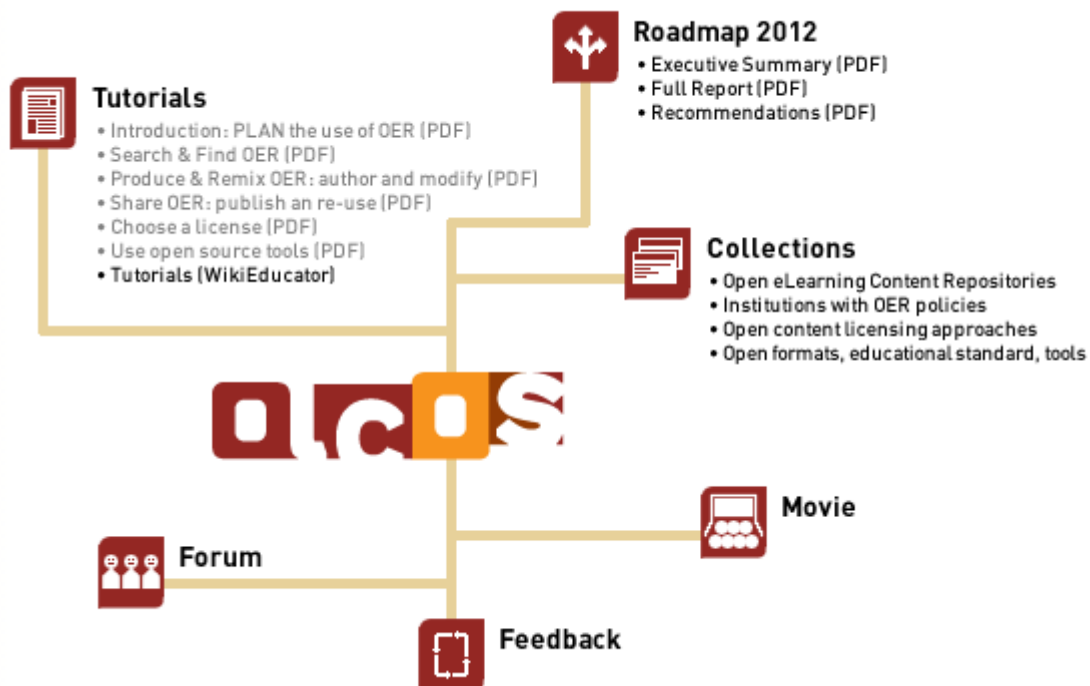


Figure 1

OLCOS Roadmap 2012

The Roadmap 2012 explores the possible pathways towards a higher level of production, sharing and usage of Open Educational Digital Content. It will provide orientation as well as recommendations on possible measures and actions to support decision-making at the level of educational policy and institutions.

OLCOS Tutorials

A set of online tutorials providing information and guidance on how to practically work with Open Educational Resources is offered in the following issues:

- Search and find OER
- Produce and remix: author and modify OER
- Share OER: publish and re-use
- Choose a license
- Use open source tools

Exemplary scenarios are described in the tutorials, commented for train-the-trainers. Among others, the following questions are answered:

- Which are the possibilities of searching for OER?
- Which repositories exist and can be recommended?
- Which materials may be used and modified?
- What are open formats and how can they be used?
- In which way can OER be published ensuring an easy use?

The tutorials deal with different scenarios and perspectives and give information, practical tasks and recommendations for further information. The tutorials will be good for use even beyond the end of the project, because they are published in an open Wiki , which everybody can update.

OLCOS Collections

Additionally, the project website offers a best-practice collection of OER repositories (e. g. stand-alone, subject portals or courses) and lists exemplary institutions, which create and use OER, and license models for OER. Collections are available in English, Spanish and German language.

OLCOS Forum

Experts and practitioners are invited to discuss OER in an moderated online forum. One recent topic for the discussion was the question how one can effectively search for OER.

OLCOS Workshops

Several awareness-raising workshops took place in the European eLearning community, designed to foster the take-up of the concept of Open Educational Digital Content, and to explore how to develop the required infrastructures, legally sound practices, educational policies and organisational strategies.

Priority: Open Educational Practices and Transformations

Open Educational Resources (OER) are understood to be important facilitators of educational innovation, but the assumption that OER per se could bring about the required transformation in educational practices is a misleading one. OLCOS' understanding is that a decisive shift towards open educational practices must take place before educational institutions, teachers and learners will benefit fully from freely and easily accessible and re-usable resources. An educational culture and mindset must be promoted that builds on sharing of resources for, and experiences from, open educational practices. For teachers, this would for example include sharing within a community practice experiences, lessons learned and suggestions on how to better foster the development of students' as well as their own competences and skills. This would be part of a new understanding of teachers' professional work that includes a permanent questioning, evaluation and improvement of educational practices and resources.

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LEARNING TO COLLABORATE, COLLABORATING TO LEARN: A 'COMMUNITY OF PRACTICE' FOR GEOGRAPHY EDUCATORS IN NORTHERN IRELAND

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Introduction

In common with business and many public services, education in many parts of the world is moving towards a position where there is ubiquitous access to sophisticated technologies for learning and where tutors and learners have the skills needed to utilise these fully. However there is great variation in how close this is to the reality of the 'chalk face'. In Northern Ireland (NI) there has been a concerted government-led attempt to remove the barriers associated with slow, dial-up internet access by providing Broadband access to the internet throughout the province. On 16th January 2006, Angela Smith, the then Northern Ireland Enterprise Minister (who was also responsible for the Education portfolio), announced that NI had reached one hundred percent Broadband coverage. The high value placed on Educational Technology is evidenced by similar levels of infrastructural development. The Department of Education in NI has made available funding that has allowed *Classroom 2000* (C2k) to provide an enviable level of connectivity for schools. C2k hardware and connectivity provision means that virtually all teachers in all NI schools have access to Broadband connectivity and to a Virtual Learning Environment (VLE), *LearningNI* (LNI) which is accessible from within or from outside school. C2k aims to deliver high quality, sustainable infrastructure, connectivity and resources designed to meet strategic educational targets for all 375,000 users of the education system.

These developments in technological infrastructure have been accompanied by exhortations from the educational authorities that the ICT provision should be used throughout the education system. Teacher education is no exception with a particular emphasis on the use of VLEs to support the initial three years of teacher education – Initial Teacher Education (ITE), Induction and Early Professional Development (EPD). Both the Education and Training Inspectorate's survey of Induction and EPD of Beginning Teachers (ETI, 2005) and Osler (2005) emphasise the need for a more integrated approach across the three phases of initial teacher education (ITE, Induction and EPD). Moreover, both advocate the use of online environments to support the early professional development of teachers across these phases. Further, the Northern Ireland Education Technology Strategy (emPowering Schools, 2004) supports the use of online communities of practice to sustain the EPD of teachers. This important policy document suggests that the agenda post-NOF (New Opportunities Fund) funded ICT training for teachers should, among other things:

- Address the capacity to use online resources and tools to support professional development through collaborative online communities of practice. (www.empoweringschools.com)
- In their report (ETI, 2005), the Education and Training Inspectorate recommended the extension of online support and of a more contiguous approach to the stages of teacher education:

Given the introduction of new online facilities in schools, there is now an urgent need for online provision that will serve and support the process of EPD. It would be beneficial for the beginning teachers if the online support integrated the initial, induction and EPD phases. (ETI, 2005: 37).

In addition, the recently formed General Teaching Council for Northern Ireland (GTCNI) have just reviewed the teaching competences (standards) to include new competences related to the use of technology to support learning (Professional Competence 11, GTCNI, 2007: 27) which includes *contact with colleagues in the wider educational community*.

LearningNI (LNI) has been in development from 2001 and has been available to schools in Northern Ireland from March 2004. The environment contains a wide range of functionality including asynchronous communication and collaboration tools, a content repository, rich digital content, publishing tools and user homepages. It is this environment that will provide the online collaborative spaces needed to support the professional development of teachers.

Deploying a rich and relatively complex online learning environment such as LNI to a diverse user community has posed a number of challenges. There is the challenge of providing awareness raising and training to 375,000 users, each with differing skills sets and individual motivations in relation to ICT use. The '*e-skills uk*' report (2007) defines eLearning maturity in a business context, but their findings are of interest here. With six categories of eLearning maturity, they examine the factors which affect uptake in business and look at how companies and organisations can change their learning culture through the use of learning technologies.

Table 1 Defining eLearning Maturity (adapted from Overton et al 2007)

Category	Survey Statement
The Novice	We know very little about eLearning
The Sporadic user	Use of eLearning is localized or sporadic (used in some departments or for some courses)
The Developing user	We are developing and co-ordinating our use of eLearning
The Established user	eLearning is established across the company and is transforming the way we manage our learning and development
The Embedded user	eLearning is thoroughly embedded within the company – we have an learning culture which influences our everyday work
The Innovator	We are thought leaders and innovators in the way in which we are using eLearning – prepared to experiment in new areas and with new technologies

A number of schools in Northern Ireland would still be in the novice category as defined here, but most are at least sporadic or developing users of eLearning. The challenge is to move onto establishing the use of LNI in schools, and embedding it within the education system while simultaneously supporting innovative schools who are making different demands on the service. At the same time, those schools still at the novice stage cannot be ignored as they have the most progression to make.

The drivers behind the deployment of a VLE at this time include some particular to Northern Ireland – including specific curriculum change and the introduction of certain new forms of school organisation such as specialist schools and collegiate structures. Just as important are the drivers at a global level and these have many similarities to the drivers impacting on other contexts beyond NI and beyond Education. These include the increasing use of online spaces to support learning and teaching and the growing role of eLearning in the development of skills and knowledge. There are also changes to the approaches used in professional and career development which impact no less upon Education as in Business, Health or other sectors. Thus, many of the responses to these challenges will share commonalities with deployments in other sectors.

Whilst a major early requirement is for widespread horizontal deployment to as many people as possible in the sector, this is necessary but not sufficient. In the planned model of deployment there must also be a strategy to embed the skills and knowledge. The model must be *successful* in raising the skills of the users sufficiently for them to employ the new technologies efficiently in improving their practice; it must be *customisable* in order to meet the needs of a range of different user groups who

will have differing needs at different times, and it must be *sustainable* so that the improvements can endure. To be sustainable there is also the requirement that the deployment is done efficiently. A highly resource intensive approach is likely to be unsustainable, for example, and arguably this may be particularly important in a public sector initiative, such as this one.

Table 2 A strategy for deployment in NI

Stage	1. Face to face (F2F)	2. Blended	3. Online
Timeframe	2004 - 2007	2007- 2008	2008 -
Type of support provided	Awareness Raising Functional training	Accredited User scheme Online support materials Communities of Practice initiated	Accredited Leader scheme Accredited Expert scheme Communities of Practice embedded
Location of support	School based/ centre based High F2F demand	Increasingly online Reduced F2F demands Structural change demands Initiating CoPs	Largely online Low F2F demands Online Moderation demands Maintaining and disseminating CoPs
Demands			
Type	Centralised	Intermediate	Decentralised

The model developed in Northern Ireland consists of a series of stages. Stage 1 indicates a period characterized by centralized training which is highly resource reliant. This was a required stage and has had considerable success in horizontal penetration into the system. However, with the numbers involved, it was unsustainable in the long term. Stages 2 and 3 indicate a shift in policy towards a decentralised model of implementation where support is increasingly online. This consists of a number of elements. One strand was a scheme of accreditation, at first targeted at novice, sporadic and developing users but expanding to accreditation of those demonstrating more and more mature uses of eLearning. In addition, users are supported in their development of skills with online materials helping to develop their competences. Most importantly, Communities of Practice are established and encouraged, with users supporting each other in functional competences and, increasingly in pedagogic application of the technology, alongside external moderation where necessary.

More difficult to summarise in a table and probably one of the more challenging aspects of the deployment is the reality that users will be at many different stages in this process. Thus it may not be possible to cease one form of support entirely to move to another stage in the model. Novice, and other 'low maturity' users, may be lost entirely if face to face training is abandoned and replaced with online support. Many of these users are novices because they do not recognize the value that eLearning might bring to their practice. A move towards online support as the sole mechanism supporting deployment is likely to result in this group never embracing eLearning in their classroom practice or in their professional development. If this is a small number of individuals, this might a risk worth taking, but a blended model with a continuing, if reduced, face to face element would help to maintain support to these users to encourage progression.

The focus on the later part of this paper is on the Communities of Practice (CoP) which are to be established as part of this deployment strategy. The CoP being examined here consists of a mixture of experienced teachers of Geography and newly qualified teachers in their first year of teaching Geography (termed Beginning Teachers – BTs – in Northern Ireland). The focus is on online learning in Geography and a range of discussions were planned to help this CoP to become established. The experienced teachers selected were largely teachers with some experience of online teaching and learning. In most cases this experience was limited. The BTs were those newly qualified from their teacher training during 2006-2007. The combination of experienced teachers with some familiarity of online environments but with extensive classroom experience alongside newly qualified teachers who have more limited classroom experience but often sophisticated ideas of how online environments

could be used to support learning and teaching was thought to be a possible synergy. Brought together in a task-oriented environment, each group brings different but equally valuable perspectives.

Continuing Professional Development within Online Communities of Practice

The idea that learning involves a deepening process of social participation has gained significant ground in recent years. Foremost in this field is the work of Lave and Wenger (1991) and Wenger (1998) and their model of situated learning which proposed that learning involved a process of engagement in a Community of Practice (CoP). Etienne Wenger's website (www.ewenger.com) details studies of the use of educational technology to support professional development. These are built around the social-situated-constructivist frameworks of Lave & Wenger's (1991) Communities of Practice which Wenger defines as follows:

Communities of practice are groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly. (www.ewenger.com)

This study is framed within a theoretical context which draws upon earlier work (Clarke 2002, Clarke and Abbott, 2006) about the use of VLEs (Virtual Learning Environments) to support Initial Teacher Education. In both of these studies student teachers' learning online was conceptualised in terms of CoP Theory, but whilst the first study gathered evidence of student learning (via an analysis of online discussions forums) the second examined the tutor perspective using face to face interviews. Both studies found that there was some evidence of the three salient processes of Wenger's Community of Practice paradigm (mutual engagement, joint enterprise and shared repertoire). Students were engaged (within the online discussions) around a joint enterprise (becoming teachers) and developed a shared repertoire of ideas and resources to support their pupils' learning.

The current study also seeks to stress the social, situated context of teacher learning, an approach which may be seen to stand in marked distinction to the standards (termed 'competences' in Northern Ireland, GTCNI, 2007) approach which is used throughout the UK and is increasingly prevalent worldwide (Beyer 2002). That approach is critiqued in a recent article by Yandell and Turvey (2007: 534) as having an '*abstracting, decontextualising effect*' and they cite others who agree that the standards model represents a narrowing conception of the teacher's role (Cochran-Smith, 2004) that involves an attempt to measure a *uniformity of outcomes* (Bullough *et al.*, 2003: 49). Yandell and Turvey (2007) suggest that, in contrast, CoP theory offers an approach to teacher education that is grounded in the complex contextual realities of professional learning where the focus is on student teachers as '*legitimate peripheral participants*' (Wenger, 1998: 100-101) within the profession.

The proposed online CoP for Geography teachers in Northern Ireland, which is the focus of the current study, will bring together new entrants to the profession, 'newcomers', and more established teachers, 'old timers', (Wenger 1998: 156) from a range of school contexts. The project aims to work towards creating a CoP which will facilitate the social learning of these teachers across the boundaries of their own professional Communities of Practice, namely schools. More specifically, this pilot project seeks to investigate the nature of learning within the CoP examining the interaction between the 'newcomers' and the 'old timers' and seeking to both establish and evaluate the three CoP processes (the work of CoPs):

- mutual engagement,
- joint enterprise, and
- shared repertoire.

A major challenge this project is one which is highlighted by Wenger – the decision of how much to rely on the spontaneous participation (of teachers) and how much to direct that participation. Wenger (1998) recognises this issue:

Within any 'design for learning' process one needs to strive for the correct balance between reification and participation or structure and empowerment on behalf of the learner within the local teaching and learning context. Effectively it becomes a decision around 'when to reify and when to rely on participation'. (Wenger, 1998: 265)

This study

Initially the Community involves 12 weeks of activity for between 30-40 geography teachers, two facilitators (the authors) and three guest experts. A longitudinal study will be evaluated using online evaluation tools. A baseline attitudinal survey will be used to measure changes during the online experience in both groups. In addition to attitudinal changes, an evaluatory online discussion will be initiated at the end of the period and online social discourse analysis of the conference postings undertaken.

The CoP is an immersive experience and the members of the Community will be encouraged to learn about Communities of Practice by engaging with others to collaborate in meeting similar needs while viewing themselves as part of a CoP. While the Community will at first be established using the asynchronous discussion forums available in LearningNI, it is anticipated that these will quickly become inadequate for the engagement that the teachers will require. At this stage it is expected that the Community will move to courseroom functionality which will allow materials to be created and shared more easily than through asynchronous discussions alone. The courseroom area of LearningNI will offer the ability to create and share course content in addition to the asynchronous communication toolset contained within the courseroom.

The authors have developed a structured programme including the provision of online 'experts' who will be available to participate in the discussions and courses at different stages of the project. However the structure is not rigid and it is expected that the agenda will be driven by the participants, particularly as there is a need to ensure that the Community is sustainable. The teachers will spend the first week in familiarizing themselves with LearningNI and in various activities which will help in forming Community cohesion. Following that they will move into a phase with wide ranging discussions regarding Geography teaching. This will last for about three weeks and will involve the sharing of issues, and possible solutions. It is in this phase that it is anticipated that the courseroom will be used. Out of this will come the need to form teams who will explore the issues and, finally, report back to the whole group. As these activities are ongoing there will be another layer of engagement in topics pre-programmed and supported by online experts.

Using the online learning environment to form a Community of Practice poses a number of research questions:

- Do discussions with high rates of interaction lead to higher levels of self-evaluated high-level learning?
- How much does the intervention of 'experts' lead to greater engagement and self-evaluated learning?
- Does the effectiveness of the Community change according to the roles taken on by the participants?

The presentation will display preliminary data from this longitudinal survey and will indicate developments to be implemented to ensure the long-term sustainability of the Community. The role of the Community of Practice in supporting a regional deployment of an online learning environment will be evaluated.

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PREPARING TEACHERS FOR THE SCHOOL OF TOMORROW – «CROSS-BORDER CLASSROOM»

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School sector in the European North – Background

Rural and small town schools are a vital part of the public education system both in Finland and Russia. Traditionally those schools have played a central role in their communities. Besides providing for basic education, they often have served as a cultural center in the community. Athletics, drama programs, library services, music, and other social activities conducted at schools have played an important part in community life and identity formation dating back to the 20th century.

Many small and rural communities now face a decline in their quality of life due to the economic downturn and the globalization of the marketplace. Businesses have closed and many young and well-educated citizens have left for urban areas. Additionally, social services, including schools, have been regionalized or consolidated as cost-cutting measures. These trends have led to high levels of unemployment and the deterioration of rural economic, social, and educational well-being.

The demographic situation in many small / remote communities also leaves much to be desired. The population is getting older, and the birth rates are rather low, which automatically leads to low number of new pupils / students coming to the schools of Finland and Russia every year.

While rural and small town schools have many of the same needs as other schools, they often face different challenges based on their unique characteristics. Funding deficiencies, lack of programs targeted to students with special needs, difficulties in recruitment and retention of teachers, and inadequate facilities are among the challenges facing rural schools. As a result for the last decade a significant amount of the schools in sparsely populated areas has been closed down.

In those conditions the schools are forced to manoeuvre, trying, on one hand, to survive in this unfavourable economic situation, and, on the other hand, to keep the high quality of teaching and good educational attainment.

The room for manoeuvre the schools have can be presented as follows

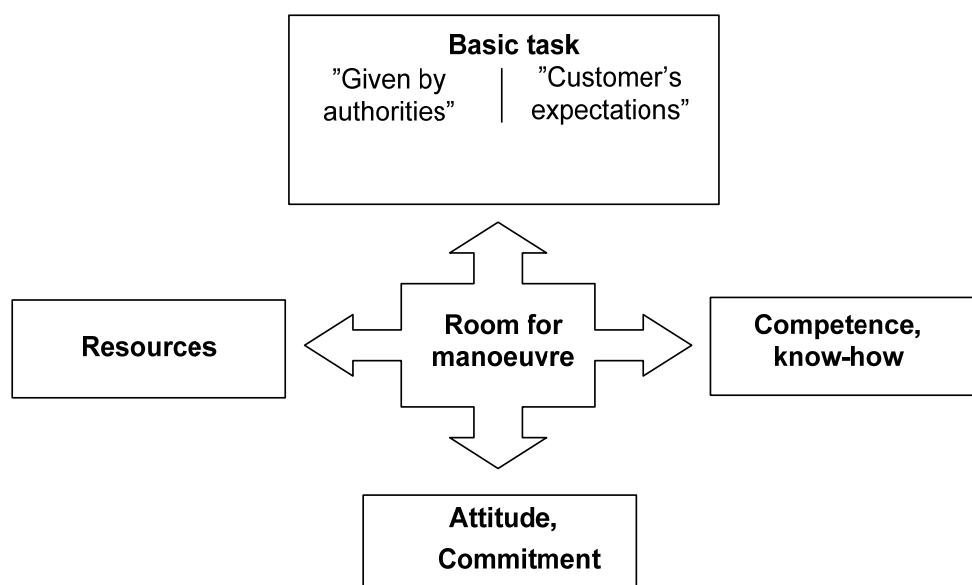


Figure 1. Strategic room for manoeuvre (adapt from Määttä & Ojala, 2000, 36).

There are a few major factors which determine the framework of strategic room for manoeuvre. The schools are obliged to fulfil their basic task / mission and jurisdiction which are, on one hand, given by authorities and set by laws and regulations. On the other hand, there are customers' expectations towards educational institutions on what they should and should not do. The students, their parents, the surrounding society and other stakeholders who could be regarded as the customers in this situation.

The situation may be seen as more complicated as the people understand the school system and its basic task / mission in a different way. The meaning of school services is influenced by the cultural beliefs and values of customers, authorities and service providers. The definition and significance of school service is contingent on the differing perception of individuals, communities and institutions. Thus, the customers, professional teaching community, relevant decision-makers, other people might have different understanding of how the school services should be organized.

Among the other factors determining the gap for manoeuvre the following ones, including the resources, competence and know-how, attitude and commitment could be mentioned. The schools have resources, both material and immaterial, which can be used in development work. There are also relevant competences and know-how both at individual and at organisational level. The attitude and commitment of the organisation members are also crucial for manoeuvre.

Nowadays many schools especially in rural areas have noticed that the above-mentioned (economic and demographic) difficulties have had a considerable / negative impact on their room for manoeuvre. In an effort to cope with this challenge the schools have been searching for solutions based upon the networking and co-operation. It was confined that by networking and joint (sharing) teaching the schools could better fulfill, and sometimes, even enlarge their basic task / mission. Sharing resources, competence and know-how could allow the schools have more room for manoeuvre as well.

Solutions to persistent problems in the school system, of course, will come not from schools alone, but also from the local and surrounding environment. The networking, manoeuvring, building of partnerships with communities and residents, introduction of new technologies, also the interpersonal and institutional ties can maintain the education quality, helping the rural youth achieve the highest-possible level of education.

Small schools in the Russian Karelia and Northern Finland – Problem overview

Small rural schools and communities are facing significant difficulties both in Finland and in Russia. The mass media reports that municipalities, due to the unfavourable demographic situation and financial problems, are forced to close down the rural schools in sparsely populated areas. According to the latest reports by the Statistics Finland among 3180 active comprehensive schools operating in Finland in 2006, 348 comprehensive schools can be found in Oulu province (North Ostrobothnia). In 2006 a total of 186 comprehensive schools or schools providing special education at the comprehensive school level were closed down or merged with another educational institution in Finland. The number of closures, totaling 17 comprehensive schools, was the highest in the Region of North Ostrobothnia.

In the neighboring territory, namely the Republic of Karelia (Russia), the situation with the school sector also seems to be unstable and recent trend unfavorable. The latest figures outlined by the Ministry of Education of the Republic of Karelia demonstrate that for over 3-year period 33 of 189 comprehensive schools in the Republic of Karelia have been closed down.

The schools located in the remote areas of the Russian Karelia and Northern Finland face the similar problems resulted in low teacher quality and low levels of educational attainment. Since a lot of small schools have been and still are to be closed down and the school network is therefore becoming sparser in both countries, new way to organise school system is needed. By networking of the Finnish and Russian schools it makes it possible to utilise the experiences and resources accumulated in both regions, thereby providing a more comprehensive basis for the development of small schools in this area.

In order to maintain the quality of teaching and a proper educational attainment in the remote areas of the North Ostrobothnia and Russian Karelia in the future, the remaining small schools should be incorporated in the regional, national and international school networks, where ICT itself and especially ICT in education play an important role. In this respect the teachers working in the school networks should be willing and capable to use ICT in education. To make it possible some more in-service training and purchase of new equipment may be needed. It is also important that the used technique would be as simple and easy to use as possible. Rapid e-learning is one solution for that.

Particularly, a new school system based upon network solutions would require the small school teachers to teach several subjects and be multitalented. Thus, the teachers would have to develop and update their professional skills continuously. In addition to that, the schools would have to be developed continuously as a flexible and learning network-organisation. Normally, such organisation, effectively using ICT as a major tool in its operations, is characterised by the project-oriented kind of activities, teamwork and flexibility in division of work share, working hours and educational service production.

A new school network would challenge know-how and attitude of teachers. In the years to come the teaching process would be understood as not a traditional teaching in one / single class but teaching networks / teams of students which could be scattered locally, nationally and internationally. In the future the term «classroom» would have different meaning than what it has now.

The school network would especially challenge the teacher's know-how in co-operation and communication as well as in ICT. ICT is expected to continue playing a significant role in the school system, being the main tool for communication with students and other teachers. That is why the teachers' skills for communication, cooperation and teamwork would be crucial for successful school networking. The practicing teachers should be able to use ICT both in synchronous and asynchronous communication, ensuring, on one hand, open and transparent contacts between the teachers cooperating with each other, and, on the other hand, helping to avoid stigma and other challenges associated with a teamwork, and external professional influence and intervention.

As it was mentioned earlier, obviously ICT and related technologies in education would constitute an important part in the school networks. In this respect it is essential that the technologies which are going to be used would be much more user-friendly than they are nowadays. The technologies should be easily integrated in the school activities, and the teachers would be required to make technology as a natural part of the school.

In the school network the learning material would be presented more in electronic format. But instead of initiating a massive electronic learning material production, rapid e-learning tools that are quick, easy and powerful, and also focusing on creating content, not complicated programming, would be introduced.

In short, promise of school networks seems almost unlimited. Apparently, the school networks offer big advantages to teachers and students, but this powerful tool comes with a price tag. To create and utilize the school networks effectively the efforts should be undertaken to make the teachers, students, relevant decision-makers, and other stakeholders understand that a school could no longer be seen as a separate/individual institution. Apart from that, in a near future the networks linking up the small and remote schools would become the key actors in the educational market.

Case study: Cross-Border Classroom

The Cross-Border Classroom (CBC) project is initiated in 2006 in order to create a network linking the Finnish and Russian schools and develop joint E-learning courses dealing with the local studies, including the history, language and culture of the local population in the Russian Karelia and Northern Ostrobothnia. CBC is a joint Tacis/Interreg project funded by the EU Euregio Karelia Neighbourhood Programme and coordinated by the University of Oulu, Learning and Research Services (Finland) in cooperation with the Karelian State Pedagogical University (Russia).

Among the partners taking part in this project are eight Finnish and ten Russian schools situated in the remote areas and also the Institute of Teacher Training of the Republic of Karelia.

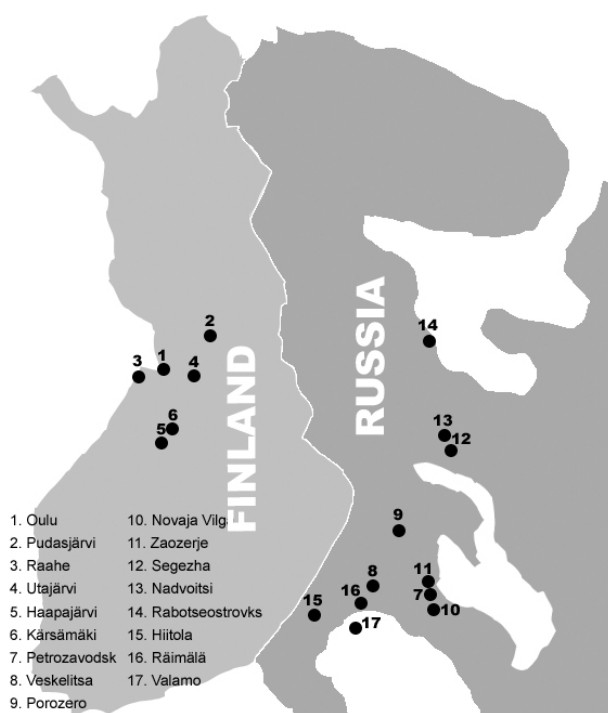


Figure 2. The Finnish and Russian schools participating in the Cross-Border Classroom project.

The CBC project is undertaken to promote the quality and competitiveness of rural education by creating, testing and introducing the innovative models of operation, mostly by networking and

manoeuvring. The educational quality in the small and rural schools could be increased by addressing the problem both with people-intensive and technology-intensive solutions. The cross-border pedagogical cooperation, in-service training programmes, introduction of new information and communication technologies in education are expected to contribute to quality and equality of educational opportunity for the students living in the remote areas of Karelia and Finland.

As a prerequisite for the present project one might consider that there are a number of areas in the content of teaching on the schools that can benefit from co-operation across the border. They include teaching of Russian and Finnish, teaching of the first foreign language, studying of history and the local traditions. Ultimately, interaction between Finnish and Russian schools and their schoolchildren adds to the understanding of language, culture and society between the two countries, which will be even more important in the future.

The CBC project is organised in the way that every project school, working in the groups consisting of Finnish and Russian teachers, carries out a small-scale development sub-projects related to its own educational needs. The sub-projects, focusing on language training and multicultural communication, folklore and folklore-related things, local way of living, traditions, and local games, are run to develop the local curriculum and promote the access, quality and competitiveness of rural education. The cooperation between the teachers and pupils are of crucial importance in all the development projects.

By exchanging of curricula and learning content, also by introducing new pedagogical approach and creative classroom techniques based upon the recent developments in ICT, the present project is expected to increase the educational quality, replace a lack of local educational services, also diversify and enrich the teaching in the remote schools. The rural teachers also benefit from the in-service training programme organized within the project; also the methodological support and professional counselling will be made available via the Virtual Pedagogical Clinic.

The CBC project is also designed to establish a permanent “network classroom” between Finnish and Russian schools, offering small schools an opportunity to expand their own teaching activities. The implementation of this network classroom makes use of the possibilities offered by the information and communication technologies, although technology is not at the centre of the activities, as it is only one tool to implement the desired operational model of the network classroom. The elements for the operational model of the network classroom are based on the above-mentioned small-scale development projects carried out within the present project.

The future activities of the network classroom are also linked to the schools’ regional centres and companies offering various technical and consulting services. The present project is also to investigate the situation with the services provided by the regional service centres for the schools and also cooperation with companies. The investigation focuses on which services connected with the operation of the schools could be implemented centrally through regional service centres. The productions costs of such services through decentralised vs. centralised means are calculated on the basis of different models of organisation for the service centres. It is also investigated how companies could contribute to the production of services. Special attention is paid to the cooperation between ICT developers and schools / other educational institutions.

The teachers working in the small schools are facing a number of various challenges. It is rather often that the staff in rural schools has cited isolation from new curricula, in-service training and methodological materials, and support mechanisms, such as communications with peers and official guidance. They are more likely to have to teach out of the field in which they are certified. The classroom technique and the pedagogical methods may also be rather outdated. It is also linked to the "brain drain" of talented teachers to urban areas.

To overcome this challenge the CBC project is expected to run in-service training programme for the teachers participating in the project. The training programme is planned and implemented in such a way that it is genuinely accessible to the staff in small schools. The major goal of the training programme is to develop the teachers’ knowledge and professional skills and, on the other hand, to

promote the exchange of experience by offering the participants collegial support, which is often very limited among teachers in small schools.

Conclusion

The Cross-Border Classroom (CBC) project has been on its way since the end of 2006. So far, it has been successful. The project covered a wide range of activities ranging from the matchmaking sessions and creation of network, running small-scale development projects, also developing a need analysis and project Web-based environment.

The expected outputs have been partly achieved through one year of co-operation within the framework on this project. Positive results have been accomplished such as institutional learning, competence building, professional knowledge, networks, and co-operation between the educational institutions.

The Ministry of Education Republic of Karelia noted with satisfaction the results achieved and the work underway to develop a Russian-Finnish pilot school network strengthening the cross-border pedagogical cooperation and responding promptly to new educational demands and challenges.

The project was several times highlighted in the local mass media. In all interviews given by the project participants, the project received the highest possible evaluation point.

The Cross-Border Classroom project supported by the EU Euregio Neighborhood Programme seems likely to have contributed to maintain the school system in the Russian Karelia and Northern Ostrobothnia. Yet, the promising results are not necessarily sustainable. School networking, manoeuvring, capability and readiness of teachers for ICT use, teacher / pedagogical cooperation are all elements of strategies, in which international collaboration is essentially required. More active cross-border cooperation between the countries and territories is also needed.

Co-ordination issues are considered as essential for future co-operation in the area, in particular with respect to the future activities of the school networks. Collaboration between different interested parties in the region, and the division of work will be crucial.

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ICT INTEGRATION IN SPAIN'S PRIMARY EDUCATION - TOWARDS THE OPEN CLASSROOM - THE CASE OF LACENET TELECOLLABORATION PROJECTS IN CATALONIA.

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ABSTRACT

In this paper are shown some of the most significant findings and conclusions from a case study carried out during the last three years on three telecollaboration projects by a team of teachers called Lacenet, based in Bages (Catalonia, Spain).

Some details of the study are explained first: the theoretical principles from which it starts off and the main characteristics of the methodology framework. Secondly, some of the most significant pedagogical elements found in the analysis of the three telecollaboration projects are presented. Finally, conclusions drawn place special emphasis on what is related to the possibilities that ICT may bring to open classrooms to society and to develop teaching proposals of educational co-responsibility between schools and the various social and community bodies.

RESEARCH CHARACTERISTICS

This research has been carried out from 2004 to 2007. It is based on a multiple and instrumental a case study, according to the Stake's classification (1999). Three telecollaboration projects were selected among the various projects within Lacenet network¹:

Table 1

TELECOLLABORATION PROJECT	EDUCATION LEVEL	AGE
Salix i els sentits (Salix and the senses) http://www.lacenet.org/sentits/	Pre-school	4-6
El món de Harry Potter (Harry Potter's world) http://www.lacenet.org/harrypotter/	Primary	10-12
Valors en Joc (Values at play) http://www.lacenet.org/valors/	Secondary	12-16

Lacenet projects are coordinated by a team of between 3 and 5 people, generally teachers. The projects are open to participation for any school or teacher, enabling different levels of involvement. The participation is free. The projects have a flexible structure and to participate in a project there is no fixed time or obligatory activities. Although the central topic in each project can be related directly to a knowledge area, the projects allow interdisciplinary and globalized work on the curriculum.

¹ Lacenet network is formed by a team of primary teachers whose goal is to design and to start up telecollaboration projects in the schools that wish to participate. Initially their projects started up at a local level, put in practice in Bages, a region in Catalonia. At the moment they have expanded, with schools and teachers of all Catalonia and other regions in Spain taking part. Lacenet team are members of IEARN network (International Education And Resource Network) and IEARN-Pangea in Spain.

Data and information for the case studies were obtained from various sources:

- Interview to the coordinator in each of the three projects.
- Interviews to three participant teachers in each of the projects.
- Interview to the president of Lacenet.
- Analysis of the information available in the web site of each project.
- Analysis of the contributions from students and participant teachers in the projects.

Atlas.ti, CAQDAS-type software, was used in the systematization, organization and analysis of data.

THEORY FOUNDATIONS AND RESEARCH AIM

Lacenet telecollaboration projects base their design on the theoretical principles of social constructivism (Coll; Palacios & Marchesi, 1990) and in the dimensions that, according to Harris (1998), telecollaboration projects must have. These dimensions include didactic methodologies like collaborative learning and problem-based learning, which for many years have been contrasted methodologies before being used in the realm of ICT.

In our theory framework we also include the ecological vision of the classroom (Jackson, 2001) with the aim to observe to what extent the use of ICT in the classroom in this type of projects makes it possible that the educational context expands beyond the walls of the classroom. Additional interest was aroused to observe how, by means of ICT, teachers actually included in their daily teaching what various authors denominate integrated educational experiences and educational co-responsibility (see, for example, Subirats & Albaigés, 2006).

The main research aim was to make a global comprehensive-interpretative approach to the studied projects and to know and to reflect on how ICT was actually integrated in the primary education classrooms in a wide sense, when a telecollaboration project is used.

SIGNIFICANT PEDAGOGICAL ELEMENTS FOUND IN THE RESEARCH.

The following is a brief description of the most significant elements as observed during the analysis of Lacenet's telecollaboration projects. Some are implicit in the design of the project and others are derived from the participation of the teachers.

Lacenet collaborative projects are set up in ways that bring about justified, significant and natural integration of ICT in curricular learning activities. ICT is a means and it is cross-curricular.

One of the factors that affect negatively in the use of ICT on the part of the teachers is their technological competence. Lacenet telecollaboration projects use very basic resources (automatically-generated webs, discussion forums, e-mail, digital image, etc.) and therefore they require minimum competence, from students and teachers alike, to be able to participate. This enables teachers who are not expert to use ICT in their teaching plans.

Teachers and schools that participate in Lacenet have the possibility of forming a professional network of exchange and socialization of resources and experiences. With ICT the professionals who participate in a project can communicate in a multidirectional way and share materials related to different areas of knowledge.

Lacenet collaborative projects contemplate the use of any type of resources for learning, therefore in their proposals we can find activities in which both ICT and non-ICT resources are integrated.

Many activities and phases in the projects enable teachers to foster students' autonomy and students' active participation in the learning process; and the use of ICT plays an important role. Even so, allowing students to control the process depends on the pedagogical traits designed by teachers, as the projects suggest methodologies but they do not prescribe them.

Participant teachers agree in considering learning with ICT as an element of high motivation for their pupils. This must be a reason for teachers to obtain a more efficient and pleasant educational process for everyone involved.

The central axis of a telecollaboration project is always a topic or an event that has some socio-cultural relevance for pupils. Therefore, participation in a project facilitates interconnection between what happens in society and what happens at school and it enables to increase the amount of significant learning.

As a fundamental characteristic of telecollaboration projects it has also been observed the fostering of collaborative learning among pupils of different schools, geographical areas and different socio-cultural backgrounds. This type of collaborative experiences could be hardly carried out without use of ICT.

In Lacenet telecollaboration projects various activities and experiences have been found that exemplify ICT possibilities for pupils to learn about values. This contradicts the cliché that when using ICT some contents related to the socio-affective development cannot be worked on.

Coordinated action among schools and the various educational agents in society, particularly the family, is fundamental for an integral education of children and youngsters, and their integration as responsible individuals in the community. Lacenet telecollaboration projects, although still in an initial way, show opportunities for teaching to extend beyond the classroom thanks to ICT. Some observed activities in the studied projects constitute an advance towards integrated educational experiences and an instance of educational co-responsibility generated at school.

SOME GENERAL CONCLUSIONS DRAWN FROM THIS RESEARCH.

The study of three Lacenet telecollaboration projects has made it possible to fulfill the main research aim. We have been able to know in depth how teaching is carried out when participating in a telecollaboration project. Considering the above-mentioned elements of pedagogical significance, we have been able to realize about the interest and the possibilities that this type of experiences have if they are to be considered by the teachers.

The voice of the teachers contrasts largely with what the project coordinators say and their pedagogical directions. A certain distance is observed between what it is put forward and what finally teachers develops in their pedagogical practice. This causes that teachers do not perceive great changes in their educational model with respect to when working without ICT. During the interviews with the teachers various factors emerged, whereby teachers do not end up integrating ICT in their teaching tasks, or why the integration of ICT sometimes does not trigger innovation of traditional methods. Some of these factors are:

- The lack of real and decided educational policies of integration of ICT.
- The technological undersupply and the lack of resources at schools.
- The resistance to change on the part of teachers, the starting point being the introduction of such a "distorting" element as a computer.
- The characteristics of school time and school space.
- The lack of appropriate training in the pedagogical use of ICT.
- The speed of technological advance.

In spite of these handicaps, in order that teachers can take advantage to the maximum of the opportunities offered by telecollaboration projects, they have to go forward towards the perception that their educational tasks are more complex. Gradually, teachers must take into account and articulate more variables in their work, which should be developed on purpose in richer contexts than the present one of classrooms and schools. These changes have to do with various dimensions, for example the organization of the curriculum (from a fragmented curriculum to one which is more suitable and global), the arrangement of school time and space (reflecting on the disadvantages of the present arrangement of time and space at school for pedagogical innovation and the integration of ICT), team work (creating a culture of sharing and of a professional network, taking advantage of the possibilities of ICT), the re-education of pupils (so that more autonomy and involvement are fostered in the learning), and others.

ICT, metaphorically, enables to demolish the classroom walls to offer endless paths to the protagonists of teaching and learning. We have seen, in the simple description of the studied projects, that their proposals bring to the classroom topics, events, dilemmas, problems, etc., of social relevance and related to students' interests. Those proposals are made in a way that teachers can make use of a scenario with which to contextualize in the students' reality a wide array of curricular contents. In addition, some of the proposed activities in the projects offer the possibility of increasing the set of relations and physical, affective and cognitive exchange that takes place in the classrooms beyond the limitations of their physical space. This counteracts the limitations that characterize the traditional classroom, limitations observed within the framework of this study.

The most significant exchange in telecollaboration projects takes place by means of collaborative activities among students from different schools. Without ICT this type of collaboration would practically be impossible to exist. Therefore, thanks to the use of ICT, actions such as Lacenet telecollaboration projects enable a remarkable enrichment of the learning contexts and increase the amount and attributes of the variables that should be considered in the analysis of the ecology of the classroom.

Simultaneously, this opening of the classroom inside-out also enables integration, in the educational context, of the kind of people and elements traditionally alien to it, thus a twofold exchange takes place, also from the outside to the inside. In certain activities, and in projects as a whole, there are opportunities for teachers to get families involved in the dynamics of the classroom, even beyond the involvement that we have termed in the analysis as "informative level", which is the one that generally occurs. Even though various levels exist in this implication, what is to be expected is that there is conscious involvement, i.e., that everyone involved is totally aware of their role and their responsibility as educational agent and articulates their tasks stemming from the coordination and pedagogical directions from the school.

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MAKING USE OF A LEARNING RESOURCE CENTRE TO PROMOTE ICT IN TEACHER EDUCATION

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Abstract

This paper focus on the establishment of the Learning Resource Centre at Stockholm Institute of Education and its role as a change agent with a mission to introduce and stimulate the use of ICT in teacher education. The learning environments are described as well as programs for competence development, how they were received and to what extent they were used. Services and resources are accounted for as a basis for strategic change. Taking departure from an external evaluation the conclusion is that a general e-learning strategy has to be accepted and formulated to support even more radical change and implementation.

Introduction

For many years computers have been a part of the tools in Swedish schools, but the teachers in the school system are struggling to make good pedagogical use of ICT. They often lack proper digital competence. The children use the ICT tools frequently when playing, communicating etc. their use needs to be met by guidance and stimulation from their teachers. The teacher education has to follow up these challenges and introduce adequate ways of teaching and learning with ICT tools.

Stockholm Institute of Education is the only independent Teacher education university college in Sweden. The student body consists of 14,000 students and a staff and faculty of 600 members. The new campus is situated in the centre of Stockholm and was inaugurated in 2002. At this point in time, a merger with Stockholm University is planned.

The Learning Resource Centre and its Mission

A Learning Resource Centre (LRC) was established in 2002 as ways and means to introduce and support the use of ICT in education and research. The goal was to provide tools and spaces for learning and teaching and thus develop the competencies of future teachers. Several factors influenced this decision. An ongoing discussion in Sweden on life-long learning and the possibility to reach groups with need of distance learning pointed to a requirement of digital competencies. Demands for new information- and media-literacy for students were put forward in the texts of Swedish legislation for higher education. An important factor was to find new e-learning and distance education tools and thus be able to join in the competition of recruiting students.

Two existing departments merged into the new LRC: The University College Library with information services, library system, collections, students work stations, user education and new physical learning spaces; The Media Production department with services for film- and video-production, computer- and video-conferencing. An ICT support and project development unit was added to the organization with the goal to build collaborative projects with teachers, students, outside interests and take responsibility for supporting distance education and support competence development.

The staff thus comprised of professional librarians, media producers, teachers, technicians, web designer, and project managers from various disciplines. An important starting point was the idea to integrate different competencies in order to produce new creative learning and teaching spaces and tools.

The mission of the Learning Resource Centre is first and foremost to use new pedagogical models, ICT, new media and new library models to generate creative environments for information handling, teaching, and learning. Secondly, it will have an initiating, coordinating, and developing role concerning ICT and its use in education and research. Thirdly, it will provide, develop, and synchronize flexible learning environments. It will furthermore create a virtual university setting and develop support for distance education in cooperation

with other involved departments. Lastly, it will be responsible for distance education course-administration for the then newly established Net University.

To achieve these goals we choose to support students and teachers in their actual work situations by offering physical and virtual learning and teaching environments with appropriate technology and support to a majority of students and teachers. First, we identified the basic skills and abilities necessary to be a proficient user of ICT. Different competence programs were introduced which would help develop digital literacy and strengthen pedagogical and knowledge-based working patterns by pointing to best praxis. A precondition is of course that the abilities and know-how of the LRC staff itself are appropriate for the tasks. To ensure this, integrative and project-oriented working patterns were introduced.

Learning Places and Learning Spaces

The start of the LRC coincided with moving into new buildings in a campus which was restored and rebuilt. The new buildings could be adjusted to new flexible study- and working patterns. An environment was established which would stimulate communication, group work and socially adjustable learning patterns. Students have the possibilities to use computers in the library, individually or in a group. An adjoining old house, the Villa, was renovated and could be turned into group work spaces with computers as well as a facility for handicapped users. Teachers can book and use designated rooms with computers in order to tutor students. Computers are placed among the collections in the library. As an antipode to the lively noisy working spaces, there is a large reading room for individual and quiet work and contemplation. Library and information service-points greet you as you enter the LRC. The service policy is intended for developing independent knowledgeable user who can operate information systems/ databases. In 2006, a special LRC-support was created when the IT-helpdesk for students was integrated with library services. A service-point was created where users can get immediate support for using the Office programs as well as the library-facilities.

Dedicated places for learning and teaching were created, among them, a Media Laboratory with programs and special support for image/video and film production which is heavily used by students. The Media laboratory has been enhanced by a Software laboratory for digital teaching aids, which will give students and teaching staff access to programs/products developed for use in school-work. To encourage use by teachers, special workshops are offered. In 2007, a digital studio has been set up for teachers who wish to practice and develop their skills in using programs for music and esthetical subjects. One of the objectives is also to inspire students and teachers how design for and work with esthetical subjects in a class-room. A special physical training environment has been set up for dynamic and flexible school-work called "the Classroom of the Future".

Learning platforms has been used at the institute since the late 1990's by proficient users. A breakthrough for a more advanced use by a majority of the faculty and the students came with the introduction of Moodle. Moodle is an open source communication platform which replaces an older open source platform, Learnloop. The introduction of the new platform was accompanied by instruction courses for the faculty.

A website for the LRC was developed and designed early on. The guiding principle for the website is to support student work and their use of information sources for searching, studying, learning, and reading/writing. It is the mostly used site at the University College. Web support for extensive distance education is further developed containing more interactive tools. The web is redeveloped according to Web 2.0.

All the physical learning and working spaces have wireless connections. Net communication systems like Marratech as well as video streaming are available. Physical places and virtual learning spaces are introduced and supported. Support is provided by professional staff that also encompasses knowledge in video production and the use of software for esthetical or special education.

Learning places such as the library, the group work facilities and the media laboratory are heavily used by students. Teachers use the library service and fifty percent of the surveyed teachers had used the media laboratory. The web is the mostly used learning space by students as well as teachers.

Literacy and Development of Competences

The following key skills and competencies are recognized as the most important for our students to attain. *Information literacy* is the ability to understand processes for and to access, acquire, organize, and evaluate information and information sources and form valid opinions based on the results as well as use information for problem solving. (Breivik,1989). *Technology Literacy* is the ability to use new media and the Internet to access and communicate information effectively (Varis,2000). *Media literacy and creativity* is the ability to access, analyse and evaluate images, sounds and words in various media and to produce, communicate and distribute content to audiences of all sizes.

To further and help develop these competencies we try to inspire and support students and teachers in their actual work situations by offering supported physical and virtual learning spaces with hands-on oriented tools as mentioned earlier. Another main strategy to reach our goals is to provide various programs for competence development. These programs are performed according to the principle of integrating learning with task performance. Development programs are directed towards all teachers and all students.

Competence Development Programs for Teachers

All teachers at Stockholm Institute of Education have been offered competence development focused on the use of ICT. Their active participation in various programs comprise of 20-40 working hrs. Sustained individual learning is guaranteed by the fact that their own learning is in progress during their own teaching, which is why we try to develop IT support and tools which can be used continuously.

Two hundred faculty members out of four hundred fifty attended standard and advanced workshops in the Office Service Pack. Before the program started, a web-enquiry was sent out and the response rate was eighty percent. Sixty percent of the teaching faculty was of the opinion that they needed training in the use of standard programs. The immediate evaluation of the workshops was very positive.

Hundred twenty teachers have so far participated in a net based course which means they have to act as students on the net. The course certifies them as net teachers. It involves using and learning communication and learning platforms; making homepages; using web evaluation; making Power Point presentations; and also producing web based learning materials. Searching, using and evaluating information sources on the internet, adapt and use programs for physically impaired, training in acting as a distance education tutor. Evaluation is performed after the course is finished. This course gets an overall positive assessment particularly those parts which focus on information literacy and technology literacy. The distance certification course gives the participants good opportunity to develop all necessary literacies. Fifty teachers can be considered to be very experienced distance educators, for those teachers we provide just in time support-platform.

A breakthrough for the use of ICT came late spring and early fall of 2006 when three hundred sixty out of four hundred fifty teachers registered and most of them took part in introduction courses in how to use Moodle, the new communication platform. Seventy two percent confirm that by taking part in the course their knowledge of ICT use had increased partly or thoroughly.

To provide an even more motivating and useful service and hopefully radical change, we help teachers in their process of course development, to choose ICT tools in coherence with the syllabus. A program of more elaborate ICT-use is offered to teachers as workshops.

Competence Development for Students

The level of ICT use by students and their understanding of tools and programs vary a lot. Plans have been made for further integrate students' formal learning of digital literacies (information literacy, media creativity and technology literacy) into the Program of Teacher Education. Throughout the program, the learning of digital literacy would then be attached to the developing of communicative abilities, information understanding and analytic abilities, scientific work patterns, abilities to perform, analyze, and present an investigation. In this way, these abilities as well as the literacies would be trained in progression. These plans have at this point only been integrated into parts of the program.

To be able to diagnose their ICT skills when they start their studies at Stockholm Institute of Education all students starting their studies at the spring semester of 2007 have the opportunity to take a diagnostic interactive web test which let them know their level of proficiency in using standard programs and web tools. The test can be used as a short introduction course to the use of standard programs.

To make it possible for students to acquire key competences there is a comprehensive development program concerning information literacy; *Basic Information Search*, *In-depth Information Search*, as well as

Individual tutoring. The *Basic Information Search* is a good example of how these courses are carried out. The purpose is having students achieve knowledge and skills in order to be able to search and review scientific information in databases and use web tools for searching as well as being able to critical assess internet sources. The course is designed as a 2x 45 minutes workshop.

The *In-depth information search* classes prepare students for degree projects and thesis's. The class is designed as a 3 x 45-minute workshop, covering relevant referential and full text databases, information sources, and individual search practice, search method, search engines, source handling, referential matters, and the question of "what makes an article scientific?" After the workshop, participants should be able to choose relevant databases and information sources, to search for information, and to a critical analysis of the information. Five hundred nine students participated in the classes during the fall semester of 2005, two hundred thirty four responded to the evaluation. Eighty four percent were content with the pedagogic in the Basic Information class. Seventy percent were affirmative that they would benefit from their new knowledge in their future studies and work. The assessment of In-depth information Search showed that seventy four percent were positive that their new knowledge would help them in future studies and work.

Students now get their user IT accounts directly connected to the communication platform Moodle. All courses are distributed to and by the platform which means that students put a pressure on teachers to use the platform for more efficient communication.

Special Projects and Networking

Special projects are aimed at trying to meet future needs of students and teachers and further developing the services at the LRC. As those projects involve teachers or students from the Institute, external partners, other universities, or businesses, they also serve as a purpose of enhancing the internal discussion. To some extent, they might also provide new knowledge and financial resources.

A priority at the LRC was to enable the electronic publishing of students' degree theses and teachers' research reports and to create electronic archives which support visibility and easier managing. Due to open access priorities most Swedish universities have started some kind of development towards electronic publication.(Berlin declaration,2003) An open access system, D-space, was chosen and which permits publication of the different formats available for a degree thesis, texts, movies, audio or presentations in other media. Electronic publishing was introduced to teachers and students by introduction courses. An introduction manual was created on the LRC -website. Students can then produce the thesis directly into the electronic archive using a digital template. As of 2007 all students are expected to produce their theses electronically. Another major digital project is the digital archive of video recordings

In accordance with digital publishing and archiving, we have started the development of learning objects. Rather than building repositories of learning objects the idea is to develop methods for creating learning objects and further the pedagogical and didactical discussion on how to build a learning object. Chemical reactions of fluids are explained in the form of a learning object. With the help of descriptive and explaining texts, video and Adobe Flash Player, the student can manipulate and repeat facts of inorganic chemistry. The use and reuse of the learning object is thus flexible. (Edman-Stalbrant 2006).

A common media server for educational TV and video programs has been set up as a distributive project shared by ten different Swedish universities. The material distributed is mainly provided by public service TV, but participating universities can share their own web-TV or learning objects archives. The service is web-based and the video or audio-files are provided as streaming media by a proxy server. The project adds to the media provision and can also be used for course development (Brenner 2006).

The ICT development program for teachers has been reinforced by getting external resources. Since January 2006 the LRC and Stockholm Institute of Education is a partner of the LIKA-project. LIKA stands for ICT development concerning processes of Learning, Information, Communication, and Administration. LIKA is a six year project financed by the Swedish Knowledge Foundation. The project aims mainly at competence development of teachers in their use of ICT and methodological analysis and progress concerning digital competence.

The accomplishment is also to a great extent due to the mix of professional competencies of the staff at the LRC which makes creative development and support of a broad spectre of digital competencies possible. Still there is need for competence development of the staff as well. During the fall of 2005 a net course started, which is available to all staff, *Learning in Networks*. The course is operated as a project between the LRC and Abo and Vaasa universities, Finland (Byholm & Edman-Stålbrant, 2005).

The LRC takes part in a number of formal and informal networks, i.e. library development is highly dependent on cooperation and standards nationally and internationally. Other networks concerns are school- and teacher development. The LRC is represented in a network called the Digital Academy started by the Royal institute of Technology, the School administration of the city of Stockholm and a number of secondary schools in the area school district. The missions are to help develop interest and proficiency with teachers in working with digital tools i. e. producing learning objects as well as examine if using ICT will help to manage prevailing problems in school-work.

Conclusions, a Strategy for Change

The task of the LRC is thus performed by working in several directions. Focus for change is the student as an independent learner and the teaching staff as tutors working in collaboration with students. The overriding goal is to develop an academic standard which encompass and integrates key skills in using information, media, and technology for teaching and learning. To accomplish this it is vital to provide physical facilities and virtual spaces where learning and teaching can take place. It is further important to present flexible learning and teaching opportunities with suitable tools. It is not enough however to introduce appropriate technology. Systems and tools have to be supported by professional staff.

When trying to track the use patterns by statistics and surveys, we found that the reason that the LRC so far seems to have had a beneficial influence on teacher education is firstly the introduction of supporting learning environments, secondly the delivery of competence development programs. We suggest that the continuous use of learning environments guarantees more solid ICT competence. Teachers who have utilized communication platforms appear more willing to adapt to new ICT tools. Our intentions are to support good habits and best practice. The use of learning environments is to a great extent performed as learning by doing which help develop technology literacy as well as media creativity. Tools for communication such as Moodle or tools for examination such as the E-archive influence students to put demands on teachers to coach them better in using ICT.

Even if we have tried to measure and map performance and use, we still need to work more thoroughly with self-evaluation and benchmarking to get evidence-based results and relate in depth to the quality issues of education. Such issues may be formulated as questions. In what way can skills and knowledge such as information literacy contribute to the ability to interpret and develop new knowledge? In what way is the capability to use new media in digital form related to abilities of expression and presentation?

An external evaluation of the LRC was performed in March 2006 by a senior researcher of educational technology, Carl Holmberg and by the National Librarian of Sweden, Gunnar Sahlin (Holmberg 2006). They considered the achievement of the LRC being successful so far. However, they also pointed out that neither the LRC nor digital competencies are fully recognized as being vital elements of a strategy which develops and shape teacher education.

As an answer to this problem, we suggest that an e-learning strategy will be formulated as a part of an overall strategy for the development of teacher education. The concept e-learning has not been used at the Stockholm Institute of Education. Since it is an internationally accepted concept, it may extend the meaning in positive ways. We mean that the e-learning resources and activities are already effective in many ways, at

the LRC or introduced by the IT department. This is however not fully recognized at the Stockholm Institute of Education. The following example of a strategy can be used as a check-list to find the suitable level for a university.

The purpose of an e-learning strategy is to define how digital media and ICT can become integrated in learning and teaching on a long-term basis. It shall further match with overall goals and reinforce the image of a modern university which may increase competitiveness internationally. To arrive at the highest quality level for research and education the university will support students' learning by the introduction of e-learning. This will

help reduce their defection from studies and thereby raise the number of graduates. The university will further provide the student with adequate resources for their studies, independent of time and space. Introduction of multi-media and interactive educational material will enhance learning forms and opportunities and promote autonomous and flexible learning. By a mix of campus- and virtual learning-programs, different learning scenarios can be offered.

The strategy should be implemented by taking the following measures. Areas of responsibilities should be decided. E-competence should be encouraged a) by considering e-competence when recruiting teachers; b) by allocating double working hours to plan and develop e-learning methods and components; c) by freeing working hours for teachers' competence development. Uniform websites should be provided. A competence centre (such as the LRC) should be provided for competence matters of e-learning. E-learning support should also be supplied at the local faculty level. As a mean of influencing change, a low percentage of the budget could be held back until a department had proved that it performed according to e-learning goals. E-learning should be implemented by appropriate software, such as e-mail, learning management systems and communication platforms, virtual classroom software to promote various forms of communication such as chat, video etc, web-logs, e-portfolios. Document servers for repositories of learning objects in various media form should be provided and systems for supporting collaborative learning. Examination should be performed also by e-learning tools, to guarantee that e-learning gets integrated into education. Quality control should be performed rigorously and i.e. by using standards such as ISO 9000.

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A FRAMEWORK FOR TEACHER'S PROFESSIONAL PROFILE IN ICT FOR EDUCATION

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Abstract

A Common European Framework for Teachers' Professional Profile in ICT for Education is described. This framework has been developed in the context of uTeacher, a project within the European Commission's e-Learning Initiative. Course designers, university teachers, examining bodies can all use this framework to reflect on their current practice, with a view to situating and coordinating their efforts and ensuring that they meet the real needs of school in a knowledge society

The Common European Framework for Teachers' Professional Profile in ICT for Education

The concept of the teacher's professional profile is related to a complex system of values, attributes, knowledge, understanding, abilities and skills forming a teacher's identity. This identity is the key to functioning effectively in a school system that is facing the challenges and problems posed by the knowledge society. This school is no longer based on the familiar transmissive model, but still has not taken on board new learning paradigms. Since there is an enormous degree of variation throughout Europe, both at national and regional levels, such a school serves as a useful abstraction that provides a context for the definition of teachers' professional profiles.

The teacher's professional profile (Midoro, 2005) aims to capture the identity of a teacher capable of functioning successfully in this changing school: the CEF (Common European Framework) focuses on a specific area of that profile, namely, those aspects that are in some way related to ICT and its adoption for education within the knowledge society.

The CEF was conceived, originally in the form of a matrix. The columns of the matrix represent the areas of social action of the teacher, that is the dimensions of action in which the teacher participates, and defines him/herself and the vision of educational praxis. The rows of the matrix represent the various contexts of the vision and action of the innovative teacher, the spheres of activity within which the teacher orients him/herself and constructs patterns of relationship with the various actors within the educational field.

Table 1 shows the structure of the framework in its original form as a matrix, indicating the main realms of practice of a teacher working within a school that is readying itself to play an appropriate role in the preparation of children for the knowledge society. The common factor underpinning all of these areas is the teacher's orientation towards adoption of ICT as a vehicle of innovation in the classroom, and thus as an enabler of educational transformation. The underlying assumption is that in his/her practice, the teacher interacts with different classes of individuals (pupils, colleagues and entities in the external environment – be they individuals or bodies) as well as engaging in self-reflective activity. This interaction takes place within different, but interdependent, domains: pedagogy, curriculum/subject matter, professional development, organisation, policies and strategies, ethics, innovation, and the technological aspects.

Table 1 The structure of Common European Framework for teachers' professional profile in ICT for Education

Interaction with SECTORS	SELF continuous personal construction of professional identity	PUPILS Facilitation of students' learning and development	COLLEAGUES Cooperation at school level and within teacher' community of practice	ENVIRONMENT interaction with the external environment
PEDAGOGY	Becoming aware of the constant impact of ICT on learning, school and society, and constructing a personal vision/philosophy of learning and pedagogy suitable for a knowledge society	Developing and managing learning environments consonant both with one's personal vision of learning/pedagogy and with the demands and challenges of the knowledge society	Sharing practice, repertoire, and learning/pedagogy visions. Collaborating in interdisciplinary educational activities.	Considering and using the local and global environment as a resource and as an arena for school and learning
CURRICULUM/ SUBJECT MATTER	Given the rapid growth in knowledge, reflecting on the key areas and topics to address within the subject area; understanding the impact of ICT on the didactics of the discipline	Designing and managing learning environments which take into account the opportunities and limits of ICT in the didactics of a given subject area	Sharing practice, repertoire, and "know how" in uses of ICT in the subject area, both with colleagues and inside the teaching community	Using local and global resources to foster learning in a given subject area
ORGANISATION	Constructing a personal vision of school organisation that responds to the demands and challenges of the knowledge society	Within the limits of context constrains, implementing an organisation of the school/classroom that responds to the demands and challenges of the knowledge society	Sharing practice, repertoire, and organisational visions and cooperating with colleagues on classroom and school organisation	Contributing to build a school organisation linked to the local and global environment
TECHNOLOGY	Constantly pursuing technical and cognitive proficiency	Exploiting ICT to facilitate students' learning	Exploiting ICT capabilities to interact with colleagues and teachers' communities of practice	Exploiting ICT to create learning networks, bringing added value to school and society
PROFESSIONAL DEVELOPMENT	Becoming aware of the increasing need for continuous professional development and the means to achieve it	Planning and taking actions to develop one's professionalism regarding the education and welfare of students	Learning to exploit ICT to cooperate with colleagues and the teaching community	Identifying and exploiting the opportunities offered by the local and global environment to develop one's professionalism
	Making one's	Gearing one's	Manifesting a	Recognising

ETHICS	prime responsibility the education and welfare of all the students in one's care	practice to the principle that the education and welfare of all the students in one's care is one's prime responsibility	positive and active role in cooperating with colleagues and interacting inside teachers' communities of practice	responsibility to prepare citizens able to live in harmony with the social and physical environment
POLICIES	Critically reflecting on ICT policies and strategies pertaining to the school-ICT-knowledge society relationship and constructing one's personal vision.	Given context constrains and policy/strategy requirements, implementing actions that respond to the demands and challenges of the ICT policies of school and environment.	Critically reflecting with colleagues on policies and strategies pertaining to the impact of ICT on the school system and cooperating to implement and evaluate them.	Given the limits of one's action, contributing to the development of policies and strategies related to the construction of a school strictly linked to the environment.
INNOVATION	Critically engage with the need for ICT-led innovation and the transformative power of positive change.	Shaping and re-shaping ICT-led change in terms of the learning & teaching we provide.	Working with colleagues to introduce and develop innovative uses of ICT in schools and teachers' wider practice communities.	Implementing actions aimed at building a school strictly linked to the local and global environment

In this model there are two axes along which teachers' action is situated. One is related to the contexts of social relationship and is oriented to the individuals and bodies involved in the interaction; and the other is related to the specific domains of educational action. Each of the cells in the resulting grid contains a brief and highly abstract description of specific teacher practice related to the specific context of relationships and the given domain of educational action.

However, we found that the conception of the CEF as a matrix was semiologically unsatisfactory. The form of the matrix could not convey the dynamic of the practice of the innovative teacher, and seemed to suggest a synchrony, frozen for a moment without emergence out of a past or the sense of movement forward. Nor could the matrix form capture the simultaneous processes of reflection and practice, of introspection and of communication, of parallel existence and action in the internal and external worlds. The teacher is oriented, simultaneously, towards the self, the classroom, the school and the world, having at base a concept of him/herself situated in the social fabric, and developing relationships and collaborations with fellow teachers, with pupils, with other school personnel, with parents, and with other relevant actors in the worlds outside the school. All of these relationships, even with the self, create tension which stimulates change.

We therefore decided to transform the framework structure from that of the matrix to that of an iris. Thus the columns of the matrix, representing the areas of educational action of the teacher have become the sectors of the iris, whilst the rows of the matrix, representing the various social contexts of the innovative teacher, have become the concentric bands within the iris. The form of the iris was chosen to emphasise the layers of social orientation and action extending outwards from the individual and also extending inwards from the broadest environment. In this way we hope to have captured the never-ending tension between the shaping influence of social forces upon the individual, and the creative contribution of the individual to the ongoing re-creation of the social order. As the arena in which this tension is played out are the institutions of society, including the educational system. In this perspective the innovating teacher operates within cultural parameters but can make a transformative input to the structure and functioning of the social order. The iris is shown in Figure 1.

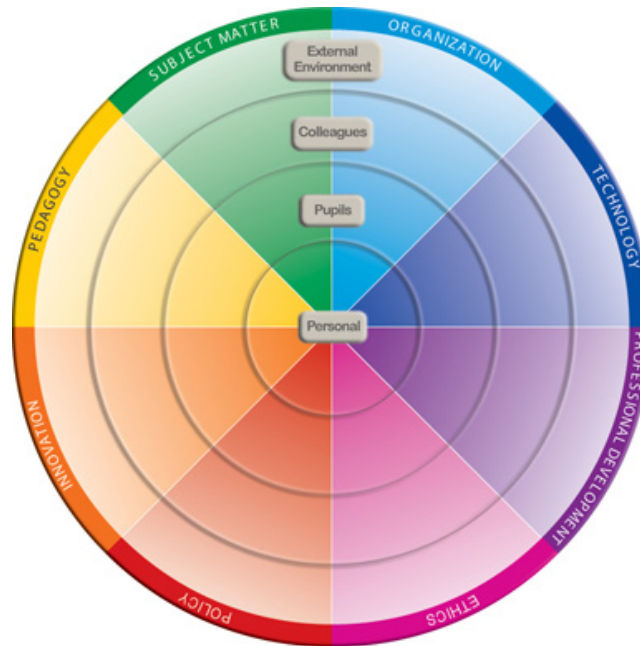


Figure 1. Iris representation of the CEF

The individual cells are still identifiable within the iris. The brief abstract contained within each cell becomes a gateway to an analytical content addressing a number of different elements:

- the context of the actions related to the practice
- the actions related to this practice
- the knowledge areas related to the activities involved
- references
- issues and case studies

In the APPENDIX an example is reported showing how a cell is populated.

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APPENDIX

Expansion of Cell colleagues/pedagogy

Context of actions related to the practice

The relationship among colleagues: informal and non formal learning

The development of teachers' competencies in ICT for education does not just depend on organised continuing professional development (CPD). It is also the result of informal and non formal learning which arises spontaneously from relationships and interactions (more or less organised) among colleagues both within the same school and from school to school.

Within the new pedagogy paradigm that embraces the use ICT in education, teachers are encouraged to collaborate together, sharing practice, repertoires, and learning/pedagogy visions.

The relationship among colleagues promotes spontaneous discussion and dissemination of ideas on a variety of different aspects such as: identifying innovative teaching methodologies and ICT use; developing subject curriculum and ICT use; developing the use of ICT in interdisciplinary activity through collaborative work in the classroom, etc.

Developing relationships with colleagues provides teachers with opportunities to experiment, to identify preferred learning styles and differentiated pathways.

Discussion on how to introduce and infuse ICT across the curriculum so as to enhance learning and the management of learning leads teachers to an understanding of how to transform their teaching practice as well as the learning of their students.

Fostering relationships among colleagues can help the teacher develop general ICT-related competencies, such as: understanding why, when, where, and how ICT tools will contribute to learning objectives; choosing the most appropriate ICT tools for stimulating students' learning; choosing ICT tools and teaching methods that integrate ICT into the whole curriculum; etc.

Within the context of the new pedagogy paradigm, the first step for disseminating awareness in the use of ICT in education is that of fostering relationships among teachers (non formal learning). The next step lies in the evolution of these spontaneous and informal relationships into targeted and structured relations, such as those arising in communities of practice, which are strongly sustained and promoted by the new learning theories (constructivism, contextualism, culturalism).

In this case, a group of teachers can decide to work together to support the exchange of experience and mutual learning, for example on the implementation of a certain ICT topic in their subject area. They can communicate by means of a Virtual Learning Environment, but it also appears to be important for them to organize face-to-face meetings. The success of these teachers' communities of practice is proven, although in order to avoid potential pitfalls careful attention is required to some critical aspects:

- not too much difference between initial levels of know-how;
- equal input from participating members;
- an open mind in the sharing of experiences;
- involvement of all members;
- task orientation;
- shared responsibility, but also somebody who takes an organizational lead.

Communities of practice arise out of people's natural desire to share ideas, get help, learn about new ideas, verify their thinking and hear the latest "professional" gossip.

A community of practice is a group of people who share an interest and deepen their knowledge about it by interacting. The concept is a very old one: social structures have been based on communities of practice ever since people dwelt in caves. Recently the concept has become more and more widespread, since it has been identified as a key aspect of knowledge management matters within organizations. Creating communities of practice is a way to make pioneer teachers aware of their role within the school system and to support them in their daily practice, giving them opportunities to interact with peers and the chance to deepen their knowledge. Within their community they can find expertise, quick answers to questions, different perspectives on common problems, but also information, materials, resources and in general opportunities for collaboration. Furthermore, since teachers' knowledge is alive, dynamic and tacit, something that cannot simply be stored in a book, the informal relationships among its members represent a way of circulating best practices and lessons learnt.

Actions related to this practice

Teachers develop and support informal and formal relationships with colleagues by:

- establishing informal and formal processes and maintain developing relationships with school colleagues and others in the teaching community;
- undertaking and participating in a range of informal and formal professional teams, in accordance with personal expertise and interests, school priorities, professional profile and school-management structure.

Teachers support colleagues in using ICT in their teaching practice by:

- proposing lines of development for using ICT by making suggestions, showing examples or providing motivation in the use of ICT;
- furthering colleagues' training, in accordance with their needs and requirements, by proposing training resources, by organising training sessions, and by enabling the sharing of knowledge and experiences between teachers (on the basis of their personal competencies);
- accompanying colleagues on occasion within the classroom, to provide backup and to offer support;
- encouraging emerging successes arising from team projects using ICT.

Teachers give support to ICT team projects by:

- helping teaching teams to make their ICT-based projects more focused, showing what is possible, setting limits, and assisting teams to specify their training needs;
- helping with the planning and scheduling of team projects;
- helping with implementation, making resources available, and even taking part in the realization of projects;
- coping with relations between teachers in a team to ensure that individuals agree with the aims of the team project, and managing any conflicts that arise;
- helping a team to evaluate process and outcomes and scheduling steps in the evaluation of projects.

Teachers promote ICT uses inside school and facilitate these uses by:

- developing and supporting the use of email, and sharing communication solutions via the school Intranet;
- discussing and setting up procedures for accessing and using ICT resources, and reaching agreement with users about access;
- organizing access to ICT resources by teachers and students.

Teachers Collaborate with professionals, paraprofessionals, teacher aides and other community-based personnel by

- forming partnerships that help to support and deliver student learning experiences;
- involving external partners, where relevant, in the planning, implementation and evaluation of learning experiences and monitoring of student progress;
- implementing strategies for maintaining ongoing communication with external partners.

Teachers contribute to learning communities and other professional networks.

Learning communities both within and outside the school are identified and accessed in accordance with personal professional needs.

Potential to enhance teaching and learning practice through contributing to learning communities is assessed.

Opportunities are pursued for involvement in collaborative curriculum planning, and learning and development activities.

Opportunities are taken to participate in the work of professional organisations, syllabus and curriculum development authorities, and professional learning and development agencies.

Teachers support specialized student activities with ICT:

- helping any students who faces special problems in using ICT, without taking the place or playing the role of other teachers, and in agreement with those teachers;
- organizing special training sessions and arranging meetings of teachers and students to demonstrate or discuss advanced features or tools.

Teachers collaborate with school management and administration by:

- making clear their role, availability, and modes of intervention according to regulations;
- regularly informing management about the progress of activities and projects;
- disseminating the results of any experiments in the use of ICT undertaken inside or outside the school;
- developing a global view of needs and means with respect to ICT support for teaching and learning.

Source: UNESCO, ICT in Education. A curriculum for school and programme for teacher development, 2002

UNESCO, ICT in teacher education, 2002

TEACHERS AND ICT: A TRAINING MODEL

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Introduction

Information and Communication Technology (ICT) has a remarkable presence in our society, but not so much in education. Some actions should be taken in order to harmonize the evolution of ICT with the evolution of education.

How to accelerate and intensify the presence of ICT in schools? Despite being complex to answer this question [1], it is clear that part of the answer is about training teachers in ICT [2].

However, not any model of training is suitable in order to reduce this gap [3][4]. In the following, this situation is reviewed and a training model is proposed in an attempt to improve and empower the use of ICT in schools.

From the Information Society to the Knowledge Society

The presence of ICT in our society and its active use has made possible greater facilities of access to the information during the last fifty years; it can be said that at the beginning of the nineties begins a process of gradual change from a social organization based on the industrial model into another one based on the information. At the present time we are attending another transformation that emphasizes the importance of the knowledge over the information. Whereas the first transformation focused its attention in different ways of organizing and accessing the information, the second one focuses its attention on the different ways of transforming information into knowledge. It is a commonly accepted fact that information has a limited duration and stability, while knowledge finally remains and it is truly useful for the human progress.

In this situation, our society requires a transformation towards a society organized around the knowledge. Not only the education system (from a global perspective) but also the local education communities (from a local perspective) play essential roles in this transformation. It is in this second level where we want to place this proposal. Our experience leads us to think that the intervention on small communities around schools could really improve the relation of teachers and students with ICT, while great administrative reforms have a fuzzier impact on the real life of people.

From the Knowledge Society to the Schools

This proposal assumes that part of the needed transformations with the purpose of building the Knowledge Society will be organised around schools; therefore schools will lead this transformations, becoming a powerful engine of them.

In order that schools can assume the leadership role that corresponds to them, it is necessary for them to obtain the needed resources and the appropriate professional staff; therefore, the training of expert teaching staff in using ICT as a way for the construction of knowledge is a strategic factor for reaching this transformation. In this sense, some experts like Sarraóna (2005) [5] have said that *the use of ICT would be a part of the strategic plan of schools, which is still minority nowadays...*

This proposal raises the necessity for each school to have a well-trained teacher who takes care of all the issues related to the daily use of ICT in the school. This professional will be The Animator of ICT in school (TAICT). According to the available information, such profile does not exist at the moment in schools, at least in Spain, and that is the reason for this proposal.

However, resources and efforts required by the creation of TAICT could not be reached nor will have effectiveness if they are not supported by own communities and schools. In this sense, this proposal focuses on two main aspects: the need to develop proactive actions in schools which will ensure the achievement of the mentioned transformations and, also, the need of TAICT figure and its professional characteristics, as well as the ways to approach them.

From the Schools to TACIT

TACIT performs essential functions to guarantee adaptation of school to the new needs derived from the mentioned changes and to make easier the contribution of schools to these changes.

This implies that teachers will plan, manage, coordinate and dynamize all the aspects related to the educational centre project deployment in relation to ICT, and the use of computing infrastructure of the educational centre. To that end, it will be necessary TACIT to acquire and develop knowledge and a set of competences that allow him to exert his function.

Ideological basis

The training of TACIT is based on a set of ideological principles which are described as follows:

Social Construction of Knowledge; knowledge is the result of an individual construction process in a social context; or what is the same, knowledge is idiosyncratic and therefore characteristic of every person, but it would be impossible to report it without considering the social environment in which it takes place; that is: the knowledge individually constructed is influenced by the social group in which it is constructed; therefore, knowledge is constructed by each person but the construction process depends on the social environment where it takes place.

Individual and Shared Learning, are two sides of learning that will be considered to facilitate the construction and organization of the student knowledge; in such a way, the training process of TACIT will consider and structure the learning and the activities that lead to it, taking into account such complementary double dimension: the individual scope and the group one in which learning takes place.

Tutorial Support (in network and in face to face way); the proposed learning will depend on providing students the necessary elements to achieve it; one of these elements is the continuous tutorial support: each student will have a tutor from the beginning who will help him in his development and construction process of knowledge that will be carried out during the training period; such tutorship action will take place not only in a face to face way, but also in a virtual way, in order to ensure the maximum attention to the student's needs.

Virtual and face to face Learning (Blended Learning); the proposed learning model regarding the virtual - face to face couple is a mixed model that takes advantage of the best characteristics of both modalities in order to strengthen the learning of the students; thus, student makes part of his activity in virtual way but he is forced to attend periodically face to face sessions that complement those; it is planned that, with the exception of vacation periods, they never spend more than 15 days of virtual learning without at least one face to face session.

Active and Reflective Learning; the learning model of the TACIT-Master is based on the realizations of learning activities and on the development of powerful reflective processes that make the student easier their own construction of the knowledge.

Competencies to be reached

Basic competencies: those are which teachers must have, regardless of the level, stage, speciality and educational position, to carry out its profession competently. For the teacher, it means the acquisition of security in the use of the technological means in a basic level, the grasp of ICT tools that enable him as user and, of course, the necessary learning of methodological and organizational knowledge.

Advanced competencies: those are which teachers must acquired to fulfil their profession in a more autonomous and creative way. It encloses the previous competencies and, in addition, those others that will allow him to produce and share his own resources.

Specific competencies: those are the ones inherent to the performance of certain educational positions that demand the knowledge and grasp of concrete utilities and applications. We include on them those of TACIT and those of the board of directors who are users of academic, administrative and economic management tools.

Therefore, it could be said that TACIT is a professional who works in educational centres and who takes care essentially of ICT and the way in which these can be added to school life.

According to it, when TACITs finish the training period, they will have to learn the following competencies:

- **C1** Knowing usual computer tools in schools; it covers from office programs to simulations and didactic tools suitable for different disciplines that are taught in schools.
 - Handling ICT tools.
 - Knowing to handle the author programs for the creation of educational contents.
 - Knowing to handle web tools.
 - Knowing to manage web tools.
 - Didactic resources.
 - Knowing didactic strategies for the use of ICT.
 - Knowing to search educational ICT resources (from the web and other sources) and to adapt them according to the needs (of school, stage, subject and so on).
 - Knowing to design and produce (and adapt, if possible) material with educational purpose.
- **C2** Knowing to analyze different characteristics and objectives described on the educational centre programme (in reference to ICT) in order to promote those actions that better contribute to reach these goals.
 - Knowing to analyse the different needs that exists in schools (at level of centre, cycle-stage, subject, individual, and so on) regarding the use and application of ICT.
 - Knowing to design, implement and evaluate schemes for the introduction and use of ICT according to the previously detected needs and to collaborate in the design and development of other schemes (of the centre, curriculum and so on) concerning the use of ICT in their respective scopes.
 - Knowing to animate, spread and stimulate the use of ICT in schools.
- **C3** Knowing to guide and help teachers, students and families on the use of ICT.
 - Knowing techniques to advise young and adult people, and take advantage of them to help them using ICT according to their necessities.
 - Analysing needs related to three mentioned groups: students, teachers and families.
 - Designing intervention programmes answering these needs.
- **C4** Knowing the diverse trends in ICT-Educational scene and knowing to apply them according to the schools needs.
 - Knowing the new features and trends in the scope of ICT and its educative applications.

- Keeping ICT tools and resources, and its educative tools, updated.
- Analysing the different possibilities of new ICT features and their potential educative use, as well as developing help guides to use them.
- Planning the introduction of the new features according to diverse needs.
- Having a positive but critical attitude with regard to the new ICT features and their impact in the centre and its environment.
- **C5** Knowing to strengthen and stimulate the presence and the use of the diverse ICT solutions in relation to the educational centre programme.
 - Collaborating on the design of the school scheme in reference to the incorporation of ICT into the daily life of the centre.
 - Designing formative and spreading actions in the scope of its influence to stimulate and help others in the educative use of ICT.
 - Knowing the ethical implications and the social impact of ICT and to stimulate the critical reflection of the users in order to collaborate in the development of a competent citizenship on handling ICT but having critical thought in its use.
 - Helping to reduce the digital gap within the school and inside its social environment designing plans and interventions oriented to this goal.

Organization of the training process

In order to organize the training of these professionals, the process has been divided in two levels:

1. Specialist: requires 30 credits ECTS throughout a year.
2. Masters: requires 60 credits ECTS throughout two years.

The following scheme both illustrates the distribution of the competencies in both levels. The acquisition of the competencies is obtained by means of the practical activities articulated around an intervention project in the own school in which the teacher will exert his function; this project is defined and completed throughout the period of formation and is continuously reformulated as the result of the knowledge that the student (teacher) is acquiring throughout the training process until it is definitively formulated at the end of the process; therefore, the training process acquires a practical value because it will serve to produce an intervention in the educational centre and, at the same time, serves as an organizer axis for the construction of the new knowledge that take place during the training process.

Table 1

Competences	Especialist	Master
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According with its goals the referred project has the following characteristics:

- Practical.
- Applicable to the educational centre.
- Individual.
- Innovative.
- Improver of the presence or use of ICT in school.

Commitments of the participants

The participation in the training process entails the assumption of certain commitments shared on the part of both (teacher and school) and without them the wished final results could not be obtained:

- The participant teacher in the training process:
 - He commits himself to make the project taking as study object his own school.
 - Once finished the training process, the teacher is committed to design and implement the different plans in his educational community in order to stimulate a significant advance in the use of the ICT.
 - Once finished the training process he will help and to advise to other teachers of the school in subjects regarding to the use of ICT.
- The school:
 - It commits itself to facilitate the necessary information and means in order that the teacher makes the project
 - The council will revise and analyse the plans designed by the teacher in order to develop the ICT in the school.

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INNOVATIVE PROVISION OF PROFESSIONAL DEVELOPMENT OPPORTUNITIES TO TEACHERS WORKING IN SMALL RURAL SCHOOLS

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Abstract

This paper reports on ongoing research on how to enable, through emerging ubiquitous e-learning technologies, the building of a lifelong learning culture and the development of advanced professional competences of teachers who work in small rural schools. Teachers of such schools are confronted with significant challenges, needing to develop personal competences falling beyond the established initial and in-service teacher training curricula. Following some initial background information on rural schools and the increased need of teachers working in them for in-service training and support, the concepts and tools of work undertaken within consecutive projects are presented as a response to the challenges posed, followed by a discussion of findings and future considerations.

Teachers' need for continuous learning

In many primary schools of the Greek provinces there is not one teacher available for each of the six grades: the low number of students statutorily justifies the employment of less than six teachers –even of one or two–, who nevertheless are expected to cover the needs of a full school. These schools, known internationally as multigrade schools (cf. Little, 2006), fulfil a function of national importance, as they provide the children of remote and less accessible areas with the access to education which all children of Greece are entitled to. Teachers of multigrade schools are confronted with significant challenges, as they have to teach simultaneously two or more age groups and possibly more than one curriculum subject in the same class. Teachers' initial professional training does not suffice and the need for competence development is evident – especially in the light of the fact that typically inexperienced, newly-appointed teachers are posted to remote schools for a relatively short term service. Thus the average teacher working in a small rural school needs to acquire new knowledge and skills and continually improve their expertise in teaching in the demanding context of the multigrade classroom. They need to develop personal competences falling beyond the established initial and in-service teacher training curricula, which are oriented towards conventional monograde teaching, in order to develop and maintain the ability to respond to the challenging circumstances of their professional position. However, there exist a number challenges in connection to remote rural teachers' need for competence development. On one hand, offering teachers from remote areas conventional professional development provision, such as in-service training seminars, is not easy. A teacher's round trips between their remote school and an urban training centre tend to be costly, if not virtually impracticable, given that there may not be a colleague available to replace them during their absence. On the other hand, the very concept of competence in the context of multigrade teaching may not be as straightforward as it appears. In the field of Human Resources Management competence is usually defined as a standardized requirement for an individual to properly perform a specific job, encompassing a combination of knowledge, skills and behaviour utilised to improve performance. However, whether a teacher is adequately or well qualified so as to have the ability to perform successfully in the multigrade classroom is a question with no official, standardised answer. The educational system –in Greece at least–, through its choices for the preparation of teachers-to-be, does not clearly define what good multigrade teaching is. Teachers are more or less left alone to explore and learn multigrade teaching on their own, through their solitary experiences in remote rural schools. What is worse, teachers at remote schools also suffer the consequences of a widening socioeconomic and digital divide which separates the rural from the urban areas in most parts of the world. The above described difficulties of multigrade teachers working in remote areas are not unique to Greece. Internationally, the shortage of teachers in rural and remote areas, and the weaknesses of the education systems in the provision of training and professional support to these teachers, have been well-documented in the literature (Forbush & Morgan, 2004; Helge & Marrs, 1982; Ludlow, 1998; Miller & Sidebottom, 1985; Ankrah-Dove, 1982; Coldevin & Naidu, 1989; Benveniste & McEwan, 2000). However, these

problems appear to be in sharp contrast with a growing recognition of multigrade schools as not only a necessary, but indeed a good-quality option for education systems, believed even to have some advantages over single-level classes (cf. Cook, 2000; Lloyd, 2002; Boss 2000).

Responding with ICT

As a response to the obstacles described earlier, the use of different forms of technology-supported learning and distance education models have been advocated for the enhancement of quality and accessibility of teacher training programs in rural areas (Squires, 1996; Ludlow, 2001). Relevant attempts have followed the technological trends in the field of computer-supported learning, while the content of training delivered via the different technologies varies greatly, from conventional seminar-type lessons to classroom observations at a distance (Kendal, 1992; McDevitt, 1996; Ludlow & Duff, 2002; Kraft, 2002; Forbush & Morgan, 2004). What is more, in recent years a lot of attention is paid to the role satellite telecommunications can play for the bridging of the digital divide (European Commission, 2003; Cohendet, 2003), and distance education is seen as a major field of application in this area, as this technology provides a delivery option facilitating access to new student populations in distance locations (Littman, 2000). Significant experience has already been gained internationally, particularly in the United States and in Australia (e.g. Boverie et al, 2000; Boylan, Wallace, & Richmond 2000), as well as in other less developed countries with populations distributed over large geographical areas (e.g. Al-Sharhan, 2000; Cohen, 2002; Lorenzo, 2002). This growing mass of international experience clearly demonstrates that emerging technologies offer promising solutions to the challenges of providing appropriate training and support to rural educators. Adopting this as a proposition in our work in the framework of a number of pioneering European and national research projects, our team has in recent years made efforts to alleviate the isolation of teachers working in remote schools through the provision of distance training, support and networking, using to the full the possibilities offered by new technologies. The main questions we have addressed in the course of almost six years of consecutive projects, have referred to: a) the appropriate content of the relevant professional development and support activities; b) the appropriateness of the various available and emerging delivery technologies, given the remote and digitally disadvantageous location of the beneficiaries; and c) the possible extensions to conventional e-learning technologies and practices, which could help the geographically disadvantaged rural educators to learn as individuals and to learn from each other, participating in informal learning experiences within a sustainable lifelong learning network. This course of work coincided to a great extent with the emergence and swift uptake by the research and technological communities of the concept of ubiquitous learning, as an offspring of the advent and proliferation of wireless networking solutions. Following emerging research in this field, we have made consistent efforts to provide rich e-learning environments with the typical features of ubiquitous learning (Chen et al., 2002; Curtis et al., 2002; Ogata & Yano, 2004). Teacher-trainees in these e-learning environments have permanent immediate access to safely stored learning content, including their own data. They can introduce and continually form their learning and needs profile so as to be offered tailor-made, adaptable learning experiences, and can interact with experts and peers both synchronously and asynchronously, participating in social knowledge building and sharing. All this happens in teachers' everyday work environment, i.e. in the small rural school in which they work, while special efforts are made to design the instruction in ways that allow the embedding of trainees' learning in daily real life situations. The whole effort started with a rather greater emphasis on teachers' competence development through training content delivered over the web (MUSE project); it gradually moved into testing more advanced technologies for broadband delivery over satellite, while continuing to further develop the content (ZEUS and RURAL WINGS projects). The 'maturity' brought about through the training experiences and the increasing involvement of remote rural teachers led to the development of a network (NEMED) and an increased interest in concepts and tools related to lifelong learning networks (NEMED, RURAL WINGS). In this context the ZEUS project timely recognized the crucial role of satellite telecommunications for securing broadband for geographically disadvantaged populations. This project offered to remote teachers a rich distance learning environment for participating in synchronous and asynchronous training via satellite networks. The training programme was attended by teachers at ten sites in the extremities of Greece, via satellite installations made by the project at their schools. The research in ZEUS focused mainly on the appropriateness of the training content (which built on the MUSE content, extending and enriching it), the development of a distance training organisation and delivery method (which is described further below), and the testing of connectivity through DVB one-way satellite links as a channel for distance training delivery to remote teachers. The outcomes of this project in terms of training content and methodology are described in detail further below. As far as the technology is concerned, the DVB satellite link, demanding the use of non-

broadband terrestrial infrastructures (broadband downloading from the satellite, uploading through ISDN telephone line), caused some technical problems and relevant user dissatisfaction, which clearly indicated the way forward. The integration of the whole effort is RURAL WINGS (2006-2009), an ambitious, large-scale international research project supported by the Directorate-General for Research of the European Commission (Thematic Priority 'Aeronautics and Space' of the 6th Framework Programme). This project takes several decisive steps ahead, not only in the field of technology, but importantly also by carefully addressing the real needs for learning of all citizens living in remote rural areas, and by fostering the development of lively learning communities in remote schools and the villages hosting them. What is more, RURAL WINGS builds on the successful approach of the ZEUS project to develop an advanced technological environment supporting lifelong learning activities in the school, at work, as well as at home. In this way, familiarization of all citizens with the new technologies is promoted, resulting in a reduced resistance to the use of state-of-the-art opportunities for local development. Teachers working in remote rural schools –the main target group in the pilot applications in Greece– undertake a crucial role in this process. Through further support, professional development and networking, teachers of rural areas are encouraged to evolve into catalysts of change and development, not only within their schools, but more widely within their local communities.

A distance training delivery model

It has been a firm belief of the team that, although technical specifications do play a crucial role in a distance-education scenario, the success or not of the effort mainly depends on the underlying pedagogical design (cf. Lim, 2002). In line with this, the training programmes produced aim to cater for both flexibility and guidance, both interaction with others and self-paced learning. To this end, a comprehensive model for training delivery has been developed and tested in the framework of these projects. In this model, the central event for each lesson is a live videoconferencing session, using a synchronous e-learning tool, thus covering the need of isolated teachers for communication and real-time interaction with colleagues and instructors (cf. Shrestha & Sutphin, 2000, stressing the importance of interaction in similar settings). On average, this synchronous e-learning portion of a lesson takes up about 30% of the overall lesson duration. Both before and after the live session there is learning activity taking place independently in the working environment of the trainee. Through the use of web-based instruction techniques course participants are offered on-the-job training opportunities through tasks and materials that allow them to work at their own pace, interact with the instructor and other practitioners as needed, and receive individual feedback as they applied information to their classroom settings. For each lesson, there is introductory information on the topic covered, preparatory activities, the outcome of which are then reported by participants in the web environment and during the live session, as well as post-session consolidation and conclusion activities. The training delivery model has generally been well received by trainers and trainees.

Evaluation

A major aspect of all the above projects has been multi-faceted evaluation of the piloted e-training solutions. The aim of evaluation in these projects typically is to assess the appropriateness of the choices made during the design stage, and the overall effectiveness of the solution, at least at three levels: the technology used, the content of training offered, and procedures followed. The views of users (teacher trainees and instructors) on these aspects are collected through a variety of tools, including online questionnaires, interviews, as well as field observations and video recordings in the schools and classrooms of the participating teachers, in an overarching case-study oriented approach, following the development of informants' views, behaviours and stances. Questionnaire responses are analysed quantitatively, while data from the interviews and observations are analysed qualitatively, making use, among other tools, of specialised software for the demarcation and analysis of video data. For evaluation purposes, as well as for the introduction of improvements at a middle stage of the implementation, the courses offered are usually organised in two consecutive cycles. As a result, evaluation activities cluster around three main points on the timeline of the project: before the outset of the course, after the completion of the first cycle, and after the completion of the whole course, at the end of the second cycle. In this way, the evaluation methodology seeks to take record of the conditions prevailing in the participating schools before the programme, after its first cycle, and after its eventual completion, so that any changes effected by the training can be spotted and hopefully interpreted. In particular, the outcomes of evaluation at the end of the first cycle are useful for the introduction of any

necessary improvements in the second cycle. In the following, some outstanding findings and conclusions from the recently concluded ZEUS project are presented, being indicative of the broader tendencies that we have been recording in our various samples. The effort invested by the ZEUS partnership in the evaluation of the project and of the training programme in particular yielded outputs of considerable value. The quantitative and qualitative data gathered and analysed revealed positive as well as weak points in the design and implementation of the project, bequeathing rich experiences and good practices for future efforts in the field. Overall, the trainees evaluated very positively the content and procedures of the training offered; a few technical problems and faults did slightly decrease teachers' enthusiasm, but in the whole they did not lead to a much lower overall appreciation of the deployed technological solution. The ZEUS experience clearly showed that satellite data telecommunications can effectively support the provision of training and professional development at a distance, particularly to professionals such as teachers who work in remote and isolated areas. Nevertheless, ZEUS also clearly indicated that significant technical difficulties, which in some (limited) cases even caused obstacles to the smooth running of training, would have been avoided if a more advanced model of two-way satellite internet provision (DVB-RCS) had been available, not demanding the use of non-broadband terrestrial infrastructures. This technology is now being deployed within the RURAL WINGS project, yielding satisfactory results. In general, the attitude of the participating teachers towards the training programme was very positive. In their majority, they were dedicated to the course, and prepared to withstand any difficulties arising out of technical or other problems. This interest in ZEUS was found to be due to factors such as a decrease in their feeling of isolation and increased opportunities for communication with colleagues, new opportunities for access to up-to-date information, as well as the good relations and rapport developed between the trainees and the staff supporting them. In addition, given the situation in schools as recorded before the beginning of training, multigrade school teachers in Greece seem to be in real need for training in the use of ICTs, as well as in new, less conventional pedagogical approaches, which would help them better respond to the particularly high demands and challenges posed by multigrade classrooms. Observations made in schools at the pre-course stage revealed a very low level of use of ICTs, as well as traditional methods of teaching and classroom management that did not appear to offer the best possible solutions for the particularities of the multigrade classroom. Another very clear outcome of ZEUS was a corroboration of the predominance of the appropriate pedagogical design over mere availability of new e-training technologies via satellite connections. The different media, tools, and contents need to be orchestrated, according to clear pedagogical planning principles, into frameworks enabling substantial learning experiences and maintaining learners' interest unabated, so that specific training goals and objectives are achieved. The findings of the evaluation confirmed the appropriateness of the procedure proposed by ZEUS for the preparation, realization and support of e-training, which structures a series of asynchronous preparatory and follow-up activities around a central live session. An equally interesting and useful conclusion of the project refers to the unique opportunities for better understanding multigrade education through close observation and in-depth analysis of the video recordings of multigrade classrooms. To illustrate this point, reference can be made here of the findings of the analysis, in terms of lesson time allocated to the different types of activity, of the video data from the classrooms observed in the framework of the case studies conducted (see Figure 1). As can be seen in the chart, the distribution of classroom time in the five activity categories was found to have changed after the training: from a strongly teacher-centred, lecture- and assessment-oriented approach, typical of most schools in Greece –including multigrade schools–, the experience of the training programme may have lead teachers to experiment with more student-centred approaches. On the whole, running ZEUS was a rewarding experience, which, on the one hand confirmed the usefulness of satellite telecommunication systems for the provision of support to remote and isolated communities, starting from teachers working in such communities; and on the other hand, suggested ways for introducing improvements into, and furthering our work in this field.

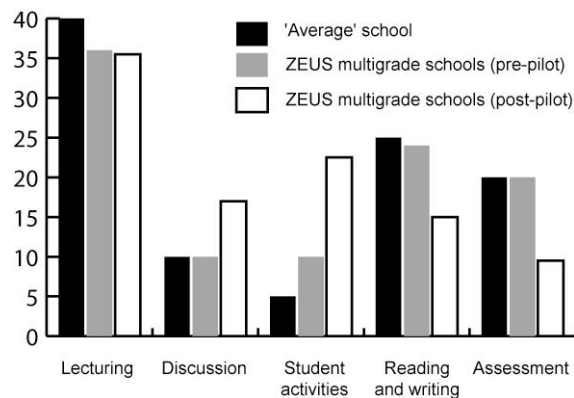


Figure 1: Profile of classroom activity

Outstanding questions: emerging issues of lifelong learning networks and competence development

In all the work described above, our efforts have led us to provide teachers working in remote small rural schools with opportunities for continuous professional development, through a number of different training initiatives, which foster the improvement of personal competences in rural teachers. In parallel, we have been experimenting with methods aiming to develop and foster a learning network of teachers, which will hopefully provide a framework for the acquisition and sharing of knowledge in an informal communication process (informal learning) lying beyond and supplementing teachers' formal professional education. Realising the issues and challenges arising, our team has started investigating further the characteristics of tools and methodologies which can foster the improvement of personal competences in rural teachers (competence development), and encourage and facilitate a teacher's contributions to the development of the other teachers (lifelong learning network). In this context, we are currently revisiting the training delivery model mentioned above at the micro level, aiming to identify, adopt and/or adapt methods and tools which could be incorporated in this general model in order to facilitate and support informal learning through peer interaction. In other words, we are currently investigating ways of effectively combining competence development and lifelong learning networking priorities and initiatives. At the level of technology, too, our team has come to realise the limitations of the conventional e-learning technologies and models, when the issue at stake turns into how to promote and facilitate competence development through networking with peers – a lifelong learning experience of multi-site and episodic nature. What is crucial at this stage is to identify the features and clarify the main issues connected with the technology/-ies which will be able to support rural teachers, both as individuals and as members of teams within the educational system (an 'organisation' in itself), to further develop their competences making use of the distributed knowledge and learning resources available. The NEMED portal is our current attempt in this direction, which has so far managed to develop into a repository of teaching and learning resources connected to multigrade education, jointly created and update by the teacher-members. It clearly needs to be further developed in the light of contemporary advances in social software and in fields such as knowledge organisation, collaborative authoring and learning, discovery and exchange of knowledge resources, personal profiling and ePortfolios, competence assessment and monitoring of change, etc. What is more, the newly-started RURAL WINGS project provides ample opportunity and challenge to organise the numerous learning resources and diverse learners in rural communities worldwide into meaningful, working networks fostering lifelong learning and competence development, within its own learning-enabling portal. In the endeavour to better understand and enable our vision of lifelong learning networks of rural teachers, we have found the notion of communities of practice (Wenger, 1998) to provide a powerful conceptual platform. According to Wenger, communities of practice are groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly. We are then aiming in this case to enable the development of a community of practice of rural teachers, which is defined by a shared domain of interest, that of the development of multigrade teaching competences. We need to establish members' commitment to the domain, and facilitate community development by assisting them to engage in joint activities and discussions, help each other, share information and learn from each other, while pursuing their interest in their domain. This will be indeed a community of practice rather than a mere community of interest, as members of the community will be rural teaching practitioners developing a shared repertoire of resources – a shared practice: experiences, stories, tools, ways of addressing recurring problems in their small rural school, etc. This kind of learning of

course takes time and requires sustained interaction – which are some more of the things that the technologies we are envisaging have to afford. Likewise, the technologies will need to support and facilitate a variety of activities through which communities develop their practice, such as problem solving, requests for information, experience seeking, reusing of assets, coordination and synergy, discussion of developments, mapping of knowledge and identification of gaps, etc (Wenger, 1998). How this can be designed and realised given current technological developments remains for us an open challenge.

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