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Keynotes

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- **Versions of computer-supported collaboration in higher education** (Crook, C.K., 2011, *In:* Ludvigsen, S., Lund, A., Rasmussen, I. and Säljö, R., Learning across sites: New tools, infrastructures and practices 1st. Abingdon: Routledge. pp. 156-171)
- **Technologies for formal and informal learning** (Crook, C.K. and Lewthwaite, S., 2010, *In:* Littleton, K., Wood, C. and Staarman, J.K., International Handbook of Psychology in Education Emerald. pp. 435-461)

Current projects concern the resourcing of collaborative learning with particular interest in early education but also undergraduates.

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Recent publications include:

- **Understanding teacher enquiry** (Joubert, MV & Sutherland, RJ. 2011 Research in Mathematics Education, 13, pp. 85-87)
- **Digital Technologies and Mathematics Education** (Sutherland, RJ & Alison Clark Wilson, Adrian Oldknow, 2011)

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Bridging the Distance from Research to Practice: Designing for Technology Enhanced Learning

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Abstract

A grand challenge for educational research is to remove its weak link to practice. One of the strategies to confront these challenges can be through the use of Design-Based Research (DBR). A DBR approach includes working iterations of design, implementation and evaluation in real world learning contexts, making it especially suitable for research in Technology Enhanced Learning (TEL).

This paper describes and contextualizes a workshop that points out the need to examine different design approaches and digital technology tools to explore TEL in educational practices. Since the goal of the workshop is to use multidiscipline perspectives of education and didactics (ED), computer science (CS), interaction design (ID), to show the complexity for supporting next generation learning, these perspectives will in the paper be described and put in relation to each other. What research questions within and in between the three perspectives should be included in a DBR-approach in order to inform and facilitate TEL-practices. In the end, of the paper a multidisciplinary DBR-approach allowing a more holistic understanding of educational practices usin g TEL will be argued for.

Introduction

One of the fundamental challenges for educational research aimed at understanding and developing the adoption and use of Technology Enhanced Learning (TEL) in schools is its weak link to practice, and the obstacles for practice to build on research. Design-based research (DBR) attempts to meet these challenges as it seeks to develop more general theories and locally valuable learning designs, theory-based design, and practical enactment of these designs (The Design-Based Research Collective, 2003). The DBR approach includes working iterations of design, implementation and evaluation in the real world learning contexts, making it especially suitable for research in TEL (Mor & Winters, 2007).

This paper functions as a framework to describe a workshop arguing for the need to examine different design approaches and tools to explore and promote innovative TEL practices along with theoretical concerns. The goal of the workshop is to use multidiscipline

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perspectives of education and didactics (ED), computer science (CS), interaction design (ID), to explore the complex issues to support next generation learning. The workshop will be researched-focused, meaning elaboration on how it will be possible using a DBR-approach to gain a deeper understanding of in what way(s) TEL can be used in teaching and learning.

Such focus will require highlighting core research questions within and between the three perspectives should be included in a DBR-approach in order to inform and facilitate TEL-practices. It will also be practice-focused. The questions to ask in a DBR-approach shall be addressed by examining the current state of the art learning tools (e.g. Course Management Tools, Mobile Tools and Social Media).

By that the workshop aims to envision research-based future learning scenarios that add value to the practice of education. The main outcome of the workshop is to identify key themes for further research and discussion, which can be further developed to support and improve the design, implementation and sustainability of TEL research to be used in educational practices.

In order to put this workshop in the context, below we will as a conceptual framework in short outline both some core ideas of DBR is understood and the three perspectives of education and didactics (ED), computer science (CS), and interaction design (ID) respectively. Each perspective will be described in relation to design for TEL. These multidiscipline perspectives will then be put in relation to each other by pointing out the overlaps between them and in terms of some examples of joint research questions.

Finally, we will try to bring the three perspectives together to investigate the possibilities to set up a multidisciplinary DBR-approach allowing us as researchers to, by asking productive and multidisciplinary impregnated questions, construct a more holistic understanding of educational practices

using TEL. The aim of the workshop is to create a common understanding that can function as a foundation for a continuously more advanced design principals to guide the further design, development, implementation and use of TEL in education. In the author's opinion it is of key importance to close the gap from research to practice, a bridge between researchers, teachers, educational technologists and students. This bridge is essential for exploring and developing education and learning for tomorrows TEL-practices.

Design-based Research

Design-based research (DBR) is said to entail a series of approaches with the intent of producing new theories, practices and artefacts that account for learning and teaching in educational practices. For example, van den Akker (1999, pp. 3-5) identified four sub-domains of DBR: curriculum, media and technology, learning and instruction, teacher education and didactics. Such approaches to design-based research separate instead of cultivate its interdisciplinary nature. However, it is argued, that a particular design intervention is not simply intended to show the value of a particular curriculum in a local setting but also to advance a set of theoretical constructs (Cobb et al., 2003), to identify reusable design principles and design patterns (Reeves, 2006). Essentially, design experiments are developed as a way to carry out formative research to test and refine educational practices based on theoretical principles derived from previous research (Collins et al, 2004). According to Collins and colleagues (2004), what characterizes design-based research is the process of progressive refinement, which involves putting a first version of a design into the world to see how it works, followed by iterative revisions based on experience.

Design-based approaches in educational research grew to large extent out of criticism from numerous researchers, practitioners, and

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policy makers claiming that the findings from educational research have little impact on practice or on the evolution of theory (Collins et al, 2004; Brown, 1992). Ann Brown (1992), one of the scholars that introduced design-based educational research, argued that we should question to what extent we are driven by a pure quest of knowledge, and to what extent we are committed to influencing educational practices.

Against this background, DBR methods are suggested to compose a coherent methodology that bridges theoretical research and educational practice (The Design-Based Research Collective, 2003). This bridging is facilitated by the fact that the methods are grounded in the needs, constraints and interactions of local practice, ensuring to higher extent that the research outputs have bearing on educational practices. DBR envisions that researchers, practitioners and learners/users work together with the goal to produce or facilitate a meaningful change in contexts of educational practices. As such, participatory design methods are frequently utilized in the field of TEL (Mor & Winters, 2007).

Education and Didactics

An important aspect of education and didactics in relation to design of TEL-activities in schools and universities is to "focus on creating rich and innovative learning experiences, as opposed to simply developing instructional products through staid processes." (Hokanson, Miller, and Hooper, 2008, p.37). The design of the TEL-activities shall within this perspective preferable be combined, or interwoven, with an understanding of the possibilities provided by the design behind the technologies used and its intention of what kind of teaching and learning interactions in classrooms and online contexts to facilitate (see further Olofsson & Lindberg, 2012).

An educational and didactical perspective provide, in some difference to the computer science or interaction design-perspective, a specific focus on questions concerning like for example course design, course planning, assessment and evaluation in relation to design of TEL-activities in educational practices (see for example Bergström, 2010; Lindberg, Olofsson & Stödberg, 2010; Olofsson, Lindberg & Hauge, 2011). Here teaching and learning through digital technologies is outlined as aspects of design with regard to the multi-dimensional and multi-relational link evolving from the triad teacher-student-content.

By that, the educational and didactical perspective can be said to embody the potential to extend the design processes aligned with TEL into interpersonal activities within the educational practices. It provides insight in the educational processes and by that a foundation for setting up innovative and creative opportunities for learners to experience, to explore, and to develop new knowledge's and skills through technology. Design informed by educational and didactical thinking has in addition the potential to provide teachers with ideas and possibilities how to create and continuously develop sustainable TEL-environments and inherent activities such as assessment and evaluation.

Computer Science

The role of computer science in respect to educational practices can be summarized by a 1945 article by Vannevar Bush for the *Atlantic Monthly* magazine that extolled the virtues of augmenting man's power of the mind, not just his physical abilities. He envisioned the concept as follows: "A memex is a device in which an individual stores all his books, records, and communications, and which is mechanized so that it may be consulted with exceeding speed and flexibility. It is an enlarged intimate supplement to his memory" (Bush, 1945, p. 5).

Thirty years later, Alan Kay and Adele Goldberg at the Learning Research Group at

Xerox PARC introduced the Dynabook concept. They envisioned the Dynabook, which was the forerunner to the modern laptop and tablet, as something that can be owned by everyone and that has the power to handle all of its owner's information needs (Kay and Goldberg, 1977). They positioned the concept as a dynamic medium for creative thought, a self-contained knowledge manipulator in a portable package, the size and shape of an ordinary notebook. In the early 1990's, Mark Weiser and colleagues extended the Dynabook beyond the idea of a single book-like computer. The aim of Weiser's ubiquitous computing was to push computers into the background in order to make individuals aware of the people at the other ends of the computer links (Weiser, 1991).

An interesting theme across these historical visions of the future is the common belief by these computer scientists that computers can be used to improve human intellect and communication, to be understood as the core of values of TEL within this perspective. These technologies can be seen to be influencing the world we live, educate and learn in, more than any recent modern digital technology.

Interaction Design

The daily use of personal information devices for intellectual, information and entertainment activities can be seen as one aspect of the changing nature of teaching and learning practices. Additionally, the widespread use of these devices is changing how people, especially children, learn because more technologies are assimilated into their everyday lives (Price and Rogers, 2004). The proliferation of these personal devices has challenged interaction design to look beyond the role of the user sitting in front of the screen and reflecting on the task to engaging in the everyday practice of work, education, and life.

Interaction design can be understood as the process of designing interactive systems. Interaction design research then is about

understanding the interaction design process and building theories and methods for designing interactive systems (Rogers, 2009). As comparison to human-computer interaction research has a focus on evaluating, rather than designing, interactive systems. Interaction designers may work in cross-disciplinary teams in phases of studying current practice (to frame the design problem), sketching and prototyping (to envision possible designs) and testing (to evaluate design alternatives). The way of working is typically iterative in going back and forth between these three phases until at least one feasible solution to the design problem can be presented. When framing the design problem by studying current educational practice no theoretical framing is required. Additionally the criteria for evaluating a design suggestion are to what extent it solves problems in current educational practice. In contrast interaction design in TEL research is framed by learning theories and design suggestions can be evaluated against learning goals. This might be the main difference between interaction design for TEL and interaction design for work practices and everyday interactive products.

Productive Overlaps

The development of digital technologies has led to a large overlap between education and didactics, computer science and interaction design. This overlap has resulted in diverse ICT for education, teaching, and learning that include intelligent tutors, computer aided instruction, computer adaptive testing, teachable agents that explore how artificial intelligence can support learning activities. For example computer science has developed different systems that provide tools for creating, sharing, and managing collaborative information for the communication, information and knowledge management. In addition the development of digital technology devices that range from smart phones, PCs to interactive whiteboards that are commonplace in education. What is interesting to point out is

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that although many aspects of our knowledge societies have easily made the transition to use of these digital technologies, educational practices and related teaching and learning activities is moving slowly if not getting a failing grade (compare Reeves, McKenney & Herrington, 2010). For example Erstad and Hauge (2011) argue that the adoption of digital technologies in schools open up for new and exciting endeavours but at the same time that there is no guarantee at all that digital technology-oriented teaching- and learning activities will take place just because the classrooms are filled up with digital learning tools.

One question that here demands attention and consequently needs to be answered by researchers and practioners is what can be done to change what right now seems to be the situation in many educational practices implementing and using digital technologies for TEL-activities? How will it be possible to gain knowledge and understanding in order to create teaching and learning activities supported by digital technology that in fact makes a positive difference for the learners? That makes them more knowledgeable and skilful? To make them ready for both participate in, and contribute to, the society?

Interaction Design and Computer Science	Computer Science and Education and Didactics	Education and Didactics and Interaction Design
How can we describe current practice?	What new approaches can be developed to design TEL systems that consider more than the human and social issues along with the technical?	How can interactive systems be designed that support rather than distract students from the learning goals?
What are the implications for design of an interactive system from descriptions of current practice?	How can we design and implement educational experiences supported by computing that take into consideration the different roles and needs of learners, teachers, and infrastructure?	How can interactive systems be designed and evaluated to align with learning goals?
How can theories, methods for developing interactive systems support the design process?	To explore the implications of these different technology design approaches for the development computing applications for TEL.	How do we design computer based learning tools for peer-oriented formative assessment?
How can the content, techniques, tools and materials structure the design process to support the design of TEL?		
How can we integrate educational theory, computer science and ID-theory in order to gain deeper understanding of designing for today's TEL-classrooms?		
How can we evaluate interactive systems against a background current educational practice and use?		
How can sustainable TEL-activities be designed and implemented?		

Table 1. Examples of research questions in a multidisciplinary perspective DBR-approach

Twenty years ago, Kaput (1992, p. 515) argued, "the limitations of computer use in education in the coming decades are likely to be less a result of technological limitations than a result of limited human imagination and the constraints of old habits and social structures." In line with the considerations addressed above and in line with Kaput we will here argue that different approaches need to be explored to promote innovative educational practices supported by digital technologies and carried out through TEL. To make that happen it is our opinion that the education, the interactions, and the digital technologies need to be designed together in order to support human knowledge acquisition for successful learning experiences and practices or usable systems.

To be able to design from a multi-disciplinary perspective and to learn from the design we mean that adoption of a DBR approach that integrates the perspectives of education and didactics, computer science with interaction design as partners for succeeding with needed human innovation in TEL will be fruitful. To us such an approach provides a possibility to gain deeper understanding of educational practices of today, their complexity and potential to facilitate teaching and learning activities in digital technology-rich environments. Results drawn from the use of DBR will in addition have the potential to provide important insight in how to design for teaching and learning with digital technology that are taking place not only in expected but also in unexpected ways. A design that is sensitive to the learning activities and its goals. A design that provides the teachers to by themselves elaborate upon the design in order to even further facilitate TEL-activities in the educational practices (compare Fischer & Giaccardi, 2006; Fischer, 2007).

To be able to carry out DBR that includes all three perspectives of education and didactics, computer science, and interaction design in one single research approach we will argue for that the initial phase should be about addressing a number of key questions that will guide the design process to come. That there is

a need to put together the perspectives in pairs of two and to identify what kind of research questions that cut through them both.

In Table 1 below we have addressed some examples of research questions that we will argue the perspectives have in common when designing for TEL in educational practices. In the final section of this paper we will then try to point out what a DBR approach aligning the three perspectives can contribute with and how it has the potential to bridge the distance between research and practice.

ED, CS and ID – Towards a fruitful combination

Learning science has a long history of cross and multi-disciplinary work across education and didactics, computer science, psychology, interaction design and other fields (Sawyer, 2006). DBR has provided theories and methodological approaches that provide a framework for investigation and the production of artefacts. But, many theoretical and practical challenges remain from the wide spread adaptation of digital technologies in school and at home, the limited innovation in the use of these digital learning tools in practice, and the difficulty in providing clear research findings. Therefore, we argue for a different approach that embraces three perspectives, that argues for a shift in design thinking to designing experiences and social artefacts that can make sense to users and their communities (Krippendorf, 2006). The questions raised in Table 1, begin the sense making process that can bridge the distance from research to practice by enabling a discursive approach.

When elaborating on design in general, Löwgren & Stolterman (2004) emphasizes the importance of designers knowing the design material well in order to work with its qualities. In this line, the same authors argue that design becomes more complex when different materials are combined that each have specific qualities. An example put forward is

the composition of both technical and social systems, which characterize the design of technology-enhanced learning activities. In the design of such systems the great challenge "is to design the social components together with the technical components as a systematic whole" (ibid, p. 3).

Tackling such a challenge from only one of the three perspectives mentioned would most likely yield unsatisfactory results. Through the combination of the perspectives, however, each of the perspectives may play a complementary role in the shaping of digital artefacts and technology-enhanced practices, ensuring to higher extent that both the social and the technological components are accounted for. From a computer science perspective an understanding of the technological material (software and hardware) is offered. This understanding entails the affordances and restrictions of the material, i.e. answers to what is possible to technologically design, and further, the know-how to design it. The education and didactics perspective on the other hand, offer answers to why the design is done, i.e. the pedagogical goals, and how learning activities should be didactically planned for in order to meet the pedagogical goals. Thus, the education and didactics perspective combined with that of computer science, in a sense, produces design visions of technologically possible and pedagogically meaningful technology-enhanced learning practices. Finally interaction design, focusing on the end-users, provides a set of techniques for contextualizing the design innovation in terms of taking account for users needs, current practices, and usability. As such, the interaction design perspective may inform the design through aligning (i.e. operationalizing) the vision derived from computer science and education and didactics with the realities of the educational systems – thus bridging the distance from research to practice.

We started this paper by addressing that a grand challenge for educational research aimed at understanding and developing the uptake and use of Technology Enhanced Learning (TEL) is to remove its weak link to practice, and the obstacles for practice to build on research. Making a strong link between research and practice so far seems to have been a slow process might be answered with on the one hand the hunt for knowledge to further inform the research community and on the other hand the willingness to influence and collaborate with different kind of educational practices? In this paper we have through a multi-disciplinary DBR approach tried to show one way to overcome this potential dilemma, through the realization that TEL researchers need to represent different core fields but work together to actively to cumulatively build understandings (Mor and Winters, 2007). Our intention is to use the discursive approach to build common ground between ED, CS, and ID for TEL. This leaves us with the final four questions that start building the bridge between research, practice, and the domains of ED, CS, and ID and seeds the workshop.

- How can the content, techniques, tools and materials structure the design process to support the design of TEL?
- How can we integrate educational theory, computer science and ID-theory in order to gain deeper understanding of designing for today's TEL-classrooms?
- How can we evaluate interactive systems against a background current educational practice and use?
- How can sustainable TEL-activities be designed and implemented?

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Facebook, Twitter & MySpace to teach and learn Italian as a second language

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Abstract

After the evolution from web to web 2.0 and from e-learning to e-learning 2.0 (Downes 2005; O'Reilly 2005; Bonaiuti 2006), teachers are approaching a new conception of learning/teaching which considers the wealth and the openness to the network and to the on line community. Tools like blogs, wikis, photo and videosharing sites, social bookmarking and social networking are nowadays introduced in different kinds of courses, creating connections between learners (Bonaiuti 2006; Fini, Cigognini 2009). What happens when we use web 2.0 tools in learning and teaching languages? Can learning be improved? Learning materials can easily be found, shared, used and created. Interaction is enhanced and students can practise the target language. The social networks, in particular, are communication, interaction and sharing environments which can be a valuable resource for linguistic and cultural learning and reinforcement, if conveniently used (Addolorato, 2009; Cotroneo, in press). In this presentation, after the description of learning theories related to the use of social networks, we'll describe the application of Facebook, Twitter and Myspace that can be used to improve language skills referring to Italian as a second language. This analysis can be the starting point of a wider research where social network environments can be used in place of the e-learning platforms, taking advantage of the social tools and the web services that permit teachers to create social network ad hoc.

Introduction

> "We use Facebook to schedule the protests, Twitter to coordinate and YouTube to tell the world" (Howard 2011)

This statement, pronounced by an Egyptian activist after Mubarak's fall, testifies the importance of web 2.0 tools in the daily life of people, all over the world, both in private and public life What about learning? After the evolution from web to web 2.0 and from e-learning to e-learning 2.0 (Downes 2005, O'Reilly 2005, Bonaiuti 2006), teachers are approaching a new conception of learning/teaching which considers the wealth and the openness to the network and to the on line community. Tools like blogs, wikis, photo and videosharing sites, social bookmarking and social networking are nowadays introduced in different kinds of courses, creating connections between learners (Bonaiuti 2006, Fini e Cigognini 2009). What happens when we use web 2.0 tools in learning and teaching languages? Can language learning be improved? Thanks to web and web 2.0 learning materials can easily be found, shared, used and created. Interaction is enhanced (in/hansed) and students can practise the target language in their daily life, even when they live abroad, connecting by desktop or by mobile. Considering the case of Erasmus students, for example, at the end of the study abroad programme they had had in Italy, its easiness and ubiquity could help to maintain

their foreign language and cultural skills. The social networks, *in particular*, are communication, interaction and sharing environments which can be a valuable resource for linguistic and cultural learning and reinforcement, if conveniently used (Addolorato 2009, Cotroneo *in press*). Using Facebook (http://www.facebook.com/), Twitter (http://twitter.com/) and Myspace (http://it.myspace.com/) for practising Italian culture and language can help to maintain and develop written and oral skills.

1. What about learning for the next generation?

During the last century, different learning theories - like behaviourism (Skinner 1957), cognitivism (Chomsky 1956) and constructivism (Vygotskij 1986, Bruner 1988) - attempted to explain how foreign language learning occurs, with the consequence of developing research about a fruitful methodology for foreign language training[1]. As Siemens states (2004), the way people work is altered if new tools are used: so, what about learning through web 2.0 tools? Behaviourism, cognitivism and constructivism can't completely explain what happens when technology has such a big role in learning. Some principles of Siemen's connectivism can help us to focus on the changes happening in teaching and learning through technology.

At first, Siemens (*ibidem*) quotes Stephenson's thoughts about experience: "Experience has long been considered the best teacher of knowledge. Since we cannot experience everything, other people's experiences, and hence other people, become the surrogate for knowledge […]." As Cross (2006) points out,

informal learning becomes important like formal and non-formal learning[2]. If at school or in an organization we learn through a programmed course, planned in relation to time, subjects and materials, in informal learning the daily interaction we have with people generates knowledge. Siemens (*ibidem*) thinks that the learning process can't entirely be under the control of the individual and knowledge can reside outside learners. Another learner can have already learnt what I need and I can gather knowledge through others and making friends with others. What I need to study can also be contained in a database or in a website, in what Siemens calls "non-human appliances".

Secondly, nowadays knowledge is growing faster and faster and, in a lifelong learning perspective, people need to be updated their whole life. The aim of connectivism is currency and Siemens states that the way to obtain currency is nurturing and maintaining connections. The knowledge we have is part of a network that is nurtured by organizations and it is developed in a cycle going from the individual to the network to the organization. When we learn we create connections between different sources so the next generation learner needs to nurture and maintain connections: the extension of their personal network brings the extension of learning.

Finally, when we learn we create connections between different fields, ideas and concepts: creativity but also serendipity can bring innovations. Moreover, Siemens (*ibidem*) outlines the importance of developing the ability to tap into sources and to find connections, because patterns could be hidden when learning occurs in a chaotic environment. Consequently, if we consider the importance of

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[1]   Consequently, language teaching has changed oscillating from the focus on form to the attention to the meaning in a way Serra Borneto called "the pendulum syndrome" (1998).

[2]   With "formal learning" we refer to those courses taking place in institutions as school or university while "non formal" is related to short –term courses, organized outside the main institutions. "Informal learning" is based on daily interaction and could happen outside educational institutions, at home or at work. For further definitions see Merriam and others (2007).

collecting people for collecting knowledge, of nurturing connections with people, of learning how to tap into sources, we can affirm that web 2.0 tools can help teachers and educators to teach and educate the next generation of learners.

2. Why should we use a social network to learn and teach?

The use of social networks in different education fields has been investigated with a lot of research all over the world. The analysis of the investigation results should suggest to us that the use of Facebook and other popular social networks encourage the use of the target language. Starting from the article of Pempek and others (2009), Facebook can develop students' intellectual capacities and the creation of a community of practice. Antenos-Conforti (2009), instead, describes the use of Twitter as a language tool by students attending an American university and studying in intermediate Italian classes. The potential of Twitter is explained quoting interaction theories: the tweets received represent the input students can process and the tweets written represent the output students produce; teachers can help giving correcting feedback to their tweets[3]. The author does not inquire into learning results but reports the students' point of view about Twitter as a language tool. In their opinion, reading tweets does not seem to be so useful in improving reading skills but, instead, they think writing tweets and comments helps to develop writing skills. It's quite interesting to notice that, in this case, Twitter has increased students interest in Italian culture, affecting positively their motivation[4]. Other essays and research written by teachers and instructional designers highlight the pros and the cons of using social media in education and report practical experiences using different tools (Spadavecchia 2010, Vagnozzi 2011, Cotroneo 2011). Facebook by college students, we can point out its potential for academic use. Through the writing of posts and comments related

3. How can we improve language skills using social networks?

Facebook, Twitter and Myspace are three of the most popular social environments that allow communication, interaction and sharing of contents between friends. In this paper we are going to describe some uses of these three social networks for teaching purposes, proposing examples concerning the teaching of Italian as a second language. To exemplify the use of these tools, we are going to consider the case of the Erasmus students coming back in their country after an Erasmus period spent in Italy. When an Erasmus student arrives in Italy, he takes advantage of the Italian language and culture lessons but also of interaction with natives. Often, they have started learning Italian when they were in their country, due to the cultural appeal of the Italian language and culture (literature, music, cinema, etc.). Sometimes, they have never studied Italian before and they can maybe give it up when they come back in their country. What should teachers do to maintain and improve the language skills the Erasmus students developed in Italy, according to an informal approach?

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[3] About the different roles input can have in foreign language learning, look at Chomsky (1959), Bruner (1983) and Krashen (1985).

[4] As Balboni states, motivation is the energy students use to accommodate new information and to support the effort needed studying a new language (2002).

"Students live on Facebook. So study tools that act like social networks should be student magnets - and maybe even have an academic benefit", state Parry and Young (2010). In a first description of the state of the art (Cotroneo *in press*) we described different kinds of social media we can use for learning and teaching languages:

- networks as Facebook, Twitter and MySpace, built for connecting people and sharing resources like posts, videos, images and notes;
- social sites including language and cultural courses to be attended helped by the native speakers community, as Livemocha (http://www.livemocha.com/), Palabea (http://www.palabea.com/) and My Happy Planet (http://www.myhappyplanet.com/);
- web services used to create social network ad hoc, to be personalized and used in your own classes, as Ning (http://www.ning.com), Elgg (http://elgg.org/index.php), Twiducate (http://twiducate.com) and SocialGo (http://www.socialgo.com/)[5].

In this paper we intend to go into detail about the analysis and the description of the first kind of social networks, referring to Facebook, Twitter and MySpace.

Founded in 2004 by Mark Zuckerberg, Facebook counts today more than 800 million users. In her paper about using Facebook to teach Spanish as a second language, Addolorato (2009) focuses on the sharing of texts, videos and links that, in her opinion, would help learners to improve their skills and to always be connected with Spanish language and culture. What about using Facebook to improve and maintain the Italian language and cultural skills? At first, Italian as a second

language learners can make friends with Italian or foreigners they knew in Italy, using Italian. They can also make friends with Italian people they share interests with (literature, music, cinema, etc.). Interaction generated by status messages or by photo and videosharing can replicate presence interaction, emphasizing attention on speech roles. It also gets the students' attention to writing, considering both meaning and form, as with the main web 2.0 tools (Fratter 2011). The example reported in fig. 1, represents a few comments on an image, shared on a Facebook wall and commented on by Italian and foreigners.

Referring to the importance of tapping into sources, we can find out – through this simple example - how the sharing of an image produces actions that become "potentially" learning actions.

In fact, reading this post a student could:

- googling the text reported in the image discovering the author of the poem, if not known, increasing literature knowledge and being stimulated to look for other poems;
- visiting the link suggested in the comment practising listening skills;
- interacting with other people commenting on their comments;
- searching unknown words in an online dictionary.

The same actions can be developed by reading and writing notes making students practise reading and comprehension or by listening and creating videos letting students exercise listening and comprehension. An other interesting aspect of Facebook can be found in pages or groups dedicated to subjects and specific fields: Italian music bands and singers, Italian sport athletes, Italian institutions, Italian cinema stars and the Italian way of life can capture students' attention and make them practise written and oral skills. As reported by Krashen (1983) talking of the "rule of forgetting", students are in this case totally

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[5] See also the papers of Troncarelli (2010) and Bedini (2009) describing the phenomenon of social networks created for language learning.

involved in the topics they are interested in and so they forget that they are using another language. Other pages can be created with didactic purposes, as in the case of "Impariamo l'italiano", where the aim of the creators is to give grammar pills, input in Italian and links to exercises hosted in a blog, as shown in fig. 2.

Fig. 1: commenting an image shared in Facebook (https://www.facebook.com/emanuelacotroneo?ref=tn_tn mn)

Fig. 2: the page "Impariamo l'italiano" (https://www.facebook.com/impariamoitaliano)

Sometimes Facebook hosts contents that can be used to learn and teach: a great example is represented by Italian Journey (https://apps.facebook.com/italianjourney/?ref

=ts), an application built for English native speakers to learn Italian words. As it's shown in fig. 3, a game representing a journey in different Italian cities proposes images and English words to be matched with the Italian translation. Students can log in, learn new words and share their results with their friends creating a motivating challenge between learners. In this case, the use of a playful methodology can motivate students and stimulate language training[6].

Fig. 3: the application "Italian Journey" (https://apps.facebook.com/italianjourney/?ref=ts)

If Facebook was built by Zuckerberg to facilitate friendship and contacts between people attending the same university, Twitter was created in 2006 by Jack Dorsey with the aim of supporting a text message service to communicate with friends. Today Twitter has become another popular free social site, used both for pleasure and work. It allows one to write very short messages, called "tweets", that are no longer than 140 letters. Even if Twitter at first impact could seem more based on text messages, we can propose the same use of Facebook. Other contents, such as photos, videos and text files, can be hosted on line and

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[6]   A complete review on playful methodology can be found in Caon and Rutka (2004), Carosso (2009) and Mollica (2009).

shared in Twitter: Instagram (http://instagr.am/),, or Twitpic (http://twitpic.com/), an internal Twitter application for Iphone users, represent two common ways of disseminating images and videos[7]. In fig. 4 we can see the sharing of an image, that can be used as a stimulus to improve writing skills and cultural knowledge.

Fig. 4: the sharing of a photo in Twitter
(http://twitpic.com/8dkgdy)

If Twitter is used during a language course, teachers can also profit from the shortness that characterizes tweets, giving students texts to summarize as an exercise for developing the ability to be more concise. Foreign students can become followers of important Italian people and be updated about Italian cultural life: tweets of Beppe Severgnigni, Lorenzo Jovanotti or Roberto Saviano are read and retwitted everyday, thanks to the virtual tom toms that became famous during the Arab revolution. Another use of Twitter can consider the following of Italian as second language accounts, created to share pedagogic contents, related to web sites and blogs on the

same subject: "Come Italiani" (https://twitter.com/#!/comeItaliani) shares posts from the website http://www.comeitaliani.it/, dedicated to teachers looking for lesson plans, games and reviews.

MySpace, set up in 2003, when Tom Anderson and Chris De Wolfe created a social network site to aggregate people sharing the same interests, especially musical ones: it can be defined as a enormous streaming repository of music, where users can listen and share songs. They can also disseminate short messages, images and photos, audio and video files and links. The profile page presents a central column, dedicated to friends' messages. On the right we can set a playlist containing, for example, Italian music giving students input to especially improve listening and comprehension. In fig. 5 we show the sharing of a music video where students have to read and listen to the lyrics, working on oral comprehension.

Fig. 5: the sharing of an Italian song
(http://www.myspace.com/578405246)

Therefore, Facebook, Twitter and Myspace seem to offer to foreign language students, coming back in their countries, a great opportunity to practise and improve their Italian language skills. The diffusion of shorter and longer texts, audio, videos, images and the possibility of writing and commenting on posts

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[7] For a discussion on Twitter pros and cons see O'Reilly and Milstein (2009).

about different subjects should help them to maintain their communicative skills. Collecting friends in these social networks can mean collecting Italian and culture knowledge, recalling Siemens assertion (2004).

4. And now…what's going on?

The description of Facebook, Twitter and Myspace features highlights the opportunity for teachers to create activities to make students practice foreign languages or the possibility of using these social networks for informal learning, thanks to the students' autonomy. We are carrying out research that aims to investigate the potentiality of social networks in language learning and teaching. We have published a questionnaire in our Facebook account to find out the opinion of its users. What they think about learning through Facebook? How often they use a second language in their daily online interaction? At the moment, 51 people have answered the questions we asked and we can summarize their opinions as follows:

- the survey involved 13 men and 38 women, 19 to 40 years of age, coming from different countries (mainly Italy but also France, Poland, Spain, Germany and Croatia);
- 16 people sometimes use a foreign language, 18 people very often use a foreign language and 10 people never use a foreign language during their social networking;
- 25 people think Facebook can help in practising a language ("Facebook helps to make contact with other cultures, to be updated, to use a language that is near to oral speech");
- 26 people think Facebook cannot help in practising language.

After this survey, we're testing the use of social networks in two different ways:

- creating a Facebook page group were it will be possible to practice the Italian language and culture, in an informal learning attitude. Focusing on learner's autonomy, we'll observe if after a set period their Italian will have improved or not; we'll also ask them to take daily notes about their use of Facebook, as proposed in Pempek and others (2009). We think that, in the presence of a great motivation, students can improve or at least maintain their Italian language and culture knowledge;
- secondly, creating an ad hoc social network, using the web 2.0 service Ning, to verify if a social network platform can easily be used instead of a traditional platform, producing better results due to social networking practises.

Conclusion

Web 2.0 seems to be a great opportunity and a stimulating challenge for teachers and students involved in foreign language training. In particular, the above mentioned social networks can offer students new ways to practice and improve written and oral skills, even after the end of formal courses. Teachers can spread the contents during the courses and after them, extending the lesson and the course time. The students participating in mobility programmes can continue, passing from formal to informal learning, the study of Italian and language culture through communicating with their social network friends. Posts, images, links and videos can represent L2 input and can produce output in L2 from students, stimulating autonomous research and going into details, surfing the web and so on. Social networking practices can also be transferred in *ad hoc* social networks, proposing formal learning in an informal environment. The results of the ongoing research should highlight some of the pros and cons of the use of social networks in foreign language and culture

learning and teaching. Paraphrasing the initial statement we quoted ("*We use Facebook to schedule the protests, Twitter to coordinate and YouTube to tell the world*"), we can summarize, in the case of the Erasmus students: "w*e use face-to-face lessons to approach Italian language and culture, ad hoc social networks to continue with formal learning in on line courses and Facebook, Twitter and Myspace to maintain language and cultural knowledge lifelong*".

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Destructive myths about NGL – how do we cope with them?

An analysis based on Swedish and international experiences

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Abstract

In this paper I will use the term NGL – Next Generation Learning – as more or less synonymous with terms like eLearning, distance learning, flexible learning. I will focus on learning with a large percentage of internet-based knowledge resources and communication and collaboration between teachers and students. The analysis is based on my own experiences from three Swedish universities, Mid Sweden University, Stockholm University, and Dalarna University, and on some international studies.

I am personally convinced that NGL has a great potential for improving many aspects of the quality and efficiency of learning, but I am also aware of a very strong lobby of people in government and educational institutions who are convinced that NGL is a serious threat against quality: increased resources should instead be given to more conventional learning with focus on the teacher in the classroom.

In my opinion, the scepticism against NGL is to a large extent based on myths which are not based upon facts. On the other hand, I think we must also admit that many arguments in favour of NGL are not yet supported by a sufficient amount of facts.

This paper will analyse some of the arguments for and against NGL, and how we could possibly obtain facts which provide more solid support of the alleged advantages of NGL and which at the same time help to falsify destructive myths about NGL.

What is the topic of this conference?

The first problem I encountered when writing this paper was how to refer to the theme of this conference. The officially stated theme, reflected in the name of the conference, is "Next Generation Learning" (NGL). But already in the introductory keynote address another term is used: "distance education", and although I have not myself been very long in this "business", I have almost painfully experienced that "distance education" is a term banned by at least some proponents of "Next Generation Learning", who grumble frowning, when they hear the term "distance education" mentioned: "*We do not use that term…*"

Furthermore, when I continue through the list of papers presented during this conference, I see terms like "online interaction", "online teaching", "web-based education", "technology enhanced learning", "asynchronous and synchronous courses", "blended learning", "blended learning in time and space", "technology enhanced inquiry learning", "self-paced learning", and "learning in social media worlds".

Is it "education" or "learning" that is in our focus? Or is it rather interactive teaching/learning processes?

The area of problems and opportunities that we are investigating and discussing at this conference seems to be an area full of fuzzy, ill-defined concepts, referred to by a wild-grown flora of terms. This may or may not be a problem.

My own background

It is not until quite recently that NGL or distance education, or whatever we choose to call it, has become a major focus of my own research. Thus you have to excuse me if I sometimes sound a bit naïve.

I received my PhD in 1973 from Stockholm University and what is today "Data- och systemvetenskap" (DSV), "Department of Computer and Systems Sciences", and what was then called "Informationsbehandling – ADB", "Information Processing", a department founded by the pioneer Börje Langefors, who managed to make the department belong to the faculty of social sciences of Stockholm University and to the Royal Institute of Technology at the same time – a very unconventional organisation in the typically extremely stovepipe-organised academic world. During my subsequent academic career, I have been a professor of information systems, information management, and informatics – different names of more or less the same academic discipline. One of the main characteristics of this discipline is that it is neither pure social science or pure technology, but it is what I would call "technology-enabled social science" – much like the discipline we deal with in this conference could be classified as "technology-enabled education and learning".

Indeed, both in informatics and in education and learning, information technology is something more than just an "ordinary" enabler. It has become a completely indispensible enabler, enabling what is called "disruptive innovations". But it is still an enabler, not an end in itself, much like pedagogical models are important enablers but not ends in themselves. Moreover, modern information technology enables a wide range of new and innovative pedagogical models, and innovative pedagogical models may induce a huge multiplication effect to the improvements in quality and efficiency of technolgy-enhanced education and learning.

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My first meeting with the modern form of technology-enabled distance education was at Mid Sweden University about 10 years ago. The Mid Sweden University had just become a university, and I was asked to help them create a research program in public information systems, or eGovernment as it is sometime referred to in a more narrow sense. During my first years I was wondering how Mid Sweden University could actually survive as a university. I saw rather few students on the campus, and although there were many courses given on all levels, there were very few students attending the courses. For example, I gave a few master courses, but there were only about 10 students attending those courses, almost all of them from non-European countries. Then, when I asked somebody, how Mid Sweden University could break even economically, I got a casual answer: "Oh, it is the distance courses." I was personally engaged only in campus courses at the time, but it turned out that the distance courses were real profit-makers – and very popular among students from all over Northern Sweden. Nevertheless, few people wanted to talk about the distance courses, and although technology-enhanced distance courses potentially offer so many advantages over conventional, campus-based education, these potential advantages did not seem to be exploited very much, and the distance courses seemed to uncritically take over many of the metaphors and administrative restrictions used (by necessity) by campus courses and programs.

When I returned as guest professor to Stockholm University, Department of Computer and Systems Sciences (DSV), after my retirement from Statistics Sweden, I encountered an impressive investment in flexible learning, strongly supported by the head of the department, and implemented by a special unit of more than 10 people within the department. Both pedagogical and technical aspects were emphasised. I decided to test the possibilities by developing a completely web-based course called "eSociety – evolution or revolution". All teaching material is available

both on a public website, https://sites.google.com/site/esocietycourse2011a/, and on iLearn, the learning platform of DSV. The teaching material includes video recordings, PowerPoint-supported lectures, and open access articles. Together with three colleagues, I developed a course consisting of 5 course modules. With the exception of the videos, we did all the development work ourselves, including the creation of the public website and the iLearn contents. We engaged a few external lecturers for some of the modules. Authors' rights problems were solved by means of a mutual use rights agreement between DSV on one hand, and teachers and guest lecturers on the other. Both parties receive complete copies of all teaching material, which they may use as they want, free of charge.

The first time we gave the course it attracted 67 students, who registered for the course, and the second time we had 103 students. Once we had made the investment in course development we could focus entirely on supporting interactions with the students. This was quite a positive experience, and the students seemed to appreciate our individualise engagement in their efforts. For each module they were given an assignment to be handed in. There were two choices for the final assignment in the last module of the course: either the students could write an individual essay, or they could organise a blog discussion with some fellow students, combined with individual conclusions from the blog discussion.

The most common questions from the students were of administrative nature. It seems that both the students and the administrators of the department have difficulties to fully understand and appreciate the flexibility that net-based distance courses offer: despite the formal registration rules, there is no reason why an interested and highly motivated student could start studying the course before it starts "officially", and on the other hand there is no reason why a student could not make a short interruption in the studies because of other duties, or study the course at a slower pace than full-time studies, postponing the final examination until the next semester. It is obvious that both the national and local formal rules and administrative systems have to be better adapted to distance courses in order to take full advantage of the flexibilities inherent in net-based distance courses.

My third experience of distance education is from Dalarna University. Dalarna University is a bit dogmatic, or even fanatic, about its aversion to the term "distance education". NGL is the only term that is politically correct there. The Department of Informatics is very successful with its brand of NGL called (in Swedish) "Fri start – fri fart", "Free start, free speed", a slogan which emphasises the inherent flexibilities of distance education that I have just discussed in connection with my experiences from SU-DSV.

I have tried to find out why it is so sensitive to talk about "distance education" and other similar concepts and terms at Dalarna University. It seems that – although the official policy supported by the top management of Dalarna is very positive to distance education enabled by modern technologies and innovative pedagogical models – there is a rather silent but influential group of teachers who are really opposed to distance education. The pragmatic compromise is that everyone should use the term "Next Generation Learning" instead, operationalised as stated in the strategy document Högskolan Dalarna (2010). The operationalisation in that document is of course very vague, and I suppose that is why it works as a pragmatic compromise. After all, distance education – or whatever we choose to call it – is and must be an essential part of any strategy for Dalarna University (and most other universities in Sweden, especially the small ones), if nothing else it generates substantial revenues, not to mention student satisfaction and quality improvements.

A review of some concepts and terms

Appendix 1 contains a relatively detailed discussion of some important concepts and terms used in the universe of discourse of this conference. Here I shall give a brief summary.

Next Generation Learning (NGL or NxGL)

The American vision

The concept of Next Generation Learning (NGL or NxGL) seems to come from some American organisations (Carnegie Corporation of New York, The Opportunity Equation, The Parthenon Group, Stupski Foundation) working in cooperation with a network of state-owned schools in the United States, the Council of Chief State School Officers (CCSSO). CCSSO is a nonpartisan, nationwide, nonprofit organisation of public officials who head departments of elementary and secondary education in some American states. CCSSO provides leadership, advocacy, and technical assistance on major educational issues. The Council seeks member consensus on major educational issues and expresses their views to civic and professional organisations, federal agencies, Congress, and the public.

According to CCSSO (2011) and the New Hampshire Department of Education (2011) the critical attributes of Next Generation Learning are:

- Personalizing learning, which calls for a data-driven framework to set goals, assess progress, and ensure students receive the academic and developmental supports they need;
- Comprehensive systems of learning supports, which address social, emotional, physical, and cognitive development along a continuum of services to ensure the success of all students;
- World-class knowledge and skills, which require achievement goals to sufficiently encompass the content knowledge and skills required for success in a globally-oriented world;
- Performance-based learning, which puts students at the center of the learning process by enabling the demonstration of mastery based on high, clear, and commonly-shared expectations;
- Anytime, everywhere opportunities, which provide constructive learning experiences in all aspects of a child's life, through both the geographic and the Internet-connected community; and
- Authentic student voice, which is the deep engagement of students in directing and owning their individual learning and shaping the nature of the education experience among their peers.

According to Stupski Foundation et al (2011) next generation learning models will necessarily rest on three building blocks: 1) knowing the student through frequent diagnosis and assessment facilitated by data platforms and learning algorithms, 2) modular, unbundled content and learning activities pegged to world-class standards, and 3) a variety of delivery methods. In combination, these components can potentially bring high levels of personalization to student learning:
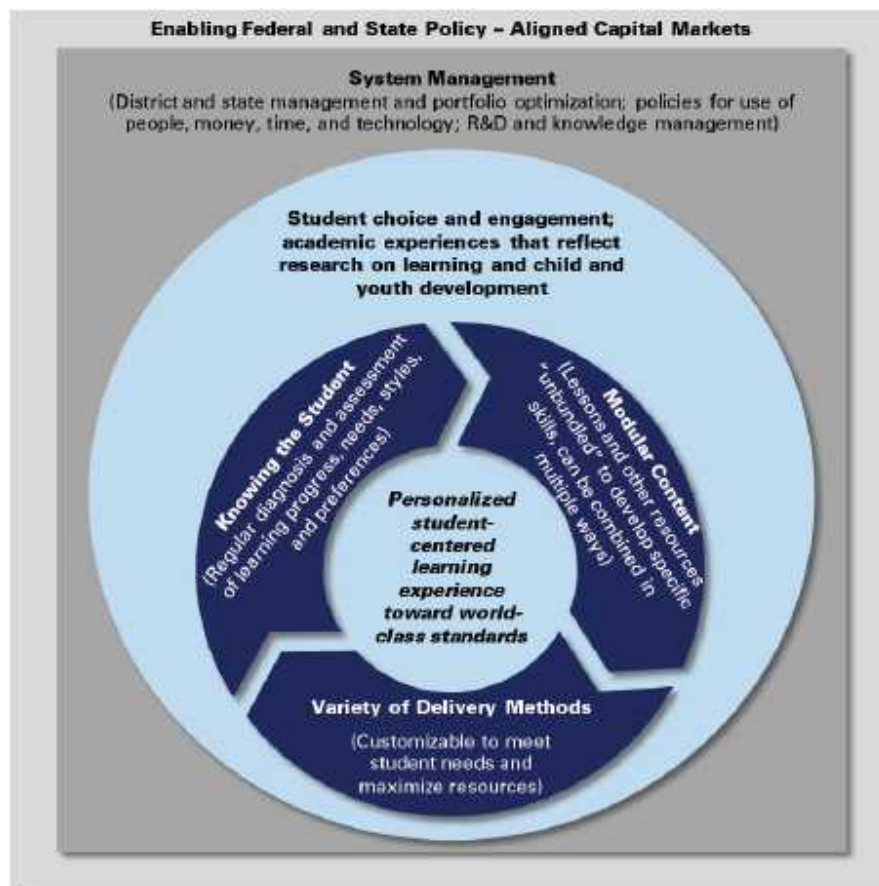
Figure 1. Next Generation Learning Building Blocks.

The vision of Dalarna University

In Sweden the NGL concept has become particularly popular at Dalarna University, intended to become the basis for projects that emphasise the enabling roles of modern information technology and innovative pedagogical models in combination:

In Swedish:

> "Begreppet nästa generations lärande förmedlar två pedagogiskt intressanta innebörder. Det handlar dels om den kommande generationens lärande, dels om de nya sätt att lära som växer fram med hjälp av en accelererande teknikutveckling." Högskolan Dalarna (2010), enligt citat från Högskoleverket (2011).

In English:

> "The concept of "next generation learning" communicates two pedagogically interesting meanings. On the one hand it is about the future generation's learning – on the other hand it is about the new ways of learning emerging with the assistance of an accelerating technical development." Högskolan Dalarna (2010) according to a quotation in Högskoleverket (2011).

Flexible learning

According to Wikipedia, http://en.wikipedia.org/wiki/Flexible_learning:

Flexible Learning is a set of educational philosophies and systems, concerned with providing learners with increased choice, convenience, and personalisation to suit the learner. In particular, flexible learning provides learners with choices about where, when, and how learning occurs. Sometimes also referred to as personalised learning. Flexible learning is a term often used in New Zealand and Australia; see Shurville et al (2008).

Flexible learning approaches are often designed using a full range of teaching and learning theories, philosophies and methods to

provide students with opportunities to access information and expertise, contribute ideas and opinions, and correspond with other learners and mentors. This may occur through the use of internet-based tools such as Virtual Learning Environments (VLEs) or Learning Management Systems (LMSes), discussion boards or chat rooms; and may be designed as a "blended" approach, with content available electronically and remotely, as well as "face-to-face" classroom tutorials and lectures.

While the majority of flexible learning programs to date have taken advantage of computer-based systems ("E-learning"), the rapidly increase in the processing power and popularity of mobile digital devices has recently caused considerable interest in mobile learning - the use of mobile devices such as mobile phones, iPods, and Personal Digital Assistants (PDAs) to increase the mobility of learners and correspondingly enhance the flexibility of their learning.

Distance education and distance learning

Distance education or **distance learning** is a field of education that focuses on teaching methods and technology with the aim of delivering teaching, often on an individual basis, to students who are not physically present in a traditional educational setting such as a classroom. It has been described as "*a process to create and provide access to learning when the source of information and the learners are separated by time and distance, or both*"; Honeyman& Miller (1993).

Distance education courses that require a physical on-site presence for any reason (including taking examinations) are referred to as **hybrid** or **blended** education. Internet-based distance education is referred to as **netbased learning**.

The Swedish Agency for Higher Education, Högskoleverket (HSV) has adopted an official definition of distance education; Högskoleverket (2011):

In Swedish:

> Utbildning där lärare och studenter i huvudsak är åtskilda i tid och/eller rum.

In English:

> Education where teachers and students are mostly separated in time and/or space.

The types of available technologies used in distance education are divided into two groups: synchronous learning and asynchronous learning.

Synchronous learning is a mode of delivery where all participants are "present" at the same time. It resembles traditional classroom teaching methods despite the participants being located remotely. It requires a timetable to be organised. Web conferencing and video-conferencing are examples of synchronous technology.

Asynchronous learning is a mode of delivery where participants access course materials on their own schedule and so is more flexible. Students are not required to be together at the same time. Mail correspondence, which is the oldest form of distance education, is an asynchronous delivery technology and others include message board forums, e-mail, video and audio recordings, print materials, voicemail and fax.

The two methods can be combined in the delivery of one course. For example, some courses offered by The Open University in the UK use periodic sessions of residential or day teaching to supplement the remote teaching.

Four major benfits of distance learning have been identified by Oblinger (2000):

- **Expanding access:** Distance education can assist in meeting the demand for education and training demand from the general populace and businesses, especially because it offers the possibility of a flexibility to accommodate the many time-constraints imposed by personal responsibilities and commitments.
- **Alleviate capacity constraints:** Being mostly or entirely conducted off-site, the system reduces the demand on institutional infrastructure such as buildings.
- **Making money from emerging markets:** there is an increasing acceptance of the value of lifelong learning. Institutions can benefit financially from this by adopting distance education.
- **Catalyst for institutional transformation:** The competitive modern marketplace demands rapid change and innovation, for which distance education programs can act as a catalyst.

Whereas NGL is eplicitly directed towards the future, distance education has a long and successful historical tradition.

Distance education dates to at least as early as 1728, when Caleb Phillips, "Teacher of the new method of Short Hand" was seeking students for lessons to be sent weekly.

Modern distance education initially relied on the development of postal services in the 19th century and has been practised at least since Isaac Pitman taught shorthand in Great Britain via correspondence in the 1840s. The University of London claims to be the first university to offer distance learning degrees, establishing its External Programme in 1858.

More recently, in 1969, The Open University was established in the UK, which initially relied on radio and television broadcasts for much of its delivery. All **open universities**, which now exist in many places around the world, use distance education technologies as delivery methodologies and some have grown to become **mega-universities**, a term coined to denote institutions with more than 100,000 students.

E-learning

According to Wikipedia, http://en.wikipedia.org/wiki/E-learning:

- **E-learning** comprises all forms of electronically supported learning and teaching. The information and communication systems, whether networked learning or not, serve as specific media to implement the learning process. The term will still most likely be utilised to reference out-of-classroom and in-classroom educational experiences via technology, even as advances continue in regard to devices and curriculum.
- E-learning is essentially the computer and network-enabled transfer of skills and knowledge. E-learning applications and processes include web-based learning, computer-based learning, virtual education opportunities and digital collaboration. Content is delivered via the Internet, intranet/extranet, audio or video tape, satellite TV, and CD-ROM. It can be self-paced or instructor-led and includes media in the form of text, image, animation, streaming video and audio.
- Abbreviations like CBT (*Computer-Based Training*), IBT (*Internet-Based Training*) or WBT (*Web-Based Training*) have been used as synonyms to e-learning. Today one can still find these terms being used, along with variations of e-learning such as elearning, Elearning, and eLearning.

Networked learning

Based on Wikipedia, http://en.wikipedia.org/wiki/Networked_learning:

- **Networked learning** is a process of developing and maintaining connections with people and information, and communicating in such a way so as to support one another's learning.

- The central term in this definition is connections. It takes a relational stance in which learning takes place both in relation to others and in relation to learning resources.[1]

- Salmon (2001) wrote "learning is built around learning communities & interaction, extending access beyond the bounds of time and space, but offering the promise of efficiency and widening access. Think of individuals as nodes on a network!"

- Networked learning can be practised in both informal and formal educational settings. In formal settings the learning achieved through networked communication is formally facilitated, assessed and/or recognised by an educational organisation. In an informal setting, individuals maintain a learning network for their own interests, for learning "on-the-job", or for research purposes.

Collaborative learning

Based on Wikipedia, http://en.wikipedia.org/wiki/Collaborative_learning:

Collaborative learning is a situation in which two or more people learn or attempt to learn something together. Unlike individual learning, people engaged in collaborative learning capitalize on one another's resources and skills (asking one another for information, evaluating one another's ideas, monitoring one another's work, etc.). More specifically, collaborative learning is based on the model that knowledge can be created within a population where members actively interact by sharing

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experiences and take on asymmetry roles. Put differently, collaborative learning refers to methodologies and environments in which learners engage in a common task where each individual depends on and is accountable to each other. These include both face-to-face conversations and computer discussions (online forums, chat rooms, etc).

Collaborative learning is commonly illustrated when groups of students work together to search for understanding, meaning, or solutions or to create an artifact or product of their learning. Further, collaborative learning redefines traditional student-teacher relationship in the classroom which results in controversy over whether this paradigm is more beneficial than harmful. Collaborative learning activities can include collaborative writing, group projects, joint problem solving, debates, study teams,and other activities. The approach is closely related to cooperative learning.

Virtual education

Based on Wikipedia, http://en.wikipedia.org/wiki/Virtual_education:

Virtual education is a term describing online education using the Internet. This term is often used in to refer to cyber schools, and in higher education, where so-called Virtual Universities have been established. A virtual program (or a virtual course of studies) is a study program in which all courses, or at least a significant portion of the courses, are virtual courses, whether in synchronous (i.e. real time) or asynchronous (i.e. self-paced) formats.

Virtual courses – a synonym is online courses – are courses delivered on the Internet. "Virtual" is used here to characterize the fact that the course is not taught in a classroom face-to-face but through some substitute mode that can be associated with classroom teaching. That means people do not have to go to the real class to learn.

Although there is a long and varied history of distance education, the current intersection of technology as a means to facilitate real-time communication with community-centered interaction, and the increasing acceptance and employment of those developments in the broader culture, have uniquely positioned virtual schools in a position of significant innovation and responsibility.

Many virtual study programs are mainly text based, using HTML, PowerPoint, or PDF documents. Any attempt to personalize the educational experience is essential in that students respond to personal attention and feedback. Today a wide spectrum of instruction modes is available, including the following:

- *Virtual Classroom:* Live teacher instruction and feedback online that enables real-time voice interaction, whiteboard sharing, and breakout sessions to enhance a student's learning experience. This provides students an opportunity to interact with the teacher as well as classmates by oral and written communication.
- *Virtual operating room:* giving students a space to learn the basic induction procedure before stepping foot in the real-life operating room.[3]
- *Hypertext courses:* Structured course material is used as in a conventional distance education program. However, all material is provided electronically and can be viewed with a browser. Hyperlinks connect text, multimedia parts and exercises.
- *Video-based courses* are like face-to-face classroom courses, with a lecturer speaking and Powerpoint slides or online examples used for illustration. Video-streaming technologies is used. Students watch the video by means of freeware or plug-ins.
- *Audio-based courses* are similar but instead of moving pictures only the sound

track of the lecturer is provided. Often the course pages are enhanced with a text transcription of the lecture.
- *Animated courses:* Enriching text-oriented or audio-based course material by animations is generally a good way of making the content and its appearance more interesting. Animations are created using Macromedia Flash or similar technologies.
- *Web-supported textbook courses* are based on specific textbooks. Students read and reflect on the chapters by themselves. Review questions, topics for discussion, exercises, case studies, etc. are given chapterwise on a website and discussed with the lecturer. Class meetings may be held to discuss matters in a chatroom, for example.[4]
- *Peer-to-peer courses* are courses taught "on-demand" and without a prepared curriculum. A new field of online education has emerged in 2007 through new online education platforms.
- *Social Networking:* Using Web 2.0 technologies in virtual classrooms promotes increased social interaction, student-centered instruction and a problem solving curriculum. Students can address a problem that is oriented to a cross curriculum activity. Teachers will act as guides and resources, but it is up to the students to collaborate, discuss, review ideas, and present solutions.

Students in synchronous mode virtual education acquire knowledge in a uni-directional manner (e.g. by studying a video, reading a textbook chapter), this would be known as asynchronous instruction. Subsequent discussions of problems, solving exercises, case studies, review questions, etc. help the students to understand better what they learned before. This learning is delivered at the students pace, not instructed live by a teacher. Although asynchronous courses are student driven, teachers are often needed to act as a guide. Therefore teacher facilitators are

often available to provide any assistance that may be needed throughout the course. Communication with teacher facilitators is accomplished through discussion boards and email. This communication may be needed at times to better explain a specific topic or make grade corrections.

Students enrolled in virtual classrooms or synchronous courses still acquire the content via real life instruction. A real teacher in real time delivers virtual classroom instruction. The virtual classroom teacher uses the computer screen as the board delivering instruction by using videos, PowerPoints, or podcasts in conjunction with audio of the teacher's voice. Students enrolled in the virtual classroom have opportunities for immediate teacher feedback and input while logged into class, just as they would in a traditional classroom. Students can also interact with other students via notes, texts, and emoticons. Additionally, many conferencing platforms used by virtual educators allow for students to work in small groups during classtime, thus again mirroring the look and feel of a traditional classroom. Electronic media like a discussion forum, chat room, voice mail, e-mail, etc. are often employed for communication in both synchronous and asynchronous courses.

Homework assignments are normally submitted electronically, e.g. as an attachment to an e-mail or uploaded to the LMS system in a view complete. When help is needed, lecturers, tutors, or fellow students, or a help desk are available, just like in a real university. The difference is that all communication occurs via electronic media.

Virtual teachers are encouraged to use technology more in the classroom. they are also motivated to share their ideas and lesson plans with other teachers through wikis, blogs, facebook, etc.

Communication in the synchronous virtual classroom is a collaborative learning experience. Students are encouraged to interact with peers through web-conferencing

technologies. Small-group and whole-group collaboration is a suggested platform for virtual education.

Communication can take place in real-time, i.e. during a class session. A small-group session is often referred to as a "Breakout Room." This is a platform that allows real-time, social interaction between students. Students collectively work on a learning task designed by the virtual classroom instructor. Individual microphones, whiteboard tools (drawing rights for the group board), and/or notes are suggested ways students communicate with one another during live "Breakout Rooms." Outside of the virtual classroom setting collaborative communication may also occur through various technologies; blogs, wikis, and/or multi-media tools.

Virtual campus

European Commission

Bieke Schreurs, editor (2011). *Reviewing the Virtual Campus Phenomenon.* http://revica.europace.org/Re.ViCa%20Online%20Handbook.pdf:

Although the phrase virtual campus is an important concept in the field of education, there is no generally accepted theoretical framework for it among researchers. In this chapter we search for a contemporary definition. To do this we have gathered definitions from more than 10 European Countries. Based on these results, we have developed a theoretical framework for the phrase virtual campus.

When defining a *virtual campus*, the European Commission stresses cooperation among higher education institutions in the field of e-learning, especially regarding joint curricula development by several universities. Indicators may include agreements for the evaluation, validation and recognition of acquired competences, subject to national procedures; large-scale experiments of virtual mobility in addition to physical mobility; and development

of innovative dual mode curricula, based on both traditional and online learning methods.

This broad definition involves many issues from partnerships between traditional and/or distance universities and other higher education providers, with a view to offering joint certifications (for undergraduate and/or postgraduate levels) and cooperation with learning support services. This might also include collaborative activities in strategic areas of education or research through cooperation involving researchers, academics, students, management, administrators and technical personnel. At the e-learningeuropa.info portal, *virtual campus* is defined as "Part of a university or faculty that offers educational facilities at any time or, in theory, any place, by Internet".

Wikipedia

http://en.wikipedia.org/wiki/Virtual_campus:

- A **virtual campus** refers to the online offerings of a college or university where college work is completed either partially or wholly online, often with the assistance of the teacher, professor, or teaching assistant.
- The majority of students using virtual campuses to obtain online degrees are adults students for three main reasons:
    - Flexibility - Adults with full-time jobs and families would find it impossible to attend daily at a traditional school setting. Online classes allow students to work at their own pace and work around their busy lives.
    - Cost - The cost of an online degree is relatively cheaper than at a traditional college setting. Obtaining your degree online eliminates costs such as classroom costs and facility upkeep costs that traditional students are required to pay because they are using the campus. However, the cheaper cost of an online degree does not diminish the value of the degree.
    - Broad Choices - Students can remain at home and have availability to degrees that may not be offered by universities or colleges nearby.
- Schools use a variety of tools for conducting classes - typically called Learning Management Systems (LMS) or Course Management Systems (CMS), e.g. Moodle, Sakai, Serco, Blackboard, Sharepoint, WebCT, Angel, Alphastudy, it's learning, Desire2Learn, EdMastery, Elluminate and eCollege.
- Some of the aspects that go under virtual campus includes various types of learing activities such as lectures, homework, discussions, readings, assignments. Classes are usually self paced using online documents and databases that might be available to them. Tests and other assignments are available online in specific programs used for online classes such as Elluminate, Blackboard, etc. Other methods used in virtual campus are live sessions, videoconferencing, discussing and sharing various applications to name a few. Individuals are able to access the materials any time they want under the teacher's control and are able to access anywhere online where they're able to access internet usage. Email is a big part of the virtual campuses and is often used before, during and after sessions. This aids individuals in exchanging information and or point them to the right direction that would be useful in increasing and understanding various methods available to them via documents and online sources.

Virtual university

Based on Wikipedia, http://en.wikipedia.org/wiki/Virtual_Universities:

- A **virtual university** provides higher education programs through electronic media, typically the Internet. Some provide online learning as part of their extended university courses while others solely offer online courses. They are regarded as a form of distance education. The goal of virtual universities is to provide access to the part of the population who would not be able to attend a physical campus, for reasons such as *distance* - where students live too far from a physical campus to attend regular classes; and the *need for flexibility* – some students need the flexibility to study at home whenever it is convenient for them to do so.

- Some of these organisations exist only as **loosely tied combines** of universities, institutes or departments that together provide a number of courses over the Internet, television or other media, that are separate and distinct from programs offered by the single institution outside of the combine. Others are **individual organisations with a legal framework**, yet are named "virtual" because they appear only on the Internet, without a physical location aside from their administration units.

Open universities

According to Wikipedia, http://en.wikipedia.org/wiki/Open_universities:

The term **open university** or **open universities** usually refers to a university with an open-door academic policy, i.e. no entry requirements.

The term "open university" may also refer a specific university, **The Open University** in the UK.

Open Educational Resources (OER)

Based on Wikipedia, http://en.wikipedia.org/wiki/Open_educational_resources:

Open educational resources (OER) are digital materials that can be re-used for teaching, learning, research and more, made available for free through open licenses, which allow uses of the materials that would not be easily permitted under copyright alone; Hylén (2007). As a mode for content creation and sharing, OER materials are beginning to get integrated into open and distance education.

OER include different kinds of digital assets. Learning content includes courses, course materials, content modules, learning objects, collections, and journals. Tools include software that supports the creation, delivery, use and improvement of open learning content, searching and organisation of content, content and learning management systems, content development tools, and on-line learning communities. Implementation resources include intellectual property licenses that govern open publishing of materials, design-principles, and localization of content. They also include materials on best practices such as stories, publication, techniques, methods, processes, incentives, and distribution.

What is the problem?

Netbased learning, distance education, or whatever we choose to call it, is chosen by a large and rapidly growing share of today's students; see for example Högskoleverket (2011). The same is true all over the world. When asked about their opinions, many students certainly have concrete criticisms – see again Högskoleverket (2011) – but on the whole they are positive and continue to demand this new

form of education with all its obvious advantages, for example flexibility. As just said, the criticisms that do exist are quite concrete and often combined with constructive proposals for equally concrete improvement.

So what is the problem? When I discuss with people at universities who are engaged in the development of these new forms of higher education, I get the impression that these people are more defensive than they should be. The explanation for this is, I suspect and fear, that a lot of teachers at the universities are in reality at least skeptical to the new education methods, and would rather prefer to stay with the traditonal methods with which they are well aquainted, and for which they have developed skills and teaching materials. Sometimes the situation is even worse. Myths are created and spread about serious shortcomings of the

new methods, and these myths sometimes develop into "truths", although there is usually no hard evidence corroborating the myths. The myths often concern different aspects of the quality of the new education methods.

Sometimes it is claimed by the critics of the new education methods that the Swedish government, in particular Jan Björklund, the minister of education, is negative to the new teaching methods and would like to see a return to traditional education forms, where the teachers lecture in front of a class in a classroom, so-called "katederundervisning" or "ex cathedra teaching"; see figure 2; often mentioned in contrast to "group work" (figure 3).

Figure 2. Lecturing ex cathedra.

Figure 3. "And today, we have group work, so that the laziest idiots can learn to exploit the talented and hardworking idiots."

I have checked what Jan Björklund actually said in the debate about "katederundervisning", and there are three things that he emphasises:

- learning activities led by teachers should become more common than today
- learning activities where the students have to take responsibility for their own learning without the support of a teacher should become less common than today
- learning activities should become more structured than they are today

Regardless of whether one agrees with the opinions expressed by Jan Björklund or not, it is obvious that all three goals stated above can be achieved regardless of whether the learning takes place in traditional physical classrooms, or whether they are implemented, for example, in web-based educatiohave checked what Jan Björklund actually said in the debate about "katederundervisning", and there are three things that he emphasises:

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Regardless of whether one agrees with the opinions expressed by Jan Björklund or not, it is obvious that all three goals stated above can be achieved regardless of whether the learning takes place in traditional physical classrooms, or whether they are implemented, for example, in web-based education.

I agree that the quality of education is extremely important. However, it is important that the quality is measured in relevant ways, regardless of delivery mode of the education, so that (a) the quality can be mesured in an objective way against explicit education goals; (b) the quality can be compared in an objective way between different modes of education, e.g. traditional, campus-based education and various forms of distance education, such as synchronous and/or web-based education.

Briefly expressed, we need more facts and less guesswork and myths about different aspects of higher education: different qualities, cost efficiency, student satisfaction, etc. Now we shall take a look at some facts that already do exist.

Towards a fact-based discussion

There are many beliefs, convictions, assumptions, and opinions – often more or less agitated, and more or less prejudiced –about the issues that are discussed in this paper. Unfortunately there have been relatively few serious attempts to find facts that could help us verify or falisify hypoteses and myths, and which could help us determine which practices should be abandoned, and which should be promoted and further developed. Naturally, some practices may be good for some students

and bad for others, and studies about such variations would be very welcome, too.

Some basic facts collected by Högskoleverket (HSV)

One of few fact-finding investigations in Sweden is the one, which has just been published by the Swedish National Agency for Higher Education (HSV), Högskoleverket (2011): "*Kartläggning av distansverksamheten vid universitet och högskolor*", a survey of the distance education at Swedish universities and university colleges. Appendix 2 contains a selection of statistical tables from this survey. Based on these facts, HSV has drawn some conclusions concerning distance education:

Summary

- Independent courses dominate
- Distance students are seldom beginners in higher education
- Many distance students acquire 0 points
- Great variation between universities regarding their strategic work with distance education

Supply of distance education

- The volume of distance education has increased
- The supply consists mainly of independent courses as opposed to complete programs
- 90% is basic education
- Law and social sciences are the biggest areas

Who are the distance students?

- There is an ongoing increase in the number of distance students
- Women are in majority
- Many older students in distance education
- There are relatively few students with foreign background in distance education
- Many distance students have parents with low education
- Distance students have often children

- Many distance students do not have financial study support

Study patterns and study achievements

- A majority study independent courses
- Unusual with full time studies on distance
- Low degree of achievement in distance education

Sweden in an international perspective

Sweden started early to develop distance education, both qualitatively and quantitatively. It was an explicit goal to broaden the recruitment to higher education. In 1998 The Distance Education Agency (Distansutbildningsmyndigheten) was created. In 2002 tasks concerning higher education were tranferred to the Agency for Sweden's Net Universities (Myndigheten för Sveriges Nätuniversitet).

During the three following years the Ministry of Education spent 500 MSEK on direct support to the universities for the development of new courses and programs.

The development in Norway has been similar to that in Sweden. Since 1994 Norway has had a permanent administrative organ for flexible learning in higher education, SOFF (Sentralorganet for fleksibel læring i høgre utdanning). In 2004 the tasks of SOFF were transferred to Norgesuniversitetet: http://norgesuniversitetet.no, which works with direct project support to universities, national expert groups, and national reviews of important issues.

In a large number of countries similar development took place from the year 2000 and onwards, for example:

- Swiss Virtual Campus: http://www.virtualcampus.ch
- Virtuelle Hochschule Bayern: http://www.vhb.org/

- Finlands virtuella universitet: http://www.virtuaaliyliopisto.fi/en/index.html
- Joint Information Systems Committee UK: http://www.jisc.ac.uk/
- SURF-foundation: http://www.surffoundation.nl/ (Holland)

Sweden, Finland, and Switerland have chosen to discontinue or drastically decrease the national support, whereas Holland, UK, and Finland have continued to support national organisations and agencies; they have also made strategic efforts to create national open (distance) universities.

In a global perspective it seems to be the open universities which have achieved most, at least as regards a broadening of the recruitment to higher education. Some examples:

- Anadoulo University in Turkey with 900 000 students;
- Indira Ghandi National Open University in Indien with 3,5 miljoner students (biggest university in the world);
- Terbuka University in Indonesia with 650 000 students;
- Open University UK with 180 000 students (biggest university in UK).

Some countries, notably Australia, have developed distance education into an important export product.

Sweden has made national efforts to organise cooperation between universities focusing on joint distance educations, e.g. "Engineer online" and "National Nurse online".

The future of distance education

Since 2002 the number of full year students on distance educations has increased by 100% in Sweden. Between 2007/2008 and 2008/2009 the number has increased by about 20%. There is a similar development in, for example, the United States, where the number of "online students" has increased by 21% during the last year; Allen&Seaman (2010).

However, the most significant development potential for distance education can be seen in Africa and Asia. For example, Tanzania expects a tripling of the number of students from 2009 to 2025; Kotecha (2010). *India expects an increase from 14 million students today to 40 million students in 2020*; IndiaEdunews.net (2010).

At the same time the share of students in Open and Distance Learning is expected to grow from 24% to 40%; Vandarjan (2009).

In Sweden 20% of the students study, at least partly, on distance, and in the United States the figure is about 30%; Allen&Seaman (2010).

Producer perspective vs customer/student perspective

Most facts that have been collected about distance education have been collected from a producer's perspective. This is true also for the study by the Swedish National Agency for Higher Education, Högskoleverket (2011), from where I have got the facts above. There are very few studies, which observe and analyse distance education from a customer/student perspective.

Högskoleverket (2011) refer some surveys that have been made by others with the purpose to catch facts about why the students choose distance educations, and what they think about those educations.

Why do students choose distance educations?

Some Swedish universities have used questionnaires, focus groups, or interviews in order to find the motives that student have to choose distance educations. Some facts about this are available from Umeå Center for Evaluation Research (UCER), which has had a task to evaluate the usefulness for students achieved by net-based distance education.

Some findings from the evaluations:

- The flexibility is the factor which has been most important for motivating the students to choose distance education.
- The students chose distance courses because of their interest in their contents.
- A large share of the students participating in distance courses were looking for jobs at the same time. Some of them chosen distance courses in order to be able to finalise their studies, even if they got a job in another part of the country.
- Another group of students choosing distance education were Swedish students living abroad.

What do the students think about distance educations?

The opinion of students about distance educations that they are participating in, or have participated in, may contribute constructively to systematic quality work by indicating strengths and weaknesses in distance educations.

Some findings from the evaluations:

- Many students think that the pedagogical quality of the courses is miserable, and that the IT support does not live up to their expectations.
- One shortcoming in some courses is that the technical possibilities are not exploited. The students are well aware of the potential of different forms of IT support from other courses, from which they have positive experiences.
- Students over 30 years of age are most critical.
- Several students think that many teachers have just copied a campus course and put documents on the learning platform without adapting the pedagogical model to distance education.
- Most of the criticism concern the support from teachers. The student miss

engagement, guidance, and dialogues from the teachers.

- Those students who are satisfied with the support from teachers are particularly satisfied with the availability of the teachers.
- Several students wanted more social contacts through physical meetings in order to keep up the motivation for their studies. This view was mainly expressed by students in health care and medicine, students on longer courses (more than 30 points), full time students, and beginners.
- Group work was strongly criticised by almost all students. On the other hand, those students, who had not had any group work, found that to be a shortcoming.
- The students asked for more continuity in the studies, for example more deadlines, and more assignments to be accounted for during the course, and they were missing a complement replacing physical meetings, lectures, and discussions. Almost all students wanted more teacher-led discussions in available net-based fora.

See also Almqvist&Westerberg (2005) and Mårald&Westerberg (2006).

Selected statistics from Högskoleverket (2011)

Studenter som studerade på distans hösten 2008, per lärosäte.	Antal distansstudenter	Andel (%) av samtliga studenter
Umeå universitet	8 380	40
Högskolan Dalarna	7 867	62
Mittuniversitetet	6 567	61
Högskolan i Gävle	5 234	59
Växjö universitet	4 847	42
Karlstads universitet	4 069	36
Uppsala universitet	3 778	15
Stockholms universitet	3 776	11
Lunds universitet	3 598	14
Luleå tekniska universitet	3 317	37
Högskolan på Gotland	3 216	79
Göteborgs universitet	3 196	10
Högskolan Kristianstad	3 176	44
Högskolan i Kalmar	3 174	40
Örebro universitet	2 909	24
Högskolan i Jönköping	2 813	26
Högskolan i Skövde	2 609	47
Malmö högskola	2 669	18
Blekinge tekniska högskola	2 612	49
Högskolan i Halmstad	1 744	38
Högskolan Väst	1 080	30
Högskolan i Borås	1 837	24
Mälardalens högskola	1 413	12
Linköpings universitet	1 313	6
Kungl Tekniska högskolan	1 155	8
Karolinska institutet	897	13
Södertörns högskola	738	9
Sveriges lantbruksuniversitet	737	15
Örebro Teologiska Högskola	104	46
Sophiahemmet Högskola	63	14
Teologiska Högskolan Stockholm	46	11
Gymnastik- och idrottshögsk	20	3
Dramatiska institutet	20	8
Danshögskolan	13	6

Helårsstudenter i distansutbildning 2008/09 per lärosäte.	Helårsstudenter distansutbildning	Andel (%) av totala antalet helårsstudenter
Mittuniversitetet	4 143	54
Umeå universitet	3 870	34
Högskolan Dalarna	3 313	47
Högskolan i Gävle	2 309	49
Växjö universitet	2 245	38
Lunds universitet	2 217	8
Karlstads universitet	1 871	34
Stockholms universitet	1 736	6
Högskolan på Gotland	1 739	68
Uppsala universitet	1 573	8
Malmö högskola	1 481	18
Högskolan i Kalmar	1 392	34
Luleå tekniska universitet	1 347	31
Högskolan Kristianstad	1 216	36
Göteborgs universitet	1 117	4
Blekinge tekniska högskola	1 099	29
Högskolan Väst	969	31
Högskolan i Borås	960	22
Örebro universitet	872	10
Högskolan i Jönköping	829	10
Högskolan i Borås	742	11
Högskolan i Halmstad	711	14
Linköpings universitet	699	4
Kungl Tekniska högskolan	523	4
Mälardalens högskola	511	7
Karolinska institutet	407	7
Sveriges lantbruksuniversitet	257	7
Södertörns högskola	133	2
Örebro Teologiska Högskola	37	19
Sophiahemmet Högskola	33	6
Teologiska Högskolan Stockholm	17	8
Gymnastik- och idrottshögsk	6	1
Dramatiska institutet	7	4
Dans- och cirkushögskolan	4	1

Antal fristående kurser sökbara hösten 2009, per lärosäte.

Antal generella program sökbara hösten 2009, per lärosäte och examensinriktning.

Andel (%) av studenter som inte klarat några av de poäng de var registrerade för.

Andel (%) av studenter som klarat mer än 50, mer än 80 respektive mer än 90 procent av registrerade poäng, studenter som inte klarat några poäng silt exkluderade.
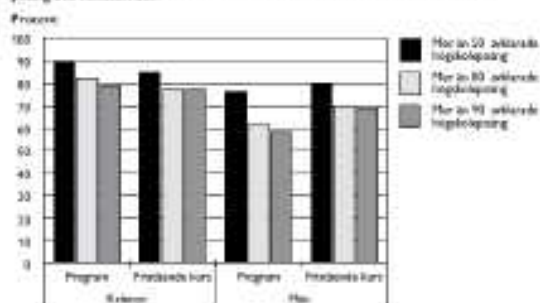
Conclusions and visions for the future

New methods and forms of higher education, enabled by modern, web-based information technologies and new pedagogical models, are a hot topic at universities today, both in Sweden and abroad. Many of us have a strong belief in many of these new forms of education, and the students are definitely attracted by them and often choose them when they are available.

On the other hand there are many university teachers, who are skeptical to the new methods and forms of education, and many students are also critical to some aspects of them. There are definitely needs to improve all forms of higher education in order to achieve better results in more efficient ways, both from a producer's and from a customer/student's perspective.

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Regardless of our attitudes towards the new methods and forms of higher education, we should be able to agree that many more facts are needed as a basis for our evaluations and decisions. And we also need to know more about which aspects and criteria should be evaluated and compared; see Högskoleverket (2008).

Some visions for the future:

- The demand from students will continue to grow for new methods and forms of higher education, enabled by modern, web-based information technologies and new pedagogical models.
- The new methods and forms of higher education will continue to be improved, taking advantage of technical as well as pedagogical innovations, often in combination.
- Open Access (OA) publishing and development of Open Education Resources (OER) will continue to grow rapidly.
- The new methods and forms of higher education will lead to improvements of quality, cost-efficiency, and student satisfaction in higher education.
- Swedish universities will develop and intensify cooperation and organise joint virtual educations and virtual universities, engaging the best teachers and resources, whereever they are physically located.

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Appendix 1. Definition of concepts and terms.

This appendix contains some definitions of selected concepts and terms. Many of the definitions are quotations from Wikipedia.

Next Generation Learning (NGL, NxGL)

The vision of Dalarna University

In Swedish: "Begreppet *nästa generations lärande* förmedlar två pedagogiskt intressanta innebörder. Det handlar dels om den kommande generationens lärande, dels om de nya sätt att lära som växer fram med hjälp av en accelererande teknikutveckling." Högskolan Dalarna (2010), enligt citat från Högskoleverket (2011).

In English: "The concept of "next generation learning" communicates two pedagogically interesting meanings. On the one hand it is about the future generation's learning – on the other hand it is about the new ways of learning emerging with the assistance of an accelerating technical development." Högskolan Dalarna (2010) according to a quotation in Högskoleverket (2011).

Stupski Foundation et al (2011)

This section contains some quotations from Stupski Foundation et al (2011): *Next Generation Learning – Defining the Opportunity*.

Introduction

It is a challenge classroom teachers understand all too well: how can a single teacher deliver engaging yet challenging lessons for all students, each with unique learning styles, levels of knowledge, interests, and degrees of engagement? The short answer is that this is a virtually impossible task. With twentyplus students in a class and 24 hours in a day, even the most

dedicated, talented teachers are structurally limited in their ability to provide personalized instruction to every student.

Today a handful of innovative thinkers are proposing a new solution to this challenge. If Pandora can predict and serve our individual musical preferences, or if medicine can be tailored to our genetic make-up, similar practices and tools can provide personalized learning experiences for all students. Personalized learning enables each student to take a customized path toward meeting high level standards. Flexible uses of time and space allow differentiated approaches to content, assessment, pacing, and learning style. This level of personalization, when combined with world-class standards, performance-based assessment, anytime/anywhere learning, deep student engagement and agency, and a comprehensive system of supports, is referred to as next generation learning (NGL). *(For more information, see CCSSO's "Next Generation Learners: A Framework for Action.")*

…

Next Generation Learning Myths

Our research also identified myths and misconceptions about next generation learning. One common misunderstanding is that all instruction in a next generation classroom takes place online. In reality, in some next generation classrooms, students rarely or never sit in front of a computer. NGL models predominantly use technology as an enabler, not an end in itself. Technology is the main driver behind personalizing instruction in next generation classrooms, but is typically not the primary method of instructional delivery. Most models will also employ traditional instruction, such as whole-class or small-group instruction, individualized tutoring, and independent study. Students will develop projects, carry out research, and showcase their final products via computers, but they will also read books, conduct experiments, assemble models, and present their work in person to teachers, classmates, and others. Technology-based delivery will be critical insofar as it loosens the resource constraints of traditional models — human capital, time, and space.

Second, the most important use of technology will be on the "back-end" of an instructional model. It is information technology, with an emphasis on "information," that will drive

effective NGL models. While some of the promise of NGL is in *how* instruction is delivered to the student, much more of the benefit is likely to be derived from *what* is being taught,

when, and *to whom*? NGL models will leverage information technology to assist educators in making the thousands of micro decisions that result in differentiated teaching and learning. "The technological advancements that get the headlines — iPads, online textbooks, etc.," offered one interviewee, "are not next generation learning. Most of the technology in a next generation classroom happens behind the scenes."

Third, interviewees overwhelmingly challenged the idea that next generation learning necessarily minimizes teacher-student interaction. "People think we're trying to create a world where students are taught by computers," explained one entrepreneur. "It is actually the opposite. If we can use technology to assist teachers with assessment and grading, then teachers will have more time to interact with their students."

Next Generation Learning Building Blocks

Next generation learning has generated considerable enthusiasm among education leaders, many of whom agree on a general vision of what the future might hold. There is less agreement, however, regarding the details of what needs to be done. There will ultimately be many flavors of NGL, but to ensure that emerging models go beyond pilot stage to influence student learning gains at scale, there are some essential elements that funders, school developers, practitioners, entrepreneurs, administrators, and policymakers should consider.

To achieve the vision outlined above, interviewees identified common design features that will be required across a diverse set of approaches. Despite the wide variety of individual

school models, next generation models will necessarily rest on three building blocks: 1) knowing the student through frequent diagnosis and assessment facilitated by data platforms and learning algorithms, 2) modular, unbundled content and learning activities pegged to world-class standards, and 3) a variety of delivery methods. In combination, these components can potentially bring high levels of personalization to student learning.

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Figure 1. Next Generation Learning Building Blocks.

Building Block #1: Knowing the Student

Next generation models keep track of students' learning progress with periodic (often daily) assessments. These might take the form of a brief quiz at the end of the day or, as models

develop, diagnostics that are fully integrated into core learning activities. For example, some students at Rocketship Education, a California-based charter management organization, receive an extra 100 minutes of online instruction daily to reinforce their regular classroom learning and address specific skill gaps in literacy or math.

For many NGL models, *knowing the student* will be about far more than assessing student skill. Some schools spend time surveying students, parents, and teachers on student interests

and learning styles to further improve personalization. Daily student assessment results also provide valuable data on learning preferences. "A student may say she learns best through online programs," said one entrepreneur. "But if her assessment results are better after receiving large group instruction, then that's what she'll receive."

Building Block #2: Modular Content

The goal of *knowing the student*, of course, is to provide students with unique, personalized instruction. Consequently, next generation content is necessarily informed by ongoing

student assessment. If an assessment determines, for instance, that a seventh grade baseball enthusiast doesn't understand adding fractions with unlike denominators, that student may

benefit from a baseball-focused fraction lesson. NGL schools establish precise alignment between content and assessment so that students receive instruction tailored to their individual needs.

Next generation content must also be modular, capable of being "unbundled" at the level of specific skills. Modular content is necessary to provide the proper instruction to each student at the appropriate time. Very few next generation schools will use a single textbook; instead, schools collect individual lessons from a variety of content providers. As a result, the typical next generation school model will require a tremendous volume of modular content.

Modular content enables next generation schools to advance students through a sequence of skills, commonly called a learning progression. Students progress at their own pace,

moving on to a new lesson or learning activity as soon as they master the one preceding it. Advanced students can move quickly through standards they already understand, while

struggling students receive targeted instruction focused on the exact skills they have not yet mastered. Ultimately, modular content creates opportunity to accelerate successful learning for all students.

Building Block #3: Variety of Delivery Methods

Next generation schools will offer students a wide variety of learning experiences, not only in terms of content but in the delivery methods used to match students' learning styles. Some

classrooms are already integrating multiple delivery methods, including teacher-led instruction, online instruction, one-on-one tutoring, collaborative learning, and more. A handful of schools even offer anytime/anywhere learning over the internet, a benefit for students with part-time jobs, for example, or students who want to take courses not currently offered by their schools.

Some next generation schools also offer project-based learning, providing students with internships, post-secondary courses, volunteer activities, and other opportunities. "Our robust assessment system provides us the flexibility to let students experiment with new learning experiences," said one entrepreneur. "If they're not learning, we'll know soon enough, and we'll make adjustments." The ultimate goal is student engagement, finding a way to deepen the learning experience and allow students to pursue activities that interest and motivate them.

Flexible and creative uses of time and human resources allow schools to maximize the variety of delivery methods offered to students. Many NGL models seek to deploy teachers in new,

more efficient ways. "Why should it always be one teacher in front of 30 students?" asked one district official. "If students are taking a test or reinforcing material they've already learned, you only need a ratio of 1 to 50. On the other hand, if you're trying to help a student learn a lesson for a third or fourth time, you'll want a ratio of 1 to 3. Next generation learning provides that flexibility."

Next generation models have found other innovative ways to utilize and support teachers. Some models emphasize the role of the teacher as content expert, encouraging them to focus

deeply on specific topics and lessons. Other models foster teachers' own professional growth, giving novice teachers easier assignments (for instance, one-on-one tutoring) and gradually

promoting them to more difficult ones (such as instruction in front of a large group.) As expectations for teaching and learning deepen with the growth of next generation models, it becomes necessary to re-envision the role of the teacher and the required supports.

New Hampshire (NH) Department of Education (2011):

This section contains some quotations from New Hampshire Department of Education (2011): "*Next Generation Learning (NxGL)*", http://www.education.nh.gov/innovations/nxgl/.

Next Generation Learning (NxGL)

Since last summer, the Department has been working with the Council of Chief State School Officers, the Stupski Foundation, and the Nellie Mae Education Foundation on advancing innovative approaches to K-12 learning known as "Next Generation Learning," or NxGL. The critical attributes of Next Generation Learning are characterized as:

- Personalizing learning, which calls for a data-driven framework to set goals, assess progress, and ensure students receive the academic and developmental supports they need;
- Comprehensive systems of learning supports, which address social, emotional, physical, and cognitive development along a continuum of services to ensure the success of all students;
- World-class knowledge and skills, which require achievement goals to sufficiently encompass the content knowledge and skills required for success in a globally-oriented world;
- Performance-based learning, which puts students at the center of the learning process by enabling the demonstration of mastery based on high, clear, and commonly-shared expectations;
- Anytime, everywhere opportunities, which provide constructive learning experiences in all aspects of a child's life, through both the geographic and the Internet-connected community; and
- Authentic student voice, which is the deep engagement of students in directing and owning their individual learning and shaping the nature of the education experience among their peers.

NH is one of seven states brought together to advance this set of design principles. The other six state education agencies (SEAs) that stepped forward to be part of this bold effort, and demonstrated both readiness and capacity to establish an Innovation Lab-comprised of the SEA, district(s), school(s), and partners-within their state include Kentucky, Maine, New York, Ohio, Wisconsin, and West Virginia. These states will work together with intensive support from CCSSO, the Stupski Foundation, and others who will be engaged in the partnership.

Over the last several years there have been a number of developments that have placed in sharp focus the need to more closely examine how we all are planning for the future of public education. The economic

downturn has created many challenges for all of us in terms of budgets and capacity to deliver quality educational services. The "disruptive innovation" brought on by rapid advancements in the use of educational technology has forced us to think in new modalities and to envision and strategize for the future in ways that may have not been anticipated just a few short years ago. The larger community expectations of student performance have grown exponentially during this same time, as has the need for intensive and dramatic student engagement. Meanwhile, we are assailed almost every day by test scores and anecdotal evidence of tremendous transformation happening all across the globe in the field of education. It is time we come together to think and plan together regarding our future.

Flexible learning

Wikipedia

http://en.wikipedia.org/wiki/Flexible_learning

Flexible Learning is a set of educational philosophies and systems, concerned with providing learners with increased choice, convenience, and personalisation to suit the learner. In particular, flexible learning provides learners with choices about where, when, and how learning occurs. Sometimes also referred to as personalized learning. Flexible learning is a term often used in New Zealand and Australia see Shurville et al. (2008)

Flexible learning approaches are often designed using a full range of teaching and learning theories, philosophies and methods to provide students with opportunities to access information and expertise, contribute ideas and opinions, and correspond with other learners and mentors. This may occur through the use of internet-based tools such as Virtual Learning Environments (VLEs) or Learning Management Systems (LMSes), discussion boards or chat rooms; and may be designed as a "blended" approach, with content available electronically and remotely, as well as "face-to-face" classroom tutorials and lectures.

While the majority of flexible learning programs to date have taken advantage of computer-based systems ("E-learning"), the rapidly increase in the processing power and popularity of mobile digital devices has recently caused considerable interest in mobile learning - the use of mobile devices such as mobile phones, iPods, and Personal Digital Assistants (PDAs) to increase the mobility of learners and correspondingly enhance the flexibility of their learning.

See also

- Blended learning
- E-Learning
- M-learning
- Networked learning
- Virtual education
- Virtual University
- What is Flexible Learning?
- Mobile Learning News
- Negotiated learning
- Educational and Institutional Flexibility of Australian Educational Software
- Wikieducator course on flexible learning

Distance education

Official definition by the Swedish National Agency for Higher Education

Högskoleverket (2011)

In Swedish: Utbildning där lärare och studenter i huvudsak är åtskilda i tid och/eller rum.

In English: Education where teachers and students are mostly separated in time and/or space.

Wikipedia

http://en.wikipedia.org/wiki/Distance_education:

Distance education or **distance learning** is a field of education that focuses on teaching methods and technology with the aim of delivering teaching, often on an individual basis, to students who are not physically present in a traditional educational setting such as a classroom. It has been described as "a process to create and provide access to learning when the source of information and the learners are separated by time and distance, or both."[1] Distance education courses that require a physical on-site presence for any reason (including taking examinations) have been referred to as hybrid[2] or blended[3] courses of study.

Netbased learning

Internet-based distance education.

History and development

Distance education dates to at least as early as 1728, when "an advertisement in the Boston Gazette...[named] 'Caleb Phillips, Teacher of the new method of Short Hand" was seeking students for lessons to be sent weekly.[4]

Modern distance education initially relied on the development of postal services in the 19th century and has been practised at least since Isaac Pitman taught shorthand in Great Britain via correspondence in the 1840s.[5] The University of London claims to be the first university to offer distance learning degrees, establishing its External Programme in 1858. This program is now known as the University of London International Programmes and includes Postgraduate, Undergraduate and Diploma degrees created by colleges such as the London School of Economics, Royal Holloway and Goldsmiths. [6] In the United States William Rainey Harper, first president of the University of Chicago developed the concept of extended education, whereby the research university had satellite colleges of education in the wider community, and in 1892 he also encouraged the concept of correspondence school courses to further promote education, an idea that was put into practice by Columbia University.[7] In Australia, theUniversity of Queensland established its Department of Correspondence Studies in 1911.[8]

More recently, Charles Wedemeyer of the University of Wisconsin–Madison is considered significant in promoting methods other than the postal service to deliver distance education in America. From 1964 to 1968, the Carnegie Foundation funded Wedemeyer's *Articulated Instructional Media Project* (AIM) which brought in a variety of communications technologies aimed at providing learning to an off-campus population. According to Moore's recounting, AIM impressed the UK which imported these ideas when establishing in 1969 The Open University, which initially relied on radio and television broadcasts for

much of its delivery.[9]. Athabasca University, Canada's Open University, was created in 1970 and followed a similar, though independently developed, pattern[10]. Germany's FernUniversität in Hagen followed in 1974[11] and there are now many similar institutions around the world, often with the name **Open University** (in English or in the local language). All "open universities" use distance education technologies as delivery methodologies and some have grown to become 'mega-universities',[12] a term coined to denote institutions with more than 100,000 students.

The development of computers and the internet have made distance learning distribution easier and faster and have given rise to the 'virtual university, the entire educational offerings of which are conducted online.[13] In 1996 Jones International Universitywas launched and claims to be the first fully online university accredited by a regional accrediting association in the US.[14]

In 2006, the Sloan Consortium, a body which arguably has a conflict of interest in the matter, reported that more than 96 percent of the very largest institutions (more than 15,000 total enrollments) have some online offerings, which is more than double the rate observed for the smallest institutions, and that almost 3.2 million US students were taking at least one online course during the fall term of 2005.[15]

A study published in 2011 by the U.S. Department of Education found that "From 2000 to 2008, the percentage of undergraduates enrolled in at least one distance education class expanded from 8 percent to 20 percent, and the percentage enrolled in a distance education degree program increased from 2 percent to 4 percent."[16]

Today, there are many private and public, non-profit and for-profit institutions worldwide offering distance education courses from the most basic instruction through to the highest levels of degree and doctoral programs. Levels of accreditation vary: some of the institutions receive little outside oversight, and some may be fraudulent diploma mills, although in many jurisdictions, an institution may not use terms such as "university" without accreditation and authorisation, often overseen by the national government - for example, the Quality Assurance Agency in the UK.[17] In the US, the Distance Education and Training Council (DETC) specializes in the accreditation of distance education institutions.[18]

Technologies used in delivery

The types of available technologies used in distance education are divided into two groups: synchronous learning and asynchronous learning.

Synchronous learning technology is a mode of delivery where all participants are "present" at the same time. It resembles traditional classroom teaching methods despite the participants being located remotely. It requires a timetable to be organized. Web conferencing, videoconferencing, Educational television, Instructional television are examples of synchronous technology, as are direct-broadcast satellite (DBS), internet radio, live streaming, telephone, and web-based VoIP.[19]

The asynchronous learning mode of delivery is where participants access course materials on their own schedule and so is more flexible. Students are not required to be together at the same time. Mail correspondence, which is the oldest form of distance education, is an asynchronous delivery technology and others include message board forums, e-mail, video and audio recordings, print materials, voicemail and fax.[19]

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The two methods can be combined in the delivery of one course. For example, some courses offered by The Open University use periodic sessions of residential or day teaching to supplement the remote teaching.[*citation needed*]

Other technology methods used in the delivery of distance education include online three-dimensional (3D) virtual worlds. A popular 3D virtual world, Active Worlds, is used for synchronous and asynchronous learning. Active Worlds provides opportunities for students to work collaboratively.[20]

Major benefits of use: an institutional perspective

Diana G. Oblinger,[21] writing specifically of the US context, has identified four broad reasons why educational institutions might embrace distance learning:

- **Expanding access:** distance education can assist in meeting the demand for education and training demand from the general populace and businesses, especially because it offers the possibility of a flexibility to accommodate the many time-constraints imposed by personal responsibilities and commitments.
- **Alleviate capacity constraints:** being mostly or entirely conducted off-site, the system reduces the demand on institutional infrastructure such as buildings.
- **Making money from emerging markets:** she claims an increasing acceptance from the population of the value of lifelong learning, beyond the normal schooling age, and that institutions can benefit financially from this by adopting distance education. She sees sectors of education such as courses for business executives as being "more lucrative than traditional markets".
- **Catalyst for institutional transformation:** the competitive modern marketplace demands rapid change and innovation, for which she believes distance education programs can act as a catalyst.

Casey and Lorenzen have identified another financial benefit for the institutions of the US, stating that distance education creates new graduates who might be willing to donate money to the school who would have never have been associated with the school under the traditional system.[22]

Criticism

Adult learners utilizing distance education can face obstacles such as domestic distractions and unreliable technology which could make completing a distance education course difficult.[23]

E-learning

Wikipedia

http://en.wikipedia.org/wiki/E-learning:

- **E-learning** comprises all forms of electronically supported learning and teaching. The information and communication systems, whether networked learning or not, serve as specific media to implement the learning process.[1] The term will still most likely be utilized to reference out-of-classroom and in-classroom educational experiences via technology, even as advances continue in regard to devices and curriculum.
- E-learning is essentially the computer and network-enabled transfer of skills and knowledge. E-learning applications and processes include Web-based learning, computer-based learning, virtual education opportunities and digital collaboration. Content is delivered via the Internet,

intranet/extranet, audio or video tape, satellite TV, and CD-ROM. It can be self-paced or instructor-led and includes media in the form of text, image, animation, streaming video and audio.

- Abbreviations like CBT (*Computer-Based Training*), IBT (*Internet-Based Training*) or WBT (*Web-Based Training*) have been used as synonyms to e-learning. Today one can still find these terms being used, along with variations of e-learning such as elearning, Elearning, and eLearning.

Networked learning

Wikipedia

http://en.wikipedia.org/wiki/Networked_learning

- **Networked learning** is a process of developing and maintaining connections with people and information, and communicating in such a way so as to support one another's learning.

- The central term in this definition is connections. It takes a relational stance in which learning takes place both in relation to others and in relation to learning resources.[1]

- CSALT, a research group at Lancaster University, UK, associated with the Networked Learning Conference series and several edited collections, has defined networked learning as "learning in which information and communication technology is used to promote connections: between one learner and other learners, between learners and tutors; between a learning community and its learning resources."[2]

- Salmon (2001) wrote "learning is built around learning communities & interaction, extending access beyond the bounds of time and space, but offering the promise of efficiency and widening access. Think of individuals as nodes on a network!"[3]

- Networked learning can be practised in both informal and formal educational settings. In formal settings the learning achieved through networked communication is formally facilitated, assessed and/or recognised by an educational organisation[*citation needed*]. In an informal setting, individuals maintain a learning network for their own interests, for learning "on-the-job", or for research purposes[*citation needed*].

- It has been suggested that networked learning offers educational institutions more functional efficiency, in that the curriculum can be more tightly managed centrally, or in the case of vocational learning, it can reduce costs to employers and tax payers.[4]However, it is also argued that networked learning is too often considered within the presumption of institutionalised or educationalised learning, thereby omitting awareness of the benefits that networked learning has to informal or situated learning.[5]

Collaborative learning

Wikipedia

http://en.wikipedia.org/wiki/Collaborative_learning:

Collaborative learning is a situation in which two or more people learn or attempt to learn something together.[1] Unlike individual learning, people engaged in collaborative learning capitalize on one another's resources and skills (asking one another for information, evaluating one another's ideas, monitoring one another's work, etc.).[2][3] More specifically, collaborative learning is based on the model that knowledge can be created within a population where members actively interact by sharing

experiences and take on asymmetry roles.[4] Put differently, collaborative learning refers to methodologies and environments in which learners engage in a common task where each individual depends on and is accountable to each other. These include both face-to-face conversations[5] and computer discussions (online forums, chat rooms, etc.).[6] Methods for examining collaborative learning processes include conversation analysis and statistical discourse analysis.[7]

Collaborative learning is heavily rooted in Vygotsky's views that there exists an inherent social nature of learning which is shown through his theory of zone of proximal development.[8] Often, collaborative learning is used as an umbrella term for a variety of approaches in education that involve joint intellectual effort by students or students and teachers.[9] Thus, collaborative learning is commonly illustrated when groups of students work together to search for understanding, meaning, or solutions or to create an artifact or product of their learning. Further, collaborative learning redefines traditional student-teacher relationship in the classroom which results in controversy over whether this paradigm is more beneficial than harmful.[10][11] Collaborative learning activities can include collaborative writing, group projects, joint problem solving, debates, study teams,and other activities. The approach is closely related to cooperative learning.

Virtual education

Wikipedia

http://en.wikipedia.org/wiki/Virtual_education:

Characteristics of virtual education

Virtual education is a term describing online education using the Internet. This term is used in K-12 schooling, often to refer to cyber schools, and in higher education, where so-called Virtual Universities have been established. A virtual program (or a virtual course of studies) is a study program in which all courses, or at least a significant portion of the courses, are virtual courses, whether in synchronous (i.e. real time) or asynchronous (i.e. self-paced) formats.

Virtual courses – a synonym is online courses – are courses delivered on the Internet. "Virtual" is used here to characterize the fact that the course is not taught in a classroom face-to-face but through some substitute mode that can be associated with classroom teaching. That means people do not have to go to the real class to learn.

Although there is a long and varied history of distance education, the current intersection of technology as a means to facilitate real-time communication with community-centered interaction, and the increasing acceptance and employment of those developments in the broader culture, have uniquely positioned virtual schools in a position of significant innovation and responsibility. In an educational environment in which school choice for families and students is increasingly valued, "cyber charter schools, as an outgrowth of the charter movement and the virtual school movement, represent a unique group of schools characterized by both their administrative model and their course delivery technology."[2]

Instruction modes for virtual education

Many virtual study programs are mainly text based, using HTML, PowerPoint, or PDF documents. Any attempt to personalize the educational experience is essential in that students respond to personal attention and feedback. Today a wide spectrum of instruction modes is available, including the following:

- *Virtual Classroom:* Live teacher instruction and feedback online that enables real-time voice interaction, whiteboard sharing, and breakout sessions to enhance a student's learning experience. This provides students an opportunity to interact with the teacher as well as classmates by oral and written communication.
- *Virtual operating room:* giving students a space to learn the basic induction procedure before stepping foot in the real-life operating room.[3]
- *Hypertext courses:* Structured course material is used as in a conventional distance education program. However, all material is provided electronically and can be viewed with a browser. Hyperlinks connect text, multimedia parts and exercises.
- *Video-based courses* are like face-to-face classroom courses, with a lecturer speaking and Powerpoint slides or online examples used for illustration. Video-streaming technologies is used. Students watch the video by means of freeware or plug-ins.
- *Audio-based courses* are similar but instead of moving pictures only the sound track of the lecturer is provided. Often the course pages are enhanced with a text transcription of the lecture.
- *Animated courses:* Enriching text-oriented or audio-based course material by animations is generally a good way of making the content and its appearance more interesting. Animations are created using Macromedia Flash or similar technologies.
- *Web-supported textbook courses* are based on specific textbooks. Students read and reflect on the chapters by themselves. Review questions, topics for discussion, exercises, case studies, etc. are given chapterwise on a website and discussed with the lecturer. Class meetings may be held to discuss matters in a chatroom, for example.[4]
- *Peer-to-peer courses* are courses taught "on-demand" and without a prepared curriculum. A new field of online education has emerged in 2007 through new online education platforms.
- *Social Networking:* Using Web 2.0 technologies in virtual classrooms promotes increased social interaction, student-centered instruction and a problem solving curriculum. Students can address a problem that is oriented to a cross curriculum activity. Teachers will act as guides and resources, but it is up to the students to collaborate, discuss, review ideas, and present solutions.

Communication and interaction

Students in virtual education acquire knowledge in a uni-directional manner (e.g. by studying a video, reading a textbook chapter), this would be known as asynchronous instruction. Subsequent discussions of problems, solving exercises, case studies, review questions, etc. help the students to understand better what they learned before. This learning is delivered at the students pace, not instructed live by a teacher. Although asynchronous courses are student driven, teachers are often needed to act as a guide. Therefore teacher facilitators are often available to provide any assistance that may be needed throughout the course. Communication with teacher facilitators is accomplished through discussion boards and email. This communication may be needed at times to better explain a specific topic or make grade corrections. Students enrolled in virtual classrooms or synchronous courses still acquire the content via real life instruction. A real teacher in real time delivers virtual classroom instruction. The virtual classroom teacher

uses the computer screen as the board delivering instruction by using videos, PowerPoints, or podcasts in conjunction with audio of the teacher's voice. Students enrolled in the virtual classroom have opportunities for immediate teacher feedback and input while logged into class, just as they would in a traditional classroom. Students can also interact with other students via notes, texts, and emoticons. Additionally, many conferencing platforms used by virtual educators allow for students to work in small groups during classtime, thus again mirroring the look and feel of a traditional classroom. Electronic media like a discussion forum, chat room, voice mail, e-mail, etc. are often employed for communication in both synchronous and asynchronous courses.

Homework assignments are normally submitted electronically, e.g. as an attachment to an e-mail or uploaded to the LMS system in a view complete. When help is needed, lecturers, tutors, or fellow students, or a help desk are available, just like in a real university. The difference is that all communication occurs via electronic media.

Virtual teachers are encouraged to use technology more in the classroom. they are also motivated to share their ideas and lesson plans with other teachers through wikis, blogs, facebook, etc.

Communication in the synchronous virtual classroom is a collaborative learning experience. Students are encouraged to interact with peers through web-conferencing technologies. Small-group and whole-group collaboration is a suggested platform for virtual education.

Communication can take place in real-time, i.e. during a class session. A small-group session is often referred to as a "Breakout Room." This is a platform that allows real-time, social interaction between students. Students collectively work on a learning task designed by the virtual classroom instructor. Individual microphones, whiteboard tools (drawing rights for the group board), and/or notes are suggested ways students communicate with one another during live "Breakout Rooms." Outside of the virtual classroom setting collaborative communication may also occur through various technologies; blogs, wikis, and/or multi-media tools.

Virtual campus

European Commission

Bieke Schreurs, editor (2011). *Reviewing the Virtual Campus Phenomenon.* http://revica.europace.org/Re.ViCa%20Online%20Handbook.pdf:

Although the phrase virtual campus is an important concept in the field of education, there is no generally accepted theoretical framework for it among researchers. In this chapter we search for a contemporary definition. To do this we have gathered definitions from more than 10 European Countries. Based on these results, we have developed a theoretical framework for the phrase virtual campus.

When defining a *virtual campus*, the European Commission stresses cooperation among higher education institutions in the field of e-learning, especially regarding joint curricula development by several universities. Indicators may include agreements for the evaluation, validation and recognition of acquired competences, subject to national procedures; large-scale experiments of virtual mobility in addition to physical mobility; and development of innovative dual mode curricula, based on both traditional and online learning methods.1

This broad definition involves many issues from partnerships between traditional and/or distance universities and other higher education providers, with a view to offering joint certifications (for undergraduate and/or postgraduate levels) and cooperation with learning support services. This might also include collaborative activities in strategic areas of education or research through cooperation involving researchers, academics, students, management, administrators and technical personnel. At the e-learningeuropa.info portal, *virtual campus* is defined as "Part of a university or faculty that offers educational facilities at any time or, in theory, any place, by Internet".

At a European Commission consultation workshop held in Brussels on 23rd November 2004,

entitled "The 'e' for our universities – virtual campus", one of the working groups proposed three definitions emphasising different aspects of a virtual campus. These were the:

- **Collaboration perspective**: The term "virtual campus" denotes ICT-based collaboration of different partners supporting both, learning offers and research in a distributed setting.
- **Enterprise (economic) perspective**: The term "virtual campus" denotes an ICT-based distributed learning and research enterprise.
- **Networked organisation perspective**: The term "virtual campus" denotes an environment, which augments and/or integrates learning and research services offered by different partners.

SOCRATES Thematic Network: Enhancing Engineering Education in Europe – E4 Survey of

Virtual Campus and Virtual University Activities in Europe4 takes a holistic approach and defines *virtual campus* as a broad conceptual framework for tools, services and facilities for students, faculty and staff. The word *campus* is used to denote the environment for the people who study, carry out research, and/or work at the university. These elements include e-learning, research activities, administrative services and other functions, e.g., complementing and supporting operations on the physical university campus.

Wikipedia

http://en.wikipedia.org/wiki/Virtual_campus:

- A **virtual campus** refers to the online offerings of a college or university where college work is completed either partially or wholly online, often with the assistance of the teacher, professor, or teaching assistant.
- Many established and mainstream colleges and universities now offer many courses (or entire degree programs) either partially or wholly online. Other schools notable for their primary online presence include DeVry University and Strayer University. In the near future, virtual campuses will become simulated campuses rather than a physical campus that you attend. Texas Tech University has already begun the process of creating a simulated campus. Primary and secondary college students from several different countries will soon create avatars and log on to a completely digital Tech campus. There are an estimated 4,500 such institutions with total enrollments approaching perhaps 2,000,000. [1]
- The majority of students using virtual campuses to obtain online degrees are adults students for three main reasons:[2]
    - Flexibility - Adults with full-time jobs and families would find it impossible to attend daily at a traditional school setting. Online classes allow students to work at their own pace and work around their busy lives.

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- Cost - The cost of an online degree is relatively cheaper than at a traditional college setting. Obtaining your degree online eliminates costs such as classroom costs and facility upkeep costs that traditional students are required to pay because they are using the campus. However, the cheaper cost of an online degree does not diminish the value of the degree.
    - Broad Choices - Students can remain at home and have availability to degrees that may not be offered by universities or colleges nearby.
- Schools use a variety of tools for conducting classes - typically called Learning Management Systems (LMS) or Course Management Systems (CMS). CMS may also refer to CONTENT Management Systems. Some notable LMS' include Moodle, Sakai,Serco, Blackboard, Sharepoint, WebCT, Angel, Alphastudy, it's learning, Desire2Learn, EdMastery, Elluminate and eCollege. EdMastery delivers customizable assessments through a simple software interface to aid teachers in assessing students on the mastery of skills required by state or local test objectives. Blackboard and webCT command the lion's share of the commercial market, and Blackboard recently (as of Spring 2006) acquired WebCT.
- Some of the aspects that go under virtual campus includes various types of learing activities such as lectures, homework, discussions, readings, assignments. Classes are usually self paced using online documents and databases that might be available to them. Tests and other assignments are available online in specific programs used for online classes such as Elluminate, Blackboard, etc. Other methods used in virtual campus are live sessions, videoconferencing, discussing and sharing various applications to name a few. Individuals are able to access the materials any time they want under the teacher's control and are able to access anywhere online where they're able to access internet usage. Email is a big part of the virtual campuses and is often used before, during and after sessions. This aids individuals in exchanging information and or point them to the right direction that would be useful in increasing and understanding various methods available to them via documents and online sources.

Virtual university

Wikipedia

http://en.wikipedia.org/wiki/Virtual_Universities

- A **virtual university** provides higher education programs through electronic media, typically the Internet. Some are bricks-and-mortar institutions that provide online learning as part of their extended university courses while others solely offer online courses. They are regarded as a form of distance education. The goal of virtual universities is to provide access to the part of the population who would not be able to attend a physical campus, for reasons such as *distance* - where students live too far from a physical campus to attend regular classes; and the *need for flexibility* – some students need the flexibility to study at home whenever it is convenient for them to do so.
- Some of these organizations exist only as loosely tied combines of universities, institutes or departments that together provide a number of courses over the Internet, television or other media, that are separate and distinct from programs offered by the single institution outside of the combine. Others are individual organizations with a legal framework, yet are named "virtual" because they appear only on the Internet, without a physical location aside from their

administration units. Still other virtual universities can be organized through specific or multiple physical locations, with or without actual campuses to receive program delivery through technological media that is broadcast from another location where professors give televised lectures.

- Program delivery in a virtual university is administered through information communication technology such as web pages, e-mail and other networked sources.
- As virtual universities are relatively new and vary widely, questions remain about accreditation and the quality of assessment.

Open universities

Wikipedia

http://en.wikipedia.org/wiki/Open_universities

The term *open university* or *open universities* usually refers to a university with an open-door academic policy, ie no entry requirements. The term may specifically refer to:

The Open University in the UK

Hellenic Open University (ΕΑΠ, Ελληνικό Ανοικτό Πανεπιστήμιο) in Greece

Open Universities Australia

Open University Malaysia in Malaysia

Indira Gandhi National Open University, India, often called by its acronym, IGNOU

Krishna Kanta Handiqui State Open University, Assam, India popularly known as KKHSOU

The Global Open University Nagaland, India

Allama Iqbal Open University in Pakistan

Open University of Indonesia

Open University of Israel

Open University of Cyprus

Open University of Japan

Open University of Catalonia

Polytechnic University of the Philippines, Open University

University of the Philippines Open University

Open University of Sudan

Open University of Hong Kong

The Intercultural Open University (distance education)

The term may also be used to refer to universities employing specific teaching methods:

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open supported learning, a teaching method used by The Open University which is not the same as distance education or correspondence study distance education, but not all open universities focus on distance education

Open Educational Resources (OER)

Wikipedia

http://en.wikipedia.org/wiki/Open_educational_resources

Open educational resources (OER) are digital materials that can be re-used for teaching, learning, research and more, made available for free through open licenses, which allow uses of the materials that would not be easily permitted under copyright alone.[1] As a mode for content creation and sharing, OER alone cannot award degrees nor provide academic or administrative support to students.[2][3] However, OER materials are beginning to get integrated into open and distance education.[4] Some OER producers have involved themselves in social media to increase their content visibility and reputation.[5]

OER include different kinds of digital assets. Learning content includes courses, course materials, content modules, learning objects, collections, and journals. Tools include software that supports the creation, delivery, use and improvement of open learning content, searching and organization of content, content and learning management systems, content development tools, and on-line learning communities. Implementation resources include intellectual property licenses that govern open publishing of materials, design-principles, and localization of content. They also include materials on best practices such as stories, publication, techniques, methods, processes, incentives, and distribution.

Appendix 2. Some statistics about distance education

Source: Högskoleverket (2011).

Antal fristående kurser sökbara hösten 2009, per lärosäte[?].

	Antal kurser
Umeå universitet	406
Högskolan Dalarna	404
Mittuniversitetet	260
Högskolan i Gävle	250
Karlstads universitet	211
Växjö universitet	198
Uppsala universitet	174
Göteborgs universitet	168
Högskolan på Gotland	134
Luleå tekniska universitet	130
Högskolan i Kalmar	119
Högskolan Kristianstad	113
Stockholms universitet	102
Örebro universitet	99
Lunds universitet	97
Malmö högskola	94
Blekinge tekniska högskola	86
Högskolan i Skövde	76
Högskolan i Halmstad	73
Mälardalens högskola	62
Högskolan i Jönköping	46
Linköpings universitet	46
Högskolan i Borås	38
Sveriges lantbruksuniversitet	28
Karolinska institutet	17
Södertörns högskola	16
Kungl. Tekniska högskolan	9
Totalt	3 540

Antal generella program sökbara hösten 2009, per lärosäte[?] och examensinriktning.

	Högskole- examen	Kandidat- examen	Magister- examen	Master- examen	Summa
Högskolan i Jönköping			7	7	14
Mittuniversitetet	6	3	4	1	14
Högskolan Dalarna	4		8		12
Umeå universitet	4	1	3	3	11
Blekinge tekniska högskola	3	3	3	1	10
Växjö universitet	1	3	3	3	9
Högskolan i Kalmar	1	4	2		7
Högskolan i Skövde	3	1	2		6
Uppsala universitet			3	1	4
Karlstads universitet		3	1	3	6
Högskolan Väst	1	1	1		3
Högskolan Kristianstad	1		1	2	4
Högskolan i Borås	1			2	3
Luleå tekniska universitet	2	1			3
Örebro universitet	1			2	3
Göteborgs universitet			1	1	2
Högskolan i Gävle		2			2
Högskolan på Gotland	1	1			2
Linköpings universitet			2		2
Stockholms universitet			1	1	2
Högskolan i Halmstad			1		1
Karolinska institutet				1	1
Lunds universitet				1	1
Mälardalens högskola			1		1
Sveriges lantbruksuniversitet			1		1
Totalsumma	34	31	45	16	127

Studenter som studerade på distans hösten 2009, per lärosäte.

	Antal distansstudenter	Andel (%) av samtliga studenter
Umeå universitet	8 391	40
Högskolan Dalarna	7 561	62
Mittuniversitetet	6 567	61
Högskolan i Gävle	5 214	59
Växjö universitet	4 861	42
Karlstads universitet	4 069	36
Uppsala universitet	3 778	13
Stockholms universitet	3 776	11
Lunds universitet	3 598	14
Luleå tekniska universitet	3 317	37
Högskolan på Gotland	3 226	79
Göteborgs universitet	3 196	10
Högskolan Kristianstad	3 174	44
Högskolan i Kalmar	3 174	40
Örebro universitet	2 969	24
Högskolan i Jönköping	2 822	26

Antal sökbara yrkesexamensprogram hösten 2009, per lärosäte.

	Andel program
Umeå universitet	11
Karlstads universitet	10
Luleå tekniska universitet	9
Malmö högskola	8
Växjö universitet	8
Karolinska institutet	7
Mittuniversitetet	6
Högskolan i Gävle	5
Högskolan Dalarna	4
Högskolan i Kalmar	4
Högskolan i Halmstad	3
Högskolan i Borås	3
Högskolan Kristianstad	3
Linköpings universitet	3
Sophiahemmet Högskola	2
Stockholms universitet	1
Blekinge tekniska högskola	1
Högskolan i Jönköping	1
Södertörns högskola	1
Uppsala universitet	1
Örebro universitet	1
Totalt	60

Högskolan i Skövde	1 609	41
Malmö högskola	2 469	18
Blekinge tekniska högskola	3 012	49
Högskolan i Halmstad	1 144	28
Högskolan Väst	1 060	30
Högskolan i Borås	1 017	24
Mälardalens högskola	1 413	10
Linköpings universitet	1 313	6
Kungl. Tekniska högskolan	1 155	8
Karolinska institutet	807	12
Södertörns högskola	728	9
Sveriges lantbruksuniversitet	717	15
Örebro Teologiska Högskola	104	46
Sophiahemmet Högskola	42	14
Teologiska Högskolan, Stockh.	46	11
Gymnastik- och idrottshögsk.	20	3
Dramatiska institutet	20	0
Danshögskolan	13	6

Andel kvinnor och män bland studenter i distansutbildning och campusutbildning, hösten 2009

Procent

Kategorier på x-axeln: Distans enbart, Distans + campus, Campus enbart
Legend: Män, Kvinnor
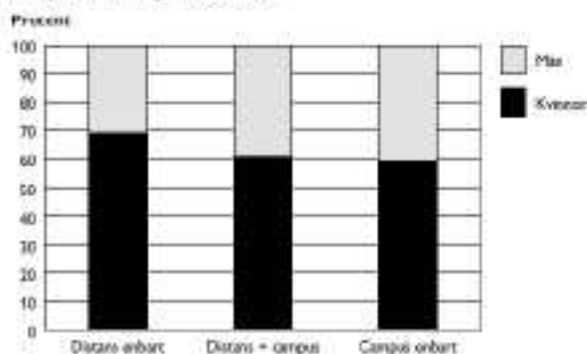
Åldersfördelning bland distans- och campusstudenter, hösten 2009.

Kategorier: Campus enbart, Distans + campus, Distans enbart
Legend: > 40 år, 31–40 år, 41–50 år, 31–40 år, 26–30 år, 21–25 år, <21 år
X-axel: Procent
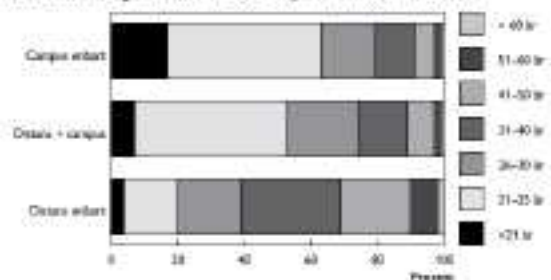
Studenter med svensk respektive utländsk bakgrund, studenter upp till 30 år särredovisade.

	Studenter upp till 30 år		Samtliga studenter	
	Svensk bakgrund (%)	Utländsk bakgrund (%)	Svensk bakgrund (%)	Utländsk bakgrund (%)
Enbart distans	88	12	87	13
Distans och campus	86	14	84	16
Enbart campus	85	15	84	16
Totalt	85	15	84	16

Föräldrars utbildningsnivå bland studenter i distansutbildning och campusutbildning, hösten 2009, procent.

Föräldrars utbildningsnivå	Enbart distans (%)	Distans + campus (%)	Enbart campus (%)	Totalt (%)
Förgymnasial	14	9	7	9
Gymnasial ≤ 2 år	29	22	21	22
Gymnasial > 2 år	14	16	13	14
Eftergymnasial < 3 år	17	22	21	20
Eftergymnasial ≥ 3 år	24	29	34	32
Forskarutbildning	2	3	3	3
Totalt	100	100	100	100

Andel av studenterna som har hemmavarande barn i åldern 9–17 år, höstterminen 2009.
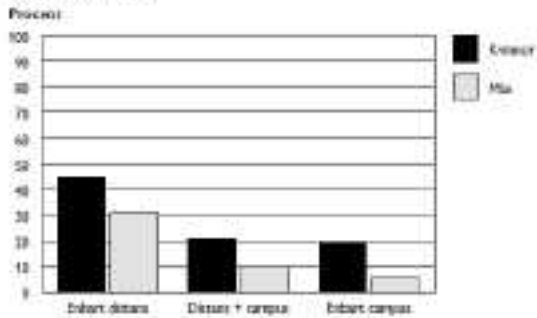
Procent

Geografisk närhet mellan boendelän och det lärosäte där distansstudier bedrivs, hösten 2009, procent.

	Samma län (%)	Angränsande län (%)	Annat län (%)	Summa (%)
Enbart distans	33	17	31	100
Distans + campus	42	10	48	100
Samtliga distansstudenter	35	15	30	100

Andel (%) av studenter yngre än 45 år och registrerade för 15 högskolepoäng eller mer som hade studiestöd hösten 2009.
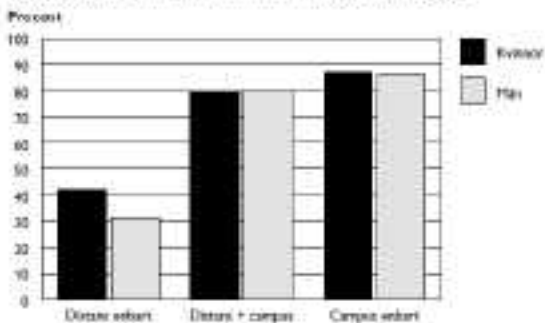
Procent

Andel (%) bland dem som enbart studerar på distans som hade studiestöd hösten 2009.
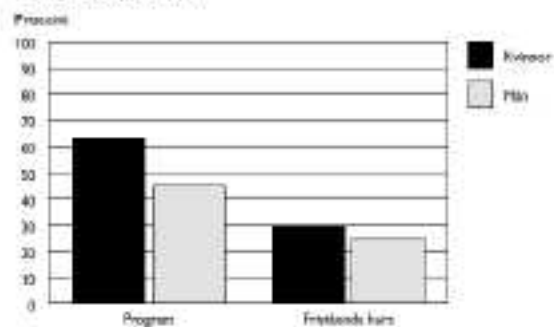
Procent

Högskolenybörjare, fördelning på distans- respektive campusstudier, hösten 2009.
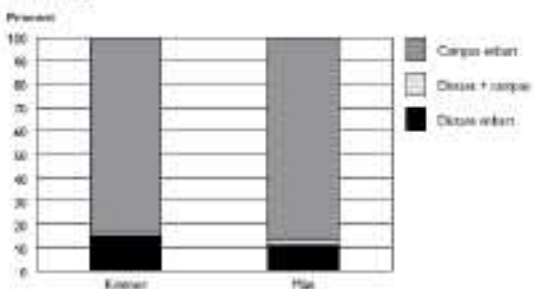
Procent

Prestationsgrader (procent) i distansutbildning 2008/09 per program och fristående kurser, kvinnor respektive män.

	Totalt	Kvinnor	Män
Program	80,3	84,3	67,5
Fristående kurs	47,2	58,6	43,1
Totalt	55,9	64,7	46,1

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Andel (%) av studenter som inte klarat några av de poäng de var registrerade för.
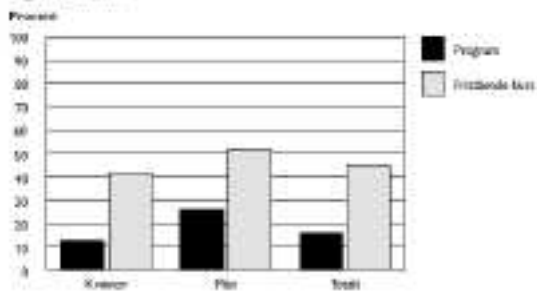
Procent

Andel (%) av studenter som klarat mer än 50, mer än 80 respektive mer än 90 procent av registrerade poäng, studenter som inte klarat några poäng alls exkluderade.

Procent
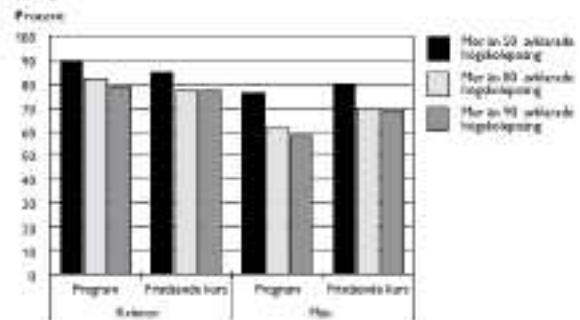
Andel (%) av studenter som inte klarat några av de poäng de var registrerade för, per registrerade poäng.

Procent

62
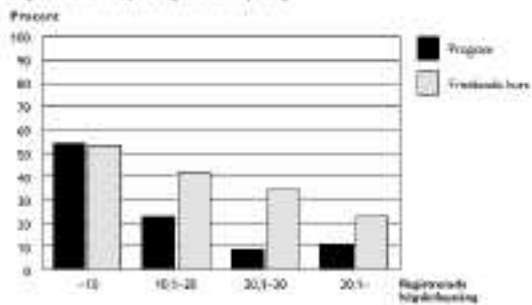
The Technology Enhanced Conference – A Board Game!

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Abstract

ITMEDIA at the University of Copenhagen have been working with taking the academic conference online for years. Streaming events, using backchannel chat systems and Twitter, producing introductory pre-event videos, setting up audio debates with keynotes to enrich and prolong the conference, and the sharing of knowledge beyond the event days.

But how can we help the organizers and participants realize the potential of an interactive conference? Because let's face it: the easier choice is to leave out the technology enhancement and stick with the well-known conference format.

We came up with a visual aid: turning it into a board game simply called The Conference Game. By making a children's board game, we let organizers play around with the options, get an overview – and the game element makes it just a little bit less dangerous, and more fun to play around with new technologies. Reception has been great, and maybe the board game can be used for other areas, where one needs to communicate complicated options for technology enhanced events or teaching and support organizers in making good choices.

Keywords: Board Game, Decision-making, Technology Enhanced Conference, Online Conference, IT-Fluency, Social Media, Community building, Backchannel, Streaming, University.

The Challenge

ITMEDIA at the University of Copenhagen have been working with taking the academic conference online for years. Streaming events, using backchannel chat systems and Twitter, producing introductory pre-event videos, setting up audio debates with keynotes to enrich and prolong the conference, and the sharing of knowledge beyond the event days.

But the challenges are many: Faculty have very different levels of ICT skills and IT-fluency – and even the ones well-versed in technology usually aren't familiar with all the different technologies – and especially the social media are alien to most. Those organizing a conference have a lot on their plate already – and quite a few have never done it before. So how do we help the organizers and participants to realize the potential of an interactive conference? Because let's face it: the easier choice is to leave out the technology enhancement and stick with the well-known conference format.

Organizing an interactive conference (with for both online and "offline" participation) is complicated. Most organizers are not aware of their options, what the gains may be, and they are faced with making choices about technologies they are not familiar with.

As the faculty's unit for e-learning (in the widest sense: audio, video and social media in

education and research communication) ITMEDIA needs to communicate the many possibilities, make organizers aware of the deadlines involved, the additional tasks (like marketing the live stream in advance, or keeping a twitter account alive). Generally helping the organizers succeed and avoid any unnecessary mistakes or blunders.

But overwhelming already busy people with a ton of information, explanations of various tools and social media services tends to scare most people off, rather than help them. Also, there is a great need to communicate the possible gains: Why go through all that trouble?

To facilitate this process, and make it easier to get it right in the planning period, ITMEDIA came up with a simple plan – let's make a board game! Move along the board and get advice on what to do, in which order – get to move extra fields ahead when you're doing well, or get sent straight to prison if you forget to ask for permissions before you publish your keynotes!

The board game boils all the choices down to one: Would you like to play? If so, then we will guide you through the board safely, and help you make your conference interactive.

The full learning potential of a conference

Let's take a step backwards and look at the conference, and it's benefits. Conferences are a well-proven way of sharing knowledge in the academic world. Papers and presentations are recognised as a means of sharing academic knowledge, even though this could be done online nowadays, academics still travel to attend conferences all over the world. The reason being that the conference is not only a formal exchange of knowledge (in the form of papers and presentations) but also a great opportunity for informal sharing of knowledge and networking. You might strike up a conversation with the keynote during the coffee break, or have a great debate with your fellow conference participants over lunch.

In learning terms, one might say that the presentations and papers are in line with traditional thoughts of learning, as simple knowledge transfer - whereas the informal learning through conversations, discussions and deliberations over dinner later are much more in line with learner-centred theories of learning (which ever variety of those one subscribes to).

Another difference between the classical conference keynote and the informal exchanges is the content. A keynote will most often present (the closest possible to) certain knowledge, finished projects and results of former work. The informal exchange of knowledge will more often be about perspectives the keynote has opened, its relationship with related areas, areas to explore further, the future of the field etc.

The two types of content complement and enrich each other - but when we talk about the outcome of a conference, we're often more focused on the formal content. Yet, when we consider not going to the conference, but watching the live stream instead, most of us are aware that we are missing out on something - though we may not always be able to put our finger on what exactly we are missing out on.

The potential of an "interactive conference"

Streaming a conference will make it available to a greater audience, but to make an event interactive, we want to engage the online participants. Use their comments and feedback to the presentations as equal contributions to the conference. Create debate, sparring, discussions and joint exploration of ideas between all participants, online or offline. Create a community around the conference, so everybody feels they are part of the same event - whether they are in the auditorium, or watching at work or at home.

A live stream can transmit the presentations, but tend to only transmit the parts relying on knowledge transfer, so how do we recreate the informal learning and networking of the coffee break or the dinner conversation online, or in learning terms; how do we support learner-centred activities and learning opportunities?

There is a plethora of services and tools available to support informal learning and networking for online participants, some of the options are:

- Creating an introductory video to give a taste of the event, and help promote the event.
- Use an online forum to allow participants to meet each other in advance - see who else is attending, and maybe make connections.
- Get the unavailable keynote, by letting them participate from a different location.
- Facilitate interaction and debate by using Twitter and/or a backchannel system.
- Record debates with pairs of keynotes before or after the event - as an appetizer or a follow up to the conference.
- Collect the recorded presentations, the twitter chat, presentation slides, audio recordings and other relevant material on the conference web page.

Unlike the physical event, the online event is not limited in space or time - and many of these options take advantage of that. Organizing a conference is a lot of work, so why have only one days effect, when the fruits of the hard work can be enjoyed by the participants for months, and maybe get a long afterlife as a useful resource online.

Win fabulous prizes!

The Conference Game has prizes too! The rather long explanation above of the true benefits of the traditional conference and the values of the online conference are presented as prizes. In ITMEDIAs folder The Conference Game is supplemented with a list of "Things you can win" - describing what the conference organizers can win if they choose to play the game:

- Further reach for your academic content: Making the conference available online makes it accessible for a much wider audience: When there are no expenses, all academic levels can participate - PhDs and students interested in the field.
- Engaged debate about the research. Not just in the allotted 10 minutes, but before, during, and after the conference online.
- Create and sustain academic interaction and networking within the field - across borders.
- Recreate the coffee break experience online, and let everyone participate in the debate.
- Supply your keynotes with a different kind of publication: Their content as video or audio.
- Allow those who can't travel due to health or finances to participate online.
- Engage otherwise silent participants. Online, there is room for everyone to

voice their opinion - also those who prefer not to speak in front of a full room.

- Activate all the knowledge, remember "The smartest person in the room, is the room!"
- Turn your conference home page into a resource that can benefit students and researchers in the future.
- Create "added value" for your keynotes. When they debate their field for an audio recording, they get new input and ideas to take home - not just feedback on their own presentation.

Why a board game?

The Conference Game looks like a children's board game; full of colour, twisted roads and there's even a dragon in the lake! We're playing on the connotations of children's games: having fun, playing games, trying new things, collaborating with others etc.

A game is also a place where one can take chances without real risk and possibly win by doing it, the childish colourful world appeals to the imagination and "serious" is not the first mood that comes to mind. The connotations of play and games are very useful in dismantling preconceptions of technology being difficult and complicated, and underlining the metaphor that there are great prizes to be won.

But a board game is also a very clear visual aid outlining the route from beginning to end - making it a great way to humorously point out important deadlines and possible pitfalls to be avoided: trying to book streaming of your event the day before it takes place sends you right back to square one. By having a route the board also outlines an order of things - what needs to be done first, what can wait until later - also conveying the message that not everything needs to be decided today. Finally the board serves as a visual guide giving the organizer

an overview of the options, choices and timeframe - or at least an illusion of this overview.

In terms of recent ideas of using game mechanics in education, The Conference Game is not a very elaborate game - and not necessarily meant to be played - but still there are still some game mechanics at play. A board with start and finish line does triggers our desire to get to the finish line - and completion is a widely used driver in many games.

Decision making tool

One of the problems when organizing a conference is the sheer amount of decisions to be made about academic programme, organization of peer review, name signs, lunch, webpage, the list goes on and on. So trying to get an already busy organizer to make decisions about streaming, backchannel, hashtag, forum and a bunch of other things they've never heard of before is a tough job. And as neuroscience tells us: the more options we humans have, the worse we are at making choices. Give people more than 5-7 options and their brain panics and they tend to make really bad and irrational choices (see Lehrer: How we decide 2009). Also risk aversion plays a large role. When faced with too many choices we tend to not decide anything at all. This is not at good point of departure when you are inviting people on a journey into the unknown land of technology.

The board can function as tool to help make decisions. By delaying some decisions, it narrows the number of immediate choices - but it can also point out inherent dependencies: If you want to live stream the event, you also need to market the possibility to your potential audience or if you want to use Twitter, you need to decide on a hashtag and let people know. This can help make a more informed decision about which tools to use. Or on a larger scale narrowing it down to the one central question "Would you like to play? Then we'll give you an interactive conference".

Reception of the game

Before The Conference Game ITMEDIA tried explanations on a webpage, a form (with too many choices) and would mostly have to explain everything 1:1 with every conference organizer (a very time-consuming - and hence expensive method) - or had to turn down organizers who tried to book streaming too late in rooms without the required technical options. We're hoping the board game will minimise these problems - and while it is not the only factor in making the organization of conferences easier, the feedback so far is great.

Creating a board game called The Conference Game may just have been a funny little idea spawned by a silly remark about a really bad drawing during a brain storm - but it turned out to be a great way to reduce a process of make decisions about unfamiliar technologies to kid's play! Rather than struggling to understand many new concepts and their repercussions while trying to stay in control and not loose face by asking what may (not) be dumb questions - most conference organizers' first reaction is now: Wow, that looks exiting! A response showing a spark of interest, openness to new ideas and new possibilities, rather than the sense of being overwhelmed by too many choices and too much new technology.

Only the future will show if we get better organized, interactive conferences on a large scale at the University of Copenhagen - but The Conference Game is definitely a success when it comes to communicating complicated options for technology enhanced event and supporting organizers in making good choices. As such it may be a model for communicating similar things in the field of technology in education. It would be interesting to see if something like that could be used to introduce teachers to different ways of enhancing teaching and learning with technology.

A study visit to the virtual company

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Abstract

To integrate study visits to different workplaces in higher education implies important benefits for the course quality. The study visit gives the students a better understanding for the real situations they will meet in working life. However for practical and economical reasons is that not always possible.

 The purpose of this project is to create a virtual company that shall replace the real one for study visits.

The goal is to create a realistic picture and that intended use of it can come as close as possible to a real study visit. It is also important to facilitate linking theory and practice.

The virtual company is built up by pictures, videos and text. All material is made available on a web page and when entering the students will meet a layout of the company. From that position is it possible to walk around and look at videos from different workstations. Besides that can they also listen to interviews with managers and representatives of staff as well as reading reports concerning productivity and the work environment. The focus of the study visit is work sciences, therefore the material also include some visualized information about work hazards. On the web page there are also a number of tasks for the students to carry out.

Until the autumn 2011, 132 students at Dalarna University have visited and produced reports from the virtual company. They were studying in programs for mechanical engineering, production technicians and human resource management. An evaluation among some ten students showed that the study visit to the virtual company is flexible in time and effective, but that students wish to have even more detailed information about the company.

Experiences from four years of use in a number of classes show that the concept is worth further development. Furthermore with production of new material the concept is likely to be applicable for other purposes.

Keywords: Virtual company, visualization, work environment, productivity.

Introduction

At Dalarna University courses focusing on the work environment are offered. The courses have been given within the programs "Industrial Development and Leadership", "Production Technician Programme" and "Human Resource Management". Many of the students following these programs will when they enter the working market in many cases be employed in positions where they are expected to have a basic knowledge in occupational risks at workplaces, how they can be controlled as well as the work environment legislation. A possible position for a student from e.g. the Industrial Development and Leadership program is as a managing director (MD) with a responsibility for work environment

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management. An important part of the work environment course is therefore to make the student prepared to shoulder this responsibility. Within this course would it therefore be desirable to have the chance to put the student in a real situation in a company where he/she could step into the role of the MD and practice to take all the responsibilities concerning work environment management that is involved in the role. There are many practical, economical as well as other reasons that make this impossible.

With this as a background was it discussed during planning of such courses how close to the desired situation it might be possible to come by building a "virtual" company that might be possible to put on internet for use by many students. It was therefore decided to start a project to "build" this company. The goal was to include so much information so that it should be possible for the student to enter the role as an MD. The answers to the questions about the situation and circumstances that was necessary should be possible to get. This project was financed by the former National Institute for Working Life and Dalarna University.

Material - The virtual company

It was decided that the virtual company should be a small engineering industry. The company should be typical for the branch which implied commonly used processes as well as work organisation. An important base for the virtual company should be videos as well as written information and other information that is necessary for the MD to have access to in this situation. To see the workplaces and to read about production as well as used machineries and the company's organisation is however not enough. When a more complete picture is needed is it also important to talk to persons working in the company. It was therefore decided that interviews

with key persons should be included in the material about the virtual company.

Suitable companies for collections of material were search for in the Dalarna region. It was expected that a few companies was needed which together should form the "typical" company. After contact with and visits to a few companies interested to participate in the project was it however clear that one of them alone was sufficient for the needs.

One of the important basis for the virtual company was videos making it possible to walk around in the company and to see different work stations, machines and how the work is performed. Since the focus for this material is the work environment and potential risks involved with the work was it important to collect a detailed video material making it possible to evaluate risks as well as seeing possibilities to improve the situation.

As a complement to the videos was it also necessary to add written information about type of production, used machines etc.

Besides that was also different studies made on the company with a method for assessment of the productivity potential (Productivity Potential Assessment, PPA) (Almström et.al, 2007), a method for assessment of the work environment (Work Environment Screening Tool, WEST) (Bengtsson et.al., 1997) and a method for visualisation of workers exposure to hazards (PIMEX) (Rosén et.al, 2005).

Figure 1. The layout of the virtual company with red camera icons.

Results

The virtual company

The virtual company has been made available on Dalarna Universities home page (Dalarna University, 2007). When entering the company is first a short introduction about the material and the virtual company made. On the next web page is a short description about the company, what they are producing, how many employees etc made.

One page is the entrance for a visit to the company. Here is a layout of the building presented and on a number of places on the layout are camera icons placed. See figure 1. By clicking on any of them is it possible to see a video from the specific part of the factory. Together with most of the videos are also written information attached telling about the work station. Also videos from the surroundings, entrance and office, changing-room and lunch room can be studied. Totally are 18 such videos included with a total length of more than one hour.

After the "tour" outside and inside the company has the visitor a very clear picture of how it looks, which machines etc that are used and what is made on all work places. It is now possible to sit down and study a very comprehensive material. The PPA-report (18 pages) includes a lot of information with the aim to make the companies "real" productivity potential clear. The presented report is based on an exhaustive study on the company that has served as model for the "virtual". The result from the WEST study on the model company is also presented in a report (4 pages). In the report are the relative risks for accidents and strain injuries as well as noise level and an estimate of general working conditions reported. The visitor can also look at seven videos visualizing a few welders exposure to welding smoke. The PIMEX method was used for this purpose.

Finally can the visitor listen to video recorded interviews with one of the welders in the company, the safety representative and the MD. In the interviews are they telling about how work environment management is organised in the company and are also giving their view about risk factors etc.

Use of the virtual company in university courses

The material building up the virtual company is as described very comprehensive. It gives thereby a lot of possibilities for use in courses where a real study visit to a company would be preferable but of practical and economical reasons not possible to carry through. On the same webpage as the virtual company is placed has also four sets of work tasks been proposed for use together with the material. Work task 1 is placing the student in the role of the MD of the company. The labour inspection has announced that they will come for an inspection soon and the task for the student is to prepare for that visit. Which laws are applicable? Which are the most important risk factors? What is needed/possible to do to improve the situation?

Work task 2 and 3 is placing the student in the role of the HR manager. The questions directed to the student are focusing on the relations to the union, information and negotiations. In work task 3 has the MD decided that all staff shall be medically examined with an aim to reduce risks at the company. The HR manager is supposed to propose how this can be carried through considering laws and relations to the staff. In task 4 is the student supposed to especially carefully study the PPA report and propose changes in the production based on this report.

Until the end of 2011 have in total 132 students at Dalarna University visited and produced reports from the virtual company. All of them have been given work task 1 as above and their specific task was to write a report presenting an overview of applicable legislation as well as to present and discuss three selected risk factors in the company. When the work task has been presented has also recommendations about web sources on legislations etc been proposed. The time frame for their work has varied but has typically been a few weeks from that the work task was given out till deadline for a report. In all cases has seminars been arranged with groups of around five students where the report has been presented and discussed.

Evaluation

Experiences from the use of the virtual company have been evaluated in two ways. The first evaluation was made as a special project after the first test and has been reported separately (Emmoth, 2009). The evaluation was made by interviewing 11 students following the program Industrial Development and Leadership where the use of the virtual company was one part of the course "Industrial Work-environment". In the evaluation report was it concluded that the technology for visiting the virtual company was working impeccable with a few exceptions. It was e.g. proposed that the students should be

given access to headphones if they were doing their work amongst others at the university.

Seven of the interviewed expressed that they should have needed more information about the different work places in the company. It was proposed that additional videos should be added where a speaker was telling a little more about machines etc. It was also proposed that a video with a walk through the whole company should be added.

The views about whether it was easy to find the information needed was varying. Some of them proposed that more time should be given for introduction to the material when the task was presented. Ono lecture hour was used for that purpose. It was proposed by the evaluator that a special video with a presentation of the "virtual company" should be added.

Two main advantages where mentioned by the students, the flexibility which also lead to that they could use their time more effectively. It was also pointed out the advantage that it was possible to go back and repeat as much as they like. The most important disadvantage was that they thought that the information about the company not was sufficient.

As a final conclusion the author pointed out that: the contents of the training material must be interesting enough to keep up the motivation to proceed and that the information must be sufficient to make it possible to apply theories. To meet those demands is, according to the author, improvements needed that are possible to make.

As in all other courses are all students supposed to fill in a course evaluation form. The answers from 68 of the students tells that many but not all are satisfied with the part of the course when they visited the virtual company. They were asked to grade this part on a scale of five ranging from very dissatisfied till very satisfied. The judgment was made concerning professional

contents and the pedagogic. The full scale was used but only three respective four of them gave the lowest grade. Around 50% of them gave grade 4 or 5 meaning that they where quit or very satisfied. A few positive comments were also given around the experiences from the visit to the virtual company.

Discussion and proposals for development

A virtual company as in this case can definitely serve as a complement or alternative to real study visits to workplaces in courses where it is important to relate and apply the theoretical part of the course to the reality. One of the biggest advantages is that students may visit the virtual company at any time and make re-visits as many times as desired. Even if this example now has been used by more than 100 students in different programs can a lot of possible improvements as well as possibilities to widen the use be identified. To produce a material like this requires resources for planning, video recording, writing of texts, production of web pages etc. This implies that an economically quit high threshold must be passed to realize a production. Resources must probably also be reserved for adjustments and updating of the material. This investment shall be put in relation to the possibilities to arrange study visits and to allow the students to take time and study the situations in details.

The experiences from this project calls for a continued development and further evaluation of the material. The base of the material is videos from and information in text about almost all workplaces, interviews with a few key persons and reports from analysis concerning productivity and work environment. The comments given by the students who have worked with the virtual company indicates that further and more detailed information is desired. This kind of information can be produced by going back to the same

company which served as the model for the virtual. It can also be made by adding material and information that for sure not is true in the model company but very well can be realistic in the virtual company. This makes it possible to gradually build out the virtual company and also to widen the topic from having a main focus on work environment. Such a development should make it possible to extend the use to a number of applications in other courses and study programmes. The probably best way to do so is to stepwise involve lecturers in other topics in a development of the virtual factory.

To make the material more "living" have the PIMEX method been used to visualize welders exposure to fumes in their work. In the now existing version are such visualizations limited. To further improve the material is a development of such or similar visualizations desired. By using PIMEX can adding of visualisations of other work environment factors as noise, vibration, muscle load etc. be a good idea. Visualizations with the help of different methods would definitely improve the quality and counteract the risk that the visit will be experienced as boring.

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OERopoly: A game to generate collective intelligence around OER

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Abstract

This workshop aims to enable participants to investigate relationships between open educational resources (OER) projects, user-generated content (UGC), Web 2.0 technologies and associated online learning communities within a collaborative environment. Participants will play a board game called OERopoly where gaming provides them with a grounded and enjoyable experience of collaborative intelligence in action. The OERopoly board game features international OER projects, organisations and their influence on academic practice. During the workshop participants will collaborate and share knowledge on OER by playing a highly adapted version of the well-known Monopoly format. The workshop thus exposes and explores the perceived relationships (both synergies and tensions) between three worlds: OER projects, UGC, Web2.0 technologies and associated online learning communities. Although there is a high international level of interest in OER and associated areas the field is still relatively unexploited in Sweden. The aim of this board game is to introduce participants to key concepts, projects and initiatives and offer the opportunity to share experience of OER and related web 2.0 technologies from their own universities. The focus of this board game, in stark contrast to the original, is collaboration and collective intelligence. By exploring key concepts and sharing knowledge in a game-based context participants will hopefully be inspired to discover more. This workshop has been devised with the full cooperation of the creators of the original version of OERopoly by Connolly, Makriyannis and Lane.

Keywords

academic practice, collaboration, communities, context, oer, open educational resources, usg, web2.0

Introduction

Learning perspectives for the 21st century and demands for learning in the future will focus more on competences and networking rather than knowledge (New Media Consortium, 2012; Ossiannilsson & Creelman, 2012a, b). Learning will be tailored to the needs of individuals, will be

more open, interactive and collaborative, and based largely on resource sharing and use of user generated content (Concede, 2011[8]). Openness impacts many areas of education – learning, curriculum, pedagogy, policy, technology, research and financing (Hylen, 2007). The global trend towards increasing openness in higher education, particular in the USA, has led to increasing numbers of European institutions distributing lectures and course material via channels such as iTunes U, YouTube Edu and Academic Earth using Web 2.0 technologies or User Genereted Content (USG) (Concede, 2011). An increasing number of European universities offer today Open Educational Resources (OER) but there is, however, a general lack of awareness about OER among teachers and an element of suspicion against open publication. Discussions tend to focus on copyright issues and protection of intellectual property (IP) instead of fostering a climate of sharing and transparency. The use of Creative Commons (cc) licenses[9] is also rather limited at European universities and there is a need to raise awareness among university teachers of the opportunities inherent in its use (Ossiannilsson & Creelaman, 2012a, b).

Activity in Sweden has so far been relatively limited. In the last year there have been two national OER-related projects funded by the National Library of Sweden's OpenAccess initiative, OER resources for learning

(Creelman *et al.* 2011) and Model for increased use of OER (Eklöf, 2011). Several repository projects have also been run, such as DigiRef.[10] There are more extensive and advanced projects and national initiatives elsewhere in the Nordic region, in particular the Norwegian National Digital Learning Arena (NDLA,[11] a national OER repository for schools that has gained a high level of recognition. Once more major initiatives are under way, a Swedish/Nordic version of this board game would certainly be more relevant.

If university course material is made more visible, protected by cc licenses, there will be several benefits for all interested parties: good material will be widely used thus heightening the teacher's and university's reputation, open publication stimulates higher quality, potential students will be able to preview the courses they wish to take and the freely available material will enhance the field of informal learning/lifelong learning. In addition, by encouraging the reuse and sharing of existing resources the teacher's focus shifts from material production to mentorship and facilitation. The future role of the teacher is thus to provide context rather than content (Batson, 2010).

Regarding educational openness Kanwar, Balasubramanian and Umar (2010) emphasize the practice and culture aspects of OER such as empowerment processes, of which the OER movement demands various

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[8] http://www.concede.cc/

[9] http://creativecommons.org/

[10] http://www.digiref.se/

[11] http://ndla.no/

types. Within a connectivist perspective (Siemens, 2005) Atlee and Benkler (2008) argue for the collective intelligence (CI) phenomenon that emerges at the crossroads of three worlds of Open Educational Resources (OER), Web 2.0 technologies and Online Learning Communities. Building CI for the OER movement means according to Connolly, Wilson, Makriyannis, De Liddo. & Lane, 2011)

"… capturing the richness of information, experiences, knowledge and resources, that the movement is constantly generating, in a way that they can be shared and reused for the benefit of the movement itself. The organisation of CI starts from collecting the knowledge and experience of OER practitioners and scholars in new creative forms, and then situating this knowledge in a collective 'pot' from where it can be leveraged with new 'intelligent' meanings and toward new 'intelligent' goals."

This outlined workshop is based on *OERopoly: A Game to Generate Collective Intelligence around OER*. CI is one strand of the Open Learning Network (OLnet) project (funded by the William and Flora Hewlett Foundation) at Open University in United Kingdom that started in March 2009. The developers of OERopoly are Connolly, Makriyannis and Lane (Connolly, Makriyannis & De Liddo (2010; Conolly *et al.* (2011).

The aim of the workshop is to discover some of these relationships through the use of mediating artefacts in a collaborative environment (de Liddo, 2010). Participants will play a board game called OERopoly where gaming provides participants with a concrete, enjoyable, experience of CI in

action. Throughout the workshop different types of mediating artefacts are used to assist users in making informed decisions and choices around game-playing and, therefore, mediate their subsequent gaming activities.

The paper for the workshop starts with a short introduction. Then follows a brief overview of history and development of OER and Open Educational Practice (OEP). The board game OERopoly is then described and so are the aims of the game (Connolly *et al.,* 2010, Connolly *et al.,* 2011). After that, the aims of the workshop and the workshop design are described and finally conclusions and further recommendations.

Open Educational Resources

Open Educational Resources (OER) may be seen as a part of a larger trend towards openness in higher education including more well-known and established movements such as Open Source Software (OSS) and Open Access (OA). The most important arguments of openness concern free availability over the Internet and as few restrictions for the end-user as possible on the use of the resource, e.g. technical, financial (Hylén, 2007). Furthermore the end-user should not only be able to use or read the resource but also to adapt it, build upon it and thereby reuse it, as long as the original creator is attributed for her/his work. This is regulated in creative common licenses (cc)

The definition of OER is more or less similar to the one used by The Open

Knowledge Foundation when they claim that knowledge should be legally, socially and technologically open. The term Open Educational Resources first came to use at the UNESCO conference in 2002 (Hylen, 2007, Atkins, Brown, & Hammond, 2007). The concept was there defined as:

"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." (Hylen, 2007 p.1).

Since the development and implementation of OER have spread around the world and also as more research becomes available the definition has been widened (Geser, 2007; OPAL, 2011 a, b). Today in 2012 the concept is more understood as expanding into open educational practice (OEP) and open educational culture (OEC). The drivers for this development are mainly UNESCO and Commonwealth of learning (UNESCO-COL, 2011a, b) followed in 2011 by the OER university partnership. Kanwar, Balasubramanian and Umar (2010) take the above definition a step further and emphasize the practice and culture aspects of OER such as the empowerment process and that the OER movement relies on various types of stakeholders and moreover that OER includes both material and pedagogical issues. Their definition is as follows:

"The phenomenon of OER is an empowerment process, facilitated by technology in which various types of stakeholders are able to interact, collaborate, create and use materials and pedagogic practices, that are freely available, for enhancing access, reducing costs and improving the quality of education and learning at all levels".

The concept today has thus to be understood both with a broader and a more extended meaning and has thus an impact on changing perspectives in education and learning, namely to focus more on individuals and on learning.

OERopoly, the board game

The OERopoly board game is played to explore the relationships between the three worlds of OER projects, Web 2.0 technologies and online learning communities, developed by Connolly, Makriyanni and Lane (Connolly *et al.*, 2010, Connolly *et al.,* 2011). By playing the game, participants engage in a process of CI, finding and sharing knowledge of OER concepts and initiatives as well as providing own experience of learning with web 2.0 tools.

The game has been devised by Connolly *et al.* (2010). With their permission we have decided to use the international version for this workshop and not to produce a Swedish version of the game since there have been rather few significant OER-initiatives so far on a national level.

Aim of the workshop

OERopoly is in essence the opposite of Monopoly. The aim is to share knowledge and learn together and there are no winners or losers. We have chosen to play our own modified version of the original (Connolly *et al.,* 2010, 2011) to cater for Swedish participants who are not actively involved in any OER project (the target group for the original version). Furthermore the time restrictions of the present conference do not

allow a full version of the game to be played.

The main aims of this workshop are to:

- Raise interest in international OER initiatives
- Share experience from Swedish universities
- Participate in a collective intelligence activity

Workshop outline (In total 100 min)

1. *Introduction* (10 minutes)

A brief background to OER and the workshop is first explained to the participants followed by an explanation of how our short conference demonstration differs from the original full version. The participants are divided into teams of 2-3 and assigned to a playing table. The rules of the game are then explained.
The game resembles Monopoly in terms of appearance but the principles are very different.

2. *Game* (60 minutes)

This game centres around sharing knowledge and discovery. There is no money involved and you "earn" properties by gaining knowledge. The various streets, stations and utilities from Monopoly are replaced by OER projects, organisations and related technologies.
At each table there are players in up to 4 teams of 2-3 people per team plus a facilitator who provides advice on the rules and can contribute to the discussions as appropriate. When a team lands on a particular property they will have to provide

three important facts about that OER concept, either from memory of by quickly searching on the net by laptop or mobile.

3. *Discussion* (30 minutes)

Participants will be given a number of questions to consider about the activity and will discuss and report on these. The question of how appropriate the game form is for promoting discovery and collaborative learning will be raised as well as the applicability of the concept for Swedish OER initiatives.

Conclusion

OERopoly has up till now been used extensively in an international context having been presented at a number of European conferences and used in several projects by mainly the developers. Experience so far indicates that using a familiar game format is an enjoyable and inspiring way of getting oriented in the OER landscape, to share experience and reach a common ground of understanding. The game is ideal as an ice-breaking activity during an OER-related workshop, conferences or introduction to OER, to establish a common reference framework for future discussions. The developers express it as follows: …"by working together through the game the participants share knowledge about the basic concepts in the field, related projects and important initiatives".

The game can of course be customized to suit the current project's environment or national, local context. As there are many stakeholders in the field of OER, this is a fruitful way of gathering representatives from different interest groups to exchange

ideas and perspectives about a common area of interest. The game can be replayed again and again and each time new insights can be gained and improved. The game can also be replayed when participants have gained a deeper understanding of the concepts. The game only gives participants a glimpse into the concepts of OER, but by sharing the experience they will be more motivated to continue collaborating to discover more (Connolly *et al.* 2011).

With this demonstration we hope that OERopoly will inspire Swedish universities to use this method to introduce the fundamentals of OER to groups of teachers, librarians and decision-makers. Preferably the game can be adapted to a Swedish/Nordic setting as more OER projects and initiatives are launched.

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Teachers work environment in web based education

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Abstract

Dalarna University has during the last years increased the amount of Next Generation Learning, such as web based education, flexible education and the use of technical support in pedagogic and learning. How has this development affected the teachers' physical, psychological and social work environment? The purpose of this paper is to increase knowledge about teachers work environment in web based education.

Physical and psycho-social areas of concern for teachers in their web based work have been identified through a questionnaire in 2008. The results show that teachers who work with web based courses have been affected or risk being affected by physical and psycho-social problems to a greater degree than those who teach on campus. Some of the physical working environment risks are ergonomics, unsuitable environment in terms of teaching rooms and offices. Psychological and social work environment risks are for example working alone, difficulties to find time for social contact with co-workers, and too much variation in workload over the working year. Some identified areas of success for web based teaching are support from colleagues and head of department, as well as good technical and administrative support. Others are a great deal of synchronous communication, access to different models of teaching and that all types of teachers are involved in web based teaching.

As a continuation, an investigation with focus on physical work environment was conducted in 2010. The aim was to identify risks, develop proposals for solutions and identify success factors for working with web based education. The study was based on a focus group including teachers with experiences from web based education, as well as work environment experts and ICT-pedagogical personnel. Identified examples of factors contributing good work environment are height-adjustable tables, individually tested head-sets, development of learning environments which allow flexible working positions, and courses for staff in the use of tools for online teaching. A forthcoming study is going to investigate success factors that can improve the social and psychological working environment. The aim is to create a research and development project where teachers experience from working with web based education will be integrated into a common knowledge and in scientific research.

Keywords: Work environment, web based teaching, success factors

Introduction

The amount of universities and education institutions in Europe, Canada and the United States which offers distance education programs are increasing (Visser 2005). Most important with distance education is the ability to learn independent of time and place (Söderberg et al, 2001). Pedagogic and technique, as well as

students experiences of the education have been in focus in conducted research concerning distance education (Ledwell et al, 2006; Ekong, 2006, Keller 2005, Ryan m fl 2000). Introduction of new technique in distance education influence not only the education moments, also the planning of the courses is affected (Larsson, 2004).

Working conditions in distance education

Distance education is not the same as education at campus. Careful planning is especially important since there are fewer possibilities for improvisation and lacks in planning are difficult to repair. The plans shall include course content and organisation, as well as selection of suitable technique and forms of interaction (Gisselberg, 2002).

Another structure is needed in distance education, even if the course content is the same as in education at campus. A larger part of the education time is spent on supervision, reading texts and writing comments to on-going group discussions (Larsson 2004).

In 2001, Bååth described some aspects of importance in distance education. One of the most important issues is that the teacher must plan carefully. Suitable study material for distance education is needed, as well as a good introduction to the course in the study guide. Fast feedback, support of spontaneous contact, and to make sure that the students have the skills to use the technique are other important areas (Bååth, 2001).

Investigations show that teachers teaching on distance are more sceptic than the students to distance education (Larsson, 2004). An identified risk is increased, to heavy work load, depending on high interaction with each student

and the possibilities to analyze the students activities in seminars afterwards (Dahlin, 2000).

Teachers working with distance education have had difficulties to create group dynamics and group communication. Misunderstandings between teacher and students are also common (Larsson, 2004). The lack of physical presence and spontaneous communication are other problems (Dahlin, 2000).

In order to introduce distance education, there is a need to invest in special technique or adjust existing, and to train the employees (Söderberg et al, 2001). Distance education also affect the administration systems and the teacher has

to take part in the role as administrator (Gisselberg, 2002; Larsson, 2004).

Related working areas

The research concerning work environment for teachers in web based education is limited. Work in call-centers is to some parts similar with its high use of computer and phone (Norman et al, 2001; Norman, 2005).

Operators at a call-centre sit in front of computers most part of the day, with both physical and mental monotonous and repetitive work. The psychosocial exposure is distinguished by high emotional and cognitive demands. The high demands are combined with limited control. Social support from colleagues and management are positive. (Norman, 2005)

One difference is that operators at call-centres often work in the same room, while teachers in distance education often are alone in the education situation. On the other hand can one suppose that some work environment problems identified at call-centres also will be present in education.

- The increase of computer work affect the physical work environment (Norman, 2005)
- Shortages in working positions, work space, physical work environment such as light and climate, and position for keyboard, mouse etc. are found and many workers have bad adjusted work technique (Norman et al, 2001).
- The exposure has led to problems especially in neck and shoulders (Norman et al, 2001; Norman, 2005).
- The worker is fixed to the computer, which can make it problematic to take shorter breaks, for example visiting toilette (Bain et al, 2000)
- The workers become stressed by inefficient computer systems, computers closing down, uncomfortable working hours, unclear management, high rate of change, and insufficient information (Norman et al, 2001).
- Operators feel controlled by the management since everything they do is visible, which gives a possibility to measure and watch what the worker do and perform. (Bain et al, 2000).

Distance education offers more possibilities for the teacher to work at home. Working at home raises problems to make distinctions between work and home environment, as well as between work and leisure time. (Allvin et al, 1999). There are also problems concerning when the work is expected to be conducted during day and night, and at what time it actually is performed (Bain m fl 2000).

Web based education at Dalarna University

At Dalarna University web based education has increased during the last couple of years. In 2006 130012 students of 5400 participated in web based education. In 2010 the numbers had raised to 4700 of 7250 students. Web based education is a part of the investment in Next Generation Learning which is prioritized in the vision for Dalarna University 2010 – 2015.

Already in end of 2007 there was a decision at Dalarna University to look closer at the new working conditions at that time for teachers in web based education. There was a need to examine teachers' experiences of their working environment, as well as to identify risks in order to secure a good work environment.

An investigation of the physical and psycho-social work environment was carried out. The results from the mapping gave a base for further work. The following year physical work environment was in focus, and next in focus is the social and psychological working environment.

Aim

The overall aim is to improve the work environment for teachers working with web based education. In specific to increase knowledge about work environment in web based education concerning:

- risks in the work
- develop suggestions for improvements
- examples of best practice

The empirical material was collected at Dalarna University.

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[12] Whole year students.

Methods and material

Main work tasks for teachers in web based education are the same as for teaching at campus but it differs in performance. When giving lectures a main difference is that lectures are recorded, in real time or in advance, and seminars are hold in virtual rooms. Supervision and material are provided in a web based learning platform, it enables teachers and students to communicate and to share documents.

A first study was conducted to investigate the physical and psycho-social working environment for teachers. In April 2008 a web based questionnaire (Hansson & Svärdhagen, 2008) was directed to all teachers at Dalarna University. The questionnaire was designed by a group consisting of union representatives, teachers and experts on work environment from Dalarna University, together with an external co-operator.

The questionnaire contained questions in the following areas:

- How is teachers health affected by the physical working environment?
- How is teachers health affected by psycho-social factors such as stress, work load, control over work situation?
- Are there differences between different forms of teaching, such as web based and campus?
- What suggestions and tips do teachers have to improve their physical and psycho-social working environment?

At the time of the study 428 teachers were employed at Dalarna University. The number of answers was 289 which gives a response rate of 67.5% which can be seen as satisfactory.

A second study focused on the physical work environment (Hedlund, 2010). The aim was to identify risks, develop proposals for solutions and identify success factors for working with web based education. The study was based on a focus group including five teachers from different subjects with experiences from web based education. The group also included work environment experts and ICT-pedagogical personnel, who also have experience from education. Three different work places were in focus; office, lecture hall and recording studio.

Results

The results of the first study show that teachers who work with web based education have been affected or risk being affected by physical and psycho-social problems to a greater degree than those teaching on campus only. Examples of physical working environment risks are ergonomics, unsuitable environment in terms of teaching rooms and offices. Teachers complain that they sit wrong and for too long time, which results in neck and shoulder ache. They also say that neither teaching rooms, offices, nor the technical equipment in sufficient degree are suitable for web based teaching. The investigation shows that problems related to physical working environment increases with the amount of web based education. It also shows that women experience problems in greater extent than men.

The psychological and social work environment risks which are increased in web based education are for example working alone, and difficulties to find time for social contact with colleagues. Another aspect is too much variation in workload over the working year. It also shows that the multi-faceted working situation with many administrative duties that must be dealt with results in stress. The factor that creates most stress is the feeling of frustration over not being able to handle the work load. The amount of stress increases with the extent of web based teaching, and generally women experience more stress then men. Direct or indirect lack of time is listed by many teachers as the major stress factor. Another

problem depending on the flexibility of the work are the difficulties to differ time for work with leisure time.

Some identified areas of success for web based teaching are support from colleagues and head of department, as well as good technical and administrative support. Others are a great deal of synchronous communication, access to different models of teaching and that all type of teachers are involved in web based teaching.

Physical work environment

Identified risks

The investigation during 2010 identified shortages concerning the physical work environment. At the office problems occurs with headsets, sitting still by the computer during long time, sight ergonomics, bad sitting ergonomics, sharing office, to small offices and bad ventilation.

A problem when recording in the lecture-hall is that the lecturer can´t move around because of the need to use microphone, to be able to be seen by the camera, to write instructions to students on line and to be able to point at Power Points with the mouse. The lecture-hall also has bad lightning, cables on the floor, distance between students and lecturer, and problems with echo.

The environment in the recording studio is tiresome with bad lightning, insufficient ventilation, bad ergonomics and a lot of technique to think of. Other problems are the lack of possibility to take breaks and that it takes long time to change users.

Independent on work place, teachers experience problems with the technical equipment, it takes focus from the lecture. Teachers also experience higher tension when the lectures are recorded, sometimes they feel that it is more like a show than a lecture.

Suggestions for improvements

Identified suggestions for improvements are divided into the three different work places. Suggested improvements in the lecture-hall are similar conditions and technical equipment in all halls, some different camera angels set in advance, sound recording of questions raised by students and use of electronic pointing device. In recording studio is a need of clear instructions for the technical equipment, better light, cooler air requested. To have an own office with an ergonomic adjusted work place, suitable headsets and common signs to put on the door in order to not being disturbed, as well as taking breaks at seminars are suggestions to improve the office environment.

Examples of best practice

The results from the physical investigation have so far led to some improvements. Height-adjustable tables are bought to offices and for the lecturer in the lecture-hall. Offering courses and on-line support for teachers in how to use different computer programs as tools in net-based education. Using the same technical equipment in the lecture halls and recording studios.

Discussion

Our results

The result presented in this paper represents the experiences of web based education at Dalarna University. The generality can therefore be questioned. The relevance of the findings can be discussed by comparing them with earlier research. Identified physical working environment risks such as ergonomics, and unsuitable environment in terms of teaching rooms and offices are similar as those identified

at call-centres (Norman et al, 2001; Norman 2005). Those identified risks are a part of the explanation to problems with neck and shoulder ache.

Our results support the identified risk with increased work load for teachers working on distance (Dahlin, 2000). The earlier identified need to invest in special technique and training of employees (Söderberg et al. 2001) is also found in our studies. The increased work load as well as the new technique can be a part of the explanation to experienced stress in web based education. Stress is also a problem in call-centres (Norman et al, 2001). Teachers in web based education have difficulties to differ working time with leisure time. That problem is earlier identified for employees working from home (Bain et al, 2000).

The situation for teachers in web based education at Dalarna University is by that as one could expect. Many development possibilities are found and the development work is on-going. The development of suggestions for solutions and identification of examples of best practise is a base for that work. Continued collaboration between teachers, work environment experts and ICT-pedagogical personnel with support from management is seen as a good way to improve the work environment.

Further work

Previously work environment for teachers in web based teaching has been investigated through a questionnaire and by a focus group. In those studies focus has mainly been on physical working environment and on finding areas for improvement. In the forthcoming project focus will be on the psychological and social work environment, but will also follow up on the changes in work environment that have occurred since the study in 2008.

The study will examine the success factors that can improve the social and psychological work environment. The goal is to create a research and development projects in which teachers' experience of working with web based teaching can be integrated into a common knowledge and scientific research.

An overall aim is to provide a digital guide to support teachers who work with web based education.

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International benchmarking
The first dual mode distance learning benchmarking club

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Abstract

Benchmarking is a self-improvement tool allowing organisations to compare themselves with others regarding some aspects of performance, with a view to finding ways to improve current performance. Benchmarking deals with change for quality enhancement but also with identification and implementation of areas of development. Benchmarking is a process that enables comparison of inputs, processes or outputs between institutions or within a single institution over time

A Dual Modes Distance Learning Benchmarking Club was set up across the world, aimed at disseminating and implementing the *Pick&Mix* model. Four institutions in the Club were successfully benchmarked using a slightly modified version of *Pick&Mix* during 2009-2010. Besides the benchmarking, concordance works with other benchmarking methods were conducted.

The Pick&Mix benchmarking system contains 18 criteria which are critical success factors (of special importance for success in e-learning).13 These are: *Usability, e-Learning Strategy, Decisions on Projects, Training, Costs, Planning*

Annually, Technical Support to Staff, Decisions on Programmes, Leadership in e-Learning, Management Style, Relationship, Management Upwards, Reliability, Market Research, Security, Student Understanding of System, Student Help Desk, Distance Learning Strategy (doppelganger criterion with e-learning strategy). All of the benchmarks were scored at six levels (a scale of 1 to 6) and a coloured matrix was produced where the state of an institution/department becomes explicit.

Among four institutions in the Club that went through to scoring, one was in UK (University of Leicester), two in Sweden (Lund University and the Royal Institute of Technology), and one in Canada (Thompson Rivers University). Later, the University of Leicester decided not to continue in the Club, due to changes in staff and policies. Fortunately Gotland University, Sweden had also done benchmarking using the *Pick&Mix* methodology. A final meeting of the Club was hosted by KTH in September 2011 with Thompson Rivers University and Lund University with Gotland University as a guest. The four universities present agreed to share their results and to continue their benchmarking collaboration in Sweden and beyond, including producing a public report of their conclusions. This paper is the first airing of these.

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[13] Re.ViCa http://revica.europace.org

Headline conclusions are:

1. Over the five years since *Pick&Mix* was first used, institutions are gradually developing stronger competence in e-learning – but progress is slow
2. Only a very few universities have strong expertise in market research for e-learning
3. No institution has a good understanding of the cost issues to do with e-learning

Staff generally feel that the management do not given them adequate reward and recognition for their e-learning competence.

Keywords: benchmarking, critical success factors, e-learning, quality

Introduction

This paper introduces benchmarking as a method and provides a short summary of Pick&Mix. Then follows a description of the *First dual-mode distance learning benchmarking club*, and its aims, partners, core criteria and processes are described. Following that, experiences from mainly the Swedish partners are elaborated together with a conclusion on methodology and the main outputs from the benchmarking exercise. The paper ends with a discussion and further recommendations.

Benchmarking

Benchmarking originated in the US as a response to competitive pressures in the early 1970s (Camp, 1993). Gradually it took on aspects of self-analysis and comparison against industry "best practices" (Bacsich, 2009a, b, c; Bibliography on benchmarking, 2012; Ossiannilsson, forthcoming). Benchmarking as used in university e-learning circles started in the UK when the Higher Education Funding Council for England put it into its e-learning strategy (HEFCE, 2005). In Australia and New Zeeland the e-learning maturity model (eMM) has been in

use since around the same time (Marshall and Mitchell, 2004; Marshall, 2005, 2007). Benchmarking e-learning in higher education is possibly more important to help individual institutions understand their own positions in e-learning, to set their aspirations and goals for embedding e-learning - and then to benchmark themselves and their progress across the sector (Bacsich, 2009a,b,c; Marshall and Mitchell, 2007; Ossiannilsson, forthcoming).

History of Pick&Mix

Pick&Mix works within a context of an *open educational methodology*. Each release of the system and associated reports is placed in the public domain (Creative Commons license).14. There is also a wiki supporting a mass of benchmarking material.15 It is rare to be this open: several other methodologies used across the world for benchmarking e-learning do not operate in this way. Being open implies that a "scholarship of benchmarking" can more easily arise, since the methodology, underpinnings, evaluations and uses are easy to access, and users motivated to improve the system. (Bacsich, 2009c).

In late 2005 Pick&Mix was adopted by the Higher Education Academy as one of the three main methodologies for the Benchmarking Pilot Bacsich, 2005). Across all the phases, 24 institutions used it out of the total of 82 benchmarked. Originally Pick&Mix had a number (20) of core criteria, all of which had to be analysed, but only those 20. However, it became clear from the Pilot Phase onwards that new criteria were needed, but ones not necessarily relevant to all institutions. Thus was born the

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[14] http://creativecommons.org/

[15] ELDDA, 2008

concept of *supplementary criteria* which institutions could *choose* to use in addition to the *compulsory* core criteria. This was one of the most popular features. The author of Pick&Mix was even the international advisor to the Australian ACODE (Bacsich, 20110) benchmarking scheme .

The first dual-mode distance learning benchmarking club

Across the world, by no means all distance learning is yet imbued with substantial amounts of e-learning. So in theory there was a decision between two options, benchmarking e-learning within the distance learning *slice* of the institution, and benchmarking distance learning, using a distance learning *mood* of Pick&Mix.

To disseminate and try out the method of Pick&Mix an international benchmarking club was set up in 2009-2011. The *First dual-mode distance learning benchmarking club* originally comprised seven universities across the world, all active in distance online learning in a dual-mode fashion, all intending to benchmark their online distance learning activity. In reality most activities took place in the period September 2010 to February 2011 but the original plan had been to conduct the benchmarking exercise twice, once in Autumn 2009 and once in Autumn 2010. For several reasons this become not the case within the exercise of the club. However, some members of the Club were successfully benchmarked using a slightly modified version of *Pick&Mix* during 2009-2010. Besides the benchmarking, concordance works with other benchmarking methods were conducted.

Benchmarking in this club had its point of departure in the Pick&Mix model, a benchmarking method that at the time was especially well known in the United Kingdom. This method had in 2008-09 been updated to fit the current developments in the field of e-

learning and has been examined by international experts through the Re.ViCa project (2009), guaranteeing a high level of quality. Pick&Mix in its full form consists of nearly 100 benchmarks. This number provides flexibility, and universities can choose for themselves which benchmarks they will consider. Eighteen of them, however, are *critical success factors* (i.e. factors that are of special importance for success in e-learning). All of the benchmarks are scored at one of six levels and, by tabulating the benchmarks, a coloured matrix is produced directly. Through the matrix, the state of the art of an institution/department becomes explicit. The Club was aimed at disseminating and implementing the Pick&Mix model (Mick&Mix, 2011) more widely beyond the UK. The participating universities carried out the benchmarking process. Within this process, generic and critical success factors were explored.

Project partners

Earlier scoping work on such a Club suggested that between 4 and 8 universities should take part, at least 4 (to ensure sufficient diversity and common working) and at most 8 (to ensure viable operation of virtual project meetings using synchronous video tools). It was further agreed that each partner should ideally be a university with at least 10,000 students whose distance online learning offering has in excess of 1000 students and also has a wide range of programmes. The final universities involved in the first dual mode distance benchmarking club list are showed in Table 1.

Country	University
UK	University of Leicester (lead)
UK	University of Liverpool

Australia	University of Southern Queensland,
New Zeeland	Massey University
Canada	Thompson Rivers University
Sweden	Lund University
Sweden	KTH

Table 1. Universities initially involved in the first dual mode distance benchmarking club.

Core criteria Pick&Mix

The benchmarking system was described as follows: The benchmarking system to be used was the Pick&Mix system used already in the period 2005-08 by 24 institutions in the UK. The basis for the new set of core criteria for the Club was the set of Critical Success Factors defined by the Re.ViCa project (2011) using extensive international input from a wide-ranging International Advisory Committee of e-learning experts. It was further adapted in minor ways to have more focus on distance e-learning and serious implementation (step-change) but without going beyond general guidelines (should be 24 or less) on numbers of criteria used. The Pick&Mix methodology draws on five phases of benchmarking with UK HEIs using the Pick&Mix system, and on wider experience of benchmarking in Europe and internationally (in particular, but not only, the Re.ViCa project). It was decided early on that the Club was a closed club – but that steps and sounding would be taken to see how to set up another club later. When the project started, a revision of Pick&Mix was considered. This led to the following set of Core Criteria being proposed for Club members. The core criterion are usability, e-learning strategy, decision on projects, training, costs, planning annually, technical support to staff, decision on programmes,

leadership in e-learning, management style, relationship (management upwards), reliability, market research, security, student understanding of system, student help desk and student satisfaction (Bacsich, 2009c, 2011, Ossiannilsson & Landgren 2011a, b, c). The core criteria are outlined in Table 2. The 8 ones that are in the UK core are in bold. Institutions that were new to Pick&Mix benchmarking were free to select up to 6 additional supplementary criteria.

Code	Criterion name
04	Usability
06	eLearning strategy
07	Decisions on Projects
10	Training
12	Costs
13	Planning Annually
16	Technical Support to Staff
19	Decisions on Programmes
22	Leadership in e-Learning
29	Management Style
35	Relationship Management Upwards
53	Reliability
58	Market Research
60	Security
91	Student Understanding of System
92	Student Help Desk

94	Student Satisfaction

Criterion 06 is paired with a doppelganger criterion 06d

06d	Distance Learning Strategy	Regularly updated Distance Learning Strategy, integrated with Learning and Teaching Strategy and all related strategies (e.g. e-Learning, if relevant).

Table 2. Core criteria Pick&Mix

Engagement approach

At all institutions the benchmarking exercise was carried out with a team leader. and with a core group as well as a reference group to ensure commitment, involvement and engagement throughout the benchmarking process: note that the implementation phase has to be included in the exercise *per se.* It will be stressed already here in the beginning that benchmarking has to be seen within a process approach according to Ossiannilsson (forthcoming). The final scoring meeting in each institution was overseen by the central benchmarking team, face to face or by remote review depending on logistics.

Those from a *quality* background will want to note that the type of engagement approach used in benchmarking is not quite the same as some institutions are used to from national quality bodies. The Pick&Mix version is called the *iterative self-review process* with use of expert moderators which has the following features:

- It encourages a more senior level of participation from the institution: the result is "theirs", not the moderators
- It allows them to get comfortable over time with the criteria as they apply to their institution

- It helps them move *directly* to implementation of change
- But it selects against complex methodologies – not an issue with Pick&Mix as it is simple (compared with others)
- And requires more effort from moderators (Bacsich, 2011)

The sequence of meetings, which also are recommended for the process as such, held at each institution was the following as is outlines in Table 3.

Meeting	Aims of meeting
Initial meeting	followed by: Initial collection of evidence, and Selection of supplementary criteria
Mid-process meeting	followed by: Further collection of evidence
Scoring rehearsal meeting	Followed by final tweaks on and chasing of evidence
Scoring meeting	xxx
Reflection meeting	To move to change

Table 3. Recommended meetings during the benchmarking process

Related analytic work

Lund University, Sweden was during the benchmarking process in 2009-2011, also undertaking benchmarking using the E-xcellence

system, created by the EADTU (The European Association of Distance Teaching Universities)16 and the e-learning benchmarking exercise by the ESMU (The European Centre for Strategic Management of Universities).17 Earlier work on the Pick&Mix to E-xcellence concordance was updated by Lund University (Ossiannilsson, 2011a, b c). Other earlier concordance work e.g. with OBHE was updated by Matic Media (Bacsich, 2009b).

Experiences from the first dual mode distance benchmarking club

Below follows a summary of experiences from the Swedish partners, Lund University, Gotland University and KTH.

Experiences from Lund University

Lund University, Scandinavia's largest University with some 47000 students was founded in 1666. Between 2008 and 2010, Lund University took part in three international benchmarking projects, the E-xcellence+ project on individual benchmarking base (EADTU), the eLearning Benchmarking Exercise 2009 (ESMU), together with eight other European Universities, and the First Dual-Mode Distance Learning Benchmarking Club. At the same time the Swedish National Agency for Higher Education had just published a report on quality in e-learning (NAHE, 2008). Besides carrying out benchmarking according to Pick&Mix as for all partners, which was done based on institutional and program level. The task for Lund University was in addition somewhat extended. Lund University did also a

concordance of all four models and the task was also to update Pick&Mix according to current discourse in the field of e-learning and quality and to relate benchmarks and indicators to Scandinavian/Swedish perspectives. Having done that, a comparison of these four models revealed a rather high level of correspondence. From these findings and from desktop studies of the current discourse regarding e-learning, a conceptual framework for e-learning emerged based on a range of critical success factors (Ossiannilsson & Landgren, 2011a, b). The model illustrated that benchmarking has to be conducted as a process and with a holistic and contextual perspective, Figure 1.

Fig. 1. A conceptual framework for quality in e-learning
(Ossiannilsson & Landgren, 2011b,c)

This model could be used as a foundation for planning, conducting and quality assurance of future e-learning and as an inspiration to develop, implement, evaluate, and internalisation of e-learning in education. The model shows that various aspects of accessibility, flexibility, interactiveness, personalization, and productivity should be embedded in all levels of management and services within the field of e-learning in higher education. To meet students' expectations, demands, and rights, these critical issues should be taken into account from a holistic perspective with transparency and innovation in mind. Therefore, successful e-learning requires change from an organizational

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16 http://www.eadtu.nl/e-xcellencelabel/?mMid=2

17 http://www.esmu.be/projects/94-benchmarking-elearning.html

as well as a pedagogical perspective. The results showed explicitly that those perspectives need to be taken into account formulating benchmarks and indicators. One conclusion from this study is that a revolution is on the way and that learning will be reoriented along paradigms of collaboration and networking. Globalization, sustainability, and lifelong learning will be some of the leading concepts in this process (Ossiannilsson & Landgren, 2011b,c).

Based on the accumulated expertise in the field of benchmarking and with regard to NAHE's e-learning quality model (NAHE, 2008) which also was the foundation for the ENQA quality conference in Sigtuna in 2009 (at which some members of the Club gave presentations), the purpose of the participation of Lund University was slightly wider and, to some extent, different from the others in the project. To consider and define critical success factors, all of the benchmarks were consciously discussed, reflected on, related, and validated. According to the experiences of E-xcellence+, the eLearning Benchmarking Exercise, and the e-learning quality model, as well as the ongoing debate and discourse in the field, our research resulted in three remaining core criteria. Of all the Pick&Mix benchmarks, 17 new core criteria were chosen, as they represented important areas for Lund University within a Swedish context. Finally, nine totally new critical success areas were added. They are constructive alignment; democratic processes; flexibility; legal security; interactiveness; participation; productivity; services for students and staff; and transparency. In total, our collection of critical success areas ended up with 28 items (Table 4).

Thus, in summary, the various steps of this work can be described as follows:

1. We valued the 18 core criteria, how important those were from our experiences and from a Swedish and Lund University perspective, and according to this we made a selection resulting in 3 cores.
2. We found that some of the other benchmarks (out of the appr. 100) in the *Pick&Mix* model were of importance from our experiences and from a Swedish and Lund University perspective, so those were added (17 in all).
3. In addition, based on our experiences and from a Swedish and Lund University perspective some new critical success factors (8) were added, which we think are of importance according to the current discourse and debate.

Remaining core criteria from the Pick&Mix model (3)	Benchmarks selected from the Pick&Mix model (17)	Added critical success factors suggested from Lund University (8)
Market Research	Accessibility	Constructive Alignment
Reliability	Benchmarking	Democratic Processes
Strategic Management (former Management Style)	Computer Based Assessment	Interactiveness
	Eco-Sustainability	Legal Security
	Employability	Participation

	e-Portfolios	Productivity
	Information Literacy of Students	Services; Staff and Students
	Integration	Transparency
	Learning Material (former Learning Objects)	
	Library Services and e-Resources	
	Organizational Learning	
	Pedagogy	
	Personalisation	
	Plagiarism (former Plagiarism Avoidance)	
	Quality Assurance	
	Staff Recognition and Reward	
	Widening Participation	

Table 4. List of suggested success factors through the project the First dual mode distance learning benchmarking club (Ossiannilsson & Landgren, 2011a, b,c).

Many of them are found among the supplementary criteria of Pick&Mix, though often among those less chosen by institutions in the UK, but others are not - thus demonstrating the

importance of national and cultural factors in benchmarking e-learning.

Regarding the second task of Lund University, the result of the comparison between the various benchmarking models revealed a fairly high degree of concordance. For example a degree of consistency between the different benchmarking methods and some common critical success factors emerged such as the student perspective, management, and strategies, and educational and technical support. However, different ways were found to express these phenomena, possibly partly because of cultural and linguistic differences. It became obvious that the vocabulary being used tended to be seen from the Swedish standpoint as somewhat old-fashioned, that the benchmarks did not appear to fit the Swedish context with regard to e-learning/blended learning, and that they did not correspond to the current terminology in relevant studies of e-learning favoured in Sweden.

Experience from Gotland University

Gotland University is not a formal member of the distance learning benchmarking club. However, Gotland University carried out a benchmarking according to Pick&Mix during 2010 and came to co-operate with the club as a guest at the final stages of the club's work. Gotland University's was founded in 1998 and having some 2500 full-year equivalent undergraduate students. The purpose and intention of carrying out a benchmarking using the Pick&Mix method was at first to find suggestions on how to strengthen the institution's e-learning. The reason for choosing the Pick&Mix method was the expected possibility to relatively quickly, with a relatively small effort, without access to own experts in e-learning get a good view and understanding of the current state of the institution's e-learning. The method was also expected to give results that would be straight forward to use to find suggestions on what aspects of the institutions e-

learning to address and what to do in order to improve. A key aspect that was found appealing when making the decision to use Pick&Mix was the easily understood and concrete (critical) success factors and their 6-level scoring with attached brief and concrete descriptions for each level. From the classification of the success factors in two sets, critical success factors and success factors, and the 6-level scoring of each success factor follows a given two-level priority and an estimate on an absolute scale of identified issues to address.

This was the first time benchmarking of e-learning was pursued at Gotland university and to help the benchmarking progress and professor Paul Bacsich joined the benchmarking team at an initial meeting, and two more times during the process as well as supporting the team using mail etc. In the initial work with the benchmarking process all the success factors identified in Pick&Mix were explored and considered. Some of the identified success factors in Pick&Mix were found not to be relevant to Gotland University and eventually 30 success factors were chosen and used in the benchmarking process. Gotland University had a few specific issues that needed to be addressed for locally specific reasons. The nature of these issues differed from the benchmarking success factors so these issues were addressed in parallell but separately.

In a few cases the benchmarking team found that it was not straight forward to identify the University's score for the success factors. This was mostly from institution internal reasons, i.e. it was hard to gather the needed information. The effect of this was that the benchmarking exercise made it clear that there was interesting information that was not easily accessible at the institution.

Apart from this, the use of Pick&Mix for benchmarking the distance e-learning at Gotland University was found to be relatively straight forward and very useful and easy to use the output

from the method to suggest changes to achieve improvements of the distance e-learning at the institution. The built-in expertise knowledge and information of the method was highly appreciated and the ease of use and ease of performing a benchmarking made it possible for Gotland University to identify the state of it's e-learning on a somewhat absolute scale and to identify what aspects and areas of it's e-learning that needs most improvement and also what measures is needed to achieve the identified improvements (Hedrén, 2011).

Experiences from KTH

The Royal Institute of Technology (KTH), founded in 1827, is Sweden's largest technical university. It accounts for one-third of Sweden's technical research and engineering education capacity at university level. KTH is organized into 10 different Schools, each of these heading a number of Departments, Centers of Excellence and undergraduate study programs. There are a total of just over 13,000 full-year equivalent undergraduate students, more than 1,500 active postgraduate students and 2,935 full time equivalent employees.

KTH joined the benchmarking club in 2010, as one of seven universities. This was the first time ever that benchmarking of e-learning was pursued at KTH, which meant that there was no earlier experience or results to lean on. After an introductory workshop with Professor Paul Bacsich in late spring 2010, four persons were engaged on a part time basis in the project.

Out of the set of success factors 17 critical success factors was selected to be used in the benchmarking, leaving the other criterions out. We also decided to interview as many persons as possible engaged in distance e-learning at KTH and to ask each one individually to score the criteria according to the Pick& Mix model (i.e. between1-6). In the interviews we should ask the

respondents to produce evidence on as many criteria as possible

Experience from years of work in the pedagogical department, guiding and training of teachers in the use of ICT and e-learning as well as our personal experience from ourselves having developed and managed several e-learning courses at KTH, had made clear to the benchmarking team, that great variations existed within KTH, between individuals but also between departments and schools. This fact needed to be addressed. If KTH was going to learn from this benchmarking activity, we needed to be able to show these differences in our report.

The best way to do this was to ask each of our respondents to value each criterion not only on level 1- 6 but also do this for 4 different organizational levels namely at;

1. Individual/or course level
2. Departmental level
3. "School "level
4. Institutional /or "KTH" level.

During the summer months the team collected all documentation possible about different projects on e-learning or courses/initiatives with a blended learning approach. Three persons shared the work to collect interview data from a total of 40 respondents during September to December 2010. The goal was to interview as many teachers as possible involved in e-learning and their management, i.e. Head of Departments and Schools at KTH were e-learning was an issue. In order to conduct each interview in a similar way, a semi-structured guide was developed. To give richness to the interviews and material to the internal report, some initial questions about each criterion was added to the guide.

Results: As expected, the picture varied quite widely among KTH's Schools. Illuminated "islands" with very advanced and high quality distance e-learning existed. But internal information about their work was not reaching

outside their group. At the same time "dark corners" that had not even thought of the possibility to use new technologies to enhance their student's learning or to try blended learning models for more flexibility were found. This meant that KTH could learn from studying successful e-learning initiatives within its organization from departments that have worked for years in different online initiatives and to develop blended learning models. The benchmarking team therefore decided to present its results not only as written reports but also as a seminar series, were the results could be discussed and good examples disseminated locally.

During the benchmarking process and especially when creating the interview guide and also during the interviews, both respondents and the interviewer commented on that some of the 17 critical success factors, were not as relevant in a Swedish context. This was especially evident on criterion 35 "Relationship management upwards".

Also criterion 58 "Market research" can be perceived in several ways and market research is not often included in the methods used at Swedish universities. Several of our respondents therefore misinterpreted the criterion as "marketing", which is quite another thing.

The approximately 100 benchmarks were gone through and discussed to see if we could find other criteria that represented for KTH important areas. Eighteen (18) new core criteria were chosen and grouped in the following areas:

Student involvement
Criterion: 90 Employability; 95 Student Satisfaction and 96 e-Portfolios.

Educational/Pedagogical anchoring
Criterion: 9 Pedagogy; 22 Adoption by Staff of Enhanced Learning; 24 Teaching 2.0;
50 Learning Outcomes; 52 Ubiquity ; 61

Pedagogy Research In and 80 Computer Based Assessment.

Staff recognition and reward
Criterion: 15 Evaluation; 19 Staff Recognition and Reward; 37 Innovation Management;
62 Integration; 83 Staff Experience and 84 Staff Satisfaction.

Open Educational Resources
Criterion: 75 Library Services e-Resources and 97 Open Educational Resources

Three of the four original Club institutions had no substantial issues with Pick&Mix. Lund University found it more challenging to use the Pick&Mix criteria without modification. However, as described above two other Swedish institutions, KTH (also a research-led institution but smaller than Lund) and Gotland (a small university college with lots of distance learning) managed to cope very well with Pick&Mix.

It is likely that as in the early days of the benchmarking exercise in the UK, the style of institution can have a large impact on acceptance of specific concepts and wording. Lund University is a large, decentralised and student-centred institution and UK experience suggests that such institutions do find the specific Pick&Mix style of benchmarking more challenging and less appropriate. It also may be a factor that the lead benchmarker at Lund University, is doing her PhD on benchmarking and this is likely to generate more comments on methodological aspects.

Over the years, the Pick&Mix tool will be updated - as it was substantially in 2009 just before the Club started. One solution may be a common scheme of benchmarking *concepts* with different wording of each concept, not only for the different languages but for the different educational/financial milieus (schools, colleges, universities; no fees, commercial fees, etc). This situation is being explored for the schools sector

in the VISCED project (Bacsich 2012) where the differences between nations in their school systems are more pronounced than they usually are for universities.

In confirming and trying to be creative and innovative in the process of working with the correlation between the benchmarking models, the current discourse and debate regarding e-learning has permeated our reflections.

Conclusions on methodology and benchmarking outcomes

A final meeting of the First dual mode distance learning benchmarking club was held in Sweden in September 2011, with an invitation from KTH to other institutions aiming to share experiences. Four institutions took part, namely the three Swedish ones and Thompson Rivers University, Canada. Especially the meeting gave all three Swedish institutions involved in Pick&Mix a good base on which to build future collaboration in and beyond Sweden. It was decided at the meeting that the three Swedish institutions and Thompson Rivers University would share with each other reasonably detailed versions of their internal reports, including scores and that a public report should be produced and a thorough bibliography.

Three key conclusions from the benchmarking exercise were that:

- Only Thompson Rivers University has any strong expertise in market research for e-learning, not only in the Club but out of all the institutions benchmarked with Pick&Mix
- No institution has strong competence in costing e-learning
- Staff reward and recognition for e-learning is not adequate anywhere.

Discussion

The political message is that such clubs are useful and that one could be easily set up in the Scando-Baltic region or within any large-population country like Sweden or even a smaller one like Finland (as has been done in Wales). Issues raised above could be handled by different wording appropriate to the national languages and cultures within a common conceptual scheme for example as developed by Lund University.

At present there is no governing of e-learning on a national level in Sweden since the Net University was closed down in December 2008. Co-operations like the distance learning benchmarking club can play a role on an inter-institutional level, both nationally and internationally, in the absence of any national level governing. Through co-operations like the distance learning benchmarking club institutions could network, share knowledge, increase their competence and strengthen their e-learning. The dissemination of Pick&Mix through the work pursued within the club has created a knowledge foundation that can be taken further to both be used within the institutions of the club and also to involve more institutions.

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Fan culture as an informal learning environment
Presentation of an NGL project

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ABSTRACT

Fan culture is a subculture that has developed explosively on the internet over the last decades. Fans are creating their own films, translations, fiction, fan art, blogs, role play and also various forms that are all based on familiar popular culture creations like TV-series, bestsellers, anime, manga stories and games. In our project, we analyze two of these subculture genres, fan fiction and scanlation.

Amateurs, and sometimes professional writers, create new stories by adapting and developing existing storylines and characters from the original. In this way, a "network" of texts occurs, and writers step into an intertextual dialogue with established writers such as JK Rowling (*Harry Potter*) and Stephanie Meyer (*Twilight*). Literary reception and creation then merge into a rich reciprocal creative activity which includes comments and feedback from the participators in the community.

The critical attitude of the fans regarding quality and the frustration at waiting for the official translation of manga books led to the development of *scanlation*, which is an amateur translation of manga distributed on the internet.

Today, young internet users get involved in conceptual discussions of intertextuality and narrative structures through fan activity. In the case of *scanlation*, the scanlators practice the skills and techniques of translating in an informal environment. This phenomenon of participatory culture has been observed by scholars and it is concluded that they contribute to the development of a student's literacy and foreign language skills. Furthermore, there is no doubt that the fandom related to Japanese cultural products such as manga, anime and videogames is one of the strong motives for foreign students to start learning Japanese.

This is something to take into pedagogical consideration when we develop web-based courses. *Fan fiction* and *fan culture* make it possible to have an intensive transcultural dialogue between participators throughout the world and is of great interest when studying the interaction between formal and informal learning that puts the student in focus.

Keywords: fan culture, fan fiction, scanlation, informal learning environment, participatory culture

INTRODUCTION

In order to better meet the needs of the New Generation of students, our challenge will be to develop new pedagogical thinking to accompany new technologies. This has led us to take a closer look at informal learning environments taking place on the internet today. The present study builds on interesting and important

previous research from scholars like Marc Prensky, James Paul Gee, Henry Jenkins and Christina Olin-Scheller, when we are taking as a premise that a favorable learning situation and learning outcome is taking place in fan culture online communities today.

Marc Prensky has suggested that the so- called decline in today's educational system is due to a discrepancy between how young people access new information and knowledge through online communities, and the traditional methodology used by their teachers to educate them. And to describe this he uses the metaphor: *digital natives* and *digital immigrants*, referring to a generation that has grown up with these new technologies and an older generation that has had to adapt to them. (Prensky 2001) Also James Paul Gee has convincingly shown in his study *Situated Language and Learning: A Critique of Traditional Schooling* (2004) how young people can learn "more" from their after-school activities than from traditional schooling (for example, complex problem solving from videogames). In his latest book *Language and learning in a Digital Age* (2011) he emphasizes learning environments and popular culture and he recognizes it as a "new learning system" and invents a new term to define it:

> The new learning system, competing today in many respects with our school systems, is learning as part of popular culture. (---) There is no "official" name for this type of learning, so we will have to make one up. We will call it "passionate affinity-based learning." Passionate affinity-based learning occurs when people organize themselves in the real world and/or via the Internet (or a virtual world) to learn something connected to a shared endeavor, interest, or passion. (Gee 2011:69)

In our paper we will focus on how communities of *fan culture* – with the examples of the two subgenres *fan fiction* and *scanlation activity* - function as an informal learning environment on

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the internet. It aims to identify and discuss some elements in these fan communities that probably benefit the learning situation. We are interested in the learning process, per se, rather than proving or evaluating specific learning outcomes. Furthermore, we will try to identify and discuss some elements within this process that benefits the learning environment. We will start with a brief introduction to fan communities and then continue on to the learning processes taking place on fan fiction and scanlation sites.

Fan culture is a subculture that has developed explosively on the internet during the last decades. Fans are creating their own films, translations, fiction, fan art, blogs, role play and also various forums that are all based on familiar popular culture creations like TV-series, bestsellers, anime, manga stories and games.

On fan culture community websites young people learn how to write, comment on and translate texts. On fan fiction websites fans create new stories by adapting and developing existing storylines and characters from the original; get involved in an intensive dialogue between reader and writer and have conceptual discussions on intertextuality and narrative structures. In the case of *scanlation*, the scanlators practice the skills and techniques of translating, as well as acquiring Japanese language abilities, in an informal environment. Art reception and creation then merge into a rich reciprocal creative activity which includes comments and feedback from the participators in the community.

In 1992 Henry Jenkins wrote a groundbreaking study on fan culture where he deconstructed the prevailing negative image of a fan as a stereotypical fanatic and reinterpreted her or him as passionate and creative community member. Since then, fandom has taken the step into online communities and experienced an explosive

development, both in the form of an increased number of participants as well as in social credit. Fan culture is now a completely transnational activity where people from all over the world come together in their shared passion for a specific fandom. Henry Jenkins characterizes a fan as follows, and the quotation also illustrates what he has defined as a Participatory culture:

> This ability to transform personal reaction into social interaction, spectatorial culture into participatory culture, is one of the central characteristics of fandom. One becomes a "fan" not by being a regular viewer of a particular program but by translating that viewing into some kind of cultural activity, by sharing feelings and thoughts about the program content with friends, by joining a "community" of other fans who share common interests. For fans, consumption naturally sparks production, reading generates writing, until the terms seem logically inseparable...

> (Jenkins 2006: 41)

This passage points to some important elements for a favorable learning situation namely: a shared passion for the fandom and an emotional investment in the material as a strong motivator for writing and participating. The fan communities are particularly good examples of *participatory culture* - where consumers and producers blend together into "prosumers" and the key word here is "sharing". James Paul Gee was seen in the citation shown earlier on his concept of "passionate affinity-based learning" and Prensky agrees with Jenkins on passion as the key element.

In the following sections, we will see two types of fan activities, identifying the elements that would benefit their function as an informal learning environment.

FAN FICTION

Feedback: Reviews and beta readers

In an article in the Swedish newspaper *Svenska Dagbladet*, the author Jennifer deLucy emphasizes the fan fiction world as a "writing school", where everyone, even professional writers like herself, has something to learn. Even if most of the fan fiction writers may be amateurs there also are the more experienced who supervise the less experienced. Under the tag "Review this story" on the website fanfiction.net every reader has the possibility to give feedback and interact with the author. The feedback from other fans often comes quickly, since the fans share the same interests – the same passion for a fandom – and normally react on the new stories immediately. It's an ongoing discussion; it's not only one comment from the teacher like in the traditional teacher-student relationship. Here, writers have the possibility to argue an opinion or just ask what the reviewers mean by something. They also develop skills in these "metatalks" in how to analyze their own writing and they're having theoretical discussions about the interpretations of the source texts (Wenz 2010; Olin-Scheller 2009). For example the question "When does fan fiction become literature?" is being discussed in a forum on fanfiction.net. (http://forum.fanfiction.net/topic/2872/56836699/1/ 2012-02-15)

Author and readers accordingly meet in this ongoing and intensive dialogue. They act as teachers/mentors for each other; they comment on texts, structure, characters, style, grammar, etc. The feedback ranges from very positive comments to concrete suggestions about how to improve the text, depending on how experienced the writer is. Sometimes the new writers are quite "educated" by others, like the signature

The Moons Feather, who has written two fan fictions on *Inkheart* on fanfiction.net. As most new writers, she asks for reviews before her story starts. On her personal profile, she informs everyone about herself and tells her favourites in different categories, for example her favourite fan fiction writer; that's Kallypso, who reviews the first chapters of her first fanfic *InkClover*. Kallypso notices that The Moons Feathers story needs more work and gives her quite detailed instructions for how to improve her writing:

> Number 1: Take your time. Don't be afraid to slow down and take time to describe the scene. You brush over the majority of a chapter with just a few sentences. Even though whoever is reading your fanfic has read Inkheart you should not be afraid to use more detail. If you don't want to spend too much time on the old scene you can always use space to develop your character and maybe delve more into her thoughts. So far I don't get much of a sense of who Clover is or what her personality is like. She's a writer... that's basically all I know. Writers are very interesting people. Explore her some more, add in some back story. Dramatic back stories can be your friend :)
> Number 2: If you plan on having really short chapters then update them alot quicker. I know, again from experience, that if you don't update quickly you might lose alot of potential readers.
> […] I'd be glad to help you any time you need me to. I was once a beginner to and it takes awhile to get into the swing of things. (http://www.fanfiction.net/r/7478112/ 2012-01-30)

Some days later, The Moons Feather has published more chapters of her story and Kallypso writes another comment. ("You took some of my advice :) Thanks for spending some time with Clover this chapter and giving some back story. i want to see more of what happened to her. Still don't be afraid to flesh out descriptions a little more. Another little note,

every time someone different talks make a new paragraph. It makes your chapters seem longer anyway :)") (http://www.fanfiction.net/r/7478112/ 2012-01-30) Significant to note here, is that even though there is a very clear teacher-student situation, the student asks for feedback and is really happy about it. The discussion on the published text usually starts directly. This immediate feedback – that even if it's critical, often contains some positive feedback like "update soon" – is probably an important element for learning.

Also beta readers (proof readers) are available to offer help *before* an author decides to publish a text on fanfiction.net. In this way, the participatory culture with its informal "mentoring" is very clear: The more experienced contributors read the texts of the less experienced and teach and support them. The definition of a beta reader on fanfiction.net is "a person who reads a work of fiction with a critical eye, with the aim of improving grammar, spelling, characterization, and general style of a story prior to its release to the general public." (http://www.fanfiction.net/betareaders/ 2012-01-09) For example, we can take a look at one registered beta reader on this webpage, Detafo. She has written 14 stories (fan fictions) for *Silence of the Lambs*, *Cats*, *Twilight*, *Alice in Wonderland* and some more. All registered beta readers on fanfiction.net have a beta description, where we get to know what their strengths and weaknesses are and what they prefer to read (and prefer not to). Detafo gives the following general description on her beta reader profile:

> I'm OCD when it comes to spelling and grammar. I spend AGES on my own fics before I post them, making sure the wording sounds right. I like to make things sound like they come from the time period in which they are set, so it sounds more believable. For example, if the story is set in the 1860's, I

don't use abbreviated terms such as 'c'mon' and 'hey'. To me it... it's insulting. Be warned that if I beta-read your fics, I might just go Nazi on things like that. Unless you ask me nicely not to ;) (http://www.fanfiction.net/beta/168470/Detafo 2012-01-09)

Detafo thus has an awareness of writing from different periods and historical language. She adjusts the style and the language to the time in which the story is taking place.

Anonymity

Most writers of fan fiction use screen names which means that we don't know their age, sex, where they live, etc. The fact that you don't know who the person behind the screen name is makes the distinction between amateurs and professionals more difficult. They're all anonymous and in the first place they identify themselves as part of the fan community, as prosumers (the mixture of producers and consumers), not young teenagers or professional writers. Some users sign up with very well-constructed pseudonyms that really show their personality and their values, or they sign up using nicknames that express the identity they'd like to have. In this way the fan fiction writers have the possibility to try different roles and different identities. (Olin-Scheller & Wikström 2010; Olin-Scheller 2009)

The anonymity thus plays an important role since it encourages learning and teaching activities. It probably gives (at least some) fanfic writers the courage to publish and it also creates a freedom to express oneself since you can have an online identity or even use many different pseudonyms in different fandoms. You're also free to write about themes that you wouldn't have done otherwise. For example the fan fiction writer MartinP in a Swedish study from 2010 by Olin-Scheller & Wikström describes a girl's sexual debut and this is a theme that he probably wouldn't have chosen whether in the classroom or on the fan fiction website if he hadn't been anonymous.

SCANLATION

"Scanlation" is a term that combines "scanning" and "translation", and started in the late 1990s. Overseas fans of Japanese manga were frustrated that there were many works that were not translated and published abroad, and started making their own translation of the scanned original version. They were all circulated by through the internet.

With time, this has grown into a major practice, and although there is a growing conflict with the publishers over the copyright issue, it has not ceased by any means. The motives today for fans to translate manga work and to read fan translated manga could be summarised as two – to read what is not translated abroad, and to read the next chapter of a series as soon as it is published in Japan. Many manga works are published in weekly magazines but it takes months for official translations to come out.

Authors such as O'Hagan (2008), Diaz-Cintas (2006) or Ferrer (2005) have published articles on scanlation, but mostly to give an overview of the phenomenon. Of those authors, O'Hagan (ibid.) suggested the possibility of scanlation functioning as an informal translator training, an idea which is closely related to the theme of this paper. We would like to consider very briefly some elements we find in this particular fan activity that could drive the process of learning Japanese language, and skills for translation.

In order to be able to translate, fans have to learn Japanese, as well as translation skills. Normally the translation into English or sometimes Chinese is done directly from the Japanese original, whereas the translation into other languages is done from the English version.

Translation is taught at university and other educational institutions, but in the community sites for scanlators, such as Mangahelpers.com for example, we can see much more OJT-type translation training taking place. In this community site of scanlators, if one wants to register as a translator, one has to go through a rigorous screening, presenting five translation works that will be graded by other translators and will be ranked somewhere between S rank and D rank (there are five ranks: S,A, B,C,D). If the work is considered to be not good enough, one is classified as a "trainee", and can not upload the translation until the quality of the translation improves.

Inside the same site, there are forums such as "Translators' Academy", "How to proofread" and "Japanese language study". In those forums, quite elaborated discussions take place about how to translate particular phrases in Japanese. For example, a translator asks for advice to translate several quite difficult sentences, such as *kudaranai mougen wo hakuna. Sonnakoto wo shinakutemo* (http://mangahelpers.com/forum/showthread.php/75218-Various-short-sentences). This would literary be "Don't vomit useless absurdity. No need for it" and the translation would be something like "Stop talking useless bullshit. No need for it". The translator confesses he can not translate this, and some very appropriate suggestions come;

> Comment 1:
>
> From the look of it, I'm going to assume that *sonnakoto* is referring to how he's barking out stupid without even thinking…I 'd translate it as "Stop barking out nonsenses. It's totally unnecessary" but I'm not totally sure unless you give me some context to it though.

> Comment 2:
>
> *Hakuna* is a rougher imperative than *hakanaide*. *Shinakutemo* is a truncated version of *shinakutemo ii*. "Just stop talking about that noncense already. No one cares".

Another forum teaches you how to proofread, an important skill you should learn in translator training. The forum teaches you not only techniques, such as to compare the original and translation, but also more tangible tips such as to get in touch with the translator when not sure about the interpretation of the text, or consideration about use of the slang, if it is appropriate to use slang in the translation for the character or situation. Finally, as many fan translators teach themselves Japanese, information sharing and peer teaching of the language is very common in these sites. Information on the basic phonetics, language history, register, basic grammar and other online resources are shared often, and then sometimes the discussion develops into topics such as how to prepare for the official Japanese language proficiency test, JPLT, both for elementary and higher levels.

There is also an important element of feedback. Translation per se is a skill acquired and used because there is a need for it – someone needs the translation to understand what he wants to understand. Feedback, therefore, could be the strong motive for a translator to continue translating, especially if the translator is not paid as in the case of scanlation.

In the scanlation sites, numerous comments are posted from right after uploading a newly translated work. They are comments of gratitude, or requests to translate the following chapter, as well as comments on the translated

work itself. Though translators use pseudonyms, normally one can keep track of what he translates, and in the aforementioned community site (Mangahelpers.com), readers could become "fans" of a certain translator, mainly for the selection of work he translates. In these fan pages, fans can post comments of not just gratitude but also of serious interest in how the translator learned Japanese or the analysis of the manga work he translates. In other words, they are of the most gratifying topics that fans, including the translator himself, could participate passionately in.

CONCLUSION

As has been seen very briefly, in both fan activities – fan fiction and scanlation –the passion to create, teach, learn and evaluate, and not only to consume, is found. And this is exactly what Prensky (2010) points out in his book *Teaching Digital Natives* as what today's students want and do not receive – learn by pursuing their passion and interest, desire to create using the tools of their time, and learn something real, not just relevant. In the fan community, or what James Paul Gee calls a learning system embedded in the popular culture, we see elements that fulfil these needs, and an environment where fans acquire such skills as writing, translating, or foreign language. How to incorporate, or make use of this informal learning environment in next generation learning is one of the major questions that we have to pursue in our NGL project.

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Who Gains the Leading Position in Online Interaction?

Power Shifts in the Online Synchronous Language Classroom

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Abstract

In this paper, the focus is on the analysis of student-teacher interaction occurring in online synchronous virtual settings in higher education. The preliminary findings of the study draw upon empirical material that consists of 20 online sessions (both students-only and teacher-led, with approximately 40 hours of interaction material), that are parts of the "Italian for beginners" and "Russian for beginners" online language courses at university level and informal interviews with the participants.

Our interests here relate to accounting for how students and teachers of the two online language courses interact inside a multimodal and multilingual online synchronous environment. The study deals with issues of how technology mediated multimodal communication affects power shift between teacher – student and student – student interaction. In particular the paper illustrates how videoconferencing reflects on power shifts between the participants and in what ways these shifts become significant for the learning process in these settings. Being inside the virtual classroom and only engaging in technology mediated communication to interact in a learning community means that the students and teachers need to adjust to the new media and artifacts available.

The study takes a sociocultural theoretical approach to tracing the ways technology enhances or hinders communication in a community of practice where different literacy practices occur at the same time (Gee & Hayes, 2011).

Preliminary findings show that the teachers as well as the students position themselves both as facilitators for other participants of the use of different modes as text chat, whiteboard, audio and video, and also as more peripheral participants who need to be guided in the communication afforded in the online environment. The active users of these different modes seem to obtain the keys to get access to the environment and the participation inside the group in contrast to the students who do not use all the available modes in the virtual settings, thus influencing the power shifts in the group during the same session.

Key Words: Language learning, online synchronous environments, multimodality, voice, silence, position and power shift.

Introduction and Theoretical Points of Departure

Technology and (Language) Learning

The 'social turn' in language (and) learning, started during the 1990s with shifts in developmental psychology (going back to Vygotsky), enabled human beings to be seen as socially embedded individuals situated in a social and historical context. It is no longer enough to consider the mind of the individual as something possible to study without considering the context where he or she is socially situated. Learning and development are seen as socially embedded endeavors of people engaging in meaningful tasks (Wertsch, 1998) and technology has an important role to play in determining how social interaction takes place in everyday life-activities, where access to potentially limitless information as well as synchronous or asynchronous communication with the whole world are just a couple of clicks (and today touches on our smartphone screen) away. In one sense there is nothing unique about this, as human beings have designed and used all kinds of tools from the beginning of human history (Säljö, 2005; 2010). As Clark claims, humans are "natural-born cyborgs"[1]. Still,

technology has not been accepted and implemented quite so smoothly inside the school arena as one might have expected (Cuban, 1986; Säljö, 2010). The bias of technology and the Internet as the panacea for learning, especially language learning, has been on the agenda of policy makers interested in school since the 1970s and the advent of the language lab, for instance. Students were supposed to take responsibility for their own learning process, on the one hand, and the teachers were able to 'orchestrate' the activities in the lab, on the other. Today, technology, in form of interactive web sites and computer applications, offers the possibility for the student learning a new language to meet synchronously and communicate with other participants, students and teachers during the scheduled online sessions. This mobility in terms of space, but not in time (since all the participants in the meeting need to be online all at the same time) has significant implications for the interaction dynamics in these kinds of online settings, where the participants need to adjust to the media and tools at hand in the environment. New technology influences previously established teacher and student roles within the institutionalized settings. As Lam and Lawrence states: "the teacher is no longer the star attraction in the room […] [and the] learners are still recipients, but the recipients of their own choosing" (2002: 296-297).

In order to make teaching and learning processes within these new settings more effective and successful for every participant it is crucial to know how technology mediated multimodal[2]

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[1]   Clark (2003) discusses the exotic sense of the word "cyborg", in an attempt to explicate what it really means, or rather what it does have to mean: people half human half machine, with digital implants inside the body. The hybrid nature of human beings (and learning) is tangible in the relationship we have with the tools we create and use: their transparency allows us to understand them as user friendly and meaningful for us, and therefore we no longer need to bother about how they are formed or how they actually function: we just use them and adjust them according to our needs.

[2]   Multimodality is based on the use of sensory modalities by which humans receive information. These modalities could be tactile, visual, auditory, etc. It also requests the use of at least two response modalities to present information (e.g. verbal, manual

communication influences the participants in their teaching and learning. Learners' actions to facilitate or at times restrain their language learning cannot be entirely understood without taking into account the situated contexts in which strategies emerge and develop (Jang & Jiménez, 2011). In this paper the situated contexts are created and presented by the technological means – the videoconferencing software. Accordingly, it is important to know how this technology affects the students' and teachers' voices inside the online synchronous institutionalized frames.

Voice(s) and Power in Synchronous Online Interaction

The notion of voice(s) focuses on the heterogeneity of thinking and communication using different "genres" or "social languages" which are socioculturally situated. According to Wertsch, the term "voice" helps us to put into question the assumption "of the metaphor of possession which focuses on what humans 'have' in the way of concepts and skills. Instead, we must consider how and why a particular voice occupies center stage, why it is 'privileged' […] in a certain setting" (1991: 14). Within this discussion, technology mediated communication provides examples of sets of practices where the "self" or the "I" is the result of a dialogical relationship where individuals position themselves in relation to one another following other rules, or other "cultures", compared to face-to-face interaction. Participating in synchronous or asynchronous online communication implies certain limitations in terms of space and time of the interaction. In

activity).
http://kellimcgraw.com/2010/05/13/defining-multimodal/ accessed 2011.11.27

an online synchronous environment such as Adobe Connect, participants communicate with the help of several tools, and they can gain the floor using different modalities. The floor can also be given, usually by the teacher, by means of the microphone or the text-chat, or other types of praxis that have been decided in advance within the group. Synchronous modes of online teaching presuppose that students and teachers are online together, separated by space, but not time (Wallace, 2003).

The social dimension of the online environment allows the students to participate in the activity both orally, using a microphone, but also visually with a web camera as well as in the written modality, with the help of a chat window and a whiteboard which are also part of the environment. A multimodal approach examines how a variety of sources as image, sound, colour and kinesthetic sources are arranged to make meaning (Jewitt et al. 2007). So far there is little research done investigating participants' roles in online synchronous multimodal communication (Bower 2011, Guichon 2010, Wang, Chen & Levy 2010).

Silence in Dialogue

Language and silence belong together (Hao 2010). Language in the form of participants' oral and written performances and silence can be seen as two vital parts of communication; both of them can function as indicators of power. Today's videoconferencing software allows observing and analyzing both language and silence even in online synchronous communication. In educational settings, silence plays a significant and complex role in classroom practices (Lee, 2005). Analysing the meaning and the role of silence in synchronous online communication, this paper considers the three types of silence outlined by Bruneau (1973). They are psychological silence which helps to understand the message by means of

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hesitations and corrections, interactive silence which occurs when the addressee is involved in planned pauses in communication, and finally sociocultural silence, the interpretation of which is based on distinguishing cultural codes. Silence in the settings of online communication often creates many misunderstandings due to the fact that voice, gesture, expression and other face-to-face interactions are not present to provide more information on how to interpret the silence (Zembylas & Vrasidas, 2007).

Linell (2009) describes the asymmetries that dominate sense-making in dialogue by stating that every contribution to dialogue has its force and dynamic in inviting or soliciting a response, hence the contribution is endowed with power: it invites to a response being itself a response to something prior. "In this sense dialogue is never ending" (Linell, 2009: 212). Following the Bakhtinian vein, human communication is understood as dialogically oriented, i.e. as the encounter between words in a: "living, tension-filled interaction" (Bakhtin, 1981: 279). Learning to talk (as opposed to learning from talk) is the key to gain access as a legitimate participant in any community of practice (Lave & Wenger, 1991). The participants' contribution to the interaction is always a social action, endowed with specific codes and rules with specific aspects of power: who obtains the floor in the conversation, whose contributions remain ignored, which voices have the highest currency in the interaction in terms of relevance in that particular situation is always to importance for learning.

Research Question

According to sociocultural theory the central unit of analysis is tool-mediated action (Russell 2010), which in the context of this study occurs in the synchronous online interaction between the participants of the courses *Italian* and *Russian for Beginners.* The central views of the sociocultural perspective adopted here are outlined among the others by Cole and Wertsch (1996), and several of them have been adjusted to the paper's analysis. This approach emphasizes mediated action in context, here the participant's interactions in the settings of the Adobe Connect software. The analysis is based on the individuals' participation in the scheduled online sessions for the above mentioned courses. According to this perspective, participants are seen as active agents in their own development, but they do not act in a setting of their own choosing. Participants are placed in settings already chosen for them by the software, the Adobe Connect videoconferencing program.

This paper applies in its analysis Vygotsky's concept of mediated activity, according to which:

> The tool's function is to serve as the conductor of human influence on the object of activity [learning of a new language]; it is externally oriented; it must lead to changes in objects (Vygotsky 1978:55).

The concept of mediated activity contributes to the understanding of how individual's intentional actions are constructed by the tool use in the purposeful activity (Russell 2010). The purposeful activity here is the intentionally planned communication in a form of scheduled language classes of Russian and Italian in the online synchronous environment. In this study, we propose to rethink the connection between technology and language learning, in terms of what kind of learning is afforded or hindered in these environments, as well as to study the kinds of cultures that the use of technology allows within the frame of an online course where no face-to-face communication is available. The paper's main research question is:

How are power relations between participators constructed in synchronous online interaction in institutional educational settings?

The unit of analysis is interaction between individuals in synchronous virtual environments occurring in the settings of the Adobe Connect software. The paper's answers and conclusions are based mainly on the interpretation of the human activity taking place in the institutionalized synchronous online environment: it shows how individuals with the support of technology can modify their behaviors and affect the 'traditional' student and teacher positions, with a clear focus on the power relationships between them.

Method

Background

Dalarna University in Sweden offers many of its courses as online courses. All course units make use of both synchronous and asynchronous virtual environments. Synchronous teaching is scheduled and takes place regularly, so the participants, the teachers and the students meet online at least once or twice a week in the settings of the Adobe Connect software.
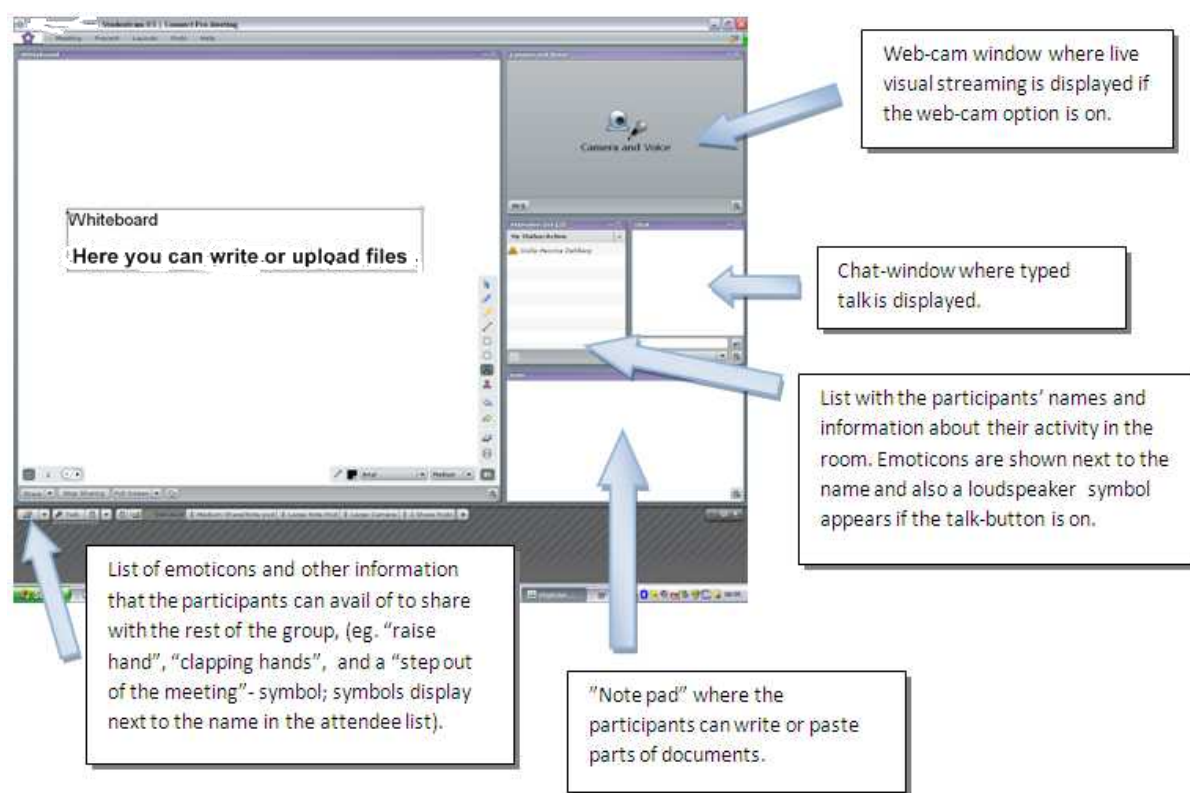
Figure 1: Screenshot of a synchronous virtual environment with up to five windows. All texts and labels in the environment are in English.

Being inside the virtual classroom and only engaging in technology mediated communication to interact in a learning community means that the students and teachers need to adjust to the new available media and artifacts. Parallel asynchronous teaching and support is offered through the learning platform called Fronter and regular e-mail communication.

This study takes an interpretive approach when analysing the observations of the recorded seminars and the interviews transcripts. More

specifically the focus is on the sociocultural perspective tracing the ways technology enhances or hinders communication in a community of practice where different literacy practices occur at the same time (Gee & Hayes 2011).

Being inside the virtual classroom. Methodological Issues on Students' and Teachers' Perspectives.

The study's results and conclusions are based on the analysis of student-student and student-teacher interactions occurring in online synchronous virtual settings in higher education. The findings from the study draws upon the empirical material that consists of twenty online sessions (both student-only and teacher-led, with approximately 40 hours of interaction material), which are part of the Italian for Beginners and Russian for Beginners online courses with the synchronous mode of teaching at the university level. When studying online synchronous communications between the participants, an adaptation of conversation analysis (CA) has been used as transcription method and analysis tool. The traditional transcription conventions of CA, focusing only on verbal interaction, are not adequate tools for analysis of multimodal texts where the unit has shifted from single turns to the actions of the participants using the different mediating tools that are at hand in the environment. Flewitt et al. (2009: 42) argues for a description of the ways "in which different modes interact together in different circumstances, and in different combinations, but also [an interpretation of the data] describing how individual modes are constituted, and the differential function of their constituents in different sites of representational activity", claiming for a need to specify which actions are taken into consideration in the analysis, thus representing the significant challenge in the

transcription process. Drawing on Baldry and Thibault, Flewitt et al. consider the fact that meaning is seen as multiplicative rather than additive, i.e. a text, considered in its wider meaning, should not be seen as the sum of all its modes, but rather as the products of the orchestration of meaning[3] occurring in multimodal text (2009: 46).

The findings are also supported by the informal interviews with the participants, as when discussing the participants' positions of power and also relationships between their positions it is significant to know what one believes, not only what he or she does (Lam &Lawrence 2002). The further analysis has been carried out according to Glaser's principles and the steps of Grounded Theory (Glaser 1992). Furthermore Grounded Theory is applied when constructing a final theoretical model of teacher-student interaction in online synchronous environments (see Figure 5). The theory is grounded in the field data and is generated later after the data is gathered (Oates 2006). The main outcome of this approach is the development of a theoretical model as the result of the analysis rather than "the description or the application of the existing theories" (Silverman 2011:67).

The final theoretical model presents the result of analysis, where the relationship between the important categories and concepts is explained. This resulting model is depicted in a form of graphic model followed by the analysis text (see Figure 5).

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[3] See also Kress et al., 2001

Communication in the Virtual Classroom: Positioning and Power Shifts

Analysis of Synchronous Interaction

When observing and discussing the nature of participants' relationships and specifically the power shifts in the online synchronous communication, it can be stated that the character of both student-teacher and student-student interactions is quite different compared to traditional face-to-face classroom interaction. This modified character of interaction has been mainly affected by the technology opportunities and the limitations set by the applied videoconferencing software, in this case Adobe Connect, and also by the synchronous access to the Internet sources. The traditional student and teacher positions are not different in terms of educational purposes of online distance education. What is different, however, are the rules and the settings of the classes, competences and responsibilities of the participants, teachers and students, and primarily the power relations between them; how they position themselves in this new virtual synchronous environment; how they interact with each other by means of different modes, such as voice, chat, webcam etc within the offered software. What is important to underline is the fact that the relationships between the participants is co-constructed in the sociocultural context. Our interest here is to investigate how online communication is influenced by the technology use in the synchronous virtual environments.

Excerpt 1 depicts the interaction between a teacher and seven students who are inside online synchronous language classroom. Inside this classroom the participants can hear each other, they can see each other as everyone has their webcams on, they share an interactive WB where the session's materials are presented and they can use a text-chat. This is the ninth online seminar of the course Russian for Beginners I&II. The excerpt below illustrates a fragment of the communication, when the participants start working on a text presented on the WB.

Excerpt 1

01 Teacher: Do we have any volunteer who would like to read it[4]? (.) Or should we read it one sentence each?!

((Student A, Martin uses the 'raise hand' function in the attendee list, where the names of the participants are visible. The teacher immediately asks this student by bringing up his name.))

02 Martin!

03 Martin: *Сейчас восемь* (.) *часов.* (xxx)

It is 8 o'clock (.) now. (xxx) ((Martin reads aloud the whole text for the rest of the group while the others are following his reading on the interactive WB as the text is there.))

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[4] The text which is presented on the WB.

04 Teacher:	*Хорошо. Спасибо.* (xxx)	
	Good. Thank you. (xxx).	
05	Now we are going to answer the questions here and <u>please, pay attention!</u> to the question words.	
06	The first question is (4) *Куда идёт Александр?*	(2) <u>*Куда идёт Александр?*</u>
	Where is Alexander going?	(2) <u>Where is Alexander going to?</u>
07	(xxx) ((student B, Michael 'raises' his hand))	
08 Teacher:	<u>Michael!</u>	
09 Michael:	*В университет*.	
	To the university.	
10 Teacher:	<u>= *В университет! Совершенно верно.*</u>	
	<u>To the university! Absolutely correct.</u>	
11	(xxx) ((following up the student's answer the teacher explains orally what grammatical form is used and why. At the same time the teacher uses the 'point' tool to focus the participants' attention by pointing at the phrase discussed).	
12 Teacher:	<u>*Куда едет Валентина? (3)*</u>	<u>*Куда едет Валентина?*</u>
	<u>Where is Valentina going? (3)</u>	Where is Valentina going to?
	((when reading a question the teacher continues using the point tool on the WB to concentrate the others students' attention on the relevant question.))	
13	((student C, Anna, 'raises' her hand))	
14 Teacher:	Anna! (5)	
15 Anna:	*На работу.*	
	To the work.	
15 Teacher:	<u>*На работу!* *Она едет на работу.*</u> (2) Хорошо.	
	To work! She is going to work. (2) Good.	
	((another student starts typing a message in the chat box directly after the teacher's words).	

Figure 2: Screenshot of the online environment in the Russian language class

From the excerpt and the illustration above it becomes clear that the use of the different modes such as webcams, voice-, chat- and note pods and also a point tool help the participants to position themselves. The teacher in this example dominates the interaction by putting on her webcam, using a microphone more actively than the students, adjusting a point tool to focus the students' attention and a note pod to write some comments about the seminar structure and the seminar content. The only space that is left unused by her at this moment is a chat pod. This space, however, is used by an orally less active student from the beginning, who starts typing her comments instead of raising her hand or using her microphone. This student prefers to show her position in the classroom by using an alternative space, the chat pod, which at this moment has not been used by anyone else. Thus she has brought up her "voice" and shown her position in this interaction. This would be impossible in the face-to-face physical classroom.

Positioning and Voice

The software used in institutionalized settings tends to presuppose that the teacher should have the ultimate control over the classroom as he or she obtains other technical rights, here called "host rights". These rights are developed in order to underline the traditional teacher's authority. The teacher has access to other tools which are not available for the students as they are not given the same rights. For example, only a teacher can divide the participants to work in smaller groups and to bring them back to the bigger group discussion; only a teacher can change the students' status to a certain degree which in practice affects the students'

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opportunities for example, to speak out and share the documents. These possibilities can be limited or broaden by the teacher. Additionally, the teacher's host rights are indicated by a literal status symbol next to his or her name in the classroom, a symbol which differs from that of the students, showing from the beginning his or her authority. The crucial issue is the fact that as a participant in an online synchronous classroom one has many more things to take control of and be responsible for than one would have in face-to-face interaction. For example, as an individual one needs to be much more focused and active in order to see what is going on in the chat, what is happening on the WB, who is speaking and what the communication focus is, etc. This observation is supported by one of the study's participants:

> "If you do not know how technology works, that affects you as a teacher a lot. Teaching online you have to be in control to be able to teach. In a classroom you are coming with your pencil and your write on a board and that is fine, whereas in Connect there are so many things to take control of. So […] if you do not, then the students will take control instead of you and then they will take over because they will be the ones who know how to start the camera, how to share the documents, how to use the chat and so on. So if you are not in charge, they will take over and then will change the balance in the lesson immediately."

From the observations of the online sessions and interview transcripts it can be stated that even if the software from the beginning does offer the teacher higher technical rights, the shift in a leading position can be observed in practice when the teacher does not obtain a certain technical competence or lose his focus over the virtual classroom.

The participants in online synchronous multimodal communication often position themselves by applying several strategies of communication by means of their voice, directly

speaking to others using their microphones and/or using the chat box by expressing their voice in a written form, using a point tool to focus the others' attention or sharing a file, a document, an audio- or/and video file. Additionally they can switch on their webcams in order to make their voice 'visible' and present. From the observed recordings we can see that the organization of time, space and interaction is divided into four clear phases in the teacher-led meetings.

Phase 1: Introduction

The seminar is usually introduced by the teacher asking whether the students have any questions about grammar, schedule and other practical issues. The students ask questions sometimes orally, but mainly using the text-chat.

Phase 2: Language and Grammar

During the second phase of the seminar, there are usually some questions asked by the students about grammatical issues. The teacher devotes 20-30 minutes to this phase during which he or she, starting from the students questions (that are usually written in the chat), provides examples and explanations. The students are active almost solely in the chat window while it is the teacher who has the 'oral floor' and keeps it throughout his explanation. The teacher also uses the whiteboard to write and illustrate the examples.

Phase 3: Conversation

During the third phase, the students take the floor one after the other, without using the raising-hand tool; they simply switch on their microphone and start answering the first question that is usually displayed on the WB. In terms of linguistic patterns, the analysis highlights the use of specific discourse markers and expressions used by the students to start their talk: "Io, Angela…" (I, Angela) or "Anch'io, Maria…" (Me too, Maria) and then they conclude "e questo è tutto" (and this is all)

or "basta così" (It's enough now). These markers are used in order to clearly define the start and the end of each talk, before the next student can take the floor. There are usually rather long moments of silence between the talks (20-40s), but it rarely occurs that two students want to take the floor at the same time. When this happens, it is usually the student who does not turn his/her microphone off that can keep the floor.

The role of the teacher during this part is very marginal, leaving long moments of silence before one of the students decides to take the floor. The teacher clearly states that he is now going to turn off the microphone to leave the floor to the students, so he seldom interferes and if there are any specific questions, he answers using the chat-tool. The teacher chooses not to intervene even when the silence lasts for almost one minute, which is a long time in this environment without any other physical presence than the chat-tool and the voice. The communication that occurs in the environment cannot be defined as a discussion or a conversation, but rather different presentations by the students who are usually well prepared.

Phase 4: Conclusion

Just some minutes before the end of the session, the teacher takes the leading position again and concludes the seminar by asking if there are any questions or other issues that the students would like to bring up. Then they all say 'good bye' to one another either orally or in the written form.

The teacher is clearly the leader of the introduction as well as the language and grammar section. He keeps the floor throughout these phases and he is nearly the only one using the microphone. Nevertheless, during the Discussion phase, it is possible to discern one student, whom we call Anna[5], who is taking the floor after a long moment of silence, or sometimes taking over the voice of the teacher when she notices the question that he asked in the written modality in the chat, is not taken up by the student who is holding the floor. She is the only one that during the analyzed sessions asks direct questions to other students, thus starting some kind of conversation. She is also rather active in the chat, but there we also have other students who are rather 'talkative'.

Excerpt 2 illustrates a naturalistic interaction occurring during the meeting nr 4 in Connect with the teacher presence. The students have prepared in advance a topic to be discussed in class, by reading texts and with the help of some questions. Almost thirteen minutes after the beginning of the one hour long meeting, the teacher steps back, leaving the floor to the students for discussion, after uploading the document with the text and the questions on the whiteboard:

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[5]   Anna is one of the students who took part in the course from the previous term.

Excerpt 2

01 Teacher: Ok (.) ecco (.) se non c'è nient'altro io direi di cominciare (.) intanto (2) ehm (2) io

Here (.) if you don't have other issues I'd say we could start (.) in the meanwhile (2) ehm (2) I

02   metto qua (3) dovrei avere (3) °non so se lo trovo° (5) ah ecco (.) bisogna (.) un

put here (3) I should have (3) °I don't know if I find it° (5) ah here (.) I have to (.)

03   attimino eh? (.) intanto pensate un attimo se avete da chiedere (.) finche io sistemo

one moment eh? (.) in the meantime you can think if you have any questions (.) until I fix

04   questo documento? (6) °devo solo trasformarlo in pdf (.) questione di un secondo (14)

this document? (6) °I just have to change it into pdf (.) questiono of one second (14)

05   ecco fatto° (3) e adesso posso metterlo qua sullo schermo (8) eccolo qui! (3)

here we have° (3) and now I can put it here on the screen (8) here it is!

06

Figure 3: screenshot of the environment in Connect during meeting 4. The document with the questions is visible on the WB (the biggest pod).

07 Teacher: (2) ecco! lo vedete? (.) vi è apparso?

(2) here it is! Can you see it? (.) has it appeared?

08 Anna: Sì?

Yes?

09 Giovanna:
┌─────────┐
│ **Chat** │
│ si   │
└─────────┘

10 Teacher: Ecco (.) queste sono semplicemente ehm le domande che avete sullo schema (1) ecco

here (.) these are simply ehm the questions that you have on the schedule (1) here

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11	le metto qui in modo che le avete presente e:: quindi potete ehm potete com-
	I put them here so that you can have them in mind a:nd so you can ehm you can com-
12	insomma (.) fare la vostra discussione partendo un po' dove volete (.) insomma seguite
	Yes (.) have your discussion by starting from where you like (.) yes follow
13	un po' la traccia (3) ecco (.) direi che potete cominciare (.) Io stacco il mio microfono
	The track a bit (3) here (.) I'd say that you could start (.) I silence my microphone
14	(1) e mi metto ad ascoltare
	(1) and start listening
15 Anna:	Ok e:hm (.) io: sono un tipo che: ama: risparmiare un po' e poi (.)spendere il resto
	I: am the kind that likes to save a little and then (.) spend the rest
	((laugh))
16	
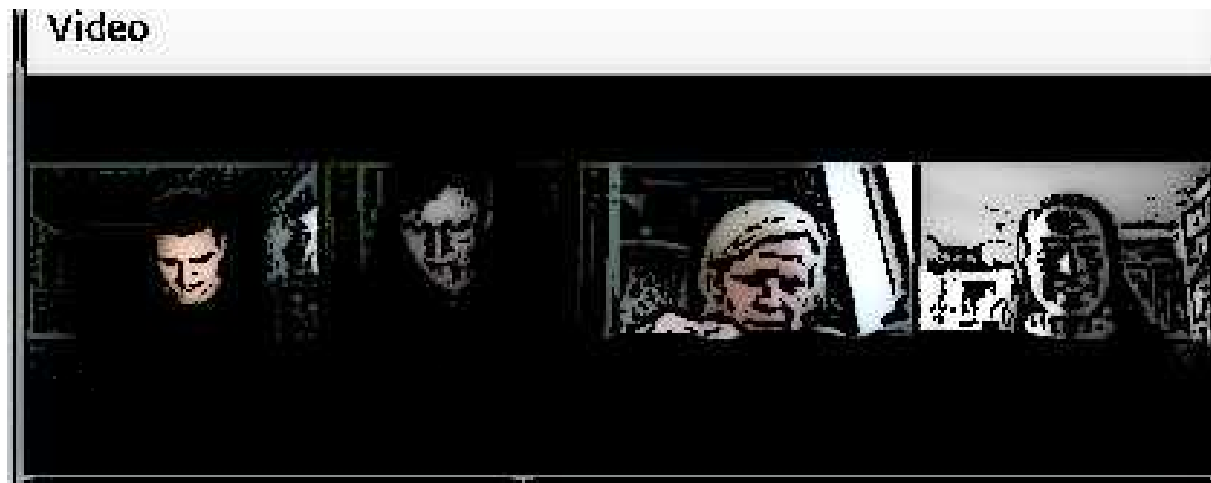
Figure 4: Screenshot of the Video pod in Connect. Anna is smiling in the last picture on the right

17 Olle[6]	(18) ö:: anche io sono un tipo che ama risparmiare (1) e:: forse non è: sempre una
	(18) Ö: me too I am the kind that likes to save (1) e:: maybe it is not always a
18	co:sa (.) buona (.) ma:: permette de:: e:: (.) fare invest- (.) investimenti?
	good (.) thing (.) bu::t it allows to:: (.) make invest- (.) investments?

19 Pamela	**Chat** non ti sento bene Olle *I can't hear you well Olle*

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[6] Also Olle, together with Anna is one of the students who took part in the course from the previous term.

| 20 Teacher | **Chat**
Investimento
investiment |

| 21 Olle | ne si chiama< investment |

inversion (.) >*how do you say*< __investment__

| 22 Teacher | **Chat**
sì |

23 Olle   Investire in immobiliari o: altre cose (10) allå! (.) mi sentite migliore ade-

To invest in real estate o::r other things (10) hallo! (.) can you hear me better no-

24 Anna   Sì (.) ciao Olle! ((laugh))

Yes (.) Hi Olle! ((laugh))

In the slice of interaction depicted in Excerpt 2 it is possible to notice how the teacher's voice is dominant, stating the end and the beginning of the different phases of the meeting. The teacher leaves his leading position by turning off the microphone, and by actively telling the students that he is doing so, thus informing them that he is now assuming a more passive role in order to let the students begin the discussion. Anna takes the floor immediately after the teacher and she also uses the oral medium both to communicate her own answers and to confirm the others' presence in the dialogue, using her voice and her appearance in the camera (by smiling and other gestures or facial expressions). Nevertheless, the access to the "embodied" part of the conversation in terms of the participants' gestures and gazes is limited, and this has implications on the ways participants orient to one another in the interaction: "the coherence of the self is not restricted to the individual per se, but is the result of a dialogical relationship between the individual and other persons" (Hermans and Kempen, 1993: 43).

The processes of positioning and being positioned are illustrated in Excerpt 3. The meeting is leading towards the end and the teacher is concluding the seminar by stating that, even though they used a lot of the time to talk about the grammar, they still could address the issue of the day: books and libraries (lines 1-3). Angela writes in the chat pod that she did not say anything (line 4).

Excerpt 3

01 Teacher   Ok (.) siamo proprio in chiusura (3) e::m (2) è stato:: un po' veloce oggi perché

Ok (.) we are concluding (3) e::m (2) it has been rather quick today because

02   abbiamo preso un (.) bel po' di tempo con la grammatica (.) e:: comunque abbiamo

We took a (.) lot of time talking about the grammar (.) e:: anyway we have

03   chiacchierato un po' anche sui libri insomma (.)

discussed about books

04 Angela

> **Chat**
> Non ho detto niente
> *I haven't said anything*

05 Teacher   Ecco (.) Angela (.) e::: he (.) non lo so (.) e::m (1) puoi aggiungere magari

Here (.) Angela (.) e::::he (.) I don't know (.) e::m (1) you could add maybe

06   velocissimamente che abbiamo tre minuti (.) u:n (.) piccolo intervento (3)

very quickly since we only have three minutes (.) a:: (.) short contribution (3)

07 Angela   Mi sentite? (1) Mi: sentite adesso?

Can you hear me? (.) Can you hear me now?

08 Paola

> **Chat**
> Sì
> *yes*

09 Gianna

> **Chat**
> Sì
> *yes*

10 Angela   Ah benissimo!

Ah very good!

After some pondering (line 5: "e:h I don't know), the teacher gives the floor to Angela, telling her that she could that "very quickly" since they only have three minutes left. The teacher thus uses his power to give the floor to Angela, giving her a time frame with the further comment that she could make a "short contribution". Angela asks for confirmation of her being heard by asking, using the microphone, if they can hear her (line 7). Immediately after, two of the other students answer positively in the chat pod, thus positioning Angela as the speaker and giving her a voice.

Language, in a form of participants' oral and written performances and silence can be seen as two vital parts of communication; through both of them one can show his or her power. Today's videoconferencing software allows observing and analyzing both language and silence even in online synchronous communication.

Silence in Online Synchronous Communication

One of the key categories which have been identified when observing the online sessions is silence. While observing the online interaction, silence has been considered as a means of communication and thus culture between students and teachers. The paper's challenge is not to formulate the final definition of silence in the synchronous online settings, but rather to illustrate different characteristics and meanings of silence that can have an effect on relationship between the participants in synchronous online environment. Silence is seen as any other cultural practice or performance which is never static (Hao 2010). Its functions and meanings change all the times, depending on the settings and the actors' behaviors.

Synchronous online environment such as Adobe Connect allows sharing one's voice, but still other important components as body language expressions and gestures which often are primary sources in interpreting the participants' silence/s are less visible and often missing. The facial expressions can be sometimes noticeable through webcams, but it is not always the fact that all the participants' cameras are on during online seminars. Sometimes students and teachers choose not to switch on their webcams and prefer to stay 'invisible' and often silent. Sometimes technical problems can cause the fact that the webcams are not on and at times problems with the microphones occur. What has been mentioned is the fact that in the online sessions where the students and the teachers used their webcams (compare to the sessions where the webcams were switched off), the voice has been given to and distributed among more participants as they were more 'visible,' they were more visually present in the virtual synchronous classroom. Thus the relationships between them have been more or less equal.

Teacher's and Student's Silences

Performances of teacher silence are normally associated with the teacher power in the classroom (Hao 2010). This can be partially observed in the synchronous online classroom as well. The interactive type of silence (Bruneau, 1973) has explicitly been expressed in the observed communication. During the several parts of the synchronous online sessions the teacher remained silent in order to give space to the students to communicate with each other and practice the target languages. Depending on the task, the interaction worked well. Nevertheless in several situations the students needed a direct feedback from an expert, in this case the teacher in order to go further with their work. They felt confused and unsure and could remain silent for some time. From this short example, the students' silence can be seen as confusion and the teacher's one as power; in this situation the teacher was the only source of knowledge (see Excerpt 2). Interactive silence is sometimes affected by the teacher's learning style. When for example addressing a question to the students, the teacher of the Russian for beginners I course waited for the answer a few seconds and after not getting any answer from the students, the teacher answered the question by himself. Thus she did not give enough time to the students to think and speak out. The teacher showed her authority.

Sociocultural silence is also one of the present silences in the online synchronous language classroom which influences the relationships between the participants. It should be mentioned that all the observed teachers who taught the Italian and the Russian courses have another than the Swedish background. One of the teachers at the *Russian for beginners I* course for example has not been aware of some central cultural Swedish codes such as how to react to and interpret the Swedish students' quietness or silence at the very beginning of the course. This

teacher did not work for a long time with the Swedish students and was used to the behaviors of the American and Chinese students, who were depicted by her as more extroverted in their classes. At the beginning of the course this kind of silence has contributed to the teacher's confusion, thus problems in communication with the students. In this situation those who who obtained the floor and were aware of the cultural settings were the students.

Psychological silences in the synchronous online settings have often been solved via chat communication by the students. When for example the students could bring up some of the seminar's points later in the chat box discussion at the same time as another part of the seminar was going on. Technology, here the chat box mode, helps the students to solve their hesitations and to deepen their knowledge. It also helps the teacher to "see what they really need," as one of the participants mentioned later in the interview. Psychological silences have several times been resolved by the use of the 'point tool' on the interactive WB. The use of

such tool helps the teacher to lead the students in the 'right' direction. For example, when silence occurs due to the fact, that a student for example did not follow properly the offered text or question, the teacher could in one-two seconds attract this student's attention with the help of the point tool. Thus the student's hesitations and perhaps some other students who did lose their focus were solved in a short period of time. Consequently the teaching process obtains more effective character, than it would be without support of such tools as chat, WB and point tools. It saves participants' time and also points the attention in a 'right' angle.

Teacher-Student Interaction in Online Synchronous Environment

In a new online synchronous environment the participants' communication and traditional student-teacher roles are affected and changed by the technology used. The main findings of the study analysis are presented in the theoretical model below (see Figure 5).
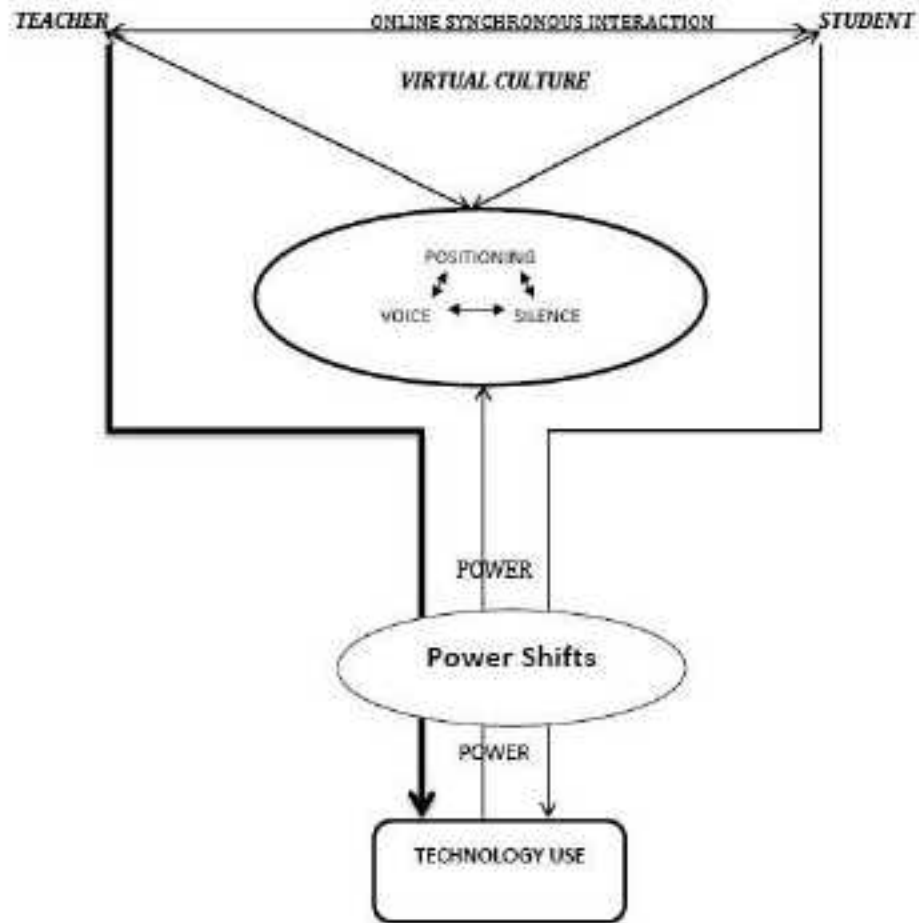
Figure 5: Theoretical model: teacher-student interaction in online synchronous environment.

The theoretical model mainly presents the relationships between the agents, teachers and students, in the technology mediated multimodal synchronous environment and the effects of the participants' interactions affected by the fact that all the participants are placed in a setting of the videoconferencing software Adobe Connect.

Power shifts has been identified as a key category which illustrates the central effect of online synchronous interaction and communication. These shifts are formed by the participants' technology use during the synchronous online sessions. This study shows that the shifts occur between the participants in their way of interacting with each other when using the offered tools and modes. Initially it is a teacher who has higher rights, the 'host' rights, and is supposed to obtain an ultimate control in this virtual communication, therefore the line between technology use and teacher has been

highlighted. This places the teacher in front of the fact that he or she has to be ´comfortable´ with the technology and handle the technology at least at the same level as students or even better than students. In practice, this is not always the case: if the teacher loses control over the technology during an online session, the students with a higher digital competence immediately take the power of control in their hands. They become active agents in the ongoing interaction and thus their own development.

Undoubtedly with the technology help, students have a possibility to questions teachers' and students' traditional placements in a classroom and also to change a discussion topic in a way that they would never done in a physical classroom. For example, Adobe Connect software allows students to take over the control and change the discussion topic via chat communication. This can be seen both as negative effect of the interaction, as it changes the teacher's positioning and the lesson planning, but also as positive one, as it can reveal the students' learning needs and interests.

According to Vygotsky's concept of mediated activity, the "tool's function is to serve as the conductor of human influence on the object of activity [the language learning and teaching] […] it must lead to changes in the objects" (Vygotsky, 1978: 55). The tool's use, here the chat pod, helped the teacher to reveal what his students "need," rather than what he thinks they need. The use of this tool has contributed to the changes of the teacher's way of thinking about what his students need to know.

The power shifts supported by the technology use influences not only the teacher's and the students' positioning, but also the operational atmosphere, the virtual environment and culture where the participants interact with each other. The main distinguishing feature of these new working settings except the regularly occurring technology problems with sound is the difficulty

of getting a whole view of a human being, as for example implied behaviors and body language cannot be expressed in the same manner as in a physical classroom. The paper's observations can be supported by the one of the participants' comments: "we are still political animals, affected by the physical attributes," suggesting that communication is often affected by how individuals look; how they speak and express themselves.

The main change in terms of the teacher position in a technology mediated online environment is the illustration of the teacher as an overmediator in and of the teaching process; he has to ´overdo things´ compared to the physical classroom where he serves as mediator of knowledge. The teacher has also an increased power over what happens in an online classroom. This power is supported by the given technical rights. In physical classroom individuals have more equal relationships supported by the rules, but they do not obtain the same opportunities to gain the floor given by technology.

However, we have not seen any major differences in the teacher's traditional teaching role. They are still teachers, who do not have a responsibility to give a direct answer to every question, but who guide students further in their learning process. Still, there are differences in how they interact with the students supported by the given technology that can offer them power over the virtual classroom if they are 'in charge' all the time, which, as has been illustrated, is not always the case.

The main difference in terms of the student position is the increased responsibility over the learning process; the students expressed that they have to be better prepared in order to participate in online seminars. If a student does not express his/her voice verbally or through chat, he/she remains 'invisible' and somehow 'does not exist' at least explicitly for the others. A student has to

be a more independent, structured learner and has to have a certain level of digital competence in order to participate in online synchronous communication. The flexibility of space and time offers a greater opportunity for students to combine their other studies, work and private lives.

On the other hand less independent and structured learners can easily lose the study focus, interest and drop or not pass the course, as they can appear to be unmentioned and not supported. These students need more direct face-to-face interaction, everyday support and contact. He is disconnected from the others by the virtual space.

The dialogical relationship between the participants in the online synchronous meetings is the result of interaction that follows specific norms inside the environment: the teacher actively chooses to leave the floor and remain silent by stating it clearly (as in Excerpt 2) thus taking a more peripheral position. On the other hand he maintains his position of expert using other media, such us tools in the WB or using the text chat. The analyzed data also shows how students have the possibility to use their voices using the different modalities afforded by the environment. When directly addressed by the teacher, they can answer using the oral or written modality (see Excerpt 1). Nevertheless they usually use the written modality when they wish to be heard or they want to take the floor (see Excerpt 3). We have seen how Anna, who takes the floor using the microphone and asks direct questions to other students or the teacher, positions herself as a facilitator of the communication situation, thus becoming the leader of the conversation in that particular moment. On other occasions, she goes back to her student's voice, and just answers the questions in the WB. We argue that this shifting or fluidity of students' and teacher's positioning during the meeting is afforded by the online

environment, with its different modes and codes that allows different opportunities for the participants to "make their voices heard" (see Excerpt 3).

The notion of 'position' or more specifically I-position is strongly related to the embodiment of the self, and which positions can be voiced is connected to what extent the participants are taken, and given, the possibility to actualize his or her voice in the communication situation. According to Hermans and Hermans-Konopka "the process of positioning and being positioned determines to a large degree which voices are actualized, what they have to say, and under what circumstances they are constrained in their expression" (2010: 227).

Conclusions

In this paper we focus on the synchronous online communication occurring between the participants of two language courses at university level. More specifically we address the issues of how synchronous online interaction affects power relations and participants' voice(s) in institutional settings.

The study shows that the power is distributed between both teacher and students; it depends mainly on who actively uses the above mentioned tools. From the observations, in the synchronous online language classroom, the chat for example is mainly used by the students, where they create their own communication space and were they dominate, as they can change the seminar's discussion. The technology gives them a possibility to create their own virtual chat culture where they take over. The point tool highlights the teacher's presence and power in the online synchronous classroom. Though this tool is available for the students as well, it was scarcely used by them.

The participants position themselves and are positioned through the use of different tools and

modes which are available within the online synchronous settings offered by the applied software. Sometimes these tools are not used by the participants who remain silent and thus invisible for the other participants in the virtual environment.

We could conclude from a dialogical approach to interaction that online synchronous communication in institutional settings can be understood in terms of how the different subject positions gain the floor in this context where the individual speaker is seen in relation to other individuals (Hermans and Kempen, 1993) that 'occupy' the same room, in this case a virtual classroom inside Adobe Connect. The preliminary results from the analysis of our data suggest further that inside the virtual classroom and with the limited access to the physical 'other' in terms of gestures and gaze, the only tool available is the language displayed orally or in the written form in the chat-window or on the WB. The teacher's as well as the students' voices, in their different modalities, thus become of central importance to gain access and power in virtual online synchronous multimodal environments.

Transcription Conventions

(adapted from Jefferson, 1987 and Linell, 2009)

Underlined	denotes that the word is focally accented
?	rising intonation, not necessarily a question
!	strong emphasis, with falling intonation
(.)	micro- pause
(1)	pause in seconds
((*laugh*))	verbal description of actions noted in the transcript, including non-verbal actions
[vi tar en i]	simultaneous, overlapping talk
[vad var]	
* *	denotes laughter in the speaker's voice when pronouncing the words enclosed
> tycker inte om det <	indicates speeded up delivery relative to the surrounding talk
.h	in-breath
=	indicates that there is no gap at all between the two turns
(alright)	single parentheses indicate unclear or probable item
(xxx)	indicates a stretch of talk that is unintelligible to the analyst
e::m	one or more colons indicate lengthening of the preceding sound
no-	a hyphen indicates an abrupt cut-off, with level pitch
°vänta°	degree sign indicates decreased volume

In the English translation:

No emphasis	original utterance in Swedish
Italics	original utterance in Italian
Underlined Bold	original utterance in English

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Building a Learning Architecture: e-Learning and e-Services

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Theme

Information resources for teaching/learning and educational knowledge

Abstract

With the rapid advancement of the web technology, more and more educational resources, including software applications for teaching/learning methods, are available across the web, which enables learners to access the learning materials and use various ways of learning at any time and any place. Moreover, various web-based teaching/learning approaches have been developed during the last decade to enhance the capability of both educators and learners. Particularly, researchers from both computer science and education are working together, collaboratively focusing on development of pedagogically enabling technologies which are believed to improve the infrastructure of education systems and processes, including curriculum development models, teaching/learning methods, management of educational resources, systematic organization of communication and dissemination of knowledge and skills required by and adapted to users. Despite of its fast development, however, there are still great gaps between learning intentions, organization of supporting resources, management of educational structures, knowledge points to be learned and inter-knowledge point relationships such as pre-requisites, assessment of learning outcomes, and technical and pedagogic approaches. More concretely, the issues have been widely addressed in literature include a) availability and usefulness of resources, b) smooth integration of various resources and their presentation, c) learners' requirements and supposed learning outcomes, d) automation of learning process in terms of its schedule and interaction, and e) customization of the resources and agile management of the learning services for delivery as well as necessary human interferences. Considering these problems and bearing in mind the advanced web technology of which we should make full use, in this report we will address the following two aspects of systematic architecture of learning/teaching systems: 1) learning objects – a semantic description and organization of learning resources using the web service models and methods, and 2) learning services discovery and learning goals match for educational coordination and learning service planning.

Introduction

For the past decade, the development of technologies for teaching and learning has been greatly enhanced, from effective organization and management of educational resources such as digital lecturing presentations and video clips at the early time to flexible and interactive process of learning methods such as self-examination and assessment developed recently. Its ultimate goal is to create a learning environment in which, at any time and any place, learners can access the learning resources, start their learning processes or continue their learning with smooth moving from one stage to another and supportive self-assessment. According to the education theory, a learning process is that of conveying the knowledge developed and embodied in a curriculum by the curriculum designers. The curriculum so developed contains not only the body of knowledge and information that is supposed to conveyed to the learners, but also the ways of how to do this knowledge transfer (various curriculum models have been developed for this purpose) [5].

Let us take a look at these three parties involving in the process of learning (knowledge transferring). The first angle is from the learners. A learner, when intending to learn something, has in mind a purpose, being it for interest or to gain knowledge or a skill. She knows what materials (learning resources) may be suitable for her to start the learning process, i.e.

something not too difficult. And she may be aware, after a certain period of time of learning, of whether she has satisfactorily gained the knowledge and skills she set to acquire at the beginning. However, we should be aware that the learners' understanding and awareness of the learning purpose, the level of difficulty of learning resources, as well as the gained knowledge are very basic, general, vague, and even not correct. The second angle, from the teachers, focuses on the learning process in which the knowledge and skills defined in a curriculum are transferred to the learners. Teachers may be part of the curriculum designers, but most of the time they are implementers of the curriculum development. On one hand, they see clearly what the purposes set for learners on the curriculum and how to assess the learners' outcomes. They can improve the learning effects by providing more flexible ways of teaching and more appropriate teaching materials (but they cannot change the curriculum). On the other hand, they see the problems faced by the learners. They are aware of what approaches should be more suitable to certain students. They can be adaptable to the students with different capabilities and knowledge backgrounds. The third angle is from the curriculum designers. Usually they are experts in the subjects with very rich experiences and knowledge about the overview of the domains, the learning purposes, the ways of learning, and the adoption of the learning materials.
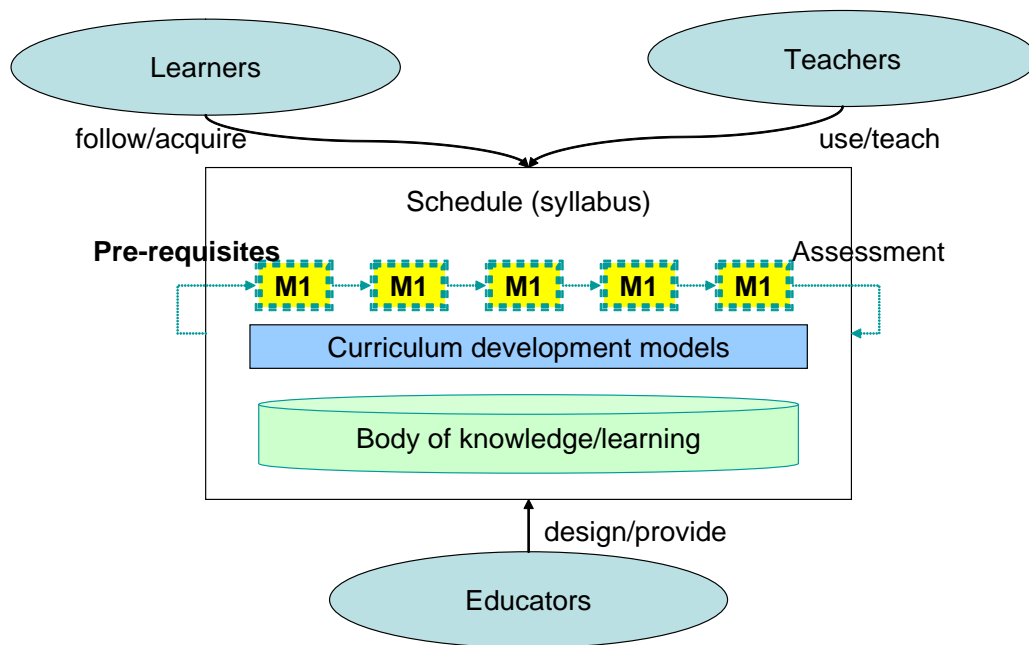
Fig.1 The learning architecture with curriculum on focus.

In this report, we focus on these aspects of the general architecture discussed above, see Fig.1, including learning objects (LO for short hereafter), pre-requisites, and learning goal matching.

Problems in e-learning

Having briefly discussed the general relations among the learners, the teachers, and the curricula, considering these relations in the contexts of online (web based) learning, life-long (flexible styled and on-demand) learning, and self (motivated, organized, and planned) learning, and given the nowadays complex learning environments – massive learning materials available on the web, various learning/teaching methods for selection, and flexible infrastructures such as P2P and Cloud Computing, learners are facing new difficulties and challenges, which can be summarized in the technological views in these five aspects: 1) availability and usefulness of resources, 2) smooth integration of various resources and their

presentation, 3) learners' requirements and supposed learning outcomes, 4) automation of learning process in terms of its schedule and interaction, and 5) customization of the resources and agile management of the learning services for delivery as well as necessary human interferences.

The availability of learning resources on the web provides a great convenience for learners to use them at any time anywhere. However, the question is how we can find the learning resources that are available at the time we want them and useful or appropriate to meet our learning objectives. This question is related to: how to describe a learning resource and how to query it. There are a few standards which have been introduced for learning resource description

such as IMS[1] and LOMD [7]. The problem with semantic description for learning resources lies in what granularity, for example a lecture or a course, we will introduce to the description of learning resources, and how formal, such as in a structured form or in a natural language (NL), this description of learning materials can be constructed.

Most of the learning resources, such as online courseware at MIT[2], are stored in distributed systems, which are connected to one another via the Internet. They are well maintained and can be efficiently queried using Database Systems query languages. For a "standard" use of these learning resources it would not be a problem to have them presented at a best quality. However, in the reality, the learning situations are more complicated. One user may prefer desktop devices while the other handheld devices. One may prefer reading a book while the other watching video shows. Considering people with accessibility difficulties to certain devices, the situations become more complicated. Another question with the learning content presentation is what presentation styles will fit or maximize the use of the learning content and learning methods. Hence, we need to address these two issues: the first is to define, organize and manage learning resources and the second to make the learning resources as services so that we can use the readily developed web service technologies for discovery, composition, and scheduling of learning resources/services. In next section we will define the concept learning objects which

form a foundation for all our discussions followed.

How to match a learner's requirements with a collection of learning materials so that the learner will be satisfied is always a difficult problem. The first question here is that a learner is not very clear of what she wants to learn. The second question is that a learner does not know how to construct her requirements with which the learning systems can satisfactorily find the learning materials. These questions again lead to two design issues: one is how to semantically describe the learning materials – i.e. a usable semantic description framework for e-learning – so that a learner can easily know how to use to describe their needs, and how a design architecture can be made for this purpose.

Even though a learner knows her requirements for the purpose of acquiring knowledge, she is most likely unable to construct a schedule or process in which all the required learning materials are organized based on a curriculum for the following reasons: 1) she has not yet understood all the building blocks of knowledge (latter we call them the knowledge points), 2) she has no knowledge (expertises gained from professional training such as education, pedagogy) to organize them into an applicable order (called learning or teaching schedule) for learners, and 3) she does not know how to assess what a learner has learnt. Obviously, a key question in the field of online learning, or e-learning, or web based learning is how an e-learning system can automatically (at least semi-automatically) support a potential learner to create a curriculum that best fits her demands. We will address this question in Section 4.

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[1]   http://www.imsproject.org/ and Sharable ContentObject Reference Model, http://www.adlnet.gov/scorm/index.cfm

[2] http://ocw.mit.edu/

Learning resources and services

According to [5], a teaching/learning architecture (structure) consists of these aspects: 1) a learner (student) who wants to learn some knowledge to meet her interest or skills to be more professional, 2) a teacher who uses the curriculum development methods to teach the student systematically so that she can be assessed by the end of the learning process how well she has gained the learning she was set for it, and 3) a curriculum (normalized knowledge and teaching methods) which contains both what students will learn and how to assess the teaching/learning results. The curriculum is the main body of the learning process, which can be considered to be a complex system, see Fig.1. In this report, we look at these two tasks of e-learning information system development – constructing learning objects and planning a learning process.

A learning object can be any self-contained and self-described unit in a learning system, such as a course, a lecture, or as simple as one book chapter or section. To make the assumption of self-containment and self-description for learning objects aims that when turning them into services, they can be run independently (self-contained) and searched the required (semantic) information in the objects.

Learning objects: a semantic description of learning resources as services

We define a learning object LO as a tuple <P, E, D, Kp, iLO, R>, where

1) P is a set of pre-conditions that require a learner to posses as pre-requisites of the knowledge before taking LO;
2) E is a set of effects indicating that after taking LO a learner will have learned or outcomes of a curriculum (if we take a curriculum as a LO);
3) D is a semantic description of LO, which could a disciplinary ontology [see ref], indicating that to which topic or subject this LO belongs (when no ontology is available it could be a NL description for the purpose of LO service discovery);
4) Kp is a subset of the set of knowledge points which have been used in the IEEE/ACM disciplinary hierarchy definitions [10];
5) iLO is a set of sub LOs contained in this LO; if this is empty, this LO is atomic;
6) R is a set of resources to be consumed by this LO (examples of LO resources can be slides, referencing books or chapters, lecturing audio/video clips, an exercise, or even an experimental working environment).

From this definition, we can see that a LO has these features of connecting LOs. 1) Two LOs are connected (we will term this as a composition of two LO services) through matching their pre-conditions and effects. Of course a composite LO – may contain a number of LOs linked to each other through their pre-conditions and effects to form a super LO. In other words, a LO contains in it a sequence of composite LOs as its sub LOs as in the definition. 2) Each LO in ontology belongs to a parental LO since each LO is associated to a set of Kp and it is clear that its parental LO contains at least this set of Kp as its subset. According to this explanation, there is a theoretic semantic hierarchy of LOs – a LO ontology, which will be very useful for LO semantic discovery and matches of pre-conditions and effects of LOs.

The introduction of these two special relationships between LOs is essential to (semi-)automation of semantic discovery of a LO, composition of a number of LOs, and a goal-effect match. Let us discuss this at details. There

are two situations that a LO needs to be searched. The first one when a learner is looking for a learning object to meet her learning demands. Usually a learner does not know what "keywords" in a Kp set KP specifying a LO and may simply and arbitrarily select a few words AP she thought to be what to be in the LO. Obviously we cannot expect that the two sets KP and AP are the same or even overlapping. However, given that the LO ontology which contains a large number of terms for the LOs, there might be a match, from where starting a reasoning process from a LO which is a parent or an ancestor of the LO searched. A learner can also provide her learning goals (objectives) or even a description of what she wants to achieve by the end of a course, and a goal-effect matching mechanism will help her to find a LO. The second situation is when a LO looks for its preceding LO or a successive LO to make a composite LO. In this case, the LO discovery problem is reduced to a search and match of the pre-conditions of one LO and the effects of the other. The difficulty of LO composition (or that of composite services) mainly lies in which alternatives better meet the learners' need in terms of a variety of quality measurements such as reliability, low cost, availability, accuracy, and so on.

For metadata description of LOs, we can use Dublin Core (DC) [2], a metadata language widely used for library and publication description and management, to describe a LO's D – description and R – Learning resources. DC contains fifteen elements, most of which such as title, creator, date, and publication can be flexibly used for describing LOs (as a matter of fact, some of LO standards, such as LOM, are similar to DC). The relations in DC can be used for referencing of a LO to other LOs, which can be further explored to represent more complicated relations between LOs and between a LO to other objects such as learners or LO suppliers. In semantic description, we use OWL-S (a web

ontology language for services, recommended by the World Wide Web consortium WWWC) [6]. The key features of OWL-S include a) inputs, outputs, pre-conditions, and effects (IOPE) suitable for describing a LO, b) a hierarchical representation of concepts which can be used for expressing Learning objects in an ontology, and c) an atomic and composite process (LO or service) representation in OWL-S fits well the purpose of atomic and composite LOs. In addition, OWL-S is supported by the first order logic (FOL) which will help the LO system to make well-formed reasoning for LO discovery, composition and scheduling based on the learners' demands.

Organization of the learning objects (services)

A logic structure for a "virtual course" [8] can be briefly illustrated in Fig.2 as the content of the structure of virtual courses in a server and the process of task decomposition.
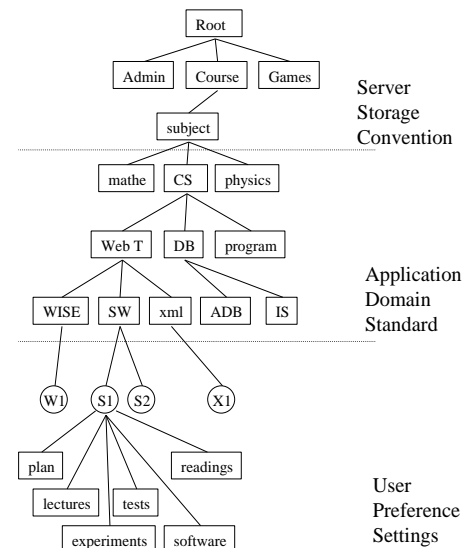

Fig.2 The example shows the resources in a server for various courses.

A server, providing various resources about learning materials, can be described as a tree structure, which has three layers in building up it,

i.e., server storage convention, application domain standard, and user preference settings. We assume that the server storage convention maintains a similar structure for all the files and folders. For each LO, as an item of descriptive information, we need the path from the root (e.g., the server name) to the physical object name.

However, semantic richer information comes from the lower layers, i.e., the application domain standard (e.g., library subject category) and the user settings, where the latter contains more informal semantics. In the reality, we can obtain this kind of ontology from any standard body. For example, an ordinary library subject category (LSC) is this kind of ontology model for learning purpose. The user settings provide more semantic connotations for the concepts of resources but they are quite informal. Currently we manage this part manually. For example, the users need to prepare a resource interdependence graph (RIG) to provide semantic relationships between the resources.

Ontology structure for learning objects [1]

The ontology in this example is constructed according to the Computing Curriculum proposed by ACM/IEEE [10], where the knowledge system of information technology is categorized into three levels: Area, Unit, and Topic. The Area represents a sub-domain of the knowledge system that is used to organize, categorize, and describe the top level knowledge structure of the knowledge system, such as Information Technology. The Unit represents a sub-direction in the Area, aiming at a more natural organization of the learning components into self-contained groups, such as Database Systems Technologies. The Topic represents a relatively independent content in a Unit and usually constructs one single course, such as DBMS Foundation. These three levels can make up the ontology of the Information Technology knowledge system, which has been applied to the *University Course Online* (*realcourse* in short) system [11] – a Grid

based video stream online education service. The leaf nodes of the ontology are the direct parents of LO instances which are normally the titles of the courses or course components that can be freely selected by learners. A LO instance can either represent the whole course or an independent part of the course. The following Figure illustrates a part of the ontology.

Fig.3 Part of the Learning Object ontology.

A curriculum guided development of learning planning

Learning services[3] coordination and interaction

This development is machine or agent based: study pre-requisites and logic sequence, as well as pedagogic principles will be used as a foundation for this (semi-)automatic coordination of learning resources including learning materials and

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[3]   We use learning services, resources, and objects interchangeably when there is no confusion or misunderstanding arises. However, strictly speaking, learning services represent a set of self-described, self-contained, independently-existing conceptual learning materials together with their functions manipulating the materials, including requested IOPE (borrowed the terms from OWL-S); learning resources are usually indicating physical materials, such as a physical course, a lecture, a presentation of slides, or a lecturing video clip, etc.; learning objects mean a sort of representational identifiers, aiming at defining their properties, functions, attributes, and relationships with other learning objects.

teaching skills. Following a preset learning goal or request, several learning services may need to be integrated together for accomplishing the goal, whereas, during this process of integration, we need to examine whether two services to be considered to integrate can be coordinated according to e.g. their learning difficulties (they should be of the same or similar levels of difficulty), learning granularities (they should contain a set of balanced learning materials and durations such as the learning length and the number of examined knowledge points), and the preferences from the learners (they should be of similar teaching/learning styles, formats, and orientation), on one hand. On the other hand, interaction between learning services considers interfacing between a learning system and the learners, where the system can take as inputs the learning questions, work, and other messages, and present as outputs the answers, solutions, and responses to the learners after an appropriate length of processing such as searching for queries, matching the answers, resolving problems, and consolidating the results.

Take a Java learning lecture as an example. On the coordination aspect, the learning system takes a learner's preferences and pre-requisites and uses them to construct a sequence of learning services with appropriate difficult level and learning styles (which are governed by the curriculum or syllabus – carefully and professionally prepared by experts, with consideration of the learning plan and goals set by the learner). On the interaction aspect, the system can take in the original Java program prepared by a learner, and, after compiling and executing it, provide compilation errors and run-time errors if any to the learner with adequate explanations of the reasons why the errors occur and how to resolve them. The interaction happens also between learning services where, considering the types of errors occur in the learning's Java program, the system is able to provide an easier programming task

from the available learning resource base (buffeted in the system but obtained from the online resource bank such as Great Learning or Open Courseware) for the learner to practise a few times or proceed to next step if the task appears not difficult to the learner. The interaction at this stage plays a role of intelligent selection and connection of learning services. [A concrete example may be needed and a formal architecture may be helpful here.]

Educational service planning and scheduling

(if we say that the previous issue is about a plan for a lecture or a module) this one is related to building up an implementation of a curriculum for a group of learners. In other words, the students are assisted to build an entire course or program themselves with all the support from this system (as a result of this study/project). Three problems that have to be considered include 1) what is the learner group's proficiency about a subject, 2) how to test the learners' progress after a certain period of study, and 3) what is the evaluation of the learner group's satisfaction on the setting of the curriculum and progression.

In the following we discuss these problems in details. First, an integral measure of the learner group's proficiency about a given subject is usually done through a general pre-requisite test, from which the results will be recorded, stored, and analyzed by the system and form a general assessment of the group. The test should be strictly based on the knowledge points set for the level of requirements for this subject at this level. We maintain three datasets for a member in a learning group: a list of pre-requisites, a set of knowledge points achieved through the pre-test, and a set of goals the learner expresses (we discuss how this is done in next section).

Learning assessment and users' satisfaction

Already included in each lecture or module a set of tests/exams will be integrated as a general assessment of learners' achievements and this will again be used for checking whether learners' need and demands have been satisfied.

Learning goal-outcomes matching

Learners' query structure

The definition of LOs provides a method of standardizing the representation of learning materials, contents, and applications like experimental methods in teaching/learning processes. Like web services, the learning objects (or services) are provided usually by educational organizations such as schools, universities, and other education oriented communities. It is still difficult and unnecessary for a user to know how a learning object is constructed. We need to make an easy to use query structure, based on the definition of learning objects, for users to express and then match their learning goals. The first important element in such a search goal is what a user wants to find. This element should be expressed explicitly by the user. The element can just be a statement or one word for the subject to search. Since we allow search goals to be unclear, so a goal statement can be in the form of one word or a set of words, stating subjects or topics.

The second element is assigned to be carrier of the learning objects being searched. Of course, we allow "null" as default value for the element. Other than the goal statement and the carrier for searching a learning object, the users' preferences and profiles are also taken into consideration. The preferences and profiles from the learning information consumers are mainly used for tuning the goal matching process. Therefore, a search goal has the following structure:

{[Goal-statement], [Carrier], [Preference], [Profile]}

where

1. Goal-statement is a list of subjects or topics or a statement of search goal;
2. Carrier is the expected carrier of the learning object to be searched;
3. Preference is a list of statements that the user specifies;
4. Profile is a set of related information on the user.

Now we give some examples to illustrate how a search goal can be matched. Suppose that a university student wants to find some learning materials on Java. He or she may prefer a book on Java for beginners. Then the goal he or she may write is:

{[Programming, Java], [book], [beginner], [university student]}.

Another example is a search goal from a manager of a marketing department. He hopes to know *what is going on with electronic commerce on the market*. This goal needs some analysis first before fitting in the search goal structure. The goal needs to be decomposed into a number of sub-goals, e.g. electronic commerce, products, market, economic situation, trends, etc. Since the general goal is vague, the sub-goals are merely made to be better searchable. Therefore, two goals can be defined as follows:

{[electronic commerce, trend, products], [any], [any], [marketing department, manager]},

{[marketing, electronic commerce], [paper], [positive], [--]}.

More important here is how a formal construction can be made for goal description than goals themselves because goals will find

their places when a set of exact descriptions for various goals are well specified. Regarding goal description and decomposition, readers can refer to [10] for details.

Search Goal Matching

After a learning goal is formulated in terms of the LO query structure, starts the search goal match process, dealing with the users' goal structure, e.g., what she or he would like to describe a LO. In general, a user will provide a number of requirements, including search goals and carriers, along with the user's profiles and preferences. The goal match process will compare the user's requirements with the description items (metadata) of the LOs stored and maintained in the repository (remember that the Web is a huge repository for learning objects). Once a goal match is found, either the matched LO will be presented to the user, or further matches continue if there are a number of decomposed goals. Under this circumstance, we call search goal match contains search paths.
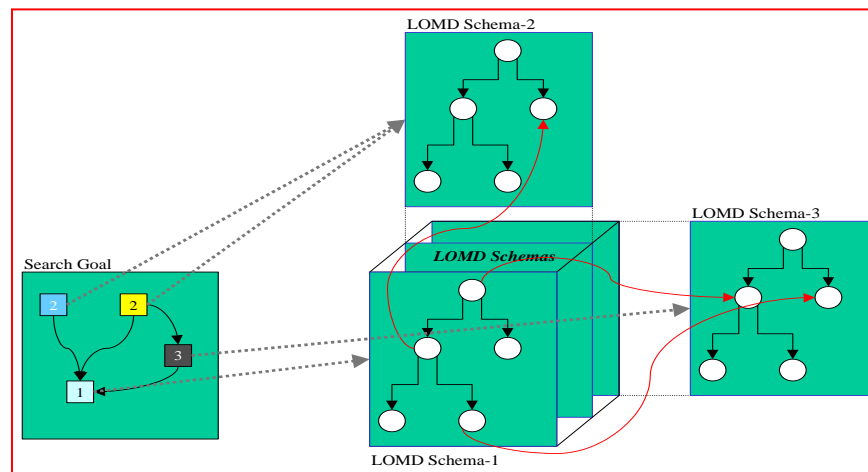
Fig.4 Goal match: search paths

Search paths mean that a collection of goal driven requirements, preferences and profiles, is associated to different aspects in the Learning Objects Modelling (LOM) [4, 7] schemas for a learning domain, seeing Fig.4. In the figure, the cubic, multi-layered box in the middle is a LOM description of LOs on a learning domain. Each layer is a LOM schema with a hierarchical description of LOs on e.g. a subject or a user preference. Here we show three layers, called respectively LOM Schema-1, LOM Schema-2, and LOM Schema-3. The objects in different layer schemas are connected as e.g. neighbour relationship, displayed by red arrow lines. To the left of the figure, a flat box represents a search goal structure, where search goal statements, carriers, the user preferences, and profiles are included in the numbered smaller boxes. Search paths are these dotted arrow lines from the search goal box to the LOM Schemas. This accomplishes the whole process of search goal matching.

The search process is an integrated one since different search elements in the search goal structure are directed toward different LOM schemas first and after goal matches, these search paths are synthesized together to form a meaningful search result. For example, consider this goal structure, {[marketing, electronic commerce], [paper], [general], [manager]}. The goal statement contains two sub-goals, marketing and electronic commerce. These sub-

goals are analyzed in terms of the LOM Schema-2 and then the analyzed results will be further checked together with the other results out from the LOM schemas, Schema-1 and Schema-3.

Experiments and System Architecture

This section we will present a design of learning systems.

Conclusion

Development of teaching/learning systems and their related curricula has been an everlasting topic. Now as we enter the era of information and knowledge where the Internet and Web provides us a flexible, pervasive, and information-massive platform, it gains a new momentum, that is, learning materials, learning plan, and learning process, as well as the assessment can be self-organized by learners in the e-learning environment [3]. In this report, we have tried to address, among others, two problems – describing learning materials (called learning objects here) and matching learning goals, and by defining the concept learning object, present a semantic description model – metadata description, ontology description, and query structure in terms of LOs – as a solution to the problems. The proposal of the LOs and related methods has been mainly concerned with a) a formal representation of learning resources to enable (semi-)automation of building learning resources (services) and their management systems for LO discovery and composition and b) a free-styled and natural query formulation to enable learners to use e-learning systems easily.

We have conducted two experiments, a learning objects system development with metadata and ontology modelling and a learning process system development supporting a learner to learn Java programming. In the first experiment, we constructed about two hundreds learning services, including learning resources and learning functions. Using simple keyword-based search and match, the system could find relevant learning objects and make a reasonable sequence of learning process at an acceptable accuracy and performance. Next step for this experiment is to scale up the system to accommodate ten thousands of learning objects (a reasonable number of courses at an ordinary university).

In the second experiment, we focused on building up a learning process, i.e. to match a curriculum with learners' demands and pre-requisites. Learners could input what they wanted to learn, for example, Java Beans and the system would pick up a number of learning objects and organized them into a few learning sequences with all the topics related to Java programming. It was easy that a few book chapters and lecturing presentations were suggested to the learners, and a test with a fixed number of questions (sort of exam) was presented to the learners after they claimed that they finished the book chapters and lecture presentations. It was difficult for the learners to do some Java programming practicals. The learners were presented with a small tool with which they could input their programs and then the system ran them and gave the results as e.g. compilation errors. If a learner tried a few times without successful passing the program compilation, the system should tell her what was wrong and how to correct them. Our next step here is to make this learning process better usable as a curriculum suggests.

In the academic study of e-learning architecture and systems, we will focus on the solid, theoretical model and architecture that is able to accommodate a variety of learning objects, including people and learning agents, as well as the learning environment. Service science has become an attracting research subject [9] and turning learning objects, including learning contents and learning methods (i.e. actions and

behaviours in learning processes) into services, is not only useful for putting LOs in the setting of the Web, but also necessary as applying the service methods and technologies for empowering the applications of LOs and e-learning.

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The computer as learning tool
– a pedagogical challenge for all teachers Combining theory and practice for development and learning in an R&D project

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Abstract

The article describes a Swedish research project founded on classroom observations and conversations with teachers. The objective is to follow up work on implementing computers as a learning tool in pre/primary and secondary school classes, whilst teachers take part in a university course on ICT-knowledge, special education and measures programmes. Activity theory is used to highlight the relationship between human, environment and activity and the needs and motives that bring about changes in the work.

Keywords; ICT –knowledge, in-teacher training at university level, intervention study, special education, activity theory

Introduction

This article draws on empirical studies of how students (86) and teachers (23) use computers in three pre/primary classes and one secondary school class. These Swedish schools participate in a research project in collaboration with Dalarna University. Data were collected during spring and autumn 2010 and 2011 through conversations with teachers and during full-day observations. The study includes 15 primary teachers, two preschool teachers and five secondary school teachers. The objective is to follow up work on implementing computers as a learning tool in pre/primary and secondary school classes, whilst teachers take part in a university course on ICT-knowledge, special education and evaluation programmes. The aim was to follow the teachers in the University course and, as a parallel process, their experiences and reflections in practice in the classrooms. What is happening? How do they view the challenges and what could be learnt from the experiences that the whole concept brings about? The purpose is firstly to follow up the practical work, exploring how teachers deal with daily tasks, and secondly how they perceive working with computers in education. The aim is to utilise the experiences generated when teachers participate in a university teaching course and not to evaluate the wider ITC project or the University course. The study uses **activity theory** to highlight the relationship between human, environment and activity and which motives bring about change in the work (Leontiev, sv. 1986). The theory embraces ideas that new needs arise during activities and that individuals create new motives based on different needs leading to new actions in a development process. The **social constructivist** knowledge building viewpoint forms the basis. The teachers had the opportunity to meet different learning theories, to read and reflect over their own practices in discussions with colleagues. The project can be considered an intervention study where teachers participated in a University course (22.5 ECT-credits) on ITC-knowledge, special education and measures handling program at Dalarna University 2010-2011.

The activity theory – a theoretical framework

Activity theory describes the relationship between the individual, the environment and activity (Leontiev sv. 1986, Davydov 1988 and Engeström 2001).

> Unlike Piaget's individual constructivism and Vygotsky's social constructivism which both draw on two component systems, individual-activity or individual-environment, the view among Leontiev and his followers was that it is the *activity,* consisting of different actions in planned activities toward *goals* and founded on *motives,* which is important to explore and to try to understand. Activities are to be created and understood in terms of a *process,* driven by an *imbalance* occurring between the *abilities* or *needs* of individuals and/or the *expectations* or *demands* in society. These imbalances are perceived to be equivalent to genuine needs, they motivate the individual to work with others to bring about change – improvements of conditions in a social context. This need-driven motive can generate and strengthen efforts to create new, changed or improved activities. (Wetso 2006).

Leontiev's activity theory can be used here to highlight which pedagogical activities that have been the focus of the analyses (1986). The aim with creating these activities should be linked to the need of creating more **purposeful** operations and there are different external (society) and internal (the individuals') motives which have an impact on the work (Wetso 2006). Four question areas (Engeström 2001) have been used to describe the target group, the main theme and activities for learning in this study:

Who are the learning subjects? How are they defined, where can they be found?

Why should they learn? What makes them prepare themselves for this task?

What do they learn? What are the contents and the outcome of learning?

How do they learn? What are the key actions or processes for learning?

The teachers' activities were studied in the educational practice and their accounts of abilities and needs were followed up in conversations with the researcher and in analyses of texts. The key concepts in activity theory were used here to describe processes.

Selection of participants

All teachers, parents and students were given information about the research project by the research team in January 2010. There were four ethical aspects considered: information about the aim and the design of the study were presented, that they were able to decide if they were interested to take part or not, that all response data should be coded to preserve anonymity and that the material would not been used for any other purpose than given in the information. In a letter, parents and students were asked if they would be interested in taking part in follow-up discussions and interviews. The teachers and students were asked if they were willing to document their work in the classroom and to allow the research team to visit the classrooms in order to do observations of lessons. The two participating schools are referred to here as "Small town" (rural area) and "Big town" (urban area). In "Small town" primary school, three out of the eight classes participated in the project (referred to as groups A, B and C in Table 1). In "Big town" secondary school, one class of the 18 educational programmes participated in the research (group D in Table 1).

"Small town" group A, B, C			"Big town" group D
Selected 65 students, of total 120 students Selected 17 teachers, of total 20 teachers			Selected 21 students, of total 1250 students Selected 5, of total 130 teachers
Group A	Group B	Group C	Group D
22 pupils	23 pupils	20 pupils	21 pupils
Year 1-2 to 3	Year 4 to 6	Year 8 to 9	Year 1 to 3

Table 1 Groups A-C primary students and teachers, D secondary students and teachers. The students in primary school class 1-2 were followed up to class 3, the students in class 4 up to class 6, the children in class 8 up to class 9 and the students in secondary school from class 1 to 3.

The research design

The study takes a hermeneutic approach. The researcher has gathered categorised and interpreted materials and also participated as observer and followed the activities on site at the schools. Triangulation has been used to collect and analyse data. The study has elements of action research where the researcher actively participates in the planning process, takes part in the presentation of the contents and gives feedback about the results from observations to participants at different occasions. The teachers themselves are active in the collection and analysis of the observation material. It is not possible to draw any general conclusions from such a small study but it is possible to discern certain recurring patterns. It is also possible to look for similarities and differences between schools through the teachers' accounts and through the observations when different factors are studied such as environment, activity and the professional teacher's learning. The research has a multi-dimensional approach. The data collection contains observations in the classrooms, dialogues with the teachers, lessons in the university course, meetings between the school leaders in the municipality and the university team, see table 2. The students' use of the computer is also followed up, see *The Computer as learning tool, comparing four school classes (pre-secondary school)* (Wetso 2012).

Activity	Number of teachers	Frequency
School – University team, meetings for cooperation		8
Taking part in university course sessions, lessons		12
Observations in the four classrooms	25	121 lessons
Dialogue with the teachers in the four classes	22	4-21 each teacher
Dialogue with the head teachers at the two schools	3	5-10 occasions
Dialogue with the ICT- service team	3	2-9 occasions
Reading of the teacher's logs. The teachers reflections over the work and the learning according to the computer as a tool in school environment	21	3 occasions
Reading teacher's evaluation reports, findings about students learning, the environment, the school's work with evaluation measures programme	21	2 occasions

Table 2. Data collection, the researcher's activity, meetings and observation

The intervention activities – a University Course of 22.5 ECT credits for teachers

The concept and content of the course

The course concept contains in total: two meetings for upstart information, 15 theoretical presentations (five for each of the three course modules), 15 seminars (five for each course module) and 15 meetings (five for each course module) in smaller groups; plus time for reading, working in pairs with classroom observations, acting critical friend to each other, analysis of leadership style and writing logs and reflections over reading and learning, sorting out a focus object for evaluation in own practice related to measures programme and writing and presenting a report. The concept was mixed with face-to-face meetings at the schools and seminars in small groups over the Internet through the Adobe Connect tool. The startup was together for all teachers at one of the schools and then participants were divided into three study groups. They were free to choose a time to see the pre-recorded presentations which were accessible via the course map (the learning platform Fronter) over the Internet. The Adobe Connect tool contained a map with recordings, papers, and materials. They could also use the map for submitting course work and asking questions.

The aim and outcome of the course

The main goal of the course was for participants to develop their skills to meet children and students in need of extra support. The aim is also to perfect participants' abilities to critically examine the mapping work of others and to develop their own skills in documenting and drawing up development plans and programmes for children and students. A further goal is to develop knowledge about pedagogical development processes with focus on digital skills. The specific goals for individual course modules are detailed in the course plan, see Attachment 1.
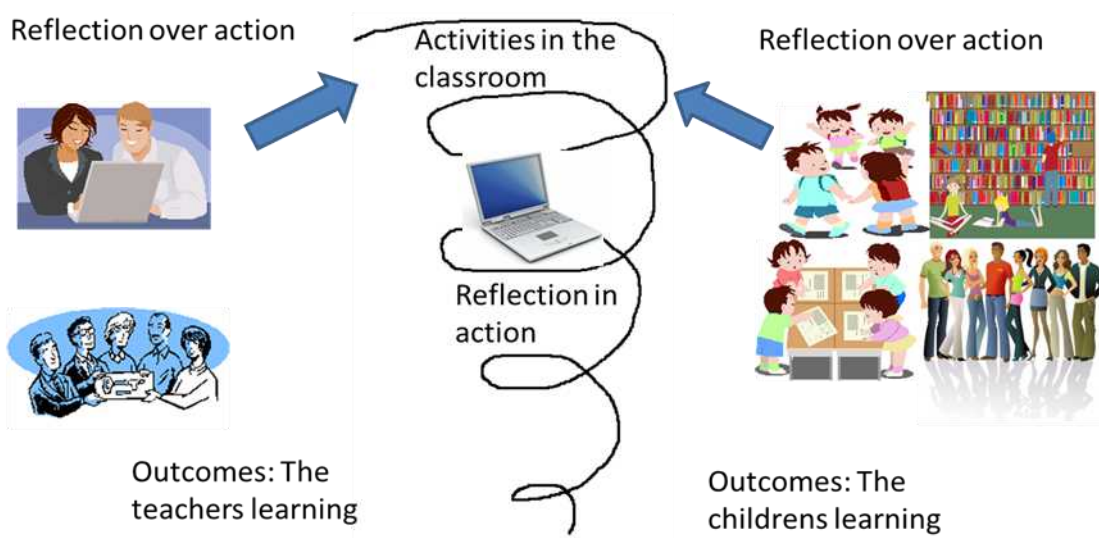
Picture1. The intervention concept related to the teachers and students activities and learning

The Swedish school system

Sweden has a school and care system consisting of Preschool, Preschool Class, Primary and Secondary School and can be either privately or municipally run. The school activities are related to the curriculum (Lpfö 98 rev 2010, Lgr 11). The Preschool (Förskola) is for children ages one to five. The aim of the preschool activity is to support children's learning and social development and to support families by providing care for children when parents are working. The parents pay for this service. From the age of three the preschool attendance (three hours per day) is free for all children. The Preschool Class (Förskoleklass) is a pedagogical activity for children aged five to six where activities of playful learning are mixed with school-like activities. These activities are free of charge and almost all children take part. The Primary School (Grundskolan) consists of nine years of compulsory education for children aged six to sixteen. The Secondary School (Gymnasieskolan) offers different theoretical or vocational programmes (three years). Most of the students are 15 - 19 years of age. The Secondary School is not compulsory but the majority of adolescents choose to study at secondary school. In order to be accepted into secondary school education students need a

passing grade from Primary School. The higher education in Sweden offers independent courses, vocational education programmes, and general programmes. In 2011, around 14% (80.000 individuals) of all full-time students were taking part in Web-based education.

The Swedish School system in Change

The Swedish school system has gone through a radical change during the period 2009-2011. The background to this is that Sweden no longer holds a lead position internationally and that the level of knowledge among Swedish adolescents has dropped in, for example, literacy. There has been criticism directed toward schools at political level. The school activities are governed, both in terms of content, monitoring and teacher activities (Skolverket 2009). All curricula have over a short period of time either been reworked or renewed (Lpfö 98, rev 2010, Lpo 94 new for Primary school Lgr 2011, new Secondary school Lgy 2011). The potential pedagogical consequences of the new steering documents and directives have been the focus of discussions in both schools and in public. The steering documents now give more distinct directives of which issues to resolve and the concrete goals students should achieve in different subjects (Lpo 11). Appraisals shall be given in year 3 of primary school education and grades given in years 6 and 9. In the past students were graded in school years 8 and 9. The aim is for more students to leave school with pass grades. The grading system has been changed from "G (pass), VG, MVG (highest mark) and UG (fail)" (Lpo 94) to the new structure "A (highest), B, C, D, E and F(fail)" (Lgr 11). The mission for all teachers in preschool and school has been to work toward creating an inclusive environment. This has not always been an easy task (Heimdahl Mattsson and Malmgren 2009, Giota & Lundborg 2007,

Wetso 2007). In reality, the categorical perspective has been common, where children are arranged into smaller teaching groups based on level grouping. (Lindqvist, Almqvist, Nilholm, Wetso 2010). From a relational perspective learning should be brought into a context where the individual's participation and activity is at the core of the learning (Wetso 2006). A strong connection exists between emotions, activity and participation which can serve to strengthen self-esteem and thus increase the motivation for learning (Damasio 2002, Wetso 2006). On the contrary, it is also possible for many students to feel excluded at school and, as a result, lose their motivation to learn. The relationship between teacher quality as an organizational property of school and students achievement and growth must be examining (Hecks 2007), the school environment do not invite all student to take part (Wetso 2006).

To include the ICT in the school system

One of the key competences in the Europeen Union agenda for life-long learning is Digital competence. The other competences are: first language communication, second language learning, mathematical knowledge, fundamental scientific and technical competence, learning to learn, social and civic competence, power of initiative and entrepreneurship, cultural awareness and means of cultural expression. All competences are to be viewed equally important. They shall include proficiency and attitudes, personal development, active citizenship, social integration and employment (Europeen Parlament, 2006). Steering documents which regulate the study programmes for all teacher qualifications in Sweden (2011) specify that teachers should be trained in ITC competences. The computer as a learning tool should be implemented in all different courses for all University students at the Teacher Training

Programme. The Swedish curriculum clearly states at all levels that the use of the computer for learning should be a given factor in all subjects (Lpfö 98 rev 2010, Lgr11, Lgy11). At Dalarna University there is a well-defined and purposeful policy since the beginning of 2000 to offer as many courses as possible online. These either substitute or complement campus-based courses. The aim has been to reach out to target groups that do not want or are not able to attend campus-based courses (Hda polycy document 2003-2011). There are no set national strategies specifying that all higher education should include courses with modern technology, digitalising and Web-based learning. At Dalarna University, around 60% of the 18.000 students were taking part in Web-based learning during 2010-2011 (official report Hda 2012). Various higher education courses included in the teacher professional training initiative termed "Lärarlyftet" (2009-2012) have among other things been aimed at highlighting teacher competences in the use ICT in education, to recognise different children's need for learning in special education and to obtain knowledge about follow-ups and reviews of initiatives (Skolverket 2009). Good subject knowledge has been recognised as an important factor in the training initiative. The qualified teacher status of all Swedish teachers is under review 2011-2015 due to the introduction of a teaching certification. Dalarna University has contributed with setting up courses for Lärarlyftet through Web-based or a mixture of Web- and campus-based study.

Previous studies and research about computers in education

For more than twenty years the computer has been common in the Swedish classrooms. The follow-up study *"Svenskarna och internet"* (*Swedes and the Internet*), showed that in primary school it is common for six children to share a computer (4.5 in private primary school) and for 2.5 children to share a computer in secondary school (1.6 in private secondary school) (Finndahl 2010). In preschool 18 children may have disposal of two or three computers. At some schools teachers also had to share computers and work spaces (Skolverket, 2010). In primary schools one percent of students say that they use the computer every day, 25% say they use it once or twice a week and 50 % that they seldom use the computer at school. In secondary school three out of ten students use the computer during lessons in school. Computers are used mainly in Swedish language classes and social studies to produce texts and to search for information. This is also the case in primary and secondary schools. Computers are rarely used in mathematical education and only two out of ten students in secondary education use the computer as a tool for studying English. These facts are based on material from interviews with students and visits to 150 Swedish schools (Skolverket, 2010). Students have access to computers at home, although this varies between different socio economic groups. Children 3-6 years of age (64%) and youngsters (89%) use the computer for games, social interaction, to search for information and many students also do their homework on the computer (Finndahl, 2011). Surveys and research show that the introduction of computers in education lags behind and that the computer as a learning tool in school has not taken full effect yet. There is a difference between access to and use of computers at home compared with in schools. Sweden consists of on average 2.5 persons per household with 2.8 computers per household and Internet access for 88% of the population (Finndahl 2011). In Sweden there were 156 municipalities during spring 2011 that claimed to actively run one-to-one projects (Davidsson & Taawo, 2011). One-to-one refers to the ratio of students to computers in preschool or school. Looking closer at these

project efforts: 90% concern secondary school, 10% year 7-9 of primary school education, whereas only three cases concern the first years of primary school education. Introducing computers as tools for learning for all students is not a straightforward task in education (Hattie, 2009, Gärdenfors, 2010). Research shows that short-term educational measures do not have an impact on change processes, and presumably also the case when it comes to the conversion to computers in education (Gärdenfors, 2010, Ainscow and Sandrill. 2010). One research study based on a three-year one-to-one project in Falkenberg, Sweden, shows that teachers were instructed on how to use the technology and programs and they received technical support but they lacked pedagogical discussions in connection to their practical work (Hallerström & Tallvidd 2008, 2009). Consequently, during the last year of the project a university course was introduced with relevance to the project. The course presented learning theories and provided literature discussions which were appreciated by students. This gave them the means for creating distance and to view the day-to-day life a little different than earlier (Tallvidd 2010). Research is needed to follow up the transition to using computers as a tool for learning (Hattie 2010, Gärdenfors 2010, Skolverket 2010).

Results

The results are presented out of six different angles: (1) the **conditions** at the two schools during the startup process, (2) the teachers' **activities** in the university course and (3) the pedagogical responses and **effects** in practice, (4) The teachers motives changed over time, (5) the teachers' **use** of the computer in the daily work and (6) the teachers' **reflections** over pedagogical **actions** and **conditions**.

The Conditions for Group A, B and C in "Small town"

First, all 20 teachers in the "Small town" school were offered the opportunity to take part in the project and to have access to a computer. The students in group A, B had to share a computer with a classmate. In group C the students got a computer of their own. **Second**, all teachers were involved in the discussion about taking part in the research. It was a joint discussion and the school decided to get involved in the project. **Third**, all teachers were given the opportunity to take part in the university course of 22.5 ECT points and 17 of the 20 teachers at the school chose that alternative (two of these teachers worked in a preschool class). Three teachers (responsible for music, textile craft and woodwork) decided not to get involved in the research project or the education programme. **Fourth**, the head teacher was positive to the three opportunities (computer access, research project and wanted to take part in the education activities). **Fifth**, information to the parents was given by the school in an introduction meeting before the activities were started up. Follow-up information was given to all parents in the school information leaflet close to the startup of the project in January 2010. **Sixth**, all parents and students were given information about the research project from the research team. **Seventh**, Group A, B and C had the opportunity to take the course on common planned time. The schedule was changed to make it possible for the teachers to have time together for course meetings and for discussions on literature and pedagogical issues. The school arranged to be closed one afternoon every second week between 1 and 5 o clock. The teachers were divided into three study groups and they could choose themselves the most suitable time. **Eight**, course literature was ordered for all participants and distributed at the school. The teachers did not have their own work space at school.

The Conditions for Group D in "Big town"

First, out of 120 teachers at the "Big town" school, only a team of five teachers was given the opportunity to participate in the project. The team had six months earlier received computers of their own. **Second**, the teachers were involved in the discussion about taking part in the research project but it was not a joint decision to participate. **Third**, only the five teachers in the team were given the opportunity to take part in the university course of 22.5 ECT credits. All five teachers took that opportunity to stay in the research project but one teacher decided not to join the education programme. **Fourth**, the head teacher was positive to the three opportunities but did not take part in the university education activities. **Fifth**, information to the parents had been given earlier about the "one-to-one" project. This happened at the beginning of term when students received their own computers and the three-year secondary education programme started up. No further information was given by the school to parents about the research project or the education plans for the teachers. The students received information at school by their own teachers. **Sixth**, all parents and students got the same information from the research team as did the "Small town" groups. **Seventh**, group D had to self-manage their spare time in order to take part in the university course. The schedule was changed from time to time to suit each individual teacher and situated needs. They had to make it possible for the team to find time together for the course meetings and for discussions on literature and pedagogical issues. The teachers planned for afternoon time every second week. The teachers were in one study group. **Eight**, course literature was ordered for all participants and distributed at the school by the teachers. The teachers had their own work space at school.

The teachers' **activities** in the university course

The central activities and key processes included in the intervention are to be followed up in the research. The activities in the courses are described and are to be viewed in relation to what has occurred in the way teachers perceive actions and their own actions in their practical work. The courses were carried out in a somewhat reversed order, a decision taken after consulting with the principals and school directors. First the participants studied course module 3, see Attachment 1. The topics in this course were: development work, school research and IT learning. Then participants took module 1 which dealt with special education, leadership analysis and inclusion theories. Finally, module 2 treated evaluation and follow-up work. 15 of the 17 "Small town" teachers completed all three course modules and two of the teachers completed the first two modules. At "Big town" all but one teacher (who dropped out early) completed all three course units. All teachers kept a log, read and reflected over literature and participated in seminars. The (19) teachers who did the course module on intervention programmes and evaluation carried out (in groups of 2-4) their own evaluation studies on activities. Absence rates were low. Five teachers were absent at one occasion and one teacher absent from two of the 15 seminars. One of the principals participated in all course modules and course activities. Course module 2 was carried out with teachers from both schools in mixed groups. The seminars for the "Big town" teachers had to be moved to a different date in order to make participation possible. It took them three more months to complete the whole course. The teachers have actively supported each other when: searching for facts, examining and producing texts, locating material in the digital course folder and taking part in seminars online. A social, pedagogical, technical and

psychological cooperative effort has developed in the work teams (noted in discussions with teachers and through observations). For the most part, teachers chose to remain at the school to help organise Internet connections and to hold discussions regarding pedagogy – even though it was possible to participate in seminars from home. Between seminars at the university, teachers arranged their own meetings for working with exercises and discussing theories at the school.

The pedagogical **responses** and **effects** in practice

To handle the multi complex data a matrix was created with five categories, see Table 3. The matrices are built on the components in the activity theory but here the components are used to describe the teachers' interests and activities related to their situation in the school context at the time they took part in the university course and then a period after the education was finished. The components are *imbalances, motives, actions, needs, goals*, and they are here used to express different aspects involved in the education concept. Both observations in the classroom and dialogues with the teachers and follow-up conversations are used. The teachers' reflections over actions and conditions at work and their thoughts about challenges to be handled in the course are collected through logs, short reports and mail conversations with the researcher. Five categories describe the teachers' different activity levels are in the matrix named *Multi active interest, Active interest, Interest, Distanced interest* and *Uninterested*. They are distinguished and characterised by slightly different wordings:

A *Multi active interested* teacher takes in responses for the learning process from the whole team. This teacher helps others and sees challenges as something positive and wants to create new conditions for the team, the school

and the children's learning. The new in the education is interesting and something you must work through to get the fruits of the labour. Theoretical aspects and the literature in the course bring new and usable perspectives on the activities in the classroom and help the teacher to be more observant and effective in the learning situation. A critical friend is accepted and observation is a strategy to deepen the insight into possibilities and problems to solve.

The *Active interested* teacher helps others and sees the challenges as something positive and wants to create new conditions for the school and the children's learning. The new in the education is interesting and something you must work through to get the fruits of the labour. Theoretical aspects and the literature in the course bring new perspectives on the activities in the classroom and help the teacher to be more observant in the learning situation. A critical friend is accepted and observation can be a strategy to see possibilities and problems to solve.

The *Interested teacher* helps others and wants to create new conditions for the school and the children's learning. The new in the education is interesting and something you must work through to get the fruits of the labour. Theoretical aspects and the literature in the course are a challenge and can help the teacher to be more observant in the learning situation. A critical friend can be accepted and observations can give possibilities to solve problems.

Some teachers have a more *Distanced interest*. The teacher helps others and wants sometimes to create new conditions for the own class and the children's learning. The new in the education is something you must work through and perhaps it will give some fruits of the labour. Theoretical aspects and the literature in the course are a challenge and can perhaps help the teacher to be aware in the learning situation. A critical friend

and observations is mostly not accepted at all in practice.

The *uninterested* teacher helps sometime others and wants sometimes to create new conditions for the own class and the children's learning. The new in the education is not interesting just something you must work through. Theoretical aspects and the literature in the course are not interesting to take part of. A critical friend and observations is mostly not accepted at all in practice.

Out of the observations some patterns were identified. The teachers handle the intervention activities in practice in the classrooms in different ways. The multi active teacher and active teacher showed a more open attitude to the challenges to solve the tasks and to look at their own leadership style in the classroom. They suggested new ways to handle the students' learning and to make the environment more related to the students' needs. The expressed that the new, the work with the computer as a learning tool was something good for both the students and teachers. The interested teacher was mostly positive about the activities, sometimes not, but could change opinion after trying out something new.

During 2010	Multi active interest	Active interest	Interest	Distanced interest	Unintere sted
Teachers N=22	**Fairly common**	**Fairly common**	**Most common**	**Not common**	**Not common**
Can see *imbalances* in the pedagogical room related to the own role as teacher	Yes	Yes	Yes and no	No/ yes	No
Can see own education *needs* related to the role as teacher in the classroom	Yes	Yes	Yes and no	No/yes	No/yes
Can see own educational *needs* related to ICT in pedagogical practice	Yes	Yes	Yes	Yes	Yes
Want education about ICT and handle programs	Yes	Yes	Yes	Yes	No
Want education to handle pupils different needs of support	Yes	Yes	Yes	Yes/no	No
Want education about evaluation and measure program	Yes	Yes	Yes	Yes/no	No
Want to read and discuss pedagogical issues with colleagues	Yes	Yes	Yes	Yes	No
Want to have time for reflection over actions with colleagues	Yes	Yes	Yes	Yes	Yes

Want to do observations and discuss pedagogical issues with a critical friend	Yes	Yes	Yes	Yes/no	No
Want to discuss own leader stile by critical friend (out of observations)	Yes	Yes	Yes and no	No	No
Can see possibilities in the class environment	Yes	Yes	Yes and no	No/yes	No
Can find *motives* for changing environment in classroom	Yes	Yes	Yes and no	No/yes	No
Can find *motives* for changing leader stile (in the classroom)	Yes	Yes	Yes and no	Yes/no	No
Can *handle* inclusion issues in the classroom	Yes	Yes	Yes and no	No/yes	No
Want to *handle* inclusive issues in the classroom	Yes	Yes	Yes and no	No/yes	No
Relate the education *goals* to lessons in practice	Yes	Yes	Yes and no	Yes/no	Yes/no

Table 3. The teachers activities related to the components imbalances, motives, actions, needs, goals for handling the practice in the classroom

The teachers with a *distanced interest* or *uninterested* were mostly not so positive for the activities that had to do with looking at own leadership style. They spoke mostly about the students' difficulties and the hard work to handle the new challenges to implement the computer in practice. The students' learning problems were seen as something not possible to handle in the school environment. Explanations behind the teachers' professional way of dealing with the challenges are here in focus but other things related to the teachers' private situation could also have affected the teachers' attitudes toward the change work in large, and also their participation in the university course and carrying out exercises.

The teachers' **motives** to learn changed over time

The teachers were from the beginning most *motivated* to participate in the ICT learning: first to meet colleagues and discuss pedagogical questions, then to read new texts and discuss pedagogical issues related to theoretical aspects, to do observations of others or of their own practice, to look at leadership styles and discuss the aspects of leadership styles with critical friend, then later on to look at their own practice and reflect over conditions in environment. The course concept follows the activities in the course but some of the teachers had difficulties to see their own role in the classroom and found it hard to let someone else observe their actions in the classroom, and also to be aware of the pedagogical possibilities that actually were there.

The inclusive perspective arose during the course, it was not something taking for granted from the beginning. Some of the teachers adapted quickly to the challenge. They can see and apply the theoretical framework whereas others have difficulties to see from an "other's" perspective and need more time. They caught a glimpse of it, but the motive to change in thought and action posed more of a challenge. Some teachers are strongly motivated during the whole course and want to learn.

To make use of thinking in actions

The new from education is interesting and some teachers start to bring the new into the classroom. They use the new knowledge in actions in the classroom. After four months they start to create a more inclusive learning environment in the classrooms. They want to go from thinking to action. After eight months they structured the work in new ways and they spoke about it and found strategies to handle the situation in practice, they are motivated to solve problems. They organised the environment to be more inclusive. "Before the children that needed special support got support in a small group" out of the classroom from a special teacher "the special educator gives support to the child and the class team we want that change". After the observations in the classrooms the *teachers* expressed they developed an ear for "listening to the children's learning and needs in another way than before". They started to analyse the children's learning styles and "their thoughts about the learning situation including the learning with the new computer", "the tools give possibilities together with the knowledge about learning theories". The student's learning and experiences are utilised to create better planning. The teachers describe how they "go outside the course exercises" and "search for material and knowledge about computers, learning, programs and so on". They value their work efforts and mobilise, describe needs and carry out change

themselves. "We now talk with each other about pedagogy in a more reflective way than before now we do this here". At first the computer received the most attention whereas now the interest has shifted to pedagogy. What is new in the teachers' actions? "We bring pedagogical verification into discussions and activities". They feel that "this is what is different. We are more aware now." The teachers highlight that "it is very important that we talk about pedagogy with each other and the students are more satisfied". The students "perceive that they have increased confidence and know-how. They are aware how they learn and if we ask them they have an understanding of it, they know". The *multi active* and *active teachers'* lessons are characterised by:

- *structure* in the classroom, everyone has their own work space, an introduction to exercises are given to the group as a whole, goals are presented
- *variation* in the way exercises are carried out and time for support are created within the classroom framework, individual, pair, group or class work is common
- *flexibility* adapting the grouping of students, the teacher is responsible for this and work space - area can vary
- *the dialogue* is carried out within the group – and based on the individual's needs
- *the technology* should be available and function based on current needs; the student should be able to choose
- the teaching follows *a theme or is put into a context so that students understand*
- *task* are created for the group but adjusted according to the learning needs
- *the climate* is open, accepting – differences are perceived to enrich the group, everyone's voice counts

- *the activity* is high– but unobtrusive
- *multi-learning* is in progress where all students are active based on their abilities
- *content*, the topic relates to how to deal with learning issues through dialogue

- *working together* is an established method among students and with close support through follow-up by the teacher, diversity is crucial
- *Orchestrating* the activities in small groups, create time for personal support to the students.

During 2010 + (2011) group A,B,C During 2010+2011 group D	At school		At home		
A,B,C "Small town", D "Big town"	Every Day	Every Week	Every Day	Every Week	Every Term
For contact with students during absence due to illness	A,B,C,D Yes, when needed		A,B,C,D yes, when needed		
For giving information/developing conversations with parents		A,B,C			A,B,C,D
For writing comments and statements	(A,B,C)D	A,B,C		A,B,C,D	A,B,C,D
For receiving and giving information	(A,B,C)D	A,B,C,	A,B,C,D		
For planning work and tasks	(A,B,C)D	A,B,C	A,B,C,D		
For reading texts	A,B,C,D		A,B,C,D		
For creating presentations		A,B,C,D		A,B,C,D	
For searching facts	(A,B,C)D	A,B,C,		A,B,C,D	
For communication with colleagues	(A,B,C)D			A,B,C,D	
For communication with pupils	A,B,C,D			A,B,C,D	
For writing texts	(A,B,C)D		A,B,C,D		

Table 4. Teachers' use of the computer as a tool in different functions in school/home environment, the second year of the research for group A, B and C is her presented in brackets.

The situation has changed for the teachers in "Small town" during the first to the second year. The first year the teachers had to do a lot of school work at home because they had no own work space at school. The teachers expressed that during the second year in the project "I

handle more activities relevant for using the computer at school" and "I could do my job more effectively because we all (teachers) got our own work spaces at school". Some of the teachers expressed "We were able to use the time between lessons, if you have a few spare minutes you can work on responses and plan work I feel more satisfied". The teachers spoke about "a kind of freedom and effectiveness". For the teachers in group D conditions did not change.

The teachers' **reflections** over pedagogical **actions** and **conditions**

At the "Small Town" school the teachers expressed that the supporting "IT pedagogue is working 20% of her time at our school as support" and the teachers were satisfied with this.

> She has done a great job and made it possible for us to manage the transformation to use the computer as a tool, to integrate it in the daily learning activities. The teachers are pleased and impressed with her competences. Without her knowledge and flexibility we could not have made it.

Technical support must be available and enables teachers "to deal with pedagogical challenges the moment the problems occur in the learning situation". The local "IT pedagogical support has also given us (teachers) and the children short presentations and courses on how to use tools and programs on the computer".

> We have a good backup from "the IT-support team in the community which has handled the overall technical issues. They provide material, service, purchases, software applications and see to that contracts are adhered to"

The second year the teachers in group A and B expressed that:

- I feel more comfortable in the teaching situation "and I can handle the situation better than before. The first year I was busy with meeting the children's needs, handling the technical changes and trying to understand how to sort things out. It was a complicated situation and many things to take care of at the same time.

- Now I can handle it and the children's learning situation is working out, they can manage the computer and the programs.

- The tools are very workable and synchronic. The first year we had problem with the tools. The children choose if and when they want to use the tools for listening and spelling. They use headsets and are competent to make use of the computers as a resources and it gives them (the children) and us as teachers a kind of freedom to handle the whole situation smartly.

- It is important to have god technical support close to the daily work. We had that opportunity.

- The Smart board is easy to use and gives me as a teacher opportunity to show the children the planning or the whole concept of a task and we often use it for analysing texts or mathematical problems. You can handle the dialogue with the children and the solving process.

- We have open access to Google so they (the children) can get information and find solutions to different tasks.

- It is like a calm feeling washes over me and the whole learning situation in the classroom. It is great (the two groups A and B have their own home classroom).

For teachers in group C the situation changed from the first to second year in the project. It was a tough start with the teenagers in the spring of 2010:

- The whole situation was stressful for us and the students. The intervention of the computers, freedom of using the Internet and taking responsibility for learning and working with the new tools was hard. We tried to manage it. We had prepared for it and we had clear rules for computer use but children in that age group brake rules. The computer became the tool they (the students) used to test boundaries and to test what is possible to do. I don't think they thought about doing it in order to brake the rules but it was so tempting.
- Year two in the project is better but we should have been stricter with the rules in the beginning.
- The students are more focussed on tasks now (in school) and they can set aside their own interests and the Internet and instead deal with school tasks. I think the experience has made them understanding that if they do not use the time in school effectively then they have to handle the work at home as it must be done. In the long run they must pay the price, no good results.
- We also changed the conditions for the teenagers. We decided to set up a home classroom. Earlier the students moved from classroom to classroom depending on which subject was on the schedule. That is the common model (in Sweden).
- Now we have a classroom, a place where the students have their own work spaces and they like it. It has a very teenage environment, but it saves time, instead of moving from room to room with the computer they know were to be. I think it gives a feeling of comfort and safety.

For teachers in group D at the "Big town" school the situation was similar at the beginning of the project.

- The students mix working time with time for communicating with friends on Facebook. It was a dilemma how to handle the situation as a teacher. We have open access to the Internet and it is difficult to control them, they are nice but sometimes their interests take up too much time.
- The situation has changed for the better this year, they are more focused on the school work than before. Perhaps they realised that it is not sustainable to let the time in school be used for contacts on the Internet. It is both good and bad; they also solve problems during this contact on Facebook. They encourage each other to complete the school work. It gives an indirect effect of handling the courses. One colleague in the team use Facebook to keep in contact with her students. She thinks it is ok. I use the phone and send text messages to reach the students with information.
- The students do not leave the classroom for rest, they stay and I think they like the classroom. They just take short brakes to buy or get things, than they are back.
- They created a home classroom with a coffee corner and boxes for material and curtains they bought themselves. The students used the computer to be online on Facebook all the time.
- The students like the education programme and they say they chose the programme because of the promise to be first in school to have a computer of their own. Now the other programmes also have one and so the special thing about it is gone.

- The courses in this education programme function very well with the computer. The computer is integrated in the special Business courses in the programme. The computer gives the student as entrepreneur the opportunity to handle the tasks like in real life. The computer gives possibilities to do economic plans and use the equipment to do it as in real situation.
- In some of the school subjects the computer is not integrated; it could be better I am sure.
- The teacher's opinion from the beginning was that students should take responsibility themselves for their learning, motivation and the needs for learning, and that the students' special needs is something for the special teacher to take care.
- We recommended students to go to the special teacher. Now we listen more to the students' thoughts about their situation and what they really need and want.

Discussion

It is a challenge to mix and analyse data from observations with comments from the teachers. The matrices are built on observations in the four classrooms, the teachers' own thinking about their learning and the situation in school at the same period. What is happening with the teachers' reasoning and activities during the period they have gone through the university course? The results show that teachers in "Small town" school after four months express the need for change in the classrooms, an organization of measures both when it comes to teaching viewpoints and for new strategies in creating a more inclusive education. They express the need to develop pedagogical competences to meet different students' needs so that the computer

can serve as a learning tool based on different abilities. They want to change their practices, increase collaboration with colleagues and share responsibilities. The pre/primary school decides to restructure resources within the classroom. After eight months teachers have carried out changes according to earlier requests, preformed their own field studies and reflected over their leadership style. They see each other's competences and there is a will to utilise joint resources more purposefully, reducing special educational measures outside the class framework. Combining theory and practice helped teachers to reflect over their role in the classroom, to dissociate themselves and adopt an outside perspective of their own practices and activities. Teachers showed through their actions that they varied the use of computers as a learning tool. Conversation with colleagues about the use of computers aided work motivation. The situation at the secondary school in "Big town" was slightly different. They followed the same pattern as in the "Small town" school but it took them longer to come through the education programme and to make use of the theoretical implications. They had to deal with the dilemma that not all teachers at the programme took part in the university education course; the pedagogical discussions were beneficial but they became somewhat of an isolated island in the "Big town" school. The inclusive message was not easy to handle in practice in the secondary school. It is a non-compulsory school which in turn affected the teachers' thoughts from the beginning: that students' needs are something for the special teacher to take care of. Over time, after the observations in the classroom and discussions in the course setting, a more open attitude and pedagogical interest arose. In the beginning of the university course the teachers were most motivated for the ICT learning, however over time this changed and the teachers' opinion was that the pedagogical courses, theory and

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discussions were needed and motivated a change in practice. The teachers' deepened knowledge about the students' needs contributed to generate more purposeful activities where the computer was utilised as a pedagogical tool. The activity theory used in this research highlighted the *imbalance* between the teachers' *needs*, *motives*, *activities* and their way to handle the mission to learn more about ICT, the children's learning – and inclusive education, measures programme. The research showed that Web-based teaching with support of face-to-face meetings gave teachers the opportunity for participative learning in the transition process.

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The overall goal is for participants to develop competence in meeting children and students in need of special support. The aim is also for participants to develop their skills to critically examine other people's mapping work and to develop their own abilities to document and draw up development plans and programmes for children and students. A further goal is to deepen the knowledge about educational development processes with focus on digital competence.

Course module 1. Fundamentals in special needs education – with the child in focus, 7.5 ECT credits

Upon completing the course, the student should be able to:

understand the social commission in preschool and school with regards to how the teacher meet children in need of support and how this can be interpreted in a historical and international context,

demonstrate ability to turn theoretical knowledge into planning and to carry out pedagogical activities in order to create a foundation for a sound educational environment and a differentiated learning,

explicate how joint efforts can develop between children and students in relation to teacher, work team and parents on an individual-, group- and organisational level in order to promote children's and students' abilities to learn.

Course module 2. Development plans. action plans and evaluation, 7.5 ECT credits

Upon completion of the course, the student should be able to:

differentiate between and understand the meaning of the concepts: development plan, intervention programme and internal/external evaluation,

demonstrate ability to construct development plans and intervention programmes,

demonstrate awareness of the theory of science in order to be able to plan and carry out an evaluation.

Course module 3. Educational development work, 7.5 ECTS credits

Upon completion of the course, the student should be able to:

explicate and discuss different interpretations of how the pedagogical work in preschools and schools is affected by contextual factors, regulatory frameworks and local conditions, and how these affect students' achievements,

explicate and discuss different views of how the interaction between the computer, information and communication technology and pedagogical working methods can be used to develop new learning environments and to facilitate student learning,

explicate and discuss how projects can be used to organise and carry out pedagogical development work and to analyse how school development projects can be organised and realised in practice.

Contents

The course covers fundamental special education concepts and approaches and documentation of students' interaction with the teaching environment, and in relation to the students' learning abilities. The participants' leadership styles are analysed and reviewed. The course aims to help participants use methods that promote children's and students' learning as part of a continuous pedagogical development work with focus on developing students' digital competence.

Module

Fundamentals in special needs education – with the child in focus , 7.5 ECT credits

The course addresses the meaning of the concepts special education, differentiated learning, integration, segregation, inclusion, exclusion as well as the meaning of a categorical and a health- and hindering perspective. The course presents inventory and documentation of the individual's interaction with the teaching environment. The educational context is mapped out in relation to students' different abilities to learn. Field studies are used to analyse and examine participants' leadership styles and how these impact the education.

Development plans, action plans and evaluation, 7.5 ECT credits

The course addresses the concepts development plan, action plans and internal/external evaluation. The course includes a pedagogical evaluation that examines how quality development work is carried out in relation to action plans. The course takes account of and critically examines the experiences of others in terms of obstacles and opportunities linked with the creation of development plans and action programmes.

Educational development work, 7.5 ETC credits

The course addresses pedagogical development work in a wider context in order to place and give perspective to effects on local school development work. Questions that are highlighted and critically examined are, for example, what factors affect performance levels in Swedish schools and what possibilities and challenges occur as a result. The course also addresses how the Internet-based information and communication technology can change and create new pedagogical opportunities. From this viewpoint, there is a discussion on how the students' and teachers' so called digital competence can be developed in interaction with the computer, information and learning environments and to facilitate student learning. Further, the course deliberates on the project as a means for organising and carrying out pedagogical development activities based on concrete school development projects.

Assessment **Examination sker genom skriftliga, muntliga och praktiska redovisningar, individuellt och i gruppseminarier. Betyg rapporteras som tre moment.**

Forms of study **Huvudsakliga arbetsformer är föreläsningar, seminarier, basgruppsarbete samt individuella uppgifter.**

Grades **Som betygsskala används U - G**

Prerequisits **För tillträde till kursen krävs Lärarexamen.**

Additional information **Denna utbildning är en uppdragsutbildning och får endast sökas av lärare som deltar i lärarfortbildningen enligt Förordning (2007:222) om statsbidrag för fortbildning av lärare. Se Skolverkets webbplats http://www.skolverket.se/fortbildning. Den som söker till denna kurs utan godkännande från skolhuvudmannen är inte behörig att delta och riskerar att få avbryta utbildningen**

The computer as a personal learning tool in school – opportunities and obstacles

How do students who require support view their opportunities to learn, and to learn using the computer as a learning tool? Two case studies

Ami Lidén
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Abstract

How do pupils in primary school who require support view their opportunities to learn, and to learn using the computer as a learning tool? How does the school deal with the task of providing inclusive teaching? What happens in the teaching environment when the computer becomes a tool for all teachers and students? A case study highlights how pupils perceive individual opportunities and the need to learn and develop at school. The study is based on interviews and classroom observations in 2010-2011 with students regarding their situation.

Keywords: ICT knowledge, case study, primary school, intervention study, special needs, Sense of coherence, salutogen theory, Antonovsky

Introduction

This is a case study of two pupils in need of special support, their learning and their own view of their learning with the help of computers.

The school where the study was carried out is an F-9 school with 115 pupils based in the countryside. 17 teachers work at the school. The school was the first in the local authority where pupils and teachers got laptop computers. This took place through a more comprehensive project called "one to one" which means that in the long term every pupil

and teacher would get their own laptop computer. The project also involved all teachers getting training through a university course of 22.5 credits.

The course ran over three terms and contained three modules.

1. The young and the Internet,"cloud services" and factors that affect results in Swedish compulsory education.
2. Basic vision in special needs pedagogy
3. Following-up, evaluation and development of response program.

In the curriculum for compulsory school of 2011, Lgr 11, it states under "Schools' values and mission":

- Schools' mission is to let every individual pupil find their unique selves and through that be able to participate in society by giving their best i responsibility and freedom.

- Teaching should be adapted to the expectations and needs of every pupil.

- Schools have a special responsibility for pupils who for different reasons have difficulties achieving the learning outcomes.

- Every pupil has the right to develop in school, feel the joy of growing and get to experience the pleasure of making progress and overcoming difficulties.

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Under the heading "Knowledge", it states that the goal is that every pupil should:

- Be able to use modern technology as a tool for knowledge-seeking, communication, creation and learning…
- Everyone working in school should:
- Pay attention to and support pupils in need of special support,
- Strengthen pupils' will to learn and their trust in their own ability,

Schools have a difficult mission, to support all pupils towards achieving learning outcomes. In the extract from the curriculum above for compulsory school in 2011, it is described that schools have a mission to promote intellectual matters and also social development for all children, and that all pupils should be able to use modern technology as a tool for knowledge-seeking, communication, creation and learning. This is a challenge for schools.

The aim of the investigation

The study seeks to understand the importance of the computer as a tool for two pupils with special educational needs, a boy and a girl in grade five. What opportunities and difficulties are entailed by access to a personal computer for these pupils?

Previous studies

In the suggestions from the parliamentary auditors' regarding ItiS - a government initiative on ICT in Schools 2001/02 RR20 - reference is made to different local authorities' work with ITiS projects in Sweden. Research on the projects showed that the use of computers in schools has not improved learning or developing education. It was found that the weaker students were disadvantaged by the freer approach to working the use of computers coincided with. The study also included the local authority that is of interest in this study.

The study found that the younger children's use of computers has been limited.

As for the group of poorly performing pupils, researchers said that they may be winners and losers in the new use of IT. It was concluded that the computer can be excellent for pupils with physical disabilities or pupils who need to practice a lot to learn but for those who have trouble spelling, there may be problems with using the computer fully. (p.84)

Större chans att klara det (Better chance to make it) is a study by Britt Hansson in Special Education at Umeå University in 2007. It is an interview study carried out in ten lower and upper secondary school pupils' views on how computer support has affected their language, learning and school situation. They have had their learning tool between 1.5 to 4.5 years. The results showed that students felt more motivated in school when they had their new learning tool, the computer. The students expressed themselves that they developed their writing and reading, and that support from parents and teachers has been of great importance. Britt Hansson writes that the result shows that the learning tool, the computer, may be important for improving learning.

Så här blev det för mig (How it was for me) is a study by Ann Lund at SIAT. In the study, she interviewed ten adults with neuropsychiatric problems about their experiences at school. She has investigated whether students receive the support they are entitled to, for example if they had access to alternative learning tools available today such as computers, synthesizers and spelling programs. She has also studied the importance that teachers and school management have the knowledge needed to support these students. The results show that some students during their schooling did not have access to the alternative tool available for their learning, which probably has limited their opportunities. She points out the importance of the schools having the knowledge of the tools available, the special needs of every pupil and that these needs vary between pupils.

Choice of participants

The study is based on an ethnographic method. I myself am a teacher among the students I study. In the analysis I have distanced myself from the text to understand what they express. Data were collected through interviews with 36 students in groups of four to seven. From the interviews it became interesting to follow up on two students who can be seen as students with special needs. The third interview was carried out exclusively with them. The WHO definition of a child in need of assistance is divided into three groups. Group A are children with medical disabilities who are diagnosed; group B are children with behavioral problems but no diagnosis; and Group C includes children where language and socio-cultural environmental factors have been detrimental to the child's learning. The students who the study focuses belong to group A, medical disability, because they are both identified and investigated as pupils with reading and writing difficulties, dyslexia. Data collection took place on three occasions, in March and June 2010 and May 2011. All interviews were recorded and transcribed over 324 pages.

The interviews were conducted at the students' school. The request for pupils to participate was sent to all custodians. Pupils then received a separate form with a request for whether they wanted to participate in the survey. Based on the positive responses of both parents and students groups were formed. The questions were partly of a general nature about computers in education, and partly specific based on the purpose of the study. They were also open and called for dialogue.

Ethical standpoints

The teaching profession is complex. Teachers engage on a daily basis with their ethical views, without us often being aware of it. It feels important to occasionally make yourself aware of the principles belonging to the profession and to keep alive an awareness and discussion of how to act. In the study, the Research Council's four basic ethical principles have been followed. We have informed all the participants what the research is, that it is voluntary, and that they can cancel their participation without consequences when they want. Information on projects and research objectives has been sent by letter to all parents. All pupils in the school were free to decide whether they wanted to participate in the survey. Based on the responses the pupils were asked verbally to participate and we formed groups. Since I work at the school, the possibility can exist of the pupils answering yes to accommodate my wishes. The school or municipality is not named. Pupils' names are fictitious. The material will be destroyed when the interpretation is complete.

Theoretical background

My epistemological premise is Lev Vygotsky and his view of the child from a sociocultural perspective. In this view you can see and take into account the whole pupil and all that it means from a biological, cultural and sociological perspective. Vygotsky use the term "nearest development zone" which means that the teacher at all times supports and assists students in their learning to the next level it has the potential to reach.

Säljö writes in (*Boken om pedagogerna p.122).*

> Vygotsky defines the development zone as the distance between what the child can deal with on their own and without the support of others, and what the child can be assumed to be able to deal with the support of others

Vygotsky was particularly interested in learning and development in children with communicative disabilities and learning difficulties. For the analysis of the interviews I have used Aaron Antonovsky's theories of "Sense of coherence". Antonovsky takes in his book, *The Mystery of Health*, based on a salutogenic perspective of disease instead of a pathogen (1991 p.34). Antonovsky's ideas are transferable to learning. Instead of taking the

basis of what the student cannot do, we should base on the abilities the student possesses. Everyone is unique and has unique opportunities for learning. There is an internal, biological innate resource that you carry with you and there is an external resource to get from the relationships you are engaged in. Antonovsky's research shows that the concept of manageability can, with good relations, be loaded with a sense of context that opens up for learning. This can happen when students feel that something makes sense in the school. Antonovsky also writes that the child / man in their lives needs to build and have the opportunity to develop:

- **Comprehensibility***: The stimuli deriving from one's inner and outer world during the course of life are structured, predictable and understandable.*(p.43)

In school and education, it means that I as a student know why I am there, that I understand what is expected of me that I should do, that my mission is structured so that it is possible for me to do them

- **Manageability**: *The resources needed to be able to meet the requirements these stimuli set* (p.43)

For a student, it is important that they feel that they have enough resources to solve the tasks facing them, or to external resources available to the pupil's disposal. A resource can be a companion, a teacher, parent, or a material such as learning tool, e.g. computers with programs that support the reading and writing process, speech and spelling programs, maths briefings on the Internet that students can study repeatedly, relevant pages on the 'net' for search by the facts where there are both text, images and video.

- **Meaningfullness:** *these demands are challenges, worthy of investment and engagement.*(p.43)

Motivation is the key factor in learning. It is the teacher in relation to the student who can instill hope and courage to recognize motivation. Brain research shows today that students' emotions and their motivation is the most important factors for successful learning. Gärdenfors 2010 (p.69).

Table 1 shows that if a student has a high value on all components, the pupil has a high sense of coherence and the student then has a strong potential to succeed in school. (Type 1) As shown in the table a sense of purpose, motivation is the strongest incentive for learning. (Type 1,2,3,4) In connection with types 5,6,7 and 8, it is seen that even if understandability and ease of use have a high value but the motivation is low, the result is negative in a learning context.

Dynamic connection between the components in "Sense of coherence"

Type	Comprehensibility	Manageability	Meaningfulness	Prediction	
1	High +	High +	High +	Stable	→
2	Low-	High +	High +	Unusual	↑
3	High+	Low -	High +	Press up	↑
4	Low -	Low -	High +	Press up	↑
5	High +	High +	Low -	Press down	↓
6	High	Low -	Low -	Press down	↓
7	Low -	High +	Low -	Unusual	→
8	Low -	Low -	Low -	Stable	→

Table 1. Antonovsky's prediction of development

Gärdenfors' book, *Lusten att förstå 2010* (The desire to understand 2010) (p.69) refers to the OECD report *Understanding the Brain* (2002) which suggests one of four reasons why students fail in their teaching.

1. *A lack of self-confidence and self-worth.*
2. *Poor motivation (you do not really want to learn)*
3. *Real or perceived inadequacy (I cannot do it, it's too difficult)*
4. *The absence of learning opportunities.*

Gärdenfors points out the four points above as central to students' failure. He also writes that they, in contrast, can be the starting point of successful learning. In addition, the author believes that if students feel they have control over their learning, it is also of great importance. Antonovsky's and Gärdenfors' analysis of learning rests on the same basis as they see students from a salutogenic perspective, what abilities and strengths the pupil has and then build education in consultation with the pupil.

Different views of special needs education

For students with special needs, there are different ways of relating. The two main features are, whether people are looking for the difficulties students have in their learning and focus the training on these difficulties and try to compensate for the language difficulties. With this approach the problem lies with the students. This approach is termed the compensatory perspective. Nilholm (2010).

The second perspective, the dilemma perspective, in which the student is seen from a holistic perspective, the lives they have and the skills available to them. Together with the student in conversation we try to develop the student's cognitive ability, that they become aware of their own learning, what learning strategies are best, the abilities and limitations of the pupil. Based on this knowledge, one can then determine how learning should be handled and structured. The student will then get the feeling and ability to take control of their own learning. Getting to the point where you feel you have control over your learning makes it easier to feel the meaningfulness and motivation for learning. Motivation is a cornerstone of learning. Since there are no "quick fixes" in the world of knowledge, you understand that it takes a great effort to learn something new and it requires motivation and meaningfulness.

Below is a table of two similar perspective choices, the relational and the categorical Persson, B (1998, s.31)

	Relational perspective	Categorical perspective
Understanding of pedagogical competence	Ability to adapt teaching and material to different expectations for pupils	Subject-specific and teaching-centred
Understanding of special needs competence	Qualified help in planning differentiation in teaching and materials	Qualified help directly related to pupils' demonstrated difficulties
Reasons for special needs	Pupils in difficulties. Difficulties take place in the meeting between different phenomena in growing-up and teaching	Pupils with difficulties. Difficulties are either innate or individual in another way.
Time perspective	Long-term planning	Short-term planning
Focus on special needs measures	Pupil, teacher and learning environment	Pupils
Assigning of responsibility for special needs work	Work units(-teams) teachers with active support from the headmaster	Special needs teachers, special needs pedagogues or pupil care staff

Table 2 relations and categorical perspectives

Including and excluding in relation to Sense of Coherence

Antonovsky also highlights the importance of the group to strengthen individuals' sense of coherence. This is especially true for children and adolescents. It is assumed that if the group has a strong Sense of coherence (KASAM) it is possible to strengthen the individuals with a weak KASAM. Antonovsky (p.215), where the group itself has a weak KASAM, it is not obvious that the individual student will be strengthened. Nilholm (2010) writes that it is essential that schools and education adapt to the amount of diversity of students coming to school. If we integrate children in need of support of an approach that is not suited for them is the inclusion doomed to failure. How do you work to succeed?

INTERVIEWS

Below is an excerpt of Anna's and Sven's replies from two of the group interviews, a conversation with a teacher and a written reply to a question

1 What do you do on your computer? Question to Anna by the teacher March 2010	2 Interview March 2010 A-Anna E-classmate (girl)
I have not done a thing I think I've played games. I do not remember what it's called, but it is popular in the class. They are those plants and zombies. Plant war and zombies. (Anna does not want to mention the computer that she thinks is complicated, the teacher writes down her answer)	I- **Is there something that is difficult to have a computer?** A- Save, it's really hard. E- Yes, but if you do this? A folder, click where it says. A- Yes, I already did. E- Then you can click them in n save stuff there. A- Yes, but there's already stuff there? E- Yes, but you can still click in there, n save the things you did. A Mm, there are also other things that I can store inside the folder. E- Yes, you can make a sub-folder, subfolders in the folder. IN A -Yes, folders, folder, folders, subfolders!
3 Anna wrote on the computer as an answer to **What do you do on your computer? May 2011**	**4 Interview with Anna May 2011**
Vt 2011 I am looking for facts about different things in maths, Swedish and social and natural sciences. I learn to read and write. I think nothing is difficult now but when we did not have the computer then it was difficult. I do not have to learn something. I'm very clever. I attended two courses (Anna means courses in speech and spelling)	**How do you learn best? What should it be like in the room for you to learn?** A- Quiet and peaceful. I- Are you eyes or ears reader A- Eyes, ears and mouth. I'm all three. I use my mouth and I use my eyes and I talk quietly and then I learn everything. I- That's the way you take it into your brain? A- Yes **I Has it become easier or harder in school with their own computer?** A Slightly Can you tell me how it has become easier? A yes you can get help with spelling, and then it is easier. understanding the text and then you can listen, but sometimes the computer can say something totally crazy though it is right. It is easier to write.

Table 3.Anna's view of learning and use of IT

1 Interview with Sven March 2010	2 Interview with Sven June 2010
S-Yeah, I can probably everything. S-I can uh, Swedish, I can maths, I can mm multiplication. I know some English. I know uh, Powerpoint n Word. **I-Yes, and more. Do you think it's something that's hard** S- Uh, yes, when to roll by then you have to first press the button then dragging down to the button itself. **I- Did you have another one.** A Yes right sometimes when doing this (showing with hands) then it doesn't obey. **I- Do you think you can do better in school because you have a computer?** S-Yes, I can really! **I- Do you have examples?** S-Yes, yes (sigh) I think if I write with a pen then it will be quite sloppy. If you write on the computer, it becomes straight. **I-But you had no idea you can learn to read and write using the computer?** Very anxiously around, the boys comment and whisper all the time. S-yes, with the help of Vital. For when they say the letters and different words. **I- you can?** S-yes, that's a plus sign on the computer n, there's lot of numbers. N there's Lexia. I the Lexia program, yes. S-L has it S what is the question? **I-is there anything you miss about the computer in school**? S-Ahh, would like to drive. I would most like to have a full page of Three in a row games I- you would like to play Three in a row. S, mm., n Minesweeper. **I Do you think you can do better in school because you have a computer?** A Yes, I can indeed!	**I- Is there a utility on the computer? Tell me** S- There are two. If you have a virus you can download a virus program that deletes all the viruses and you can use dropbox when the teachers put on your computer. So you can save all that you want to save. **I- Dropbox, it is a special program?** S- There is a special program to save what you have saved on my computer? **I -These Vital and Stava Rex have you heard of them?** S- Yes **I How do you save on your computer? Where do you put what you want to save?** S- I'm too tired to remember. I'm saving, I put it on the dropbox. Via something save, save button. **I- Just there** S- Yes but once it did not really happen. **I- Go on**. S- The first time I wrote my story about the Loch Ness Monster. I wrote a little bit, then I wrote a lot. I thought I had saved and then when I would return, I had not saved? So all my work was gone. **I- But?** S Then when I checked with you, plop ahh it was there. **I -Then we went and looked in the computer.** S You mean you. Picture 1 classroom enviroment

Table 4 Sven's view of teaching and use of IT

Sven's view of teaching and use of IT May 2011

I-How you think about computers. In which way do you learn best and how should it be in the room.

S Above all quiet and less loud.

I- Are you an ears and eyes reader

S- I 'm an ears reader

I- How do you read?

S- I'm using a tablet. The book I'm reading also has an audio disc. It reads to me.

I- Are you following text in the book or close your eyes?

S- I concentrate and take it slow or close my eyes.

I- Do not you read the book simultaneously?

S- No, but I keep track of where I am.

I- Sometimes it happens that you come to me and show the book and say 'look what it says here ''

S- Mm When it's fun stuff.

I- Yes but then you know that it is there.

S- Yes, but it is the audio disc has said it and I know exactly where I am.

I But can you read without the audiodisc?

S- Mm, but then it will go worse.

I- Is it easy to understand what you read.

S- Yes, but it is not too advanced a book.

I- Do you think it has become easier or harder in school now that you have your own computer.

S- I think it's been easier.

I- How has it been easier.

S- You can write more easily and much more than if you write with pen and paper. You can also pick up the facts on the internet. You can go to Google.

I- If you want to read something on the Internet what do you do?

S- You can go to Wikipedia. There, I read.

I -Do you do not use Vital to read it.

S -No I do not use Vital as much.

I- Is it something that is hard now that you have a computer?

S- Yes, it's hard to keep up, too.

I- How?

S- For example, if the teacher writes too quickly for you to write it down.

I- Can you find it what you have saved on your computer. How do you save?

S- I go into a folder called schoolwork. And there I can find everything I have saved since I powered down.

I- Save and find is not difficult

A- No, and it is as easy to send.

I How would the design of the computer be? Is there anything that made you think that would make it easier for you?

S- Yes if you type would install a writing program .... which can teach a few letters while writing for you.

I- How so?

S- One could type up a writing program so that the program writes what he wants and you have like, a small microphone which plugs into the computer so you say what you want to write, write the program it for you. And at the same time you learn.

I- It would suit you well

S- If there is one of those programs?

I- it was an interesting thing. I've thought about it regarding you and your learning that you could have a microphone when you are writing a story.

S- And while you could have one thing on your screen so you see what I do. You told me about it when you were at the meeting in England.

I- Interestingly, just what you're saying about being able to talk in a text. We must find out if there is one of those programs. You have a tremendous language and are a great storyteller.

S- That's because I'm so interested in history.

I- Can you feel that you have the story in your head and what is it that makes it hard to write it down?

S- So, I lose were the letters that I write and then it takes longer to write it. But if I have that microphone and say, rather then of course the writing at once and then it would be easier.

I- It would be interesting if you could try one of those programs.

S- If there is one of those programs.

I -I will ask the IT office if they have one.

S- but they have not had one like that in years. Though it was too advanced. It cost a few million. It was extremely expensive. Then they stopped because almost noone bought it.

I- We must investigate this.

S- I've seen one of those microphones. You put it into the USB. Then I install the microphone and say what you want.

I- You have good thoughts.

S- Yes, everything is in stock. And they are saved when I most need them

Picture 2 pupils working with "smart board"

RESULTS AND ANALYSIS

To analyse the interviews I have chosen to use Anton Antonovsky's matrix.

"Dynamic connections between the components in Kasam" AA (p.43) In the matrix I have filled in twice after analysis where I see Anna and Sven to be in their view of learning in school based on; Comprehensibility, managebility and meaningfulness. Vt. 2010 och Vt. 2011

Type	Comprehensebility	Manageability	Meaningfulness	Prediction	
1 A3,4 S 3 Vt. 2011	High +	High +	High +	Stable	⇨
4 S1,2 Vt. 2010	Low-	Low -	High +	Press up	⇧
8 A 1,2 Vt. 2010	Low -	Low -	Low -	Stable	⇨

Table 5. Anna's och Sven's place in Antonovsky's schema after the interviews

When analyzing the students' statements, it appears that after a year of change and access to computers, they feel less vulnerable and not locked in a learning context. They see that they manage their work better themselves. They know their own learning style and know what it should be like in the room for them to have the opportunity to learn the best way. It can also be seen in the learning situation through the observations that the students can cope with more independent work such as reading, reading comprehension and management of writing assignments. They take the help of computers and know when they have more self-control over their learning. It feels better that the computer supports correct spelling than for an adult to point out spelling errors. Both pupils expressed the feeling that school and work are going much better. Both have verbally expressed that they want to continue working inclusively. The pupils are also harnessing the resources of the educational space, they get what they want from materials, peers and adults. If Sven has a task that contains several instructions, there are still difficulties in keeping the task and the direction in his memory. His working memory does not have the capacity to hold several different tasks at the same time.

Pupils in need of support have often worked in small groups with specialist teachers. At times they did the same work as the other class, but most usually had other tasks. The two students studied have been diagnosed with great reading and writing difficulties. The students who the study related to also underutilized the educational space. The explanation for the underuse of the room is described by Wetso GM in *Lekprocessen-Specialpedagogisk intervention i (för)skola. 2006* (The play process-Special education intervention in (pre-)school) (p.201)

> Student underuse resources in the pedagogical room regarding materials, peers and adults. Pupils do not take what is offered. The student is reluctant, hesitant, or passive.

The team decided at the beginning of a new school year to begin work inclusively with all children and instead of individual teachers for children in need of help get as many group hours as possible. After one term a "one to

one" project also started where students had access to their own laptop. While the project started all teachers at the school took a university course in special education. The course had a link to IT support in learning and involved 22.5 credits.

Changes have taken place in the environment

All pupils now have their own computer as a learning tool. The computers have a speech synthesizer and a spell checking program for Swedish and English. All pupils and teachers underwent training in the use of speech and spelling programs. Previously, only the diagnosed students learned to use speech and spelling programs. When the students were alone in using those programs, there was resistance from them to use the programs. When everyone had taken a course and trained on the use in the classroom, the problem was gone. Now, they show that they feel included and learning tool, speech synthesis, becomes a resource for everyone.

The teachers' further training was also part of development work around the response plan. After the course the teachers acknowledge that they have a different attitude to parents and pupils. Previously, the problem lay with the child and the discussion circulated around how the student would change in order to fulfill educational objectives. After the course, the teachers moved their focus onto the problem and tried, along with pupils and parents, to discuss and find out which learning style best suited the pupil and what the pupil's strengths were, and work from them. This meant that a higher motivation was created and the students felt they could manage their assignments better. The approach is also now fully inclusive. The class has instead been given more group hours. Students work in mixed groups and usually have jobs where they work in pairs. The pairs vary. The teachers believe that differences in the pairs develop both students. Teachers can see that if you as a

student must explain to another student it consolidates your own skills and make you more able to develop new skills. The student who needs to get explanations can hear different explanations from different learners. Teachers also describe that when students write on computers, it is easier to help each other than when writing on paper. What's on the screen is perhaps more clearly?

Discussion

The great investment in information technology carried out at the school in the 90s showed that it did not favor students with special needs. Perhaps they were also losers with the increase in individual working and were left alone. It was also more common to have an exclusionary approach. The students disappeared from the teacher and the class and another, special education teacher, was left to care for the needs of the student. It was the model that was still used at the school when the research began.

The study shows that with an educational approach to the introduction of a new learning tool, the computer, there is potential to transform learning environments in school. For change to come about, there needs to be an awareness among leaders and teachers, where it is easy to focus only on technology. With support and training for teachers, there is a possibility to change learning environments and work inclusively with pupils in need of special support. With that, all pupils become winners through the wide variety of ideas, skills and knowledge which the group then develops.

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Picture 3 pupils reading

Can Facebook aid learning?

What fills the multi-communication with a focus on Facebook, to function in a learning context in the classroom and the home environment?

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Abstract

Can Facebook aid learning? How do social media affect the student's daily work in schools? A study was carried out exploring how secondary school students organise their day at school, how they spend their time at school and how they view the interactive tool, Facebook. The study was founded on documentation and mini studies of how students spend their time in the school, and interviews and conversations with students about the Facebook phenomenon.

Keywords; ICT knowledge, secondary school, student activity, according to Facebook, Intervention study, Activity Theory

Introduction

Senior high school in Sweden is voluntary, and is a step on the road towards university and/or work. There are national programs, both those that prepare pupils for university study and vocational ones. This means that study at senior high school can lead to a profession, but can also be a preparation for university study and work.

Pupils start at senior high school when they turn 16 and finish when they are 19. All programs last three years; and some are purely theoretical, while others are both theoretical and practical. The programs consist of courses the pupils are examined in and most also include work experience. After the pupils have successfully passed all courses, they graduate.

How schools ought to deal with computers in teaching and social media is a topical issue which is reflected in the media. All teachers will be affected by the use of the computer as a teaching tool. In the curriculum for pre-school, Lpfö98 revised 2010, for compulsory school, Lgr11 and for senior high school, Lgy11, it is stated that computers should be a tool in teaching.

The study involves a senior high school which offers 18 national programs. At the school there are 1250 pupils and there are ca. 150 members of staff. The target group of this study consists of 23 pupils, of which 8 are boys and 15 are girls. The study can be seen as an intervention study.

The project "One- to – one" started in the Autumn of 2009 at the school, which means that the pupils in one class were selected. They would get their own computer, which they would have access to around the clock, including in school. It was a major change from having only specific lessons in a computer room to actually carrying the computers with them. It was also a big change for me as an active teacher. The official start of the "One- to – one" project and research into it first started in January 2010.

During lessons, this entails an increased focus on social media, above all MSN and Facebook. I very quickly asked myself the question: Should I see social media as a problem or an opportunity? In the beginning, the answer was to see them as a problem. All of this almost led to me acting more as a policeman than as a teacher in the classroom. I went round and

made sure the pupils were not on such sites, but were working on the current assignments. This created a lot of frustration for me and it affected the pupils too. In the end I found the situation untenable. It was good neither for me nor the pupils. Once again I asked myself the question: Should I see social media as a problem or an opportunity? This time I chose to see it as an opportunity and during the time I had even become very interested in social media and above all in the Facebook phenomenon.

Facebook is a large part of pupils' daily life. You can say that Facebook almost characterises their lives. They live with Facebook around the clock, all year round. Most pupils have so-called "apps" installed on their phones, which makes it possible to follow what is happening on Facebook without necessarily sitting at a computer.

Picture 1. Cooperation in classroom. (Baron 2012)

The aim of the study

Can Facebook help pupils' learning? How do Facebook/social media affect pupils' daily school work? I worked based on the following questions.

- What function does multi-communication fill in the learning situation in school and the home, with a focus on Facebook?

- Can Facebook aid learning?

Theory

To carry out the study I was helped by the following questions (Engeström 2001)

1. Who are the learning subjects? How are they defined, where are they?
2. Why should they be learning, what makes them focus for this?
3. What do they learn, what is the content and what is the result of learning?
4. How do they learn, what are the key events or processes of learning?

The questions are built on the implications of activity theory for activities, the motives for activities, the need to achieve certain goals. The theory highlights the relation between:

- People
- Activities
- Environment

The Facebook phenomenon

Facebook was started in 2004 by Mark Zuckenberg. The idea of Facebook originally came from Harvard where they had a paper version of Facebook. So it was just like our school yearbooks, but in picture form, where every pupil is present. The idea was that pupils would get to know one another via their school yearbook and just like with our yearbooks it took time from when the pictures were taken to

them being printed and published in Harvard's Facebook. Mark Zuckenberg got tired of waiting and started his own web-based Facebook, which was where the name came from. Zuckenberg started to market the service and in a short time nearly half of the students at Harvard had signed up. In the beginning Facebook was only at Harvard, but after a while Zuckensberg's Facebook became so popular that it began to spread to other universities and since Harvard did not own the rights to Facebook, this could happen without any legal problems. After this Facebook spread over the whole world and when it "came to Sweden" basically only adults used it. They wanted to find old classmates, or other friends they had lost contact with. Youngsters still used other sites. But after a while youngsters also started to use Facebook and now (2011) Facebook is the dominant social network in Sweden.

Selection of participants

That this specific class was selected depending mainly on the fact that the class was specially put together and signaled a new trend in senior high school. It was specially put together in that it was a part of the Social Science program but was aimed towards the Economics program which was to start in Autumn 2011. A rector's group felt the class was appropriate for the project and marketed the program by promising that every pupil would get a computer. Many pupils applied for the program because of this special set-up, but mainly mostly because they were promised their own computer.

Data collection

Data has been collected at different points of time during the project in more informal conversations as a part of classroom teaching, but mainly at two points during the Spring and Autumn of 2010, when the pupils were interviewed. At these times, the pupils were interviewed in four groups. Two groups of girls, one group of boys and one mixed group. There were around five pupils in each group and it

total around 23 pupils have been interviewed, 8 boys and 15 girls. The first time, all pupils were interviewed using the same open questions, where certain questions dealt with social media. This was done to get more specific answers related to my research questions. The interviews took the form of conversations where the pupils felt comfortable. The interviews have been transcribed in their entirety, covering 324 pages.

In the second interview, new open questions were asked that partly built on the answers from the first interview. This time there were questions directly related to Facebook and pupils' use of Facebook. The groupings were the same and this was done so that they would feel comfortable in the groups they had been in from the start.

Other data has been collected through continuous observation by me during lessons. I have observed the pupils' use of Facebook and have also had conversations with some of them at different times during the school year. Apart from this, the pupils have been given written questions to answer based on their view of Facebook and how they use Facebook. The questions have been directly related to Facebook and the use of this social medium.

Apart from this, I have had regular conversations with colleagues who have come in contact in one way or another with Facebook or use it themselves.

Activity	Frequency
Classroom observations	20 weeks VT-10 x 5 lessons per week. 20 weeks HT-10 x 5 lessons per week. 20 weeks VT-11 x 5 lessons per week. 20 weeks HT-11 x 5 lessons per week.
Conversations with pupils	Many times per week
Interviews with pupils	1 time VT-10 1 time HT-10
Conversations with colleagues	Many times per week

The intervention activities

The pupils started at the school in August 2009, but did not get their computers until September 2009. This was due to the computers being delivered late and them needing to be installed by the local authority's IT department. The pupils then had to sig an agreement where they got the right to use the computer. Up to that point, the computers were not insured, since the authority thought that the cost of insurance would be too big. Subsequent insurance would be added to pupils' home insurance. At the end of the project, the pupils would get the possibility to buy the computers at a price of 500 crowns.

In parallel with the project, the teachers in the work team took a 22.5 credit university course during the 2010-11 school year which included ICT, special needs pedagogy and individual development plans, and action programs.

Previous studies and research on computers in education

Olle Findahl writes in his report "Svenskarna och Internet" (Swedes and the Internet) about Facebook, which dominates social media, and the use of Facebook. Findahl argues that "you go there to keep up to date about your friends, make your own status updates on where you are and what you are doing. And for many, this is a daily activity. On Facebook different groups are also started to discuss or mobilise on different issues" (Findahl, Svenskarna och Internet 2011, p. 19)

In Lärarnas tidning (The teachers' paper) nr 19, 2011 the journalist Stefan Helte takes up the subject of digital contacts and their effect on teachers' spare time. This article demonstrates that teachers have more contact with pupils, parents, colleagues and school leaders in their spare time, that is, outside of normal working hours. According to an investigation by SKOP, where 1000 teachers

have been asked, "Four out of ten teachers" experience "that it is not tough. Six out of ten, that it is very or a little tough" (Lärarnas tidning nr 19 2011) to have contact in their spare time. This gives us signals of increasing contacts which can affect spare time negatively. The feeling of never being free can be tough for teachers.

The question for teachers of whether they should be friends with other teachers is a very up-to-date question in today's schools. In Lärarnas tidning nr 19, 2011 Helte takes up the subject in the form of an interview with teacher Niklas Nord. He works as a music teacher at lower high school in a town in Sweden. Niklas has nearly 1000 pupils and former pupils as Facebook friends. Pupils communicate with their teacher day and night. "It is up to me as a teacher to make sure the border between work and free time is not blurred" (Helte 2011) Niklas says at the same time as he argues it is important to create a relationship with your pupils and keep it on the right level. A disadvantage can be that the border between work and free time can become diffuse. "For pupils, communication never ends. It can be taking face-to-face during breaks, an sms to one another during classes and interacting on Facebook in the evening" (Helte, 2011) Communication exists among pupils and they live with it all day long, no matter whether it is by sms or Facebook. Niklas has limited access to his profile in that pupils do not have access to his pictures or most of his status updates. The motivation is that Niklas wants to distinguish his own private life and role as a teacher. So he has not chosen to create a so-called teachers' account, but uses his private one. Pupils can send messages to him even if they have limited access. The messages can include anything from school questions to pupils telling him how they feel. Niklas argues here that it is important not to answer messages on Facebook at once or to answer mail, sms or mobile phone calls from parents or pupils on the evening. He sees it as a matter of training becasue it is not always easy to avoid

answering. "One of the biggest difficulties of being a teacher is setting limits for when work is over" (Helte, 2011)

Peter Gärdensfors writes in his book "Lusten att förstå" (The urge to understand) about the importance technology such as computers has for pupils' learning. It is important not to believe that learning gets better just by introducing computers. You have to know how to use them so that there is a pedagogical advantage in doing so. That is to say, using IT without knowing how to use IT in the right way does not contribute to better knowledge-building or understanding than through traditional methods. The IT Commission agree and say in "Skolan, IT och det livslånga lärandet" (School, IT and life-long learning) that "We can state that IT in itself does not result in pedagogical development – that requires a pedagogical vision and a context so that IT can contribute to development of the school"

However, Gärdensfors further argues that the IT Commission does not take up where this pedagogical vision is to come from, but state online that "One goal should be that all pupils who leave the education system should have the search for knowledge as a built-in reflex." Gärdensfors argues that the problem with that is "before starting school children have a strong innate curiosity that school has tended to kill through a form of knowledge transfer where children are passive recipients" (Gärdenfors, p. 225). To get on the right track here, bringing in the computer is one way. Children and adults can have fun with computers, for example through computer games. Pupils have to interpret the information computers contribute and they have to create a good attitude to the sources they user. Information does not become knowledge by itself and computers can rarely help pupils in their interpretation and valuation of information. Gärdensfors also claims that "information has to be put in a context so that it becomes meaningful and usable. It is even

more important that teaching should not only give knowledge – it should above all lead to pupils understanding" (Gärdensfors, p. 226)

Gärdenfors also takes up the computer as a means for communication. "In the area called computer-supported cooperation they use special programs so that people in different places can work on the same material" (Gärdenfors, p. 241). You can communicate and work with people all over the world without having to meet. This communication can be strengthened through video-conferencing where the partners see and hear each other, but can also collect facts and work in parallel with the conversation.

The Falkenberg project

In its evaluation (preliminary report 2) on the One- to –one project in Falkenberg's local authority, authors Martin Tallvid and Helena Hallerström write about the role of the computer as a tool for learning. "These research results point to many positive effects, but also a number of questions" (Tallvid, Hallerström, p. 18). That is, the computer is a good tool, but that you should not have too high expectations in it. In the investigation, Annika Lantz-Andersson is also mentioned, who have done research into digital media and teaching materials in schools. Lantz-Andersson believes that computers give great possibilities, but cannot solve all problems in schools and the teacher is still an important part of teaching and learning. Thus, the teacher cannot be replaced. Tallvid and Hallerström further argue that "it is not the computer per se that affects learning, but what the teacher and pupils do with the computer that is significant. It is not only about technology, but also what we do with it and in which way this leads to understanding and learning for the pupils (Tallvid, Hallerström, p. 18).

Results

Regarding contacts with IT support, the pupils had at first a great scepticism, but after a "pep-talk" from the teachers they dared finally to ring and talk about problems with the computers' hardware. When pupils had made their first call, it was suddenly no great deal to call the supplier. They even felt proud to have the responsibility of this contact with the supplier. All support in the form of software remained with the local authority's IT department.

	Direct effect	**Indirect effect**
Learning in the classroom	Send links, tips and ideas.	Remind each other about assignments or activities during school time.
Learning at home	Send links, tips and ideas.	Remind each other about assignments or activities during school time.

Table 1. Facebook related to activities in school and home.

Picture 2. Girl using Facebook. (Baron 2012)

Answers to the written question "How have you used Facebook during this school week?"

During the school week I use Facebook to communicate with classmates and other friends. I often communicate with friends who do not go to this school, but during school time it is mostly classmates I communicate with. I can ask about different dates for assignments, tests, homework, etc. and we can also send links to each other, etc. If I am not communicating with my friends, I use Facebook just to see what is going on and to keep up-to-date (Boy 18)

I use Facebook not only to check what people are doing and what is happening, but I also discuss things to do with school. It can be that we help each other to find the right answer to an assignment. We may discuss how to solve a problem or maybe how to do a task together. (Girl 18)

In class time I am not on Facebook so much, when I am, I am communicating with teachers and classmates. We have set up a class page on Facebook so we can all chat together, it helps me to know when we are starting the next class, etc.

You can ask the class anything and get an answer directly! Otherwise you check during breaks, check if anything new has happened and what is happening in general. Facebook is a good source of news where you can find out masses of different things, e.g. when a shot was fired in Björksätra, I found it out first on Facebook. There are loads of good things you can find out by using social media, this is why I use it every day and I always learn something new. (Girl 18)

During the school week I use Facebook when I am done with my work, when I don't have anything else to do during lessons then. I am also usually online during breaks and lunchtime. If the lessons are boring and the teacher is not really into what the class is doing, I usually also go into Facebook. If you have a bad teacher or substitute, we can chat with each other in class in our SMSP chat and see if the rest of the class is listening and understands what the teacher is

talking about. Nowadays we have even started to use Facebook instead of the fc. You send group work to each other and the teacher usually can also write what we are to do on Facebook. (Girl 17)

I use Facebook far too often during the school week, sometimes I am tired with myself at how much time I spend on it. Really I do not even know what I am doing on that stupid site, I am just wasting my time. What I mostly do is to check if anything has happened and sometimes I chat with someone in class or with some other friend. In the class we have our own page where we can write whether we are sleeping in or to ask what we have to do in school. But we mostly write unnecessary things in the chat. We can also send schoolwork via Facebook since it is quick and easy to use since we are also online very often. But Facebook disturbs schoolwork quite a lot as well since you are always online. I sometimes get so tired with myself because I am always checking Facebook and blocking the whole Internet. (Girl 18)

Comments on the pupils' answers to the question

Facebook is overwhelmingly used by the pupils to communicate with friends during school time. They can be friends outside of school but also friends in school or in the same class. Communication takes place through the chat function on Facebook. The content of the chat log contains both things related to school and those that do not. The purpose of this use can also vary between pupils. Some use it to pass the time during a class. It can be the case then that the pupils find the lesson boring or that they are finished with their assignments and have time to spare. Others use Facebook to keep themselves updated all the time about what is happening in and outside of school. There is also lively communication between pupils on assignments to be done and the activities to come during the day and week.

Observations

In the beginning when the pupils got their computers, a whole new world opened up. Previously they had used computers in compulsory school, but did not have access to their own computer all day long. Social media like for example Facebook and MSN took up a very large part of their daily lives in school. In the beginning when I banned the use of social media, it became more of a sport to be on one of these sited without me noticing. This took time and the pupils almost focused more on that than their work. After I dropped the ban, I noticed the social media almost took over and the pupils got very little done. Naturally there were pupils who could handle their use of Facebook and MSN, but for most pupils things did not go so well. They quite simply could not stop using Facebook but stayed online during both lessons and breaks. There was also a lower need to take breaks since the pupils rather stayed sitting at their computers. Naturally this concerned me since it affected their schoolwork negatively. We have many conversations and discussions about this and I hoped that it would lead to the pupils getting their eyes opened.

During year two, I noticed that there was a tendency to use Facebook and MSN less during school time, even if it still dominated. They were still there, but were not used so much and more and more pupils had started to do their schoolwork more and social media were not so much in focus. However there were still a number of pupils who still used Facebook and MSN very much. The interesting part of my observations was still that I had started to see a tendency to lower use and it was the pupils themselves who had realised they were on Facebook too much, and affected their studies. Even during grade two we continued our conversations and discussions around the use of social media.

When we got to year three, where we are now, I had noticed in my observations a clear difference in the pupils use of Facebook and

MSN compared with year one. Most pupils now use Facebook in a more controlled way, and MSN is used more rarely. During conversations with the pupils, it came out that they themselves has realised that the situation was untenable and they were forced to reduce and control their use of social media in order to be able to get on in their schoolwork at all. The pupils had developed a critical approach to the use of Facebook. What was interesting about all of this was still that based on the discussions the pupils had come to an insight and had themselves taken the decision to reprioritise, in favour of learning.

Picture 3. Students using different sites on the Internet. (Baron 2012)

Discussion

In the big picture I consider that Facebook has an important function in learning when pupils use Facebook for schoolwork. They send links, tips and ideas to each other, both during school time and their spare time. They remind each other of coming tests, assignments or activities. Communication takes place all the time in some form, even if it is not always about schoolwork. But if you take some communication away, you risk losing the focus on schoolwork since there will then be a focus on what is missing about communication. The pupils also have a need to take breaks from their schoolwork and there, Facebook can be a step on the way. Many pupils are on Facebook all the time, but have it in the background and

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take it up if they need to rest. In that way Facebook can improve pupils' learning.

Personally I am very interested in the Facebook phenomenon. But in the question of the relationship you should have with your pupils, I still have doubts about using Facebook in teaching. If I were to use Facebook it would be in the form of a "teacher account" but it would also mean that school would have a responsibility all day long. Because if I happen to log onto my teacher account one Friday night at 8pm and a pupil writes that she or he is feeling bad and is thinking of hurting her- or himself. What responsibility do I have then? And what responsibility does the school have? These questions are very complicated, but are very important. This is also something I think we in the school world will be forced to deal with at the same rate as the computer is gaining ground. When Facebook loses its popularity, which it sooner or later will, it will be replaced by something else. But Facebook or not, you have to reach pupils on their level without encroaching on their territory. One way to go is a stable teaching platform where pupils can quickly reach their teacher and vice versa, without one becoming too private which Facebook can unfortunately mean.

Just like in the article with Niklas Nord, I usually get friend requests from my current and former pupils now and then. When these requests started to show up, I accepted them, but put the pupils into a limited profile, which means they had limited access to my page. But after a while I started to think if it was so appropriate to have current pupils as friends on Facebook. I saw a problem on the horizon problem from comments such as:

– Aha, you are a friend of the teacher on Facebook? No wonder you got such a high grade... I did not want to be a part of it so I decided to only be friends with pupils who had left school.

Today I usually say this to my pupils, when I tell them I am on Facebook. Some understand

me, while others think I am exaggerating. My experience is that there is a need to have a more personal relationship with you teacher and the question is if this is a step in a new direction in teaching? It is certainly important to have a good relationship with your pupils, but is Facebook the right way to go? In any case I think it is extremely important to draw a line over what is private and what is work-related. That line may be difficult to draw when it comes to Facebook. On the other hand I think it is ok and important to answer mail, sms and telephone calls from your pupils outside of school time, and I have never experienced a pupil calling or sms-ing for social reasons. When they have contacted me, it has always been regarding school-related questions. But maybe this depends on me not having my pupils as friends on Facebook? As a teacher you have to ask yourself the question, what sort of a relationship do I want with my pupils? The democratic process has shown itself to be the winner.

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Boys and girls view on the computer

How do boys and girls (8-17 years old) view the computer as a tool and how do they refer to the computer as a learning tool at school and in their spare time?

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Abstract

The goal of the study is to try to understand from a gender perspective what happens with pupils' learning and linguistic expression when they work on a computer in school.

It is draws on group interviews with students in one compulsory school group (38 students from different classes) and one secondary school group (21 students) during Spring and Autumn 2010 when all pupils got a computer each in school.

The study shows that the gender differences suggested by previous research agree with my own study, that is, that girls use the computer as a partner and that boys use it as a gaming machine. In learning situations, boys and girls are in agreement in terms of their understanding. The younger ones see learning as varied and it brings new possibilities. From grades four to eight, they reproduce their learning in reading and writing, and argue that the computer affects them positively. Pupils in senior high school relate their learning to the future and their choice of work. In their spare time, the younger pupils of both sexes play games. In senior high school, the boys still play games, read newspapers or communicate by MSN or Facebook. The girl's blog and are on Facebook.

Keywords: ICT, gender perspective, comparing primary and secondary students, learning, school, spare time.

Introduction

The digitisation of school has been going on for 20–30 years and took off in the middle of the 1990s when most schools in Sweden got an Internet connection (Hylén, 2010).

Jedeskog (1998) and Hylén (2010) argue that there are four motives for bringing computers into schools. The four that are mentioned are: learning, democracy, working life and change.

Learning – The computer increases pupils' motivation. Pupils also learn to critically evaluate texts on the Internet and look for facts. They can also take responsibility for their own learning in a good way. But there are also risks with this technology that pupils are left alone too much to search for their own knowledge. The less motivated pupils maybe do not always take this responsibility (Jedeskog, 1998). Hylén (2010) argues that learning with the help of a computer can be more effective and is necessary for the future. In the draft IT Law (2004/05:175) it states that "in tomorrow's society, good IT knowledge will be necessary for every individual and for society's growth" (Hylén, 2010, p. 13). Hylén has looked at studies that suggest positive effects of having IT in schools. He sees that:

> In summary the effectiveness argument can be thought to be gaining ground. But the discussion of what knowledge is important for the future and how you best measure and evaluate it is not over. It will probably continue and increase right now, not least as a result of the EU deciding that digital competence is one of the key competencies for life-long learning (Hylén, 2010, p. 22).

Democracy – All pupils must have the same possibility to use computers in their school work so that they do not just benefit a few. Time must be spread evenly if there are a limited number of computers (Jedeskog, 1998). IT in schools gives possibilities for pupils to get a digital competence. Hylén also points to the draft IT Law (2004/05:175) which points out that it is a question of justice and equality to have equal access to technology (Hylén, 2010).

Working life – Deals with pupils being prepares for their coming working life where the technical side is more and more important (Jedeskog, 1998). It is important that schools train pupils for their coming working life which demands IT knowledge (Hylén, 2010).

Change – Means that the computer affects your way of working, and the role of teacher and pupil. Many pupils can study by distance. Assignments can easily be handed out by mail. More target groups can be reached, even in the countryside (Jedeskog, 1998). Schools can be more flexible and new possibilities can be opened up to arrange courses. The challenge with using the technology lies in adapting the organisation and pedagogy of education. Schools are also affected by IT whether they like it or not (Hylén, 2010).

Learning with the help of technology

IT offers many advantages but also disadvantages, and Säljö (2000) argues that it changes teaching patterns.

From a socio-cultural perspective, Säljö (2000) sees that the new technology makes it possible for people to interact with a machine. It makes visualisation possible – to see what is otherwise invisible and the stimulation of many senses can take place through multi-media experiences. This can then be seen as a threat to traditional teaching environments like schools. Learning in relation to technology becomes creating and producing work, instead

of the traditional learning by heart that has historically characterized schools. It can also give pupils the possibility to increase their co-operation and create common products, according to Säljö (2000).

Men and women's use of the Internet – a question of democracy

In a study of Swedes' Internet habits (Findahl, 2010), it was shown that men and women use and have access to the Internet to approximately the same degree. But what distinguishes men and women is that time they use the Internet, where men spend 12.3 hours/week and women 10.2 hours/week. Internet use is increasing in Sweden and one of the groups who are increasing is women. They see an increase of 57 percent compared with men who have an increase of 43 percent (Findahl, 2010).

Thinking of the democracy question, Findahl (2011) brings up the idea that the Internet is not only for those who work, but encompasses all ages from three years and older. But there is very little research on small children and the Internet.

Preparation for the coming working life

In a more and more digitalised society, knowledge of IT is demanded. Therefore it is necessary that school pupils get access to and knowledge of the possibilities of the technology so that they are readied for their coming working life (Hylén, 2010).

The effect of change on work in schools

In the investigation Unga svenskar och Internet (Young Swedes and the Internet, Findahl, 2009) it has been shown that 92–99 percent of pupils in the age range 12–18 years have access to the Internet in schools. So it affects schoolwork to a certain extent. The investigation shows that in the ages 12-13

years, the Internet is used for school assignments at a rate of 34 percent, and in the ages 15–16 years this has increased to 46 percent. Here we are talking about weekly assignments. In the study, it comes out that the youngsters do not see the Internet as having the greatest importance in schoolwork. But the pupils have discovered the possibilities of getting information via the Internet. Here neither girls nor boys dominate, but there is an equal division between the sexes. The investigation asked what youngsters use the Internet for in school and it is to check facts, look up words and information on schoolwork. On top was getting information for schoolwork (Findahl, 2009).

The effect of technology on the education sector

Hylén (2010) has looked at how the education sector has been affected by digitalisation. He sees four trends.

1. Content is freed of its packaging – Here Hylén argues that text, sound and image that used to be as a unit can be accessed individually. In higher education, this is seen clearly. Net-based education is increasing and current students are tailoring their education. They pick those parts that suit them.
2. Users become producers – In school, pupils and teachers make materials of different characters. They not only consume textbooks but are involved in creation. Teachers and pupils become *prosumers*, i.e. they both consume and produce. There are websites where teachers can find tips for lessons, e.g. lektion.se. Lectures and powerpoints are also produced which are loaded into different courserooms in schools for pupils and teachers. This can be seen again and again for learning purposes.
3. Informal learning is increasing with the help of the Internet – At the same pace as the Internet grows, more social sites are opening. In these, pupils can exchange informal knowledge with each other. These sites are available around the clock and are chosen based on one's own interests and needs.
4. An increased independence from time and space – Technology is developing the whole time and there are new possibilities for teaching. Video-filming of teachers, net-based distance education, films are available around the clock. The user is not dependent on computers alone, but can follow clips via mp3-players, mobile telephones etc.

Boys' and girls' different views of gaming

Findahl (2010) has also studied how common it is to have laptops and finds that ca. 70 percent of highly educated people have one and in younger years 16–25 77 percent have a laptop. The group of youngsters that sticks out are girls between 12–25 years who use their possibilities to get connected for social reasons. Boys in this target group prefer to use a desktop computer since they play games and then a desktop is better suited to gaming. Findahl (2011) shows that the differences in gaming are small in the beginning, but from ca. 10 years boys play more, preferably every day. Girls, on the other hand, have their gaming peak at 9-11 years and then at 12–15 years they play 15 procent per day, as opposed to the boys' 50 percent.

Tönnesen (2007, 2008) in Selander and Svärdemo–Åberg(2009) investigated 15-year-olds' use of computer games. It became clear that there was a gender-divided market for computer games. The boys preferred to play Counterstrike and the girls played The Sims. The games were about strategically carrying out different missions. The girls felt that in the game The Sims families were created, and that there was a social and ethical side to the game that attracted them. The game involved no great drama and no particular goal, and was

not time-limited. Counterstrike, on the other hand, was time-limited and had a goal. The game was more dramatic and deals with different terror and anti-terror groups fighting against each other. In the game the player learns to take risks and use their team. In the conversations the girls thought that the game was about shooting without thinking. The boys thought the girls' game was boring and meaningless. But learning in the games can depend on how differently motivated the different groups are for their games, and what they are practicing are thinking and learning different strategies. To do this, they have to understand and read different signs in both games (Selander & Svärdemo – Åberg, 2009).

How different games are used was investigated in a project by Alexandersson, Linderoth and Lindö (2001) and interested boys and girls a little differently. Mulle Meck's car-building was a programme that was used, and the boys built more and the girls wrote more stories about Mulle Meck. In the competitive parts in the programme, the boys were more interested, and the girls were not. The girls were most interested in the social aspects, e.g. reading letters and answering questions in the game. In this study, the boys were louder in their discussions and could be likened to a team – they "cheered" one another on. The girls talked more quietly. But both boys and girls were happy to share their computer knowledge with each other. According to Alexanderson, Linderoth and Lindö (2001), Skolverket (The Swedish Education Agency, 1998) have also described how there are clear differences in how boys and girls relate to technology. They argue that girls use computers to communicate, while boys use it more for gaming and programming. When pupils are to write a story together on a computer, it happens in different ways. The boys seem to write every other sentence, so-called team-writing. The girls discuss the content more and write later.

Girls' and boys' language in relation to the computer as a social medium

Öhrn (2002) takes up different studies of gender patterns and compares those from 1970s-1980s. It shows that there have been changes, but also that the conditions known from before are still present. In later research, girls can be seen as a non-subordinate group in education, and boys can be the losers in the system. By this, the researchers mean that today's girls take more space in the classroom and make their voices heard more.

Einarsson (2009) describes that connection between language and, among others, technology, power, gender, age. In the study, it comes out how different researchers view boys and girls in classroom situations, among other things. According to Einarsson (2009) youngsters hang out a lot online. He asks the question if language is then affected by IT in speech and writing. He argues that young people have great access to the Internet, especially boys. The Internet is used by boys mostly for gaming and by girls for chatting, schoolwork and mailing. Places for youngsters to meet have gone over to online sites like e.g. Lunarstorm, Facebook, MSN. Youngsters create virtual rooms for different kinds of reflections, but can also open forums that are more negative, e.g. bullying. When youngsters chat, they use a language that resembles speech, e.g. with reduced forms. They use symbols that express feelings. Language takes on a playful character, Einarsson (2009) argues.

In a study "Bekönade ord i förskolan" (Gendered words in pre-school) that Einarsson carried out in 1981 it came out that small children already differentiate between words and categorise words clearly according to gender. Yet staff in pre-schools and schools are nowadays more aware of the problem of equality. But in different research on boys and girls in schools, it can be demonstrated that boys can dominate in conversations depending on the teaching

situation. The boys dominated in situations like question-answer sessions and facts-based lessons. On the other hand, the girls were more active in conversations about relations. Another perspective that Einarsson (2009) describes is the view of boys and girls in teaching plans that is doubly hidden. Girls are expected to follow the lesson plan, help the teacher, read aloud, be quiet and still, get follow-up questions, do not get their questions fully answered, etc. The boys on the other hand are seen not to follow the lesson plan, discuss more in mathematics and social studies, ask for more help, talk more, get more correction, etc. Einarsson (2009) can see that the hidden teaching plan contains different expressions for boys and girls. Girls are expected to be more passive and boys are expected to take up a greater place in the classroom. Findahl (2011) demonstrates the differences in what men and women use the Internet for, and here it comes out in the study that girls blog more from the age of 12 years than men. Blogging has become their own culture for many girls, and is seen as one of the most common things to do online and its age range spans from 12–25 years. Findahl (2011) sees that the group of girls who read blogs is between 12–15 years. More and more people are using social media, and here you see it starting to become an interest from the age of eight. The most common social medium among the younger ones, 9–10 years, is Bilddagboken (Picture diary) and then when they get older comes Facebook. The difference between boys and girls is that 37 percent of boys and 54 percent of girls make an update every day. By *update* it is meant that they describe what happened that day for them. In connection with that, boys and girls publish digital pictures, where 23 percent of girls publish and 11 percent of boys. When it comes to shopping online, the difference between men and women is not great but it also shows that men are into buying and selling sites like Tradera and Blocket more than women. Women dominate in searching for health information - 72 percent compared to 55 percent of men (Findahl, 2010).

Statistics show that 63 percent of girls had a laptop in the age group 14–15 years and 33 percent of boys. Swede's reading habits have also been studied and it comes out that reading a daily newspaper online has increased and become a habit. Here, there is no difference between the sexes (Findahl, 2010).

Boys share more files, which can be described as a form of trade, and here 29 percent of boys file-share, compared with 10 percent of girls. The age range of boys who file-share is 16–25 years. An increase in file-sharing has taken place between 2010 and 2011, and 69 percent of boys compared to 38 percent of girls have file-shared in the age range 16–15 years (Findahl, 2011). Findahl (2010) has investigated how Swedes view digital participation, and it can be stated that there is no difference in terms of interest between men and women. But there are of course those who do not feel part of the digital world, and they are the elderly in society and here it is elderly women who most often do not use the Internet at all.

Aim

How do boys and girls view the computer as a tool and how do they refer to the computer as a learning tool at school and in their spare time?

Data collection

- Interviews with 59 students, 38 girls and 21 boys. Of these 24 girls and 14 boys were in compulsory school, with 14 girls and seven boys in senior high school. In grade two, there were three boys and four girls. In grade four, there were five girls and five boys. In grade five, there were three girls and three boys. In grade six, there were two boys and three girls. In grade eight, there were 10 girls and one boy. In senior high school, there were 11 girls and six boys.
- We tried to get as equal a mix of boys and girls as possible. But the number of girls in grade eight and senior high school was greater than the number of boys, and in compulsory school some pupils were missing because of illness, declining to be involved, etc.

- The interviews took place at the start of the project with groups of 3-6. They were like a conversation. They were based on a questionnaire with open questions. All pupils who were interviewed got the same questions.
- The material was worked through in different ways. The interviews were carefully transcribed. Boys' and girls' contributions were marked to be later grouped.
- The transcription of the recorded material came to 330 pages. In the analysis of the interviews, patterns were sought based on the material I received. In the analysis I have compared the different statements with one another.

Selection of participants

Participation in the study was completely free and could be stopped without saying why. Names of pupils/adults and schools were not mentioned in the study. It was free to take part in the interviews and every pupil/adult had the right to say no without saying why.

We took into account the four ethical principles that Vetenskapsrådet (The Swedish Research Council, 2002) have published, and they are:

Demand for information – we informed parents and pupils of the purpose of the investigation. Also that it was up to them to take part in the interviews and that the pupils could stop when they wanted to.

Demand for consent – we got consent to participate in writing from pupils' parents or guardians and also asked the same orally to the pupils who took part in the study.

Demand for confidentiality – So that no pupil or school could be recognised, the names of schools or local authorities were given and the pupils were referred to as boys or girls.

Demand for use – pupils and parents were informed of the purpose of the study.

Results

In the results, I present chosen parts of the empirical study of the conversations between boys and girls, and how they express themselves about using computers in schoolwork. In the whole presentation of the study, I have chosen to add quotes from the investigation. These quotes are not in this shorter version.

The computer in schoolwork

(Tell me what you use computers for in schoolwork?)

The pupils did not give extensive answers to this question, but included their free periods. The boys expressed themselves more regarding how they used computers in their schoolwork. They answer in longer and more comprehensive sentences. The girls answer with single words and answer one after the other in the group. In general, they answer in the same way that they use the computer for schoolwork in order to write, look for facts, download pictures. In senior high school, they expand on their answers by naming different programmes they need for the courses they are taking. In their free periods, the younger pupils play games, both boys and girls. From grade five, the pupils are more into blogs, homepages, Facebook and MSN. In senior high school, they read Aftonbladet, which the boys mention, and listen to music, which the girls mention. There are no real differences between boys' and girls' answers. But what can be got out of the interviews is that from grade four girls start to spend more time on social media. Boys of all ages play games and then they also mention reading newspapers in senior high school.

The computer and learning

(How do you think that computer use will affect you own work in school? OR

How do you think that computer use will affect your own learning?)

This question was hard to answer for all age groups and for both boys and girls.In grade two, girls thought that their learning was not affected much. But they think that they can do more. From grades four to eight, girls say that they learn more about spelling. Girls express a worry about handwriting and that it will be affected. From grades four to eight, boys think that spelling and writing become better if computers are used. Work becomes more fun. One mentioned that their grades will be positively affected.

In senior high school, boys do not talk about grades when questioned about learning. Their answer is that it depends on where you will work later. No-one says that they may get better grades. In senior high school, girls think that spelling and writing get better.

The computer for relaxation in school

(What do you do on the computer when you want to relax from your schoolwork?)

The younger pupils play games when they want to relax from schoolwork. This is true for both boys and girls. From grade six, it looks like schoolwork takes more time from free activities. There are stricter rules, according to the pupils. In senior high school, things are again a little freer, and boys relax with Aftonbladet and Facebook. In senior high school girls blog, listen to music, are on Facebook, and watch films. The older pupils do not play games much, but are more on relationship sites and here things are equal between the sexes.

The social media are increasing in size and take more time from the pupils. In breaks from lessons, older pupils from grade five and older are often sitting at the computer instead of just being together.

The computer in leisure time/at home

(Do you use the computer in your leisure time? Describe what you use it for?)

What came out here was that girls play more relationship games at younger ages, and boys of all ages play games with links to machines and sports. The slightly older boys play more action games. The older girls get a bit embarassed during the conversations and laugh when they are asked if they use the computer to play games. Only one girl in senior high school said that she used it to play SIMS which is a relationship game. The younger pupils expressed themselves in more detail on their use of games, and there was no difference between the sexes. In senior high school, both boys and girls are short in their answers. The boys talk with other words like click, download, icon, double-click, computer mouse, google, email, FC. Girls talk more about their relationship with the computer. They think it is a luxury to have a computer, talk more about the environment than boys and think it is more fun to go to school.

Boys' and girls' understanding of differences in computer use

(Tell me what you think girls and boys use the computer for? Describe these things)

The younger girls say at once that boys play more action games. Boys think that girls play more relationship games and use blogs. At this question, the older girls giggle a lot and mumble to one another. In the mixed groups, the girls comment on the boys' answers. On the other hand, the boys did not comment on the girls' answers. The girls felt that the boys played more games. The boys think that the girls blog more, are on Facebook, tell more gossip. But after some thinking, both boys and girls come to the conclusion that MSN is something they have in common. They have a clear division into what are boy and girl games. They describe each other as if they think they know what the opposite sex does. For boys in grade eight who are in the interview with some girls, there were no direct answers.

What do pupils think they are especially good at

(What are you good at when you use a computer?)

The girls in grade two found it easy to say something they were good at. The boys in grade two all reply that they are good at playing games. Girls in grade four argue that they are good at writing, downloading, drawing with Paint, and have an imagination. Boys in grade four think they are good at mathematics on the computer, games, Swedish, Word, Powerpoint, English, Youtube. The older the pupil, the harder they had answering this question, and this was the same for both boys and girls.

Conversation patterns between the sexes

In the conversations in the different groups of pupils, I could only distinguish nuanced differences. In the mixed groups in the lower years of compulsory school, boys took more space. From grades six onwards, it was mixed in terms of speaking room. In grade eight, where there was only one boy, it felt like the girls took over the conversation, and spoke for the boy. In senior high school, there was a mixed group where there was one boy and the rest were girls. This boy took more space there, but was rebuked by the girls.

Discussion

Learning with the help of technology

In the context and the conversation on the computer, I can distinguish and common denominator among the pupils. They are united around the computer as a tool with possibilities. I experience that they are all proud and feel blessed to have this took for their learning. Both boys and girls use it to search for knowledge and to have a social

environment. Säljö (2000) calls the computer an artifact to group around. But language can also be an artifact. Artifacts can be seen as tools we have developed for us to act in our surroundings and they are here because in the social environment we find ourselves in we are constantly in development, where artifacts combine and lead to new developments.

Men's and women's use of the Internet – a question of democracy

Schools must teach pupils to use IT tools, even if they already can use them then they start school. IT knowledge can vary depending on access in the home, and therefore it is of the greatest importance to bridge the digital divide that can appear (Hylén, 2010).

Research (Findahl, 2010 och 2011) points to an increase in blogging among girls and a decrease in age. On the other hand, boys are developing in using more games and file-sharing, according to Findahl (2010 and 2011). This agrees with the results of this study.

In the conversations, it came out that girls talked more about relationships and computer use. I can guess that they have a closer relation with the tool than boys. The boys see it more as a technical gaming machine. Findahl (2009) argues that girls see themselves as less competent in using technology, and more boys than girls answered in this study that they were interested in trying new technology. Conell (2009) has come to the conclusion that girls tend to be seen as more caring and emotional. Gärdenfors (2010) has also argued that girls analyse more and boys understand the whole picture more. Alexanderson, Linderoth and Lindö (2001) describe that there is a noticeable difference in boys' and girls' relationships with the technology. They argue that boys use it for games and girls for their social environment.

The effect of change on work in schools

In Lgr 11 (The Swedish School Curriculum 2011), it is written that pupils should use technology to search for knowledge, and I can interpret that pupils do this and answer that they do. The boys' great interest in games comes out in all questions. Can it be the same that this goes over the top? But can you then use boys' interest in games in pedagogical practice? Many so-called serious games have a pedagogical finesse, and Alexandersson, Linderoth and Lindö (2001) have done research on this and come to the conclusion that learning took place depending on how that game was set up. But from an adult perspective, maybe it was not learning that was meant. Who has the right to say what type of learning is best?

In Findahl's (2009) investigation, it comes out that the Internet is used a lot to search for facts, keep oneself updated on schoolwork, and to look up words. This is in agreement with the interviews my study relates to.

Preparations for upcoming working life

In the study, it comes out that boys in senior high school see the computer as a possibility to prepare for their working life. Otherwise, the pupils interviewed do not mention the connection between the computer and their upcoming working life.

Hylén (2010) points to an OECD study where Pedró (2008) argues that today's citizens live in a technical world that affects their lives a lot. Therefore, he argues that schools must be a part of that world and prepare pupils for their working life online.

How schools of the future will look and how boys and girls use the Internet will be very exciting to follow.

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The computer as learning tool
– Comparing four school classes (pre-secondary school)

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Abstract

The article describes a municipal school development and research project. The study uses interviews with teachers, conversations with students and classroom observations to examine how four primary/secondary schools deal with implementing computers in daily work. The study uses activity theory and results are presented by comparing the four groups.

Keywords; ICT –knowledge, Primary/secondary school, intervention study, special education, activity theory

Introduction

The article draws on empirical studies of how 86 students and 23 teachers use computers in three classes in a pre/primary school (65 students, 17 teachers) and one secondary school class (21 students, five teachers) in Sweden. The schools participate in a research and development project 2010(-2012) in corporation with Dalarna University. Data were collected during spring and autumn 2010 and 2011 through full-day observations and conversations with students and teachers.

The objective is to document the classroom work aiming to find a) in which activities and contexts computers are used, b) if similarities and differences exist between classes in term of how they use computers and c) how students and teachers perceive the computer as a learning tool. The aim is to utilise the experiences generated when the students and teachers got computers in school and not to evaluate the wider ITC project in the municipality.

The teachers' activities are described in more detail in another article named *The computer as learning tool – a pedagogical challenge for all teachers. Combining theory and practice for learning in an R&D project* (Wetso 2012). The same theoretical framework has been used for the two articles (about the teachers and students activities). The study draws on activity theory (Leontiev sv. 1986) and, from a social constructivist knowledge (Vygotsky sv. 1981) building viewpoint; the interaction processes have provided an interesting focal point for further investigation. The study took place during a period when the Swedish education system was going through a change (2009-2011). Curricula had been reworked in order to provide clearer goals and a new grading system had been introduced with the intention to get more students to achieve passing grades at school.

The results from this study are presented by comparing the different classes. The project can be considered an intervention study where all students and teachers participated in implementing the computer in the daily activities.

Background

In autumn 2009 a study was presented: *What affects the results in the Swedish compulsory school?* This research-based knowledge overview highlighted different factors that could have had a negative impact on the results in Swedish schools. One work method that was common during the first years of the 21st century has been identified as such a factor. It comprised of students themselves searching for

information and communicating ideas regarding different issues. Students with good reading and writing skills, who were able to stay focussed on the task and work independently, could handle this well. Those who lost out were students in need of support. To search for, examine, critically review facts, exercises and write presentations and present knowledge was too overwhelming for many students and the consequences were that they did not achieve passing grades. Students were given the responsibility for their own learning before they were ready for it. Students who needed clearer directions were not offered this under these working conditions since the role of the teacher as leader for the work had been reduced to more like a mentor (2009).

The earlier study had not considered if there was a connection between the use of computers as learning tools in relation to individual work among students. But what happens in school when students receive their own computer, does collaboration between students and teachers increase or does individual work become the dominant work form, or are new work forms created? To this date, the introduction of computers as learning tool in Sweden has been slow. We can assume that too few computers and not enough support for teachers during this change work has been the cause of this. In Sweden it has been common for 4-5 pupils in primary school and 1-3 students in secondary school to share a computer. The computer has mostly been used to search for facts and to write texts, and less frequently used in second language learning and mathematics (Finndahl 2010, Skolverket 2010).

All students should learn, at school, how to critically review texts and facts from the Internet. The aim for school activities includes giving students the competence to use computers as learning tools (Lgr 11., Lgy 11.).

To include the ICT in the school system

Digital competence is one of eight key competences in the European Union agenda for life-long learning. Key competences shall be included in and presented during the whole educational process for all children and adults. They should be viewed as equally important and include proficiency and attitudes, personal development, active citizenship, social integration and employment (European Parliament, 2006). The competences are: 1. first language communication, 2. second language learning, 3. mathematical knowledge, fundamental scientific and technical competence, 4. digital competence, 5. learning to learn, 6. social and civic competence, power of initiative and 7. entrepreneurship, 8. cultural awareness and means of cultural expression.

In our parallel study which highlights the teachers' learning during the transition toward using computers in education identified that:

> Combining theory and practice helped teachers to reflect over their role in the classroom, dissociate themselves and adopt an outside perspective of their own practices and activities. Teachers showed through their actions that they varied the use of computers as a learning tool. Conversation with colleagues about the use of computers aided work motivations. (Wetso 2012)

The earlier results (Wetso 2012) showed that some teachers' have **multi active** and **active** interest during lessons (the other categories are: interested, distanced interest and uninterested) and are characterised by:

- *structure* in the classroom, everyone has their own work space, an introduction to exercises are given to the group as a whole, goals are presented
- *variation* in the way exercises are carried out and time for support are created within the classroom framework, individual, pair, group or class work is common

- *flexibility* adapting the grouping of students, the teacher is responsible for this and work space - area can vary
- *the dialogue* is carried out within the group – and *based on the individual's* needs
- *the technology* should be available and function based on current needs; the student should be able to choose
- the teaching follows a *theme or is put into a context so that students understand*
- *task* are created for the group but adjusted according to the learning needs
- *the climate* is open, accepting – *differences* are perceived to enrich the group, everyone's voice counts - *the activity* is high– but unobtrusive
- *multi-learning* is in progress where all students are active based on their abilities
- *content*, the topic relates to how to deal with learning issues through dialogue
- *working together* is an established method among students and with close support through follow-up by the teacher, diversity is crucial
- *Orchestrating* the activities in small groups, create time for personal support to the students (Wetso 2012)

It is clear that teachers who had a positive attitude to introducing and using computers as a learning tool in education in combination with a personal insight about the importance of developing pedagogical skills in collaboration with other colleagues and students also were the ones who managed to handle the task with consideration to different students' needs and abilities. It was important that teachers were given the opportunity to discuss learning based on existing abilities and needs. None of the participating teachers had previously worked with theories about learning or with issues around inclusion in relation to ICT knowledge. Teachers had about 15-20 years' experience of working with computers in education, work that they more or less had to handle without support for the implementation work itself. Previous studies show that there is a need for research to follow up the learning of both students and teachers in general (Wetso 2007) and the use of computers in education and in

school in particular, Computers that are used more purposefully can offer the students and teachers the opportunity to develop new forms for learning and give new dimensions to the learning process itself (Ainscow and Sandrill 2010, Grönlund 2011, Gärdenfors 2010, Hattie 2010, Källander 2010, Skolverket 2010, Tallvidd 2010).

The activity theory

According to Leontiev (sv. 1986) there are external (society) and internal (individual) motives that have an impact on the actions of individuals in different activities or contexts (Wetso 2006). Supported by activity theory the relationship between the three components **individual**, **environment** and **activities** can be studied. This study uses the four question areas formulated by Engeström (2001) as a basis:

1. Who are the learning subjects? How are they defined, where can they be found?
2. Why should they learn? What makes them prepare themselves for this task?
3. What do they learn? What are the contents and the outcome of learning?
4. How do they learn? What are the key actions or processes for learning?

This study focusses on the students' **actions** and **activities** in school. Activity theory has been used to highlight conditions in the environment: **imbalances**, **needs**, **motives**, **activities** and (in direction toward set) **goal** (Leontiev 1986). The school activities are governed by the general goal that all children should be given opportunity to leave school with passing grades, The study does not reveal if this goal is achieved but it does present how the school environment is structured to create conditions in line with the specified goal for educational activities according to the curriculum for (pre-) primary- and secondary school (Lpfö, 98 rev 2010, Lgr 11 och Lgy 11)

Selection of participants and the research design

Information about the research project was given by the research team in January 2010 to all teachers, parents and students.

> In a letter, parents and students were asked if they would be interested in taking part in follow-up discussions and interviews. The teachers and students were asked if they were willing to document their work in the classroom and to allow the research team to visit the classrooms in order to do observations of lessons. The two participating schools are referred to here as "Small town" (rural area) and "Big town" (urban area). In "Small town" primary school, three out of the eight classes participated in the project (referred to as groups A, B and C in Table 1). In "Big town" secondary school, one class of the 18 educational programmes participated in the research (group D in Table 1). (Wetso 2012)

"Small town" group A, B, C			"Big town" group D
Selected 65 students, of total 120 students Selected 17 teachers, of total 20 teachers			Selected 21 students, of total 1250 students Selected 5, of total 130 teachers
Group A	Group B	Group C	Group D
22 pupils	23 pupils	20 pupils	21 pupils
Year 1-2 to 3	Year 4 to 6	Year 8 to 9	Year 1 to 3

Table 1. Groups A-C primary students and teachers, D secondary students and teachers. The students in primary school class 1-2 were monitored up to class 3, the students in class 4 up to class 6, the children in class 8 up to class 9 and the students in secondary school from class 1 to 3.

The data collection contains classroom observations, dialogues with the students and teachers, meetings between the school leaders in the municipality and the university team, see table 2. The design and data collection are similar to the study focusing on the teachers activities (Wetso 2012). This means that observations are made in the school environment, and the students activities are followed in the four school classes.

| Activity	No of teacher	Frequency
School – University cooperation team		8
Observations in classrooms	25 teachers	121 lessons
Dialogue with students	86 students	121 lessons
Dialogue with the teachers	22 teachers	4-21 each teacher
Dialogue with the head teachers	3	5-10 times
Dialogue with the service team	3	2-9 times
Reading students texts, arts, work plans		132 times

Tabell 2. Data collection, the researcher's activity, meetings and observations

The study takes a hermeneutic approach. The researcher has gathered, categorised and interpreted materials and also participated as observer and followed the activities on site at the schools. Triangulation has been used to collect and analyse data. The study has elements of action research where the researcher actively participates in the planning process, takes part in the presentation of the contents and gives feedback about the results from observations to participants at different occasions. It is not possible to draw any general conclusions from such a small study but it is possible to discern certain recurring patterns. It is also possible to look for similarities and differences between the two schools and the four groups when different factors are studied such as environment, activity and the professional teacher's handling and the students learning. The research has a multi-dimensional approach. (Wetso 2012)

The students in the research project have just been given computers when the research project started spring 2010. The teachers in this stud have, in parallel with the transition to using computers in education, been studying a university course (22.5 ECT credits) at Dalarna University (Lärarlyftet, Förordning 2007:222). The course included ICT knowledge, special education, learning theories and how to handle follow up work and evaluation.

Intervention, university course in three steps, Including:
ICT knowledge, special education and measures handling program (22,5 ects)
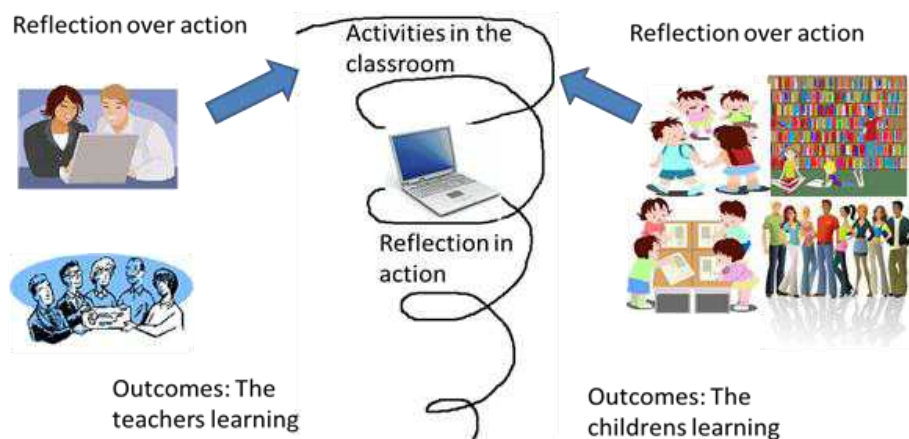
Picture 1. Relationship between teacher and student and activities when computers are introduced in the school environment

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Results

Here focus is on the **students** (individual, 1.) **activities** (2.) and use of computer in the pedagogical **environment (3.)** The conditions at the two schools during the start-up process and daily activities must first be described. Based on the activity theory it is important to describe the three components in relation to each other and not as single components.

The results are presented from three angles related to the objectives. The objective was to document the classroom work with the aim to find a) in which **activities** and contexts computers are used, b) if similarities and differences exist between classes in term of how they use computers and c) how students and teachers perceive the computer as a learning tool.

Group A. Pupils in classes 1-2 are integrated, that is, these children are taught at the same time. Sometimes mixed-age constellations are used among age segregated groups. The reason for this was that there were not enough children in the catchment area. All students have their own work space but the classroom is organised in such a way to make collaborative work possible. This means that different

furniture arrangements are used. There are round tables for four-five students, pair benches and a sofa corner with enough room for everyone. The pupils have access to two classrooms and one group room. Pupils shared a computer with one other classmate during the first term of the project. The teacher(-s) always planned their work based on participation of all students during different phases. Speech synthesis and headphones as well as spelling tools were introduced to all students from the start. The children in the school were trained to handle different resources on the computer, to collaborate and take turns to solve different tasks; *variation based on need* was the fundamental principle. Boys and girls often worked together. The big challenge is to train students to learn how to write with the computer as learning tool. The students who are not familiar with letter sounds and shapes find this phase more difficult. They do not identify the letters on the keyboard and may not be able to follow, for example, a run through on the Smartboard. Extra lessons are introduced to strengthen the linguistic awareness both auditively and visually for these students. Students need to be able to differentiate between the form and content aspects of language and to identify letters and

sounds. These issues come to a head for both students and teachers as reading and writing learning are to be handled at the same time as introducing use of technology and exercises and programs are to be interpreted. From autumn 2010 all students receive a computer of their own. The incorporated collaboration strategies remain. Smartboard is used at run-throughs or analyses of tasks. Rules for how to handle computers are clear and games and play is a selective part of the learning. Other games or play using the computer is allowed 15 minutes every day before school starts. The students follow these rules and there are no controversies found during lessons. Goals are explicated verbally in connection with exercises and written versions are put up in classrooms.

Group B. Consists of students in a year 4 class. The class has a classroom and a group room at their disposal. Students sit in rows of two/three facing the board, all students have their own work space. At the back of the classroom there is a sofa corner. The climate in the classroom is permissive, students can move their chair or choose to utilise floor space in order to collaborate with other classmates around material. Students have during the first years in school (years 1-3) been training to use pens and to a certain degree use computer to search for facts and to write (a few computers per class are available). Girls and boys work together to solve different tasks using the computer. Students have to share the computer with a classmate during the first term of a one-to-one project. *The education rests on the principle of equality* i.e. everyone is allowed to use the computer and the students help each other and take turns carrying out the tasks at hand. The goals are related to different exercises that are to be handled and are presented through dialogues with the students and texts on the walls in the classrooms. In parallel with the teaching in the classroom there has been a level grouping teaching where students in need of support sometimes have been segregated in order to get access to

specially equipped computers and special teachers. During autumn 2010 all students receive a computer each. The incorporated collaborative strategies remain and are broadened in the classroom and the earlier separate special education is terminated. A special education teacher is recruited to support the work team. Speech synthesis and spelling tool, headphones are available for all computers and students are encouraged to use these resources, which they do.

Smartboard is available and used for different purposes e.g. analysis of speech or presentations in the classroom. Team work is structured to suit the use of computers. Students collaborate in pairs or smaller groups who plan the work, read up on facts, formulate questions for interviews e.g. visits to work places. The work is presented in words and images to the class and ends with evaluations. The evaluations include a critical reflection over the personal contribution, how the work was carried through, results and personal learning. Step by stem the students work through the task. Games and play on the computer occur when they serve a purpose to aid learning. The same rules apply for this group as for group A. Students can play games on their computers before the start of the school day. Students follow these rules.

Group C. Consists of students in year 8. During the first term they do not have a home classroom of their own. They move from room to room according to a scheduled system where school subjects are allocated to a particular classroom. It is time consuming, takes effort and students perceive this as cumbersome. They have to collect books, writing material and move computers. Earlier these students sometimes have had access to a computer room. Basic skills for writing have been achieved through traditional learning with pen and paper exercises. Students in need of special support have had access to computers with assistive applications and separate teaching with a special needs teacher. During

the second term students get their own home classroom that they decorate together. Students get computers with extra resources for reading and writing training and are encouraged to use these. They continue to work with the computer as they have before and they feel a little uncomfortable using available resources. They associate these resources with special needs education and exclusion. When they are asked to write spontaneously they most often choose to write with pen and paper instead of on the computer. So far they are more accustomed to writing with a pen. Students are encouraged to collaborate in different constellations and subjects which works well in practical tasks for language learning or lab work, but when they are writing texts or solving exercises they spend time at their own computers and write on their own.

Students often have to carry out shorter tests to assess knowledge. These are presented in paper form and to be filled out with a pen. The goals are not as explicitly laid out here as in the case for younger students but are highlighted in connection with the introduction of new tasks or exercises. *The message to these students is unclear* because sometimes the computer is to be used as a learning tool and sometimes not. The conditions change and give a somewhat mixed signal to students about what applies. Smartboard is available and is used by both students and teachers for mutual presentations, analyses and reviews. Students have the same rules as in groups A and B but these students are in their teens and surf the net during recess and also use social media like Facebook for contacts with other individuals both within and outside the school, during both recess and classes. This behavioural pattern causes problems for both students (who have difficulties to keep control of their work and complete tasks within the set framework for allocated time in the school) and teachers (who claim that they do not really know how to steer the whole issue). This is especially poignant during the first two terms of the project. During term three of the project

the issue levels out and both students and teachers feel that it has become more manageable. Students are allowed to bring computers home with them.

Group D. Includes students who, at the start of the project, are in the first year of a three-year secondary educational programme with economics, entrepreneurship and business. They have chosen to use a classroom as base for group work in the specific programme subjects. In the classroom there is a sofa corner. Other lessons, e.g. in foreign languages take place in mixed groups with students from other classes and in other classrooms. These students have also received traditional education where books have been used for reading and collecting facts and paper and pen has been the writing tools even if there has been an element of computer use during the early school years form either searching for facts or editing texts. Students have free access to computers and often choose to bring computers home to complete different subject exercises. The class is encouraged to collaborate in different project exercises, for example on how to start and run businesses where the students own ideas and initiative is encouraged. Practical elements of the course work includes heading out into business activities and try out different forms of work that is linked to entrepreneurship. Grading is performance based and a significant part of exercises are individually, both orally and in writing. Students meet teachers who are included in a development project (four) and have participated in the university training and teachers (six) who have not participated in the project. This means that the *premises are different from subject to subject and from lesson to lesson.* Sometimes students are expected to use computers as learning tool integrated in the education together with other classmates (regarding economics, entrepreneurship and business) and sometimes almost never (when it comes to e.g. foreign languages, mathematics and physical education). The special educational support is

given outside of the classroom by a special teacher. During the project a more open attitude develops which means all teachers can offer personal support to those students who are in need of support. Goals are presented in connection with new courses or subjects being introduced to students, i.e. a few times during term. The same phenomenon occur for students in secondary education as for students in group C. they want to surf the Internet and use Facebook mixed with course exercises. The climate in the classroom is positive, they have the will but the concentration is sometimes split between activities with social media and school exercises. It becomes apparent when a teacher does a review of some form and the students' gaze is more directed toward the screen than toward the person speaking. Students often turn to the adult in person to discuss what is to be done. During term three and four the situation is a bit different and students can drop Facebook. They are determined and are more focussed on solving different school tasks.

The student activities in the classroom

In table 3. It is shown in which **activities** and contexts computers are being used and how common these activities are. The similarities and differences between the four classes in terms of how they use computers can be seen. It becomes apparent that when students are at home due to illness they maintain the contact with the teacher and/or the class through computer communication. It could concern a particular exercise that has to be handled by working with classmates (teamwork) or that teachers want to ensure that the student has received relevant information about the school work.

	Almost every lesson	Every second lesson	Almost every day	Every week	Almost every second week
For contact during absence due to illness					A,B,C,D *
For getting information before conversation with parents and teachers					A,B,C
For reading comments and statements				A, B,C,D	
For use of Facebook		C,D**			
For use of Google		C,D	A,B		
For getting information /instructions	D***		A,B,C		
For exercises in mathematics		A,B		C	D
For solving problems			A,B,D		
To plan work		A,B			
For reading		C,D			
For presenting				A,B,C,D	
For searching facts			A,B,C,D		
For communicating		A,B,C,D			
For writing		A,B,C,D			

Table 3. The students use of the computer as a learning tool related to different activities in group A, B, C and D. * When needed, ** not as a direct learning tool but indirectly for discussions about school tasks with classmates. *** Just for topics related to the programme subject entrepreneurship and business, not for lessons in foreign languages) and mathematics.

Before individual planned conversations with guardian and student about the students' learning information is made available through a homepage with access (through log in) for students and parents. The information highlights the student's activity and progression in relation to the school goals.

	Almost every lesson	Every second lesson	Almost every day	Almost Every week	Every second Week	Almost every month	Theme related work
Needle work						B	A, B, C, D
Music						A, B, C	A, B, C, D
Sports						A, B, C	All subjects can be involved in theme related work from time to time
Foreign languages				C	D		
English				B, C	D		
Mathematics		A	B	C	D		
Science			A, B, C				
Civics		A,B,C,D					
Swedish	A,B,C, D						
Courses related to the specific program	D						
	Theme related work can be from every lesson to every second week						

Table 4. The students' use of computers as a learning tool related to different school subjects; group A, B, C, and D

Teachers and students communicate texts through the computer during face-to-face lesson but comments and dialogues are also added after lessons and this is done using the computer. Students use the computer so read text, gather information from the teacher or from the Internet and to produce texts or present material from exercises. The use of the computer is different mainly with the younger students in groups A and B having integrated the computer in more school subjects than the older students. The younger students use the computer for Swedish, science, social science, mathematics and language learning. Students in group C use the computer in many subjects but not as frequently as the younger students. The oldest students in group D use the computer mainly in school for specific exercises linked to their educational programme which include entrepreneurship and economics, and for searching for facts and writing text but less so during lessons in mathematics and languages, see Table 4.

	Group A	Group B	Group C	Group D
Single work	Yes	Yes	Yes	Yes
Pair work	Yes	Yes	Yes	Yes
Group work	Yes	Yes	Yes	Yes
Full class	Yes	Yes	Yes	Yes
For homework	No	No	Yes	Yes
Pupils dispose the computer at school and home	No	No	Yes	Yes
Separate work and free time	Yes	Yes	Yes	No

Mentor support and following up conversations	Yes	Yes	Yes	Yes
Documentation	Yes	Yes	Yes	Yes
Evaluation of different activities	Yes	Yes	Yes	No
Estimate use of computer during the day	30% - 40%	30% - 40%	20% - 30%	40% - 50%

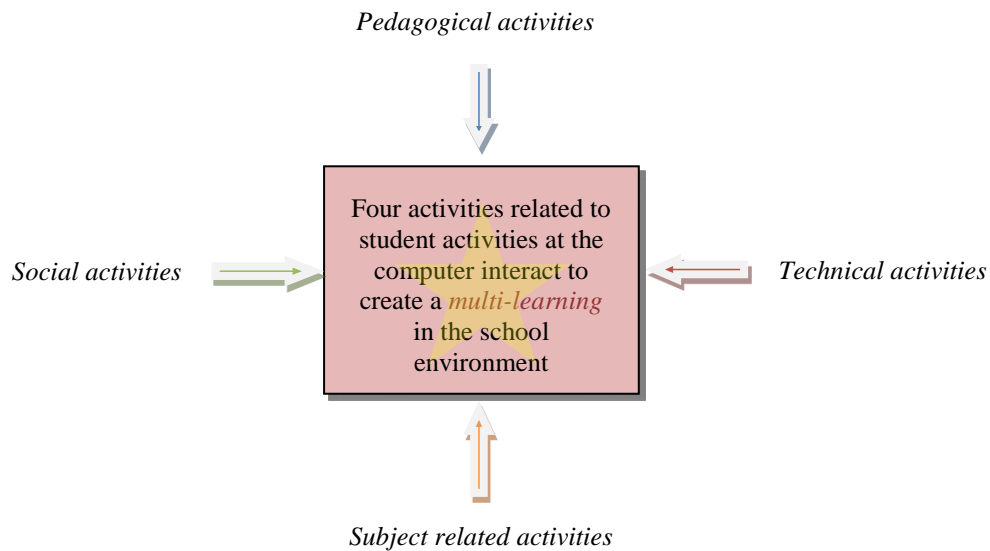Table 5. The computers are used in different activities by the students in group A, B, C and D.

Different forms of work, single work, work in pairs, group activities were common in the four groups. The youngest students in groups A and B disposed of computers at school. Students in groups C and D were able to bring computers with them home. Almost all students have computers at home, see Table 5.

A new school culture emerges where multi-learning takes place

Based on classroom observations it is possible to see that the computer is used also to solve different problems and to raise understanding for different dilemmas that are to be dealt with in relation to handling different school tasks. The use of computers in education can fill a function to highlight a task or dilemma that the students should handle. Images and texts are combined and presented with own descriptions where the work develops often in collaboration between students or students and teachers. This happens during what we can call an open creative process where the dialogue and activities are contained by and can be described as containing several **dimensions** in relation to use of the computer as a learning tool. Concretely, it is possible to follow how an illuminating dialogue is carried out (heard) between students and an interaction process with different **actions** (can be seen) to develop

in the pedagogical space. Occasions for multi-learning are created in the process and can be seen for all four groups. A fundamental condition seems to be a permissive atmosphere and that a flexible handling of exercises is worth striving for. Teachers set the path by openly examining different solutions and reflecting and weighing up solutions and alternatives. Students showed in the learning situation that they adopted a learning model with four dimensions. They succeeded in handling *exercises* and challenges in different activities in order to *increase understanding, learning and achieving set goals when they:*

- handled *the central subject contents, and* talked about what was treated and how the central content could be perceived?
- handled *the technology and made use of different functions* which were tested and verified in relation to handling material and producing own material,
- handling *layout in relation to description and* intention in presentation creating images. Students matched texts and images in order to highlight the contents.
- handled *social collaboration,* created reasoning for exchange and understanding in order to use classmates' competences and knowledge in the work with different exercises.

Pedagogical activities

Social activities

Four activities related to student activities at the computer interact to create a *multi-learning* in the school environment

Technical activities

Subject related activities

Picture 2. The model of the four dimensions of multi-learning

Discussion

The computers are used for individual, group and whole class work in all the classes and exercises are often designed to allow collaboration. In groups A and B, computers are used in almost all subjects and teaching. Students use computers to write, count, search, evaluate and present work. Group C students use computers in almost all subjects but on a more irregular basis than do younger students. Group D use computers mostly in courses relating to the study programme, for example computers are more used in entrepreneurial studies than in language and never in mathematics education. All groups have a home class room which they feel helps working at the computer, providing coherent time. Teachers and students activities, strategies and working methods continuously change to become more educationally inclusive and the need for varied teaching is handled within the class framework. Students learning strategies become the focal point and individuals identified to be in need of support claim to feel more included. Two critical phases were identified where teaching activities were perceived as challenging and difficult for teachers and students to deal with: 1) when writing training is introduced on a computer for students in a group A and 2) when students in group C breach the 'freedom of responsibility' code by using computers as

social media. The study reveals that using the computer in education allows four dimensions of learning to operate in the pedagogical space. A multi-learning can be created in collaboration and in a kind of inclusive learning. The pedagogical activities, the environment give the students the freedom and opportunities to handle learning and to reflect over learning and skills in different ways during interchange. The environment includes the students in social activities; the students create a close interchange in actions and in dialogue with each other. The students create supportive activities with each other and have the freedom to make use of different technical resources (reading, listening and spelling applications, headphones, Smartboard, Internet and technical support by the teacher team) to handle the tasks. The students bring in and relate the subject to the possibilities in activities and in interchange from time to time. They play the computer with four or six or more hands together. A new way for pedagogical collaborative learning occurs. The zone for development and learning expands and a new school culture is possible to bring to life.

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