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Ansvarig utgivare: Dekanus Björn Åstrand
Redaktör: Docent Gun-Marie Frånberg, 090/786 62 05,
e-post: gun-marie.franberg@educ.umu.se
Bildredaktör: Fil. Dr Eva Skåreus
e-post: eva.skareus@educ.umu.se

Redaktionens adress:
Tidskrift för lärarutbildning och forskning, Gun-Marie Frånberg, Institutionen för interaktiva medier och lärande, Umeå universitet, 901 87 UMEÅ.
Grafisk formgivning: Eva Skåreus och Tomas Sigurdsson, Institutionen för estetiska ämnen
Illustratör: Sofia Agronius
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Editorial

This is the last issue of *Journal of Research in Teacher Education* in its present design. In 2009 the Faculty of Teacher Education, at Umeå university, will be replaced by Umeå School of Education. One of the reasons for this change has to do with an ambition to enhance research in educational science but also to make sure that the responsibility for teacher education is a concern of the entire university. The departments of the Faculty will from 2009 and onwards be located in other faculties at Umeå university.

In this last publication Sofia Agronius has done an exellent work as an illustrator. Her pictures serve the purpose to arouse the readers expectations and curiosity. Anders D. Olofsson, Department of Education, has been a guest editor. During a period of one year 15 researchers related to the presented research area, have met and discussed the articles of this publication. The seminars held in our departments, i.e. Department of Education and Department of Interactive Media and Learning, have been very constructive and well received by the participants. One thing that has become clear during these seminars is that our research area, *Interactive Media and Learning* is urgent, but also growing in shape and complexity, and also changing rapidly.

The first article of this journal, written by *Peter Bergström* and *Krister Lindwall*, reports on an online workshop which was held in October 2006 on the topic of contemporary web 2.0 technologies. The workshop was a part of the European project eLene-Teacher Training. It was organised by two teacher educators in Sweden and 33 participants were enrolled from eight countries in Europe. The workshop took place during one week on the Internet in a blog environment. It is analysed from both a pedagogical and technical perspective. The workshop is evaluated with a questionnaire, analysis of blog posts and pod casts and through reflec-

tions from the teacher educators. The result indicates that the technical aims were reached i.e. the participants learned to create pod casts and learned how to blog. The pedagogical aims suffered from difficulties to discuss for example attitudes to publishing content on the Internet. Instead pedagogical issues should be raised by the participants.

The aim of the second article written by *Elza Dunkels, Gun-Marie Frånberg* and *Camilla Hällgren* is to outline an emerging research area, evolving around young people and contemporary digital arenas. The field is growing in size, shape and complexity and the need for study is urgent. The research area is also somewhat elusive and its outline changing very quickly over time. In previous works the authors have focused on different parts of this area, and in this article they bring their ideas together to form a joint research base. The first theme is identity; what factors influence young people's identity development and how to interpret identity in a changing media landscape as well as in a changing society? The second theme is learning; have contemporary media influenced the processes and outcomes of learning and if so, how can the educational system exploit and benefit from this? The third theme is what in this context is called abusive practices; how can abusive behaviour on the internet, among and towards young people, be understood? The issues problematized in this article are to be seen as a probing for and a framing of a research base for further development. The overall aim of the proposed area of study is to identify, analyze and problematise contemporary digital channels of communication and learning in particular, expressions of abusive behavior, and their influence on digital culture and digital native identity construction, with a specific emphasis on issues related to age, class, gender and ethnicity.

The next article, written by *Carina Granberg*, presents a study of three campus courses of Swedish student teachers' experiences of using educational blogs blending face-to-face and virtual learning activities. In order to investigate their experiences and the circumstances that influenced their way of engaging in their blogs, 38 narrative interviews were carried out. To illuminate how information and communication technology (ICT) affordances and the blended environments were perceived, the data were analysed in light of Greeno's theory of affordances. Furthermore, a socio-cultural theory by Vygotsky was used to analyse students' social interaction within their groups. The paper presents a discussion of the circumstances in which students engage in their blogs. The students' expe-

riences of affordances in respect of blending face-to-face and virtual learning activities and the importance of social interaction within the groups are outlined.

The overall purpose of the next article is to make a contribution to current educational debate about learning by exploring theoretical and practical arguments for using Information and Communication Technologies and Multimedia in teaching and learning. The article, written by *Alison Hudson* and *Eva Mårell-Olsson*, focuses on epistemological, technological, and pedagogical dimensions and places emphasis on how ICT and multimedia can make different knowledge, skills and understanding visible in teaching and learning. It draws attention to different theories and conceptualizations of learning and uses some practical examples to illuminate how ICT and multimedia can make learning visible. In particular this paper presents two specific cases and illustrates ways in which students develop an ability to collect, organize, interpret and reflect on their own individual learning and practice and become more active and creative in the development of knowledge.

The article by *Brian Hudson* is based on a study of the student learning experience in a particular module of an international Masters programme that included a large element of online learning. It builds on earlier work which highlighted the importance of design and development of social infrastructure for supporting the development of an online learning community by revisiting the data from the perspective of a didactical design framework. The overall aims of this study are to consider how, as teachers, we designed and developed teacher presence and how this was achieved in practice from the design of teaching-studying-learning processes through development to interaction in the online learning community.

Monica Liljeström, Agneta Hult and *Ulf Stödberg* are focusing on peer assessment as a tool for collaborative learning in Distance and Online Education in Higher Education. The article starts with a background to the project which aims at implementing and evaluating peer assessment in Online and Distance Educational settings. It continues with an outline of the design used in the pilot courses and it reports some early results from the project. The focus of the research in this article is the students' experiences of participating in peer assessment in a course within the teacher education programme, with a special attention on strengths and obstacles with peer assessment and participating in this kind of activities trough text based communica-

tion. The results show that the students found it to be hard work but still valuable; as they thought that participating in the peer assessment process had enhanced their understanding of what they were supposed to learn as well as their learning process. Most of the students thought that this activity had worked well in the text based context although a few of them thought that other means for communication would have worked better. Conclusions are that the results so far give at hand that it could be well worth to continue to explore the strengths and limits of peer assessment in the Online and Distance context.

The paper by *Anders D. Olofsson* focuses teacher professional development (TPD) through the Internet. In the paper an informal arena for TPD in form of a Swedish online learning community (OLC), called lektion.se is researched. Special attention is paid in the paper on investigating the personal and professional background of those members currently working as teachers and frequently using the discussion forums at lektion.se. The result shows that it is often relatively young female teachers working in compulsory school with limited experience of the teacher profession that use the discussion forum for which they have been members for one or more years. The paper also argues for lektion.se being an informal online learning community for TPD with potential to inform teachers' everyday life in the Swedish classrooms.

In the next article *Fredrik Paulsson* presents a study about digital learning resources, sometimes referred to as Learning Objects. He asserts that the rapid growth of digital learning resources has brought forward a number of issues concerning availability, distribution and use. The issues are a mix of interplaited technological and pedagogical considerations. Some of these issues, mainly related to repositories and the distribution of digital learning resources, are described and examined in this article. A particular focus is put on how resources can be described and indexed using metadata, and on how access to digital learning resources can be improved and facilitated through federation and/or harvesting of metadata in order to tie several repositories together to provide a service that offers one single entry point for access. The study also examines how this single point of entry can be moved closer to the user (i.e. to the environment where digital learning resources are intended to be used) through simple federation of the service, enabling access to the network of repositories from any virtual learning environment. The study is carried out through

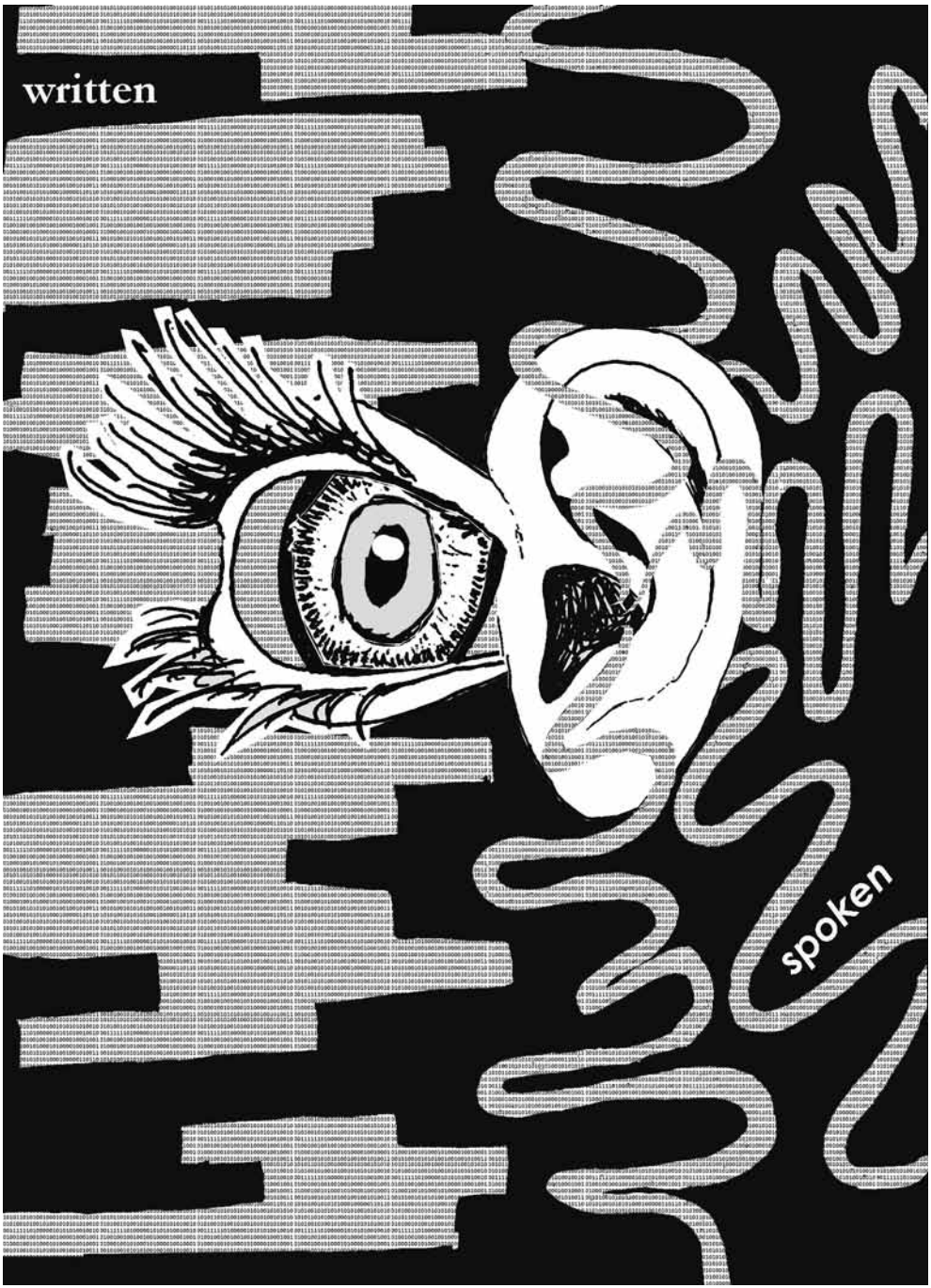
experiments connected to a real-life case. The study concludes in several suggestions for how access to digital learning resources can be enhanced, as well as in the identifications of a couple of new issues that need to be addressed by future research.

In the paper by *Tor Söderström* attention is given to teacher students´ experiences of using video recordings in their education. The paper investigates the notion of video recordings as a device for stimulating reflection on teacher students teaching skills. The argument is based on a two-year long student-centered video feedback project. Donald Schön´s concept reflection-on-action and reflection-in-action is used as an analytical framework for understanding the students´ experiences. It is suggested that the adoption of video recordings as a solution for creating reflections among the students may be misleading. It is argued that, without careful course design, the effect from the video recordings might only lead to an immediate feedback on the students performing self and no call for reflection about the students teaching. Video projects ideals popular discourses about learning and pedagogical methods while, at the same time, masking the fact that it may fail to live up to these ideals.

The writers of the last article of this journal, *Hakim Usoof* and *Eva Lindgren*, present a study of computer based text development processes performed by ten native English language writers. The aim of the study was to analyse the text development process using a computer, at a micro-level and macro-level to inquire the existence of unique keystroke patterns existing across writers and within writers to identify individuals. The paper also explains the use of a fuzzy-logic comparison engines to analyse and compare different tasks and different writers to identify unique keystroke patters, and the results of the analysis by the fuzzy-logic engines. The paper also goes on to suggest future improvements to the comparison engines and also ethical issues that need to be considered if such an identification mechanism were to be introduced into online assessment systems.

With these words I would like to thank all writers who have contributed to this journal. I also want to thank our readers throughout the years.

Gun-Marie Frånberg
Editor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Teaching and Learning Podcasting through Blogging

Peter Bergström and Krister Lindwall

Abstract

This article reports on an online workshop which was held in October 2006 on the topic of contemporary web 2.0 technologies. The workshop was a part of the European project eLene-Teacher Training. The workshop was organised by two teacher educators in Sweden and 33 participants was enrolled from eight countries in Europe. The workshop took place during one week on the Internet in a blog environment. The workshop is analysed from both a pedagogical and technical perspective. The workshop is evaluated with a questionnaire, analysis of blog posts and podcasts and through reflections from the teacher educators. The result indicates that the technical aims were reached i.e. the participants learned to create podcasts and learned to blog. The pedagogical aims suffered from difficulties to discuss for example attitudes to publishing content on the Internet. Instead pedagogical issues should be raised by the participants.

Introduction

Teaching with Information and Communication Technologies (ICT) has changed education in both the school system and in higher education. For example, teachers and students can make use of the benefits of new technologies in distance education and through blended learning. Benefits could be described in terms of flexibility and ubiquitous learning (Mogren, 2006). New, emerging technologies have an impact on teaching and learning in terms of how we teach and use these technologies. But what if we combine two well-known web technologies such as podcasting and blogs? The authors of this report, both working as teacher educators at the Department of Interactive Media and Learning at Umeå University, explore the question in this report.

The report presents a study in which the aim is first to explore if it is possible to construct a learning environment with open source and free

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software that is accessible on the Internet. The second aim is to evaluate a particular workshop for academic staff such as teachers and tutors with a generally good ICT literacy. Furthermore, organisation and planning of this particular workshop will be described.

In order to evaluate if the purpose had been achieved, the following questions were asked:

– To what extent have the technical and pedagogical goals been achieved?
– What can be further developed in the workshop from a technical perspective?
– What can be further developed in the workshop from a pedagogical perspective?

The workshop, 'Combining podcasts and blogs, is it possible?' was conducted as part of the eLene-Teacher Training (TT) project[1] at the Department for Interactive Media and Learning at Umeå University in Sweden over a period of eight days in October 2006. It was developed by means of open source and free software, and from the perspective of combining practical and theoretical work with technology. The main purpose of the workshop was to train academic staff in using podcasts in education and to understand how technology in general can be used. Another purpose was to provide teachers with the experience of being a student and of being able to understand problems from the student's point of view. This was achieved, for example, by using new software, taking part in the implementation of new technology and understanding assignments in this context. Also, the aim was to inspire teachers to think creatively about how, why and when technology can be used in educational settings and to encourage them to further consider the role of the teacher.

The decision to use blogs in the workshop builds on experiences from the Department of Education at Helsinki University, member of the eLene-TT project, which managed a workshop[2] called 'How to teach with the web', where guest teachers discussed the use of weblogs (blogs) in higher education during spring 2005. Another reason was that blogs, commonly used in society, are a frequently used vehicle for collaboration and sharing content and thinking. The website Technocrati (http://www.technocrati.com/) has statistics of blogs and currently shows that 57,4 million blogs were registered (2006-10-27). A third reason was the importance for staff in academia to explore the power of blogs and podcasting, and to consider how they can be used in educational settings.

Definitions

Several key concepts are used in this report and we draw particular attention to Web 2.0 and how it could be described in terms of different functionalities and terms. In the final part of this section of the report we also consider and define our own role in the workshop.

Web 2.0

Web 1.0 was characterised by individuals creating and maintaining websites and content. MacManus & Porter (2005) argue that websites in this context are created for reading. With Web 2.0 we have moved the web and users are allowed to create content and can now both read and write (MacManus & Porter, 2005; Richardson, 2006). However, from a pedagogical perspective it is important to understand content at the level of micro content (MacManus & Porter, 2005; Downs, 2006.; Alexander, 2006). One example of micro content is a blog post; a comment or a podcast. Micro content serves as a service that could be connected to other domains. One purpose is for content that has been created in one place by one particular user to become transformed, shared and remixed by other users. The new tools and resources that Web 2.0 can offer to support teachers are not a technological revolution per se, but rather a social revolution (Downs, 2006). Note that according to O'Reilly (2005) there is doubt about Web 2.0. One important aspect to consider, is that many of the new tools that are used are notions of open software, free or low-cost (Richardson, 2006). Many or most of these tools are free to use (see for example flickr.com, del.icio.us, Gliffy.com, Cmap.com).

Social software

The main characteristic of social software is that it connects people, providing a space where they can interact and share ideas and experiences. Social software is often seen as a feature of Web 2.0 and can be described as tools that are used to communicate in different settings such as: one-to-one (e-mail), one-to-many (blog) and many-to-many (wiki) (Wikipedia, 2006; Tappert, 2003). An important function of social software is that it helps us to collaborate with other people on the web. Richardson (2006) argues that the toolbox for the teacher contains weblogs, wikis, RSS, aggregators, social bookmarking, online photo galleries and audio/video casting. Perhaps the most commonly known social software are blogs which are used for discussions. A wiki is often described as a tool for support group work and knowledge building, and as a help for structuring information. Podcasting is also explained by Alexander (2006) as social software.

RSS

One explanation of the acronym RSS is real simple syndication; however, there are different explanations related to different versions of RSS (Wikipedia, 2006). RSS could be used in two main ways: as software that produces a feed, or as a receiver who subscribes to the feed. Thus, RSS makes it possible for readers of a blog to subscribe to the content (Richardson, 2006). The technology behind the blog is supported by XML and enables users to subscribe to content from blogs. This could be explained as "the content comes to you instead of you going to the content" (Richardson, 2006, p.75)

With the support of RSS, teachers and students can subscribe to a number of different information sources without the need to frequently visit each website to access the desired information.

RSS aggregators and readers are software applications that can be downloaded freely. A RSS aggregator is a client side software application (see for example http://www.rssreader.com/) used to receive web content via web feeds such as weblogs (blogs) and podcasts. D´Souza (2006) explains that users 'pull' the content when subscribing to a feed. Similarly, aggregators can replace the need for regular checks on websites by pulling out the content. Once subscribed to, the aggregator will keep the user updated (Wikipedia, 2006).

Blogs

Blog is a commonly used term, and is an abbreviation of web log (Barlett-Bragg, 2003). A blog is a dynamic web page through which the content can be developed by both author(s) and readers if, for instance, comments are allowed. It is possible to subscribe to content from most blogs. There are different types of blogs with different purposes and content. A blog can be associated to one blogger, with the community responding to the blogger. A blog could also belong to a community, with bloggers responding to a specific topic. Blogs can either be hosted by an individual or by a company as a service. When blogs are hosted by a company, they can either carry a cost or be free to use if you choose to have advertising on your blog (see for example http://webblogg.se/info/english).

One essential feature of blogging, both within educational settings and in daily life, is that what is written, are expressions of individuals. Richardson (2006) argues that blogs engage readers to contribute with links and with comments on a topic. The opportunity to support reflection in educational settings is another feature

commonly recognised within the blog sphere (Richardson, 2006; Barlett-Bragg, 2003). It is suggested that the intention with using blogs in education is to take learning further; from the surface to deeper levels of learning (Barlett-Bragg, 2003).

Podcasting

Podcasting was a development from web broadcasting through which radio programs were published on websites with the purpose of giving users the opportunity to listen whenever it suited them. Podcasting is a technology to make digital content easy to subscribe to and shared. A podcast is defined as a "multimedia file distributed over the Internet, using syndication feeds for playback on mobile devices and personal computers" (Wikipedia, 2006).

Richardson (2006) describes podcasting as a simple-to-use technology. He argues that the only equipment needed is a digital audio recorder, space to store the created file and a blog. Accordingly, it should be very easy for teachers and students to produce their own podcasts.

The use of podcasting in education seems to be connected to subscribable content (Richardson, 2006; Ractham & Zhang, 2006). Universities have developed podcasting solutions for the same purpose (see for example http://www.classcaster.org). With this approach to podcasting, the purpose seems to be to give the students more flexibility in their studies; if they miss a lecture there is still a possibility to listen to it using iTunes (http://www.apple.com) or another software application that plays media files (for example MP3).

Combining Podcasting and blogs

The blog, in combination with podcasting, is one example of the use of tools to communicate. In this communication participants use their intellectual tools with both their written text and through their voice via recorded audio podcasts.

Teacher Trainer or Teacher Educator?

The terms teacher trainer and teacher educator reflect different traditions in the field. Hallman (2003) highlights two traditions within teacher education; a practical tradition and a university professional tradition. Erixon Arreman & Weiner (2003) argue similarly when discussing seminary 'trained' primary teachers and university 'educated' secondary teachers. On this basis, a teacher trainer is viewed as someone more practically oriented and a teacher educator as someone more academically and research oriented. The project is named eLene-Teacher

Training and it is a practical project. The technical and pedagogical parts of the workshop were constructed through academic literature and experience. From that point of view the role of the workshop moderator is more a teacher educator role.

Theoretical and methodological considerations

This section presents theoretical considerations related to the workshop on combining podcasts and blogs. As mentioned earlier, workshop participants were supposed to learn and work together, but also to use software applications to facilitate flexible learning. Consequently the sociocultural perspective became important, as well as the notion of ubiquitous learning; not only for framing the workshop, but also for our understanding of the outcomes of the study.

Learning can be understood from different theoretical perspectives. When working in an ICT context, a pedagogy grounded in a sociocultural perspective on learning is commonly used. (see for example Säljö & Linderoth, 2002). This perspective combines three key components: physical tools, intellectual tools and communication (Säljö, 2001). A computer can be seen as a physical tool, while the written text and spoken language are examples of intellectual tools. With the support of these tools it is possible to communicate in interaction with others. Furthermore, Säljö (2001) explains that the tools can also help us to mediate the world around us.

From this sociocultural perspective on learning, "culture" can be understood as knowledge shared and developed between people in collaboration; to describe and understand what knowledge level a group has reached and what level we can help them achieve through problem-solving activities. The notion of zone of proximal development (ZPD) can be helpful (Vygotsky, 1978).

Another useful and commonly used concept in the context of ICT and learning is ubiquitous learning. It refers to flexibility in education, i.e. learning content that is always accessible. This kind of learning is facilitated by wireless and mobile devices such as PDAs, notebooks, mobile phones and iPods (Chang, Sheu & Chan, 2003; Mogren, 2006). So, with this kind of technology the student has the opportunity to download or synchronously utilise learning material whenever he/she wants to.

The workshop

The workshop took place October 9 – 16, 2006 and was flexible in time and space to enable participants to combine it with their daily work. Participants were invited by the eLene-TT partner universities and the aim was to train teachers from higher education to use podcasting in educational settings. When participants applied for the workshop, they were informed about the software and competences they would need to participate in the workshop.

Before the workshop started, instructional films were produced by Lindwall & Vinnervik (2006) and distributed as podcasts. The films introduced the following subjects: podcasting, RSS, how to subscribe content, how to record audio, practical use, examples of podcasts in educational settings and finally an explanation of what a podcast server is.

The workshop was planned and divided into two sections: Firstly a technical section and secondly a pedagogical section. Each section had its own learning goals that were set up by the teacher educators running the workshop. In the technical section the participants were expected to learn how to use the technology of podcasting with the support of instructional films. The purpose of this section was for participants to understand what type of software is needed to produce a podcast, learn how to subscribe to and submit podcasting material and learn how to produce and publish a simple podcast. It was decided that the participants would only focus on the production of audio podcasts as it is simpler to produce only audio, and as the focus was on combining podcasts and blogs. Three topics were discussed with the support of a blog. The blog functioned as an arena for collecting both podcasts and blog posts.

The first two days were technically oriented and devoted to practical work and the production of podcasts. The participants were instructed in how to download the software iTunes in order to subscribe and listen to podcasts, how to use Audacity to record audio, and with the support of the LAME encoder, export the produced wave files to MP3 file format.

The next five days were pedagogically oriented. This section of the workshop was aimed at discussing pedagogical issues within podcasting in higher education. The workshop participants discussed three topics: attitudes and arguments for publishing content on the Internet, discussions and sharing of ideas on how to use podcasting in teaching and learning with the support of their new experiences, and whether

podcasting as a technology fulfils a purpose for ubiquitous learning. These three topics were constructed by the workshop leaders, i.e. the teacher educators.

Evaluation

In order to evaluate the participants' understanding, data were collected by means of a web based questionnaire. As the workshop participants came from nine different countries, a web based questionnaire was considered the most convenient way of collecting data. Questions were constructed as multiple choice and scaling questions with comment boxes. The evaluation was aimed at all the participants in the workshop. The questionnaire was voluntary and answers were anonymous. A week after the end of the workshop an e-mail with a link to the evaluation was sent. The questions were aimed at evaluating the experiences of the workshop from the following perspectives: the extent to which learning goals had been achieved on both a technical and pedagogical level; whether the software was easy to use; and an estimation of the participants' attitude towards podcasting both before and after the workshop, as well as their impression of the workshop from a generally holistic perspective. In some questions an extension scale between one and seven was used; with a score of one indicating that the person did not agree with the presented statement at all. A four indicated neutral, which means that they agreed that the statement had been reached, but nothing more. A seven showed that the person was in complete agreement with a statement. Teacher educators' reflections were collected through discussions and with support of the written evidence gathered in the blog during the workshop.

Informants

The participants were invited through the eLene-TT partner universities and 33 applications were received for the workshop. In the end 14 participants attended the workshop: seven women and seven men. There was no selection of participants. The participants were aged between 39 and 50, and were from Sweden, Italy, France, Spain, Poland, the Netherlands, Finland and Croatia. There were no physical meetings during the workshop and all interaction was carried out using a blog as a learning space.

In the design of the evaluation, the guidelines of HSFR (Humanistisk-samhällsvetenskapliga forskningsrådet, i.e. The Swedish Council for Research in the Humanities and Social Sciences) were considered. The participants where informed about the study through guidelines on the use of the blog and the presentation of infor-

mation. The informants were asked to answer a questionnaire for a report.

Considering the relatively small number of informants and the fact that the study was carried out during a limited period of time, the results are not to be seen as an attempt to make generalisations. Instead, it is to be seen as an example of how to run a workshop with emerging technologies and what can be learnt from that particular example.

Technical framework

The workshop required specific software for both participants and teacher educators. A short description of each software, divided for use by either participants or teacher educators, follows below.

Software for producing podcasts

With several participants using different platforms and with different restrictions for downloading and installing software, it was important to use appropriate technology for producing and aggregating podcasts. The chosen software had to be reliable, free of charge and web based.
In order to subscribe to, watch and listen to podcasts, iTunes (http://www.apple.com) was chosen as both media player and RSS aggregator. With this media player/aggregator it is possible to pull several formats of media such as audio (MP3), video and multimedia (MP4) and even text documents (pdf). iTunes was chosen as the appropriate software to use for delivering the instructional films and content from the blog as it supports several file formats and is available for Windows as well as Mac OS X..

To record audio the open source software Audacity (http://audacity.sourceforge.net) was used and the Lame encoder (http://lame.sourceforge.net) was used as pod-producing software for PC users. For Mac users, pod-producing software comes with the computer.

Software for content

The blog tool WordPress (http://WordPress.org) was chosen for managing the workshop discussions and was installed by the teacher educators in charge of the workshop. WordPress was chosen for a number of reasons: It is freely available, well-tested open source software which is highly reliable and continuously developed. Furthermore, building on our own experience, it is easy to set up and easy to manage. It also produces RSS feeds and provides a plug-in for podcasting. However, to use the blog for posting media files, some minor changes had to be made for file uploading.

Figure 1. The figure shows a screen shot of the WordPress blog.

The above figure shows a screen shot of the WordPress blog created for the workshop. At the centre of the page posts or pages are displayed. On the right side users can navigate, search for micro content (e.g. a blog post) and find links to guidelines for blogging as well as manuals for the workshop.

The blog was used by teacher educators and participants to post media files and to post reflections as comments to posts. It was also used to describe the assignments, to provide manuals on how to use the blog and to give participants technical tips and pedagogical guidance. The blog was configured so that participants had to log in before posting comments. Each participant in the workshop was registered as an author in the blog, which enabled them to both write and upload podcasts. Only authors and teacher educators were able to post on the blog, which was open for readers.

Podcast plug-in

A WordPress plug-in PodPress was used to facilitate the combination of podcasting and blogging and to enable audio files to be played in a web browser. This plug-in is easy to configure and creates a RSS feed for the audio content in the blog.

Figure 2. Screen shot of the plug-in PodPress and the built-in media player.

The above figure shows a post in the blog with a header followed by the date when posted and a short text on the blog introducing the podcast. The control makes it possible for the user

to start and stop the audio file. There are links at the bottom for a number of options.

Analysis

In this section, results from the evaluation will be displayed; technical goals, pedagogical goals and teacher educators' considerations. As said earlier, the results are to be seen as examples of how to run a workshop with emerging technologies and what can be learnt from that particular example.

The questionnaire was answered by 64,2% of the participants (N=14); five women and four men. One question in the evaluation concerned how the participants estimated their attitude to podcasting before the workshop and the overall attitude was considered to be rather neutral.

The below figure illustrates the frequency of posts and comments made by participants during the workshop. This shows that most postings were made from Monday to Wednesday. During Monday and Tuesday the participants were active, producing and publishing podcasts. Each new participant who produced a podcast was welcomed by a teacher educator, which can explain the amount of comments on Tuesday. Other comments related to technical issues following some technical problems with the WordPress

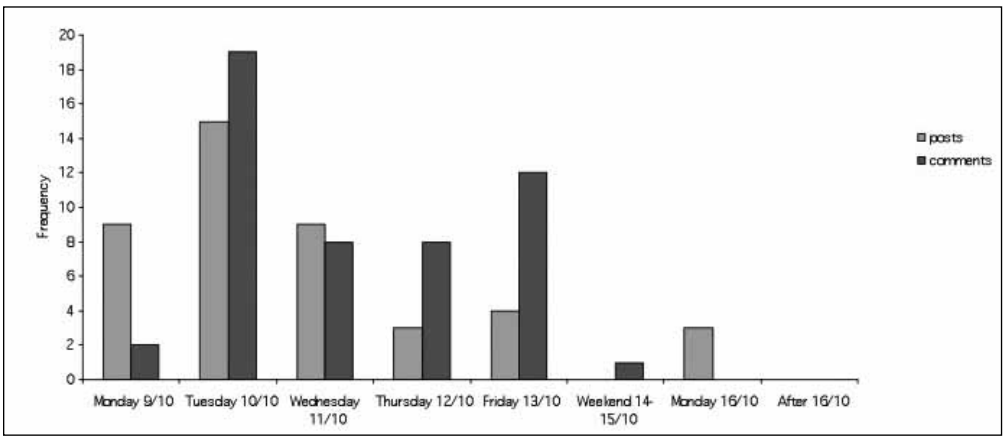

Figure 3. The figure illustrates when participants were active in the workshop.

blog. There were few new comments or posts by participants between Thursday and Friday. Most of the time was spent on learning how to use the technology and little interest was shown in pedagogical discussions.

Technical goals

One purpose of this study as outlined in the beginning was to find out how well technical goals were achieved in the workshop, i.e. how the participants were able to create, publish and subscribe to podcasts. To explore this, participants were asked to estimate how well they attained three different, technical sub-aims of the workshop (see Figure 4 attached). Looking at participant responses, the technical goals were achieved very well.

The below figure illustrates the extent to which participants estimated they had reached the

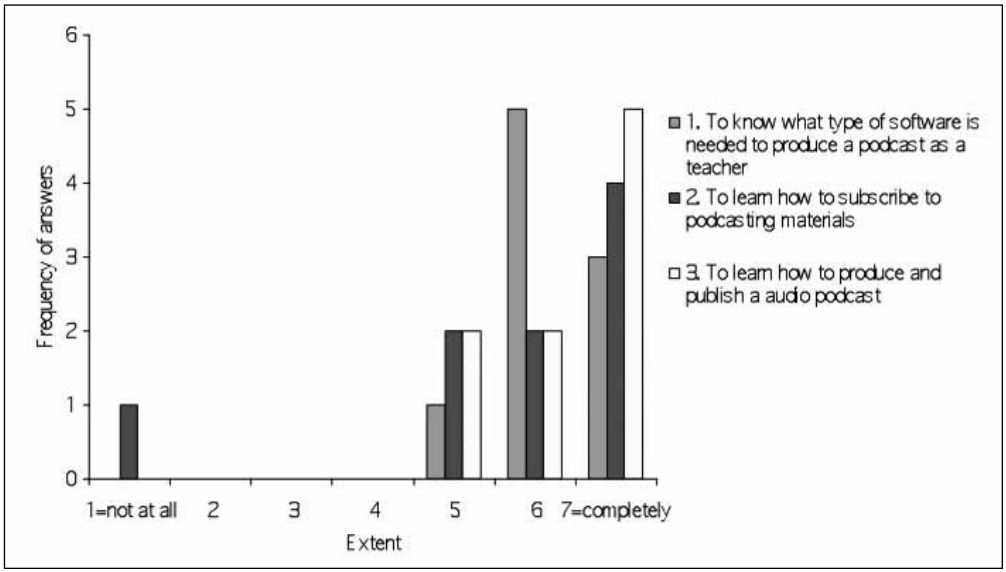

Figure 4. The figure illustrates the extent to which participants estimated reached pedagogical goals on a graded scale (1=not at all, 4=neutral, 7=completely).

technical goals. First, second and third goals were reached to a high extent. First and third goals are coherent from a perspective to produce. Results related to the third goal indicate that the technical part worked well when participants were producing podcasts with Audacity and Lame. It is coherent with the first goal because participants had to have an understanding of what type of software was needed. Goal three is also about publishing. The software WordPress with the PodPress extension are tools used to publish, collect and arrange the content. Two participants commented that they had problems and difficulties with the blog. For example:

"Tried to participate in discussion on blog, but my comment never appeared. The blog was not the simplest one to use when writing a message."

The results show that for some users the WordPress blog can be difficult to master. The second goal did not achieve the high marks of the first and third goals, which indicates that it is more difficult to understand how to subscribe to content from the blog.

Pedagogical goals

Another purpose of the study was to find out how well pedagogical goals were achieved in the workshop, i.e. how did participants find their own arguments for publishing content on the Internet and how did they learn how podcasting can be used as a tool for teachers and students in their learning. Furthermore, how did participants develop their knowledge and personal arguments in respect of podcasting if it works for ubiquitous learning. To explore this, participants were asked to estimate how well they attained three different pedagogical sub-aims of the workshop (see figure 5. attached).

The figure on the next page shows to what extent the participants estimated that they had reached the pedagogical goals. The result shows that participants did not reach them as well as the technical goals. The first goal indicates that most of the participants are open for publishing content on the Internet. The answers of the second goal separates the participants in two groups: those who were positive and those who could not see podcasting as a tool for teaching and learning. The third goal was less successful at developing the participants' knowledge of the use of podcasting to learn anytime and anywhere.

The lower values on the pedagogical section of the workshop can be explained in terms of 'too much to do at work' and 'the workshop was too short'. For example:

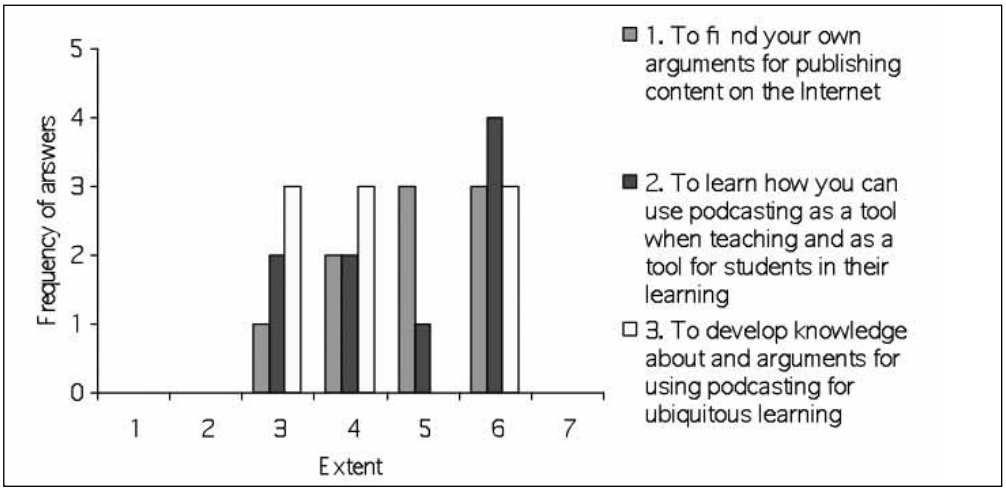

Figure 5. The figure illustrates the extent to which participants estimated reached pedagogical goals on a graded scale (1=not at all, 4=neutral, 7=completely).

"Unfortunately I was not able to participate in the discussion because of overwhelming obligations in my office during the second part of the workshop. For me personally, the workshop was too short, and because I was engaged in other duties in the few days that the workshop lasted, I could not proceed with the activities after that."

The third goal is highly complex as the participants have to connect their experiences to the concept of 'ubiquitous learning' which is a part of the workshop literature.

The workshop from a holistic perspective

The participants were asked to evaluate the workshop from a holistic perspective. The holistic perspective could be explained as their all-embracing feeling of the workshop, combining podcasting and blogs (see figure 6).

The preceding figure illustrates to what extent the participants were positive about the workshop. Eight out of nine participants were positive about the workshop. Five participants made comments on this topic which were both posi-

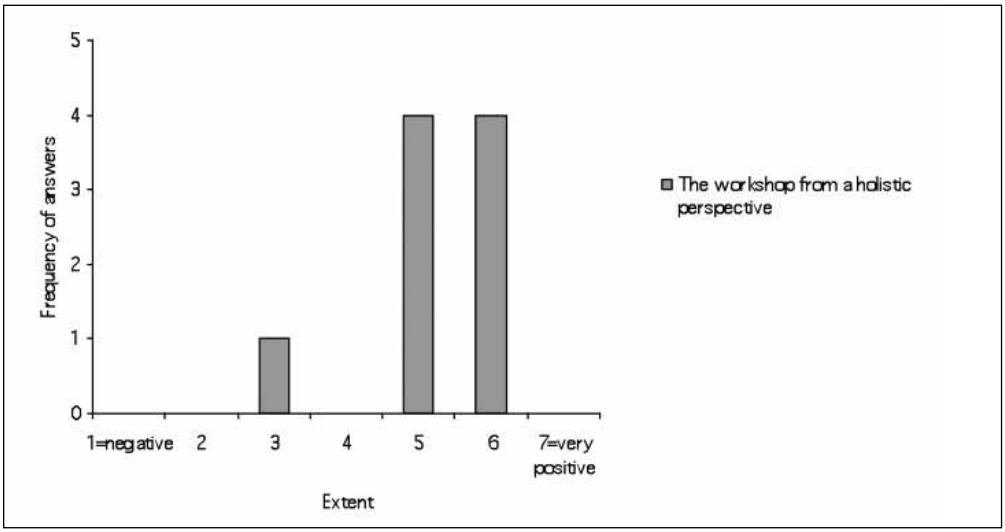

Figure 6. The holistic value of the workshop on a graded scale (1=Negative, 4=Neutral, 7=Very positive).

tive and constructive. Some of the participants agreed that the workshop was interesting both in form and content, and that it provided the confidence to produce a podcast. Critical voices were raised concerning too little activity in the discussion, limited feedback on posts and that the three topics of discussion could have been clearer. Some participants struggled with the blog due to uncategorised comments which made it hard to find comments and discussions that were spread over too many threads. This indicates that the use of RSS and its benefits was not successful.

Teacher educators' reflections

Our own reflections from a technical perspective are that the workshop worked rather well. Participants published their podcasts and in some cases a few participants had technical difficulties. The usability of the blog when uploading files was a problem. The upload function of files could have been easier. There were many steps

and the instructions had to be followed carefully. For example, when uploading a file, meta information had to be added correctly otherwise the file would not be attached to the post.

Problems with the RSS feed occurred during the workshop. There was a problem to reset the number of podcasts shown in the subscription list in the aggregator. This led to a decision to manually publish all the participants' podcasts in an alternative feed. At the end of the workshop the blog responded slowly to commands. From a pedagogical perspective we think the function of sharing and publishing content in the blog is valuable. Participants used hyperlinks to spread and share different resources, outputs from work and experiences. The discussions were rather diverse and comments or posts became uncategorized, resulting in many comments and posts being hard to find and to collect all micro content.

Furthermore, participants gained experience in both video casting and audio podcasting.

We also observed that participants raised a number of questions in posts. These questions were seldom answered or commented on. There was no dialogue. This raises questions about how the teacher educators should act when dialogue suffers and how teacher educators should moderate discussions when activity is expected to be 24 hours a day.

Discussion

The participants were most active during the first two days of the workshop. One purpose of the use of Web 2.0 technology was to make it flexible and not dependent on time. Even if the technology gave the participants the possibility to be active whenever they wished, there seemed to be a problem finding the time to work on these activities. This technology is designed to help bring people together. However, building on the results of this study, there are concerns about how easy it is to follow three separate discussions simultaneously. If it is hard to find micro content; perhaps because participants consider it is too time consuming to search for the threads in the topics. The results are contradictory on this question because the technical goal of subscribing to content was reached rather well. From this perspective, RSS could have helped to avoid this problem. If participants had subscribed to content from the blog, the content would then have come to them automatically. From this point of view, RSS may be one of the most important Web 2.0 technologies to help users with different skills to find content in content rich information spaces.

Alexander (2006) describes both blogs and podcasting as social software. Tappert (2003) and Wikipedia (2006) suggest that the blog has the potential to connect people. In the workshop the blog served its purpose of bringing the participants together, but with 14 people uploading content, some problems occurred. The social aspect of podcasting is that podcasts are designed to be shared among people. It was possible for participants to subscribe to the posts, podcasts and comments from the blog from two different RSS channels. The results indicate that the participants have learned rather well how to subscribe content, but there is however a contradiction since the results do not reveal anything about how well they then can find and use a comment. On this subject it is worth reflecting on the role of the software iTunes that is used to subscribe to RSS. Participants were less in agreement on the second goal than on the others, which could indicate that teacher educators have to put more effort into supporting the participants' understanding of RSS in iTunes.

The software application used to create the podcasts was open source software and free to download. This software has been easy to use and has been distributed on the Internet and viewed on personal computers. The participants' position is that it is easy to use. The results also indicate that Audacity with the Lame extension has been easy to use to produce the podcast files.

Even though the workshop was designed in such a way that participants had the opportunity to use tools that enabled them to work and learn anytime and anywhere, they needed to have some knowledge of these devices. The technology of podcasting is a ubiquitous technology and the content from the blog could be subscribed to using iTunes and viewed using a laptop or MP3 player, enabling the participant to view it anytime and anywhere. This is described as a key feature for use in education (Richardson, 2006; Rachtam & Zhang, 2006). The purpose of the pedagogical discussion topics was to take the practical experience further. According to Barlett-Bragg (2003) the intention of using blogs in education is to take learning further. This did not work particularly well in this workshop. It has been a problem to discuss the pedagogical issues. Mogrens' paper (2006) was barely referred to in the few discussions that occurred. The pedagogical discussions consisted of a few threads and were uncategorised in many cases. We argue that a blog engages readers to contribute with links and contents. In this case we were successful when participants started to share and give examples.

The instructional films were created as video podcasts with the purpose of giving the participants multiple views of podcasting when they are producing audio podcasts. The pedagogical argument for choosing this media was not clearly explained. One perspective on further development of the material is that audio content allows the listeners to create their own images, and that the content is easier to change afterwards.

The challenge for forthcoming workshops would be to consider how to engage students to participate in pedagogical discussions. Only on one occasion did a participant ask a question that led to a discussion. Even though this was only a single instance, it forms an important example for participants to identify an area of interest that increases knowledge within the group when other participants share their comments. Vygotsky (1978) argues that problem-solving activities can help a group reach new levels of knowledge. We suggest that this is a good example of the potential of blogs and that participants have their own experience to create questions from.

The podcasting technique must be transparent. If this technology is to be used widely, podcasts should be possible to download to any hand-held devices such as cell phones, media players and hand-held computers. The development of RSS aggregators and Wi-Fi in cell phones are signs that indicate the direction of future developments.

Finally, the results show that it is possible to create a workshop with open source and free software, and to combine two technologies. It is also possible to connect participants from different geographical areas without previous knowledge of their equipment and platforms at a low technological cost.

Conclusions

On the whole we can confirm that the participants reached their technical goals to a great extent and that it is possible to learn podcasting in a blog environment. From a technical perspective we suggest the following developments and changes to future workshops:

- The open source solution with WordPress and PodPress is unstable and for future use a more stabile technical solution needs to be found.
- When choosing a blog tool for a multiple user context, scalability has to be taken into consideration for good functionality.
- The software for aggregation and recording has worked very well and could be recom-

mended for other courses. This application is easy to install and easy to apply.
– If teachers have problems when starting up a blog at their department, external resources could be used; for example Podomatic (2007) (produces both media files and RSS-feed) and OPML Workstation (2007) (creates a podcast from PowerPoint, both media files and RSS feed).

It can be said that the pedagogical goals were not reached to a great extent and we conclude that the pedagogical assignment was too open and not sufficiently clear. The technical assignment was closed from the perspective that it was very clear that the participant should publish a podcast.

The workshop design could be developed in the following direction:

– Greater focus on the importance of RSS and subscription to content. These are key issues as RSS facilitates administration and information gathering, which have become very important in a world of teaching and learning with multiple information sources.
– The pedagogical discussions should be more mutually critical and pedagogical questions should be developed by the participants from their own experience.
– The blog tool has a strong influence on the pedagogical approach and we conclude that a more effective tool is needed to handle multiple discussions.
– Pedagogical issues should be raised by participants based on their own experiences rather than by the moderators in order to achieve active discussions and knowledge construction.

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Footnotes

[1] The eLene-TT project consisted of a group of nine European partners. Partner universities were Umeå University (Sweden), the Canège consortium (France) consisting of the universities of Nancy 2, Paris Sud and Paris Dauphine, Politecnico di Milano – METID (Italy), FVU/University of Helsinki (Finland) , Universität Bremen (Germany), Open University of Catalonia - UOC (Catalonia, Spain), Utrecht University (the Netherlands), Polish Virtual University (Poland) and UK Healthcare Education Partnership (United Kingdom).

[2] See also: http://blogit.helsinki.fi/teachwithweb/index.htm


Why did she write that?
She doesn´t even know me...
What should I do?
Ask her in a private chatroom. Maybe its a misunderstanding and she can take it back?
Puh! As if she would...
Revenge!
Start a rumour about her!

Young People and Contemporary Digital Arenas: Identity, Learning and Abusive Practices

Elza Dunkels, Gun-Marie Frånberg and Camilla Hällgren

Abstract

The aim of this article is to outline an emerging research area, evolving around young people and contemporary digital arenas. The field is growing in size, shape and complexity and the need for study is urgent. The research area is also somewhat elusive and its outline is changing very quickly over time. In previous works the authors have focused on different parts of this area, and in this article bring ideas together to form a joint research base. The first theme is identity; what factors influence young people's identity development and how do we interpret identity in a changing media landscape as well as in a changing society? The second theme is learning; have contemporary media influenced the processes and outcomes of learning and if so, how can the educational system benefit from and exploit this? The third theme is what we in this context call abusive practices; how can we understand abusive behavior on the internet, among and towards young people?

The issues problematized in this article are to be seen as a probing for and a framing of a research base for further development. The overall aim of the proposed area of study is to identify, analyze and problematise contemporary digital channels of communication and learning in particular, expressions of abusive behavior, and their influence on digital culture and digital native identity construction, with a specific emphasis on issues related to age, class, gender and ethnicity.

Introduction

The way you navigate through life depends on what conception you have of the conditions under which you are acting. Under what conditions are we acting in the early 21st-century, then? According to Baumann (2003) we have moved from the solid stage of modernity to the liquid stage of modernity in the recent decades. Why this metaphor of liquidity? In any encyclopedia you will find that a liquid is a substance,

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which cannot keep its shape for long. And in terms of society this is a demanding condition. For the first time in history, fluidity is a major logic for structuring human life. So we need to develop ways of acting, and ways of interacting, which are fit for living in this state of constant change and uncertainty.

Three factors condition living in a liquid modern world (Baumann 2003). Firstly, we need to act under the condition of uncertainty; secondly, under the condition of constant risk, risks which we try to calculate but which in principle cannot be fully appreciated as there are always surprises; and thirdly, we need to act under the condition of shifting reliance. The issue of learning also comes under a big question mark. Our culture today, is as much a culture of learning, as it is a culture of forgetting in order to clear the ground for new things to replace the old ones. Learning is now more or less understood as a life-long process. And above all, today learning consists of the ability to change what is considered true, appropriate, usable, and effective knowledge.

What we also see is an increasing complexity of information mediation (NSF 2008). New technological tools for learning, communicating, collaborating, information gathering and production are introduced to us nearly every day. Our lives are becoming increasingly easier to lead as we are becoming more and more connected through an ever-growing dependence on cell phones, e-mail, blogs, video conferencing, and other technological applications. A new approach to teaching and learning emerges from this connected world in which access to information is immediate and considered predominant (Brown 2006). However, equating learning with knowledge acquisition and reducing the learning process to the omnipresent access of information in the form of text, images, video, and audio is overly one-dimensional and lacks an understanding of the development of higher order thinking skills. Learning has more to do with making connections between people, ideas and concepts than simply focusing on the information itself. While technology can be used to identify potential connections, it also takes reflective thought and meaningful dialogue to make meaning of these connections. Another important difference is that the creation of new net-based communities easily crosses all the traditional borderlines of age, gender, race and religion.

Parallel with the transition to a globally connected society and the increasing complexity of interaction and learning, young people have a central position in the digital revolution. Only

a few years after the advent of the world wide web Katz (1997:173-174) suggested that "Children are at the epicenter of the information revolution, and ground zero of the digital world. Children can for the first time reach past the suffocating boundaries of social convention, past their elders' rigid notions of what is good for them". Yet, eleven years later into the digital revolution, the metaphor of epicenter is still valid and when it comes to picturing youth position in relation to emerging technologies, it is also accompanied by discourses of fear (Sandoval & Latorre 2008).

Consequently, several parallel conditions frame our research on young digital cultures: For example, the move towards a fluid regime for structuring human life and technological meta trends, suggesting an overall increased complexity of knowledge mediation. Further key conditions are young people's continuous central position on digital arenas, the existence of abusive web-based practices and the influence on learning contexts. Together this forms a matrix where social, cultural and learning issues are interlaced with school practice and youth everyday life. We suggest that there is a need for critical school-based research on the relationship between contemporary digital arenas, young people, identity, learning and abusive practices.

Young People

There has been a strong focus on generational aspects of net cultures during a couple of decades. (e.g. Buckingham 2002; Oblinger & Oblinger 2005; Prensky 2001, 2006; Tapscott 1998) This has been criticized for its one-dimensioned view on the unifying powers of age; not everyone born during the same time has equal experiences, exposure, and conditions. However important it is to make the matter more complex, giving weight to gender, ethnicity, social class among other intersecting perspectives, we find age intriguing as a viewpoint for studying young people and contemporary digital arenas. Age can be seen as one of many parameters constructing and upholding power structures in modern society. In the same way that we have learned to recognize power structures built on gender and ethnicity, we can also identify structures that build on age. This structure has been called childism (Alderson 2005) and seeks to describe and disclose the stereotyping and discrimination of young people (Dunkels 2007). In view of this the generational aspect is valid as a tool to deepen our knowledge of both what goes on among young people and how adult community relates to this.

Furthermore, in the discourse of youth, learning and digital media the young generation

are given labels such as net-generation, digital generation, millennial learners, millennials, the net-gen, generation I, and the YouTube generation, etc. These are all labels constructed by an adult generation. As Herring (2008) points out, adults' influence on digital arenas and their interpretation, construction of contemporary technologies, youth identity and practices are often normative and based on stereotyped assumptions. This may generate a process of othering, defining youth as "the Other" as well as it may contribute to exoticizing the digital context and its associated activities. But, as Herring (2008) continues, this divide may also be seen as a rich site for cross-generational conversation.

Larsen (2008) uses Scollon's Geographies of Discourses to describe different levels of actions, where local discourses describe our daily lives and every-day activities, and global discourses are the mediated or public descriptions of our activities (Larsen 2008). Larsen claims that for most young people the local discourse is in focus, when communicating with real life friends in a net community. When a young girl publishes a self-portrait on a social web site this is mostly aimed at her friends and contemporaries. However, adults in general and media in particular, constantly place communication between friends in a global discourse, interpreting the girl's action into a context where pedophiles and others constitute potential threats. Larsen offers this as an explanation to the knowledge gap between generations when it comes to the internet, claiming that negative experiences on the internet are not normally part of young people's daily lives. This corresponds with the conclusions of Dunkels (2007) who claims that young people are aware of the dangers of the internet but that the negative sides are not very prominent when the children talk about their habits on the internet.

Contemporary Digital Arenas

Contemporary digital arenas derive from emerging technologies found in the transformation of the web as an arena primarily for passive content consumption to a place for social networking, collaboration, and participatory creation. This development is popularly referred to as the shift from Web 1.0 to Web 2.0. The term Web 2.0 may be interpreted as a catch-all term and was coined in 2004 though its meaning is still much debated (Anderson 2007). In general, Web 2.0 is interpreted as a precondition for the emergence of so-called social software e.g. blogs, wikis, pod casts, 3D-Web environments, social book marking, folksonomies, social browsers and social operating sys-

tems. These may also be read as buzz words associated with web 2.0.

A major characteristic of Web 2.0 is its emphasis on the active user. Others are the decentralization of content production and user-generated content (Anderson 2007). Ideas of user participation and openness are however not new; rather they are remnants from the time when the web was created some 15 years ago by Tim Berners-Lee (Alexander 2006). Today these ideas are reincarnated through simplification of the publication process, increased possibilities for producing information, and open, public editing (Anderson 2007; Alexander 2006; Best 2006).

But there are also more complex descriptions and explanations of Web 2.0 which include economic and technological issues, and ideas about a connected society (Anderson 2007). It is argued that the emergence of Web 2.0 and the use of its associated applications should not primarily be seen as a technical revolution, but rather as a social revolution (Downes 2007a). This involves the individual user being placed at the centre of communication; shared intelligence and social interaction are seen as more important than the underlying technology (Hinchcliffe 2005). Web 2.0 may also function as an example of the increased individualization that can be seen in Western societies as a whole.

Additionally, specific concerns have emerged in relation to the Web 2.0 phenomenon, for example regarding copyright, ethics, identity construction, power, validation of knowledge and information, all in relation to learning and the expanding digital culture. Further, contemporary digital arenas facilitate intensification of user interactivity and participation, thus decentralizing power over the media, allowing digital cultures to expand into new arenas, which in turn increase the number of channels and instances in which abusive practices can take place.

When it comes to Web 2.0 and its relation to learning, there are three technological meta trends believed to influence education during the five next coming years: 1) Collective sharing and generation of knowledge 2) People being connected to each other through networks and 3) Moving the computer into three dimensions e.g. the emergence of animation tools allowing 3D representation (NMC 2008). It is worth noting however that Web 2.0 and its relationship to learning are generally promoted with optimism and that there is a striking absence

of critique. Additionally emphasis is placed on methods, as evidenced in the large body of instructions and examples of good practice that currently exist. Much detail has been expended in explaining how teachers can use for instance blogs and wikis in their teaching (e.g. Brenner 2007; D'Souza 2007; Konieczny 2007). Systematic reflections on the consequences of changed communication channels and interaction in relation to values are rarely to be found and similarly for identity construction and social value learning processes (Anderson 2007; Owen et. al. 2006). Furthermore, with few exceptions e.g. a BECTA-report (2008) focusing on Web 2.0 learning benefits in the classroom with children aged 11-16, most examples reflect practices at the tertiary level i.e. University and Higher Education.

Identity

The early internet massification, in mid 1990, was paralleled by sometimes imaginative discourses on identity constructions in the online context. Metaphors like "no one knows you are a dog on the internet" (Wikipedia 2008) illustrate a much longed-for possibility to communicate without visual markers such as social class, age, ethnicity and gender. Somehow, the digital sphere was seen as a place people could communicate purely, mind to mind (Everett 2008). Nevertheless, it seems that the need for identity or identification and people's inventiveness was stronger than we could first imagine. Alternative identity markers appeared and skilled internet users could draw conclusions regarding gender, race, age and social status. Today contemporary digital arenas provide rich user interface and increasing numbers of possibilities in various social media contexts to mediate identity communication and construction. Further, as Palfrey and Gasser (2008) found, when it comes to young people's identities there is no sharp line between online and offline identities. Most young people employ one identity with representations in two or more different spaces. Even if appearance and visual identity may play a proportionally less important part of the online communication process, internet is neither genderless nor raceless. The place and identity remain important factors.

At its core, identity can be understood as a '… person's understanding of who they are, of their fundamental defining characteristics as a human being' and that recognition, absence of recognition or even misrecognition can play a part in the formation of identity (Taylor 1994:75). Furthermore, the notion of identity may include recognition of ethnic, cultural and other social identities as 'differing in salience among indi-

viduals and across given historical and social contexts and explores how these are situated in a wider framework of power' (May 999:33). Acknowledging both the limits of identity and hybridity between cultures, May (1999) suggests emphasis on avoidance of stereotyped conceptions of culture or identity. Rather, stand-points are recognized and supported with regard to individual rights to define identity and experience. (see f. Hällgren 2006)

Choices however are not available to all individuals and groups, and in-built contradictions exist between a non-essentialist conception of identity and acknowledgement of group-based differences of power and status (May 1999). Similarly, Buckingham (2008) suggests that we are not entirely free to choose our identity and how we are defined by others. Who we are, or think we are depends on our intentions, who we are with, what social situation we are part of, and our motivations.

Further, in the process of creating self-awareness and ideas of identity, viewing someone as the Other, is a fundamental function (Griffiths 1999). At the same time, the process of differentiating oneself from the Other may be guided by social, biological, cultural, religious, linguistic or territorial boundaries, for example, when defining ethnic minorities and immigrants as not one of us. As such, when used as basis for legitimizing exclusion and/or subordination and/or exploitation of subordinated groups, the dialectic process between Self and Other becomes part of an abusive discourse (van Dijk 2004; Yuval-Davis 1999). Consequently, within abusive discourses, the Other and Othering can be seen as located in the intersection of identity and abusive practices. But, as shown by Hällgren (2006), since the relationship between self and online Others also can be part of an expanding self-awareness and ideas of identity, communication with other identities on the net can provide a possibility of intervention in stereotyped preconceptions and to an expansion of ideas of identity. (see f. Hällgren 2006)

Learning

Papert (1993) claims that the potential for change was sensed but feared, making schools design computer labs in which the computers were held isolated in order to counteract their potential to instigate change. This can form one interpretation of the history of contemporary technology and learning. Another interpretation is that when computers and the internet first were introduced to educational institutions, much of their potential was overlooked. The new technologies were seen as replacements of old

technologies; many hours were spent on debating whether or not there would be any use for teachers in the computer age. Very rarely were the foundations of learning discussed in relation to computers, instead the focus was on the expressions of formal education as we recognize it in schools, classrooms, teachers, pupils and books. Computers were seen as potential substitutes for these expressions rather than tools for thought (Rheingold 2000), tools to enhance human activities such as learning. This mix-up of learning and formal education is still strong in the debate of today. It is symptomatic of the development in the 1990's that one of the leading brands of web based learning management systems was named Blackboard. Today, much of the development at the intersection of learning and contemporary technologies is carried out by laymen and strikingly often young laymen. The educational system has come to a brutal and late awakening when influential researchers in early 2000 pointed out this development (cf. Jenkins 2006; Oblinger 2005).

Changing web forms and practices have also influenced educational practices, suggesting a need for changed competences among teachers in order to adapt, understand and manage learning and values in relation to technological transformation, digital cultures and identity (e.g. NSF 2008; OECD 2008; UNESCO 2008). Some researchers describe the new experiences of educational institutions as a paradigm shift where new roles and practices have emerged (Barr & Tagg 1995; Brown 2006). Son & O´Neill (2006) asserts that in the space of approximately one hundred and thirty years, we have moved from the industrial age through the scientific age to the technological information age and the knowledge economy. With regards to pedagogy, this dramatic shift has placed traditional approaches to teaching and learning directly in the 'darkest shadow' compared to a new, possible vision about the learner, in a more and more globalised world. Yet the relationships between technology, teaching, learning and pedagogy have not been fully explored (Paulsson 2008). Watson (2001) asserts that despite the ubiquity of technology, no clear role has emerged in education. After many years of national policies and investment in Information Technologies in i.e. the UK and elsewhere, technology is still an imposed and novel 'outsider' in the pedagogy of schools. Understanding the problematic of using Information Technologies demands a consideration of some more fundamental educational issues. IT is often perceived as a means for change; change in teaching style, change in learning approaches, and change in access to information. Yet research indicates

that teachers are both threatened by change, and conversely not impressed by change that appears to focus on what the technology can do rather than on learning (Watson 2001).

Significantly, teachers are seen to be 'immigrants' in regard to the new digital practices, appearing to lack knowledge about how children and young people engage with the net in informal, out-of-school contexts (Dunkels 2007). While at school teachers are challenged by young digital natives of the Net who are members of an established digital culture from which teachers are generally and for different reasons, excluded. Thus there is a risk that the young digital culture is ignored within schooling and that student experiences are not respected or considered in school, or elsewhere.

> *"The single biggest problem facing education today is that our digital Immigrant instructors, who speak an outdated language (that of the pre-digital age) are struggling to teach a population that speaks an entirely new language."* (Prensky 2001:2).

Consequently this impacts on the relationship between students and teachers in the classroom and places constraints on the learning process and interaction (van't Hooft 2007; Prensky 2001, 2006). This is particularly influential on teachers' possibilities to act, respond to and prevent the abuses as well as the possibilities of the digital culture.

Abusive Practices

A number of reports have cited "cyber bullying" and also noted the existence of abusive practices which become documented, edited, set to music and published on the Net (e.g. Swedish Data Inspection Board 2007; Bris 2007, 2008; Smith et. al. 2006). These are examples of how new digital channels make it possible to add a direct and public dimension to abusive behavior that can be disseminated worldwide. As if this isn't enough, when this form of abuse is out and published, it can be reproduced and made available forever. Further, this official dimension not only amplifies the abuse but also opens up possibilities for responses whether negative or positive, for example by means of blogging or via other online channels provided by contemporary technologies.

Most teachers and students are aware of bullying as a problematic phenomenon that is difficult to handle and that causes severe consequences. Schools are also taking actions against bullying in different more or less successful ways (Frånberg 2006). The fact that many students also

are being harassed through electronic communication is an increasing problem that adults feel even more uncertain about (Li 2006). First; adults know less about young people's Internet use and second; they are also uncertain about how serious cyber bullying is and how grave cyber threats actually are. To be able to deal with this problem, more knowledge about the issue is required. Media hardly contributes to reliable information about the relation between the Internet and crime (Dunkels 2007). Flaming news bills and big headlines rather cause panic than offer trustworthy information.

What is cyber bullying then? The nature of contemporary technology makes it possible for cyber bullying to take place more secretly and spread more rapidly. Moreover, the traces of these bullying acts stay behind for extended periods of time. Willard (2007:265) defines cyber bullying as "sending or posting harmful or cruel material or engaging in other forms of social aggression using the Internet or other digital technologies". Cyber bullying sometimes also involves stalking and death threats and can thus be very serious. Many adolescents have also experienced sexual harassments over the Internet (Katz 2002).

While traditional bullying is either physical or psychological, and overt or covert, cyber bullying has characteristics that are specific to cyberspace (Shariff 2008). Key characteristics of cyber bullying are, according to Shariff (2008):

Anonymity; allows for the targeting of classmates and/or teachers without being easily detected. Identity is protected by constructed names, etc.

An infinite audience; possibility for hundreds of perpetrators to get involved in the abuse.

Permanence of expression; emails and insulting materials about a person on the Internet are difficult to remove once posted.

Patchin & Hinduja (2006) claim that skills concerning the medium itself can yield power online, while power in traditional settings can originate from physical or social status; who is the strongest or the most popular. According to statistics females are more often targets of sexual harassments, cyber-threats, cyber stalking and pornographic materials (Herring 2002). On the other hand cyberspace has had a liberating effect on girls. Communication technologies have helped girls become more social and confident and develop a new sense of identity and agency that helps them break free from cultural and social non-feminist expectations and stereotypes (Shariff 2008).

Theoretical Considerations

It seems as if contemporary digital learning arenas demand other ways of understanding knowledge than existent, traditional ways that build on ideas deriving from behaviourism, cognitivism and constructivism. These are all theories using language and logic as major components to describe knowledge. They were also developed to understand learning situated in a pre-digital age society. As a complement to cognitivist views on knowledge, connectivism may be of interest to further the understanding of the non-linear, formal and informal learning on the net. Connectivism explains knowledge as 'the set of connections formed by actions and experience' (Downes 2007:1b) and suggests a learning theory that acknowledges technological shifts in a society where learning is no longer an internal, individualistic activity (Siemens 2005). It integrates principles of 'chaos, network, complexity and self-organization theories' (Siemens 2006:30). Other central principles of connectivism are that learning and knowing are seen as continuous, on-going processes as opposed to end states of products and that this process is collective. Furthermore, decision-making is equal to learning in the sense that choosing what to learn and the meaning of incoming information is seen through the lens of a shifting reality. While there is a right answer now, it may be wrong tomorrow due to alterations in the information climate affecting the decision (Siemens 2006). In relation to IT Siemens formulates an important point of departure: "Knowledge may reside in non-human appliances, and learning is enabled/facilitated by technology". According to Siemens the abilities to see connections and recognize patterns constitute core skills today; "Learning and knowledge require diversity of opinions to present the whole and to permit selection of best approach" (Siemens 2006:31).

Intersectionality may also be a useful analytical concept when it comes to understand identity and 'othering' in a liquid, connected and modern world. It shows that factors shaping identity and experience are multiple rather than distinctive. For example Solorzano and Yosso (2001) argue that ethnicity and racism intersect with other forms of subordination such as social class and gender in the formation of identity and experience. Thus, intersectionality becomes a useful concept for understanding this complex interplay. Intersectionality refers to how ethnicity, gender, class, nationality and sexual orientation interact with each other, and how their combination can play out in various settings. These factors generate intersectional individuals. As argued by de los Reyes and

Mulinari (2005) an intersectional perspective asks questions about how power and inequality are interlaced with preconceptions about whiteness, masculinity, gender, heterosexuality and social class etc. through a process of constantly (re)creating new signifiers for the difference between Us and Them, transformed into new social codes. (see f. Hällgren 2006)

There is a need of developing a critical framework to be able to conduct and analyze the outcomes of research findings in the area of young people and contemporary digital arenas. In our opinion a post connectivistic theory construction together with intersectional perspectives on identity, would be fruitful. Critical constructivistic connectivism is an approach we have begun to develop in relation to this research field. The theoretical framework will consider a critical perspective, a constructivistic approach as well as a modified theoretical approach on learning. This will hopefully give us opportunities to develop comprehensive analytical concepts.

Conclusions

Several conclusions can be drawn that contributes to outline the emerging research area around young people, contemporary digital arenas, identity, learning and abusive practices. In this article we have argued that the increased opportunities for communication and user participation offered by Web 2.0 provide us with possibilities as well as challenges. Problems such as harassment and deception are imported into an increasing number of channels, and thus add to the vulnerability of young digital natives and their communities. Consequently, the expanding arenas of the digital culture, the potential vulnerability of members of the young digital community and its identity construction, teachers' insecurity and at the same time, their central role in the teaching of technology and values, are all problematic issues that we wish to explore. As such the proposed research intention aims to focus on the pedagogical potential afforded by contemporary digital arenas. Further aims are to embrace social and cultural perspectives on contemporary technology by focusing on social values and net cultures at the intersection of age, class, gender and ethnicity. Overall, such perspectives are important since they encourage adopting a critical approach towards education and technology use.

The overall aim of the proposed area of study is to identify, analyze and problematise contemporary digital channels of communication and learning in particular, expressions of abusive behavior, and their influence on digital culture and digital native identity construction, with a

specific emphasis on issues related to age, class, gender and ethnicity.

The emerging picture will be analyzed from a critical perspective with reference to technological development (e.g. Aviram & Tami 2007; Sanders 2006), an intersectional, critical perspective concerning identity (e.g. de los Reyes & Mulinari 2005; Delgado & Stefancic 2001), and a sociocultural theoretical perspective with regard to learning (e.g. Vygotskij 2001; Säljö 2005). More specifically the research will identify and study the following areas or themes:

- Webb 2.0 and abusive practices, in particular concerning discrimination;
- Values and digital cultures;
- Identity construction of the digital native or community in relation to learning processes.

Our overarching research questions are: What are the possibilities of and dilemmas associated with contemporary digital channels; and how do they interact with and influence learning possibilities and identity construction for young people? Further, how can this together be analyzed and understood from an intersectional perspective?

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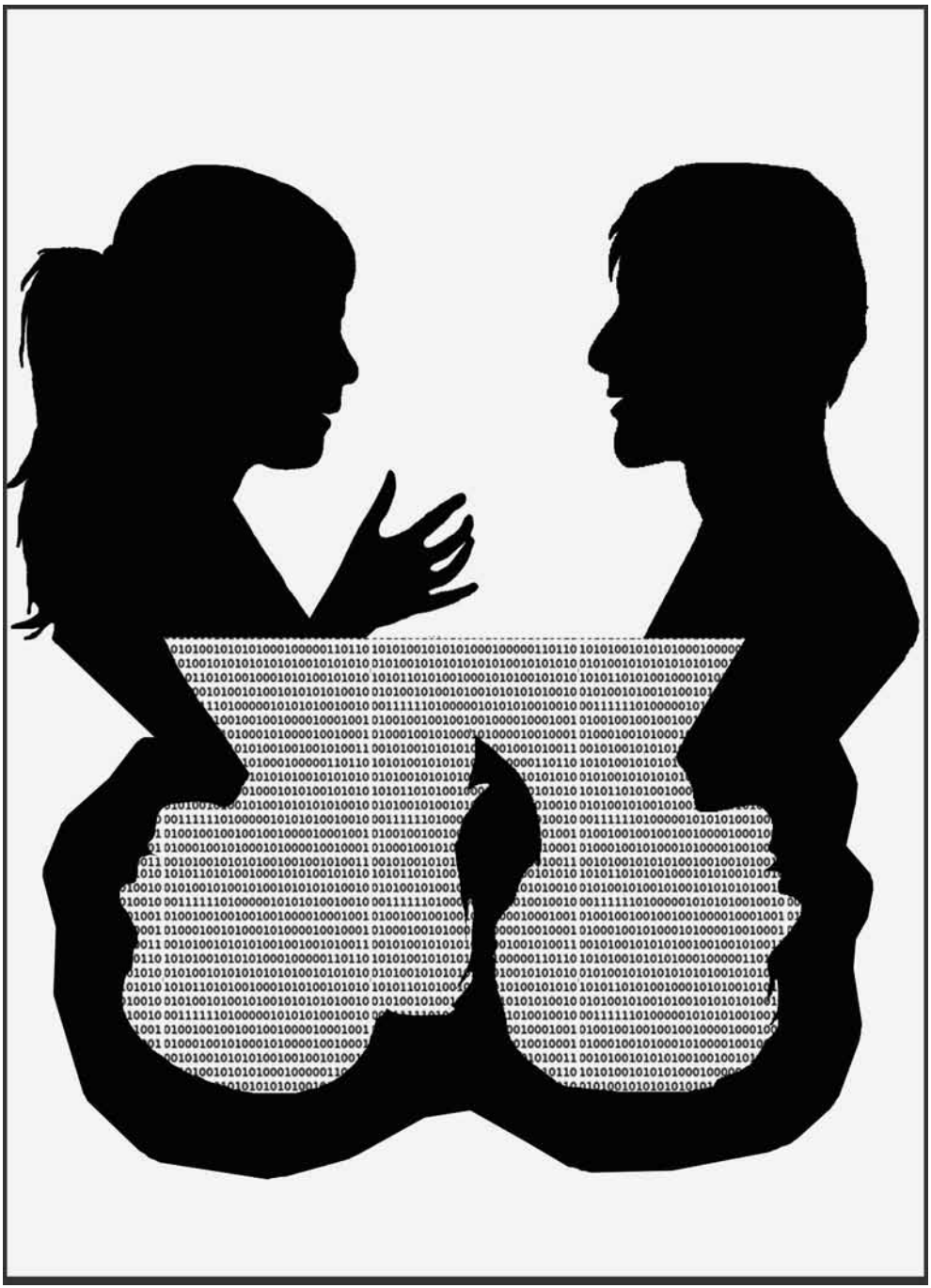

Educational blogs in teacher education – Blending face-to-face and virtual learning activities

Carina Granberg

Abstract

This paper presents a study of three campus courses of Swedish student teachers' experiences during 2007 and 2008 when they used educational blogs blending face-to-face and virtual learning activities. In order to investigate their experiences and the circumstances that influenced their way of engaging in their blogs, 38 narrative interviews were carried out.

To illuminate how information and communication technology (ICT) affordances and the blended environments were perceived, the data were analysed in light of Greeno's theory of affordance. Furthermore, a socio-cultural theory by Vygotsky was used to analyse students' social interaction within their groups.

The paper presents a discussion of the circumstances in which students engage in their blogs. The students' experiences of affordances in respect of blending face-to-face and virtual learning activities and the importance of social interaction within the groups are outlined.

Introduction

The concepts of *open diaries*, *weblogs* and *blogs* have developed and spread rapidly over the past two decades. This idea of individual writing and instant worldwide publishing, inviting others to comment, seem to meet a human need for reflection and communication. However, the blogging culture has not had any major impact on teacher education in Sweden, even though reflection and dialogue are considered essential for learning. The potential integration of blogs into campus courses to support learning has not yet been fully explored, but could be one way of blending face-to-face and on-line learning activities. This paper presents the results of a study carried out at a Swedish teacher training programme during 2007/2008. The study looks at how students chose to use blogs for educational purposes, and how they experienced this

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type of work. In this text teacher educators will be referred to as *teachers* and student teachers as *students*.

Background

This section presents some research that describes blogs in learning environments in general and as part of a blended learning initiative.

Blogs in learning environments

Since the 1990s, blogs have made all Internet users presumptive publishers. Even without any advanced skills in home-page editing, it is relatively easy to write and publish text, pictures, videos, and links on a private blog, and these instant publications can be read and commented on by others. Various blog genres have developed over time, depending on the purpose the blog serves. These include personal blogs, group blogs, topic blogs, blogs about content; text blogs, picture blogs, video blogs, or on their audiences; individual blogs or community blogs (Herring et al. 2004). When blogging found its way into the corridors of schools and higher education, a genre of educational blogs emerged. The educational genre stretches across various blog genres, depending on the purpose of the blog and how students choose to use it. An educational blog may contain different kinds of media; and it can be used for both individual reflections and group discussions.

One frequent aim of using blogs within the educational arena is to encourage reflection and critical thinking in support of the learning process (Chaczko et al. 2007; Divitini & Haugalokken 2005; Stiler 2003) as well as collaboration and peer support (Ganley 2004; Hall & Davidson 2007). There are also papers written about blogs, pointing out that such communication may support professional discussion (Romono 2008) and encourage reflective learning (Hall & Davidson 2007).

Blogs as part of a blended learning initiative

Oravec (2003) describes blog*s as a creative middle-space*, something between face-to-face and digital, when she points out that the blending of these two is very student-determined: they can choose how much face-to-face interaction they incorporate into their blogs, and vice versa.

The use of blogs as a learning activity in campus courses could be seen as a move towards initiating an environment of blended learning. Salen (2007) has compared 17 studies looking into the use of blogs to introduce a blended learning environment in higher education in Australia,

Hong Kong, Norway, the United Kingdom, and the United States of America. The reported aim of mixing face-to-face meetings with blogs in these studies was to enhance reflection, interaction, collaboration and confidence among the students. Salen points out the positive results of the use of blogs in a learning environment being that students engaged in reflective thinking and collaboration. As examples of obstacles, Salen describes students' problems with technology and their dissatisfaction with blogs due to them being too public.

However, some experiences of offering students educational blogs as an option for reflecting on their own learning have reportedly been disappointing. Divitini et al. (2005), for example, describe their setbacks when only one student out of 34 used the blog as intended. The reason for this, besides a lack of time and having experienced technical difficulties, was that the students did not feel the need for blogging since they could interact with each other face-to-face in class in any event.

Blended learning

We have, for some time, divided higher education into campus courses using face-to-face learning activities, and distance courses, in which all or at least a major part of the learning activities are carried out online. There are significant differences between these two 'learning cultures', and they have influenced one another to the extent that we now face learning contexts that integrate face-to-face and digital interaction (Garrison & Kanuka 2004). This mix, often referred to as *blended learning*, can be understood and carried out in various ways. Consequently, there are also different approaches when it comes to defining the concept. This indistinctness could be considered as a weakness; indeed, some researchers find the concept too vague to use at all (Oliver & Trigwell 2005). On the other hand, it could be regarded as a strength, giving teachers and policymakers the space to create a concept of *blended learning* suited to their own contexts (Sharpe et al. 2006). This reasoning – of designing a blended context – is similar to the mixed environment the young people of today create in their private lives. These "digital natives", as Prensky describes them (2001), have grown up using ICT and communicate with their friends face-to-face as well as digitally in a relatively integrated way. This way of blending would be familiar to them, therefore.

Garrison and Kanuka (2004) agree with the idea that *blended learning* is a question of design, integrating face-to-face and virtual activities.

Their definition of blended learning, which will be used in this paper, emphasises how these concepts will be joined: "*Blended learning is an integration of face-to-face and online learning experiences – not a layering of one on top of the other*" (ibid.:99).

Ginns and Ellis (2007) argue that there are few studies reporting on how students who participate in campus courses perceive the integration of face-to-face and ICT-supported activities. The reports to date have looked at students' experience of the difference between the face-to-face and virtual options, rather than at how these two options may support each other as a concept of *blended learning*.

A research study of students using blogs in three courses

The campus courses in the teacher education programme at the Swedish university described in this paper are still mainly based on face-to-face interaction. Even though the pace of its introduction may be considered slow, ICT has found its way into the teaching context. Communication by e-mail and virtual learning environments is frequently used, although concepts like *digital portfolio*, *digital individual development planning* and *blogs* are in different stages of being tried out.

Three courses of students using blogs

During the academic year 2007-2008, three groups of student teachers participated in compulsory courses in which blogs were introduced. Teachers from the ICT Department at the Faculty of Teacher Education were involved in all these courses, supporting the students in the use of blogs for different educational purposes. All students in these three courses were offered lectures and workshops in order to learn how to blog using text, sound, pictures and video.

Course A

In the autumn term of 2007, 222 students started their first compulsory course in the teacher education programme on campus. The teachers responsible for the course had not advocated the idea of using blogs as a tool to support individual reflection. Thus, the ICT teachers participating in the study chose to offer the students to use blogs for individual reflection on voluntarily basis.

Course B

At the same time, 57 students participated in the same compulsory course as course A, although 130 km from the university campus. In order for these students to receive as much face-to-face tuition as those participating in course A, teachers from the university traveled to the remote

campus to deliver lectures and host seminars. In collaboration with the ICT teachers, course B teachers introduced blogs to the students on a compulsory basis. These students used their individual blogs as group blogs. In smaller groups, the students were tasked with reflecting on the prescribed literature and transforming course content for practical use.

Course C

During the spring term of 2008, 70 students participated in a compulsory course on campus, and were introduced to blogs as a tool for reflection. Both the teachers responsible for the course and the ICT teachers planned the use of blogs together. The blogs were devised as group blogs, and the student groups were assigned to document and reflect on their learning process during group work.

Aims and questions

The aim of the study was to illuminate how student teachers chose to use their educational blogs and their experiences of ICT affordances and constraints. Furthermore, this study aimed to provide an insight into relationships between the students' choice and factors such as their age and prior experience, as well as the teachers' introduction of and arguments for educational blogs.

The research questions arising from this study are as follows:

- How do the students choose to use their blogs, and how can different choices be understood?
- How do blog activities and class activities relate to each other?
- What ICT affordances and constraints do students experience using blogs?
- What impact do characteristics like age, gender and prior experience have on the students' experiences and choices?

Methodology

Blog genres, *blended learning*, *learning dialogue*, etc. are concepts we interpret and construct in relation to a social context. Moreover, students' individual understanding of their learning environment will influence their individual choices as regards how to use the blogs as well as their experiences.

As an ICT teacher, the author took constructivism as an epistemological starting point and aimed at understanding how blogs could be used from the students' perspective. A hermeneutical approach was used in this study, therefore. Hermeneutics focuses on interpreting and

understanding the objects of study, and allows the researcher to interpret and relate data to his or her own prior knowledge (Ricoeur 1976).

Methods

All students in all courses were invited to voluntary, semi-structured interviews. Thirteen students from course A, 13 from course B, and ten from course C volunteered to be part of the study. Three of the informants were doing both course A and course C.

The interviews were carried out face-to-face (5), by phone (28) or by online chat (3), and lasted between 35 and 90 minutes. Except for the online chat, the interviews were digitally recorded and transcribed. Course evaluations brought additional data to this study, as did the blogs that the majority of the students made available for the study. A thematic content analysis was used to structure data, and identify themes and theories in order to gain insight through a hermeneutic interpretation. A more detailed account of these theories will follow.

Emerging themes

As a thematic content analysis was used, the first reading of the transcribed interviews aimed at identifying themes. The students' different perceptions of the affordances of blogs for educational purposes came out very clearly. Given the author's prior experience of students' diverse understanding of and attitudes towards ICT, this finding was not surprising. Greeno's (1994) theory of affordances was, therefore, used to gain insight into students' interaction with educational blogs. However, students' narratives showed that their choices about how to use their blogs were clearly related to their experiences within their respective groups. Thus, theories from the socio-cultural tradition, e.g. by Vygotsky were added to the theoretical framework. Furthermore, most informants addressed their own as well as the other students' age as playing a crucial role when it came to how they approached ICT. Finally, the theme of blending face-to-face and digital activities emerged in most of the interviews. The four themes could, therefore, be described as follows:

- Age and attitude
- ICT affordance
- Blending face-to-face and digital activities, and
- Social activity.

Ethical issues

All necessary ethical requirements by the University of Umeå, as outlined by the Swedish Research Council (2001), were followed in this

study. Accordingly, the aspects of beneficence, non-malfeasance, informed consent, and anonymity were taken into account in planning and carrying out the research, and approval for the research design was achieved at the appropriate level of the organisation. The author has worked as a teacher in the ICT Department since 2002, and is familiar with the context, despite not having used blogs for educational purposes. As a doctoral student, the author's interest lies in how the didactic use of ICT can and is developed within learning environments. Because the author's work and research occur in the same context, it is imperative that distance is maintained from the object of study, and that prior understanding of that object is clarified. Therefore, the author chose not to take an active part in any of the courses concerned.

Theoretical framework

As described earlier, the study developed four themes that emerged through an analysis of the students' narratives. To understand some of the interactions between these themes, arguments are drawn from the theories described below.

Theory of affordances

The theory of affordances goes back to Gibson (1977), who presented the idea that animals could perceive information – affordances – within nature and could thereby provide themselves with food and shelter. Gibson's positivistic ecological theory has inspired researchers to widen the concept of *affordance* to incorporate not only nature but also the human environment, in which all kinds of objects may have affordances, that is, something to offer people that allows them to perform an action.

Greeno (1994) developed the concept further by adding a corresponding quality, namely ability, within the human being. He pointed out the relationship between the abilities of an actor and the affordances of an object. Thus, Greeno takes a more constructivist approach when he discusses *affordances* and *abilities* as interrelated concepts, constructing each other: "*Neither an affordance nor an ability is specifiable in the absence of specifying the other*" (Greeno 1994:338). Greeno's theory could, therefore, be transcribed as follows: An object may have some *affordances*, and if the actor has the *ability* to perceive and act according to those affordances, the *intended activity* will take place. However, the theory of affordances does not consider social interactions and how these may cause individuals to make different choices. Therefore, when the importance of the group came out very clearly in the interviews, theory from the socio-cultural tradition was added.

Socio-cultural theory

Some of the main perspectives on socio-cultural learning originate from Vygotsky (1978), where he describes *learning* as "situated", "mainly social", "distributed", and "mediated". Furthermore, the language we speak is considered an essential condition for any learning activity. In other words, learning does not take place in an objective, external environment or strictly in our minds. Learning is situated in social and physical contexts. There is a need to consider the historical and cultural contexts, as well as the relationships and interaction between individuals participating in the learning activity. As human beings, we are all unique and we do not all share the same skills or experiences. Knowledge could thereby be described as distributed, and learning as a social activity through which we learn from each other. Vygotsky (1978) also introduced the idea of the *zone of proximal development* as important to our mind's development. He defines this zone as follows (ibid.:86): "*the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance, or in collaboration with more capable peers*".

When learning activities take place in social contexts, there is a need to mediate the learners' thoughts, questions and responses. The most important mediating artefact in this process has always been our language. *Communication* could be described as a process in which what we know becomes available to others (Dewey 1999). We do not only use our spoken language to communicate face-to-face: we have created artefacts to support this social mediation, namely books, pictures, ICT, etc. These artefacts represent different traditions of communication and offer various ways of mediating learning.

Irrespective of whether we define *learning* as a strictly individual or a social activity, very little learning will come about if the individuals do not have the motivation to take active part in learning activities. Using a socio-cultural perspective, Dysthe (2003) describes the required motivation as expectations of society or social contexts. Furthermore, Dysthe (ibid) points out the need for confirmation and the experience of group belonging in order to motivate the students. When learning is socially mediated it is of great importance that students share and work towards the same learning goals (Slavin, 1996). The willingness to learn relates to whether or not learning is regarded as important in the group.

Findings

This section begins by introducing each course, and describing how and to what extent the students used their blogs. The four themes presented earlier will then be explored.

The students and their blogs

Students' levels of engagement in their blogs differed across the three courses and are, therefore, presented separately.

Course A

The course consisted of 222 students who were offered blogs on a voluntary basis in order to reflect individually on their studies. About 20% of the students activated their blogs. Among them, 30% used their blogs to reflect on their education, publishing at least four entries each. Media other than text, like video, sound or pictures, were rarely used. A few students made some comments, but no teachers did. A majority of the blogs could be described as text-based, private, and individual. Among the students who chose not to activate their blogs, the majority pointed out in the course evaluation that the blog had not been compulsory. Nina, one of the students interviewed, said that, "*The blog was voluntary and, therefore, easy to drop. You take the shortcuts you can*." Some students, like Karin, presented more ethical arguments: "*You cannot use a blog to reflect during the practical training. It would be unethical to write about the pupils or the mentor.* Most of the informants who started to use their blogs gave up when no dialogue emerged. Eve explained that "*It was like writing into the empty void. It did not give me anything.*"

Course B

This course involved 57 students who were divided into smaller groups of 5–6 students each. They used their blogs to carry out one digital group seminar, discuss course literature and to complete a group assignment in which course content was transformed into classroom activities. In order to pass each blog assignment the students had to publish two blog entries each. All students participated in the text-based discussion by commenting on each others' blogs. The teachers contributed a short summarising comment at the end. The blogs could be described as text-based and holding thematic group discussions.

According to the course evaluation, 38% of the study participants claimed that they would not have written in their blogs if it had been voluntary. Lydia said that, "*During our first blog assignment, we wrote our two entries just to get through the discussion and pass*". The remaining

62% claimed that they would have written a blog even if the assignment had not been compulsory – as long as their teachers and/or fellow students gave their comments.

Course C

The 70 students in course C were divided into smaller groups of 6–7 students each. The students were supposed to use their blogs on a daily basis in order to document and reflect on their progress during their group work. Each group shared a blog, and the majority of the groups used different media, such as text in combination with sound and/or video and pictures in order to document the learning process. The blogs could be described as group blogs, holding documentation and reflection through different media. The informants spoke of how their teachers gave them constant feedback during the process by commenting in their blogs as well as by making face-to-face comments in class.

Students' age and attitudes

The informants were between 19 and 48 years old. The majority were 25 years or younger, while a few were 35 years or older. When the informants described their use of ICT, it became evident that younger students are generally more used to handling it. Alice explained: "*If you grow up using ICT you will learn as new concepts are introduced; if you just keep up, you will never fall behind*." There are, of course, no sharp boundaries between these groups: there are older informants who are very interested in ICT, who could be described as early adopters, and who have acquired great ICT skills as adults.

However, this does not imply that young students per se are interested in ICT and always search for new ways of using computers. Nonetheless, there are some informants who were very interested in using ICT. Peter could be described as an early adopter: "*I am always curious, [and] usually first among my friends to try out new ways of using ICT, convincing them to try"* However, other students are very sceptic and put up as much resistance as possible. Sally pictured herself as a reactionary: "*I am very sceptical and resist as long as I can. I just use ICT when I am forced to write school assignments*". Most of the informants could, however, be placed somewhere in between these two extremes, i.e. they need time to adjust to new ideas before adopting them. Donna explained this as follows: "*I usually find new ICT application unnecessary. But my hesitation disappears when I learn how to use it.*." These three students are all young and have used ICT since their childhood, but they approach ICT very differently.

Most of the informants felt age was a crucial factor, but said that young people were pictured as pro-ICT even if they did not fit the picture. As Kevin explained, "*I am young, so I am supposed to join communities, blogs, MSN, etc. [But] I am just not interested.*" Marie agreed: "*Being only 20, I know that I am supposed to know how to use computers, but I have never been interested and I just do not know how computers work.*" Furthermore, some of the younger informants expected themselves to change as they age. As Joe explained, "*I think it is a process of maturity. Now that I am older, I am not so keen on trying all this new stuff*".

Affordances of blogs

All informants were familiar with blogs although this way of using blogs was a new way of understanding the concept. The narratives show that the majority of the informants found it difficult to relate blogs to an educational environment. Their prior understanding of blogs made it difficult for them to perceive any educational affordances. Karen expressed this as follows: "*People write blogs in order to expose themselves. When the teachers suggested that we would use blogs to reflect on serious stuff like our education I felt really provoked and I refused to write.*" Even some students that could be described as early adopters and very pro-ICT did not perceive any advantages. Julia, for example, asked the following question: "*I write almost every day about my life in my private blog. Why should I write a school blog? It sounds extremely boring. Who would ever be interested in reading about that?*" There were also students who appreciated the idea of digital discussions, but felt very sceptical towards blogs. Lisa stated this as follows: "*I thought the idea of documenting our process digitally was great, but why use a blog? Blogs are too hip and unserious to be used for educational purposes*".

The majority of the informants in courses B and C described undergoing a positive change in attitude towards blogs as they worked on them. Kitty had the following to say: "*I used the blog because it was compulsory, I was bloody sceptical, but it turned out to be lots of fun and very fruitful*". In their narratives, the informants discussed four affordances they perceived to have influenced their blogging. First among these were the affordances of documenting. All the informants in courses B and C pointed out the benefit of having discussions in writing, because they could read other groups' discussions and go back and read their own again. As Tracy explained, "*Spoken dialogues just vanish. You think that you will remember, but you don't*". One third of the students described the writing as a way of capturing their thoughts. Anne

put it as follows: "*I really need to put my ideas down in writing to structure my thoughts and to be aware of them.*"

Secondly, most of the students pointed out that blogs offered one time to read, to look for additional input, and reflect on one's writing before it was published.

The third affordances some of the informants perceived could be described as *talking space*, as Meg pointed out: "*There is often someone that takes over a face-to-face discussion. There is always room for everyone in a digital dialogue*". These affordances, offering time and space, encouraged some of the informants to mediate their thoughts in a way that they usually did not.

The forth affordance which most of the students agreed on was the possibility to receive comments from others. However, these affordances constituted a constraint at the same time. When blogs offer the opportunity for readers to comment, the expectation is created that teachers will be involved in the dialogue. Also, when the students did not get any comments, they became disappointed – which in turn affected their writing, As Eve explained, "*It is like when you talk to the teacher in the classroom and are just ignored. My activity in the blog definitely decreased*". A majority of the informants in courses A and B pointed out the lack of supportive feedback from the teachers. Because blogs afford communication, the students expected the teachers to take part in the dialogue.

When students described the affordances as well as the constraints in using blogs, they either compared digital with face-to-face dialogues, or described how they complemented each other. The following theme will, therefore, concern the idea of blending these two.

Experiences of blending

Except for four informants, all of the participants in courses B and C pointed out the affordance of blending digital and face-to-face dialogue. Firstly, students described themselves as preferring one way of communication. Grace presented the following argument: "*I prefer to write ... I am not as shy when I write in a blog as I am holding a face-to-face discussion in a seminar.* Kate spoke for the majority in her opinion: "*I prefer to talk in person. There is more information in a face-to-face meeting.*" Most informants were aware of these different qualities and the benefit of blending the two methods to communicate to meet different needs. Kate added that, "*Everyone has something to share; some like to do it face-to-face, while others prefer to write*".

Secondly, two thirds of the informants pointed out the advantage of having the possibility to use face-to-face sources while blogging. Tracy described: "*There are a lot of things happening when you discuss something using a group blog. I can read, think, talk to other students, ask my friends, and think again before I publish. It is a whole process*". The very blend of writing and discussion can complement each other, as Meg pointed out: "*When you write, you have time to think; when you meet, the dialogue is much faster and richer in associations*".

The third affordance, as the informants in course C pointed out, was the interaction between face-to-face activities and digital documentation and reflection. These students chose to work with their blogs in various ways. The groups that decided to discuss what should be documented in the blog before they published described the benefit of finding the essence of the face-to-face activities during the day, as Lucy explained: "*I learned a lot while we were transferring our face-to-face discussions to a blog entry. We had to reflect on our reflections made during the day*". To transform a long and associative face-to-face activity into a short and structured blog entry forced them to reflect on the learning process. The students who chose to use sound or pictures/video described the same process of reflection when they had to discuss what they had actually been doing in order to document the learning process. Indeed, the interaction and meta-reflection went the other way around as well – as Helen (course B) described: "*Reading our blog after the first assignment, we could see that it was just a mess. We sat down and discussed how to engage in digital dialogue*". The blogs made their messy discussion and their shortcomings visible, and they solved their problem in a rapid and evocative face-to-face discussion.

The social aspects of group

All of the informants referred to different groups, friends, their classmates, or broader society when they described how they used ICT in their private lives. All of the informants spoke of the social pressure to use ICT. Younger informants described this pressure as coming from their friends. Kate was an example of this: "*All my friends take on new ways of using ICT, and eventually they have dragged me into new communities. The group pressure is severe*". Older students are, however, more likely to be influenced by society, as Susan reflected: "*Neither I nor my friends use ICT to communicate. Maybe that is why they are my friends. … but ICT is used everywhere and I feel forced to allow ICT into my life*". Thus, the motivation of using

ICT in their private lives is definitely related to the students' socio-cultural context.

The main motivation to use educational blogs has obviously been whether the blogs were compulsory or not. However, there were students who voluntarily started to blog, but who gave up when no confirmation was forthcoming from a social context. Social interaction is important, therefore. Rose, who did not use the blogs when they were voluntary (course A), did not have the same reasoning when she attended course C: "*Because it was a group activity, [in course C] I do not know if I had refused to blog even if it had been voluntary. Depending on what the rest of the group had chosen I would have followed their example*." The teachers' expectations – or lack thereof – were also important to students' motivation. The course C informants, who continuously received feedback in their blogs as well as face-to-face, were the most active. Joe described it this way: "*Our teacher, who read and commented on our blog throughout our work, was our blog engine*".

Furthermore, the narratives showed that social interaction within the group is important when it comes to the kind of learning activity that will take place. Within a group of 6–7 students, of different ages and backgrounds, their knowledge was distributed. They represented a range of experience and skills, which provided positive conditions under which activities of distributed learning could take place. This process of learning was not present in all the student groups. Slavin (1995) discussed the importance of having a common goal within the group and, depending on that decision, the size of the groups' distributed knowledge may differ. The groups in courses B and C that made an (informal) decision to publish only two blog entries – just to pass the assignment – made little room to share their experiences. June expressed: "*When we all had published two entries, everything was just hanging in the air: all these questions that nobody cared to answer*". They did not take the opportunity to challenge each other in order to initiate a learning discussion. Most of their distributed knowledge never became visible or shared; the entries lacked engagement; and the zone of development decreased to a minimum – as did the learning process. Depending on the social interaction within the groups, their level of reflection and discussion varied, as Bertha pointed out: "*When I read the other groups' blogs, I could see that it depended on the group and the relations within the group how much dialogue and reflection would emerge*".

More activities took place in all course B and C groups where the informants described that they

had aimed for something more than just passing the assignment. These informants described how their activities in the blog had increased, how more and longer entries had been published, and how they had questioned and challenged each other. Thus, the importance of group interaction came out very clearly. These groups also described how they had discussed how to engage in their work and had reflected on their working process. In course C, for example, the students first discussed and then decided how to work with their documentation; therefore, they ended up using the media in very different ways in respect of mediating their work and learning processes.

Discussion

The first part of this discussion examines the abovementioned research questions concerning students' engagement in their blogs and their experience of the affordances of ICT and blended learning environments. Finally, age – as a characteristic that all students referred to as crucial to the use of ICT – is highlighted.

The students' engagement in their educational blogs varied among the groups. Like the students described by Divitini et Al. (2005), the majority of students in course A did not bother blogging, while those that had, soon gave them up. When the blogs were voluntary, individual and without teacher feedback, no expectations of the social context were created and, as described by Dysthe (2003), the students' motivation to engage in their blogs decreased Furthermore, the narratives showed that a majority of the informants found it difficult to transform blogs from the genre of personal blogs into educational blogs. Their prior understanding of *education* as situated in schools, in a physical context, prevented them from relating blogs to an environment in which formal learning could be situated. Therefore, as expressed by students in courses B and C, the social expectations of teachers seem to be important in helping students widen their experience and understanding of blogs.

The blogs in courses B and C became a group activity, and there were consequently social expectations from the group. These expectations, as described earlier, were closely related to the goals of the group, and the students seemed to adjust their engagement to fit these goals. As described by Slavin (1995), the importance of common goals is obvious in this study, although we need to add that these goals have to aim for social interaction in order to motivate the students to engage in their blogs. If they merely aim to pass the assignments, their common goal will instead constitute an obstacle to the

learning process. Informants in courses B and C who described their groups' common goals as related to "learning activities" engaged in the blogs long enough to widen their understanding of the medium from being something private to being an environment for learning. Learning is situated and mediated; to engage in educational blogs, therefore, we need to broaden our perspectives of learning as something that is situated in schools and mediated by teachers face-to-face to a wider concept, that includes learning being situated in a virtual context and mediated through artefacts like written text, sound, pictures and video.

Students' understanding of educational blogs, social expectations, interaction with teachers and social activities within their groups seemed to influence their engagement in their blogs.

As described earlier, the affordances of blogs for learning were not obvious to the students at the time the blogs were introduced, although this became evident to the students in those groups that had engaged in their blogs. Seeing blogs as a creative "middle space", to use Oravec's (2003) term, was shown to be highly student-determined. The design of blending face-to-face and virtual learning activities was created by the students, individually as well as in groups. Both the students' ability to perceive blog affordances, and also the affordances of the blogs, developed during the course. In this way both the students' abilities and the affordances of the blogs were created in relation to one other (Greeno 1994). The affordances of blending face-to-face and virtual activities, as described by the informants, correspond to Garison and Kanukas' (2004) definition of *blended learning* as a design of an integration of face-to-face and online learning experiences. The informants pointed out affordances of deriving advantages from both environments to support different needs they had of mediating their thoughts and reflection in order to become a part of the distributed knowledge within their groups. Furthermore, they described how their own learning had profited from the reflective process in which they had transferred their face-to-face activities to their blogs, mediated through different artefacts.

These affordances described by the informants, in course B in general and in course C in particular, became evident to the students during their work. As stated earlier, besides their prior understanding of blogs and their social activities within the groups, there were no other characteristics that could shed further light on the informants' abilities. For example, their age did not seem to play a crucial role in their engagement in blogs.

However, there is a rather widespread understanding that young people, by definition, are interested in ICT. Prensky (2001) describes these "digital natives" rather homogeneously as having grown up using ICT. This homogeneity could be considered an overstatement. As stated earlier, young students can be early adopters of as well as reactionaries to ICT; they also have the same understanding as people in older age groups of school as being a physical face-to-face context, and the same struggle as their older counterparts in transforming blog genres from a private to an educational environment. Irrespective of age, therefore, the informants expressed a wish that teachers clarify the purpose and advantage of using blogs for reflection, documentation and dialogue. Also irrespective of matter age, they wanted teachers to read their blogs and give feedback on them, confirming that they were on the right track and using the blogs as intended. Students needed help in constructing and defining educational blogs as a genre, and blogging as a learning activity. Furthermore, there is a need to discus how open educational blogs should be. This is an ethical matter as well as a question of concern in respect of for students', teachers' and pupils' privacy and security.

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To make learning visible: In what way can ICT and Multimedia contribute?

Eva Mårell-Olsson and Alison Hudson

The child has a hundred languages
(and a hundred, hundred, hundred more)
but they steal ninety-nine.
The school and the culture
separate the head from the body.
They tell the child:
to think without hands
to do without head
to listen and not to speak
to understand without joy
to love and to marvel
only at Easter and at Christmas.
Loris Malaguzzi, Founder of the Reggio Emilia Approach (translated by Lella Gandini, (Malaguzzi in Edwards et al.,1998))

Abstract

The overall purpose of this article is to make a contribution to current educational debate about learning by exploring theoretical and practical arguments for using Information and Communication Technologies and Multimedia in teaching and learning. The article focuses on epistemological, technological, and pedagogical dimensions and places emphasis on how ICT and multimedia can make different knowledge, skills and understanding visible in teaching and learning. It draws attention to different theories and conceptualizations of learning and uses some practical examples to illuminate how ICT and multimedia can make learning visible. In particular this paper presents two specific cases and illustrates ways in which students develop an ability to collect, organize, interpret and reflect on their own individual learning and practice and become more active and creative in the development of knowledge.

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Introduction

The authors of this paper have both been working with ICT and multimedia in different contexts and different countries as a form of pedagogical documentation for almost a decade. As teachers and researchers their interest in the use ICT and multimedia has prompted research questions relating to the broader concept of how ICT and multimedia can make different forms of knowledge and learning visible in teaching, learning and assessment.

Where and how does learning take place? Take a moment and think of a situation when you had a strong memory of yourself learning something. It can be any kind of 'aha'-experience or a feeling of really learning something. Where were you? Were you in a classroom or in school or somewhere else? If students are asked to think about these questions they most often describe situations where they were not in a classroom or even in an educational situation. So how can knowledge and learning be described and in what forms do we have access to knowledge? What kind of cognitive approach could be our guideline in education?

Historically, knowledge has been fundamental for the development of society and survival of man. People have through time known and been able to do things without being able to explain how they have known what they know. In certain professions, quick decisions are needed which require specific knowledge. However, knowledge is multiple and complex, as with emergency care for example, where fast assessments as to what measures to take are necessary. That type of professional knowledge, which demands a particular experience based competence, is hard to describe and is usually referred to as tacit knowledge (UR, 2003). In today's society, peoples´ professions develop different forms of knowledge and there is a need for reflection to improve competence and understanding. For example in UK higher education reflection and planning is seen as important in developing and maintaining a culture that values learning as a life time activity. As such the emphasis is placed on making learning more visible through Personal Development Planning (PDP) (The Higher Education Academy 2008).

Knowledge, skills and wisdom – three forms of knowledge

One distinguishing feature of what we could call a knowledge society is that the understanding of learning and of what knowledge is and how it can be understood has expanded (Gustavsson & Wahlström, 2004).

Gustavsson (2000) takes a starting point in the philosopher Aristotle's theory about the three forms of knowledge development - *episteme*, *techne* and *phronesis*. These three forms of knowledge interact with and develop each other and to separate them is only a way to visualize and explain them (see figure 1).

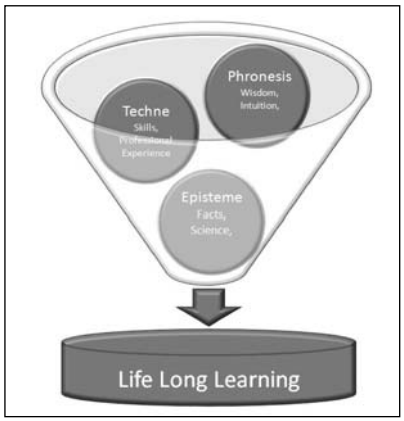

Figure 1. Knowledge, skills and wisdom – three forms of knowledge needed for lifelong learning.
Based on three forms of knowledge by Gustavsson (2000) and the EC commission´s recommendations about key competences for lifelong learning. (Mårell-Olsson, 2008)

Knowledge *episteme* is identified by Gustavsson (2000) as the type of objective knowledge that can be analyzed systematically, proved through empirical data and is developed within science and research. A requirement of *knowledge (episteme)* is to secure knowledge in a scientifically acceptable manor. The criteria for objectivity can vary in different philosophic traditions. Within education and school, this form of knowledge is often referred to as fact knowledge.

The second form of knowledge is *techne*. This type of knowledge is tied to handicraft, manufacturing of products, professional skills and artistry. It is within the body and tacit knowledge and tacit skills are included. In the world of school and education, this form of knowledge is known as skills.

The third form of knowledge Gustavsson identifies is *phronesis*. This form of knowledge is related to experience and wisdom. It comprises of social, political and cultural work between people and aims to produce a good life for people. Life experience and good judgment, which can take a lifetime to achieve, belong to the knowledge form wisdom. According to Gustavsson, life experience can't be taught through books, it has to be gained through life. But one

way of trying to acquire experience in professional educations is to let students read case studies and fictional scenarios. Thus 'storytelling' is seen as an important practice in education, professional development and organizational learning (Brown et al., 2004).

Knowledge education is a lifelong process where impressions from the surroundings are worked on by the individual in an interaction with the world around. Gustavsson (UR, 2003) describes it as a journey into the unknown in a loop where you meet other people with different thoughts and different opinions returning to yourself and reshaping your knowledge and personal believes. Knowledge in the sense of education and culture is what people have integrated into their disposition, beliefs and values. This form of knowledge is decisive as to how the individual interprets knowledge, perceives the world, lives in the world and acts in the world. Gustavsson suggests that, man exists within himself or among himself and makes excursions out in the world and there he meets what is strange and different to him and makes new experiences. It is in that fashion knowledge processes and educational processes are made, that is, how one gains knowledge and understanding and how knowledge processes work. What is important is the excursion and the returning. The excursion is to go out in the unknown and the returning is to interpret what you have met and make new experiences of what you have met in the earlier world. Thus knowledge education is an interaction between the known and the unknown (UR, 2003).

Gustavsson also suggests that education and schools today only activate the "brain" and the intellect and lack practical approaches to combining knowledge, imagination, fantasy and creativity. Similary Malaguzzi (in Edwards et al., 1998) argues that 'the school and the culture separate the head form the body'. Thus it is important to consider approaches to education that creatively integrate theoretical and practical knowledge with the imagination instead of using just the intellect as many educational settings are doing today.

Knowledge models and educational models

Bloom (1956) attempts to classify learning in terms of overlapping 'domains'. His well known model identifies the *Cognitive Domain* (knowledge and thinking), *Affective Domain* (attitude and feeling) and *Psychomotor Domain* (skills and doing). Bloom's taxonomy is ordered as a series of pre-requisites for learning and is still used as a basis for sequencing learning activities. How-

ever, modifications of the original model also exist. For example Anderson and Krathwohl (2001) modified Bloom's *Cognitive Domain* to fit into educational demands of today. While Bloom expresses the *Cognitive Domain* in terms of the following six nouns: knowledge, comprehension, application, analysis, synthesis and evaluation, Anderson and Krathwohl change nouns to verbs and make some minor adjustments. Thus they see knowledge and thinking in terms of actively remembering, understanding, applying, analysing, evaluating and creating.

Remembering is when the student memorizes and reproduces facts. *Understanding* is the process where the student uses and reasons out facts and understands relations and connections. *Applying* is when the student transforms knowledge to general principals and adapts knowledge in new areas. *Analyzing* is when the student classifies, compares, organizes and discovers patterns. *Evaluating* is when the student assesses, sees consequences and evaluates ideas, methods and solutions. The last part of the process, seen as the highest level of development by Anderson and Krathwohl is *Creating*. This is when the student synthesizes, coordinates, concludes and creates something of his or her own.

The 4 F:s

In the Swedish school world, knowledge is commonly addressed in terms of the 4 F:s – fakta, förståelse, färdighet och förtrogenhet (see figure 2) i.e. (facts, understanding, skills and experience.

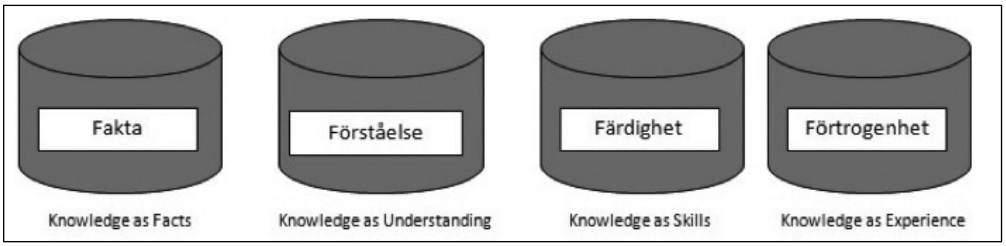

Figure 2. The 4 F: s. Swedish School Concepts i.e. Fakta, Förståelse, Färdighet and Förtrogenhet compared with the concepts of Knowledge as Facts, Knowledge as Understanding, Knowledge as Skills and Knowledge as Experience (Mårell-Olsson, 2008).

In the report *Skola för bildning* (School for Education) (SOU 1992:94) the concept of knowledge is reviewed in terms of *facts, understanding, skills* and *experience*, all of which are included in the curriculum. These concepts can be related to Gustavsson s (2000) knowledge philosophy, Bloom´s taxonomy (1956) and Anderson and Krathwohl's (2001) adaptation of the Cognitive Domain.

The term *fact* can be related to *episteme, knowledge* and *remembering. Understanding* is comparable to *comprehension.* While Gustavsson's knowledge philosophy does not specifically address the concept *understanding* Gustavsson's sees understanding as socially constructed knowledge incorporated within personal insight. *Skills* can be compared to *techne, applying and adapting* and the practical productive knowledge where silent knowing is included, which is also reflected in tacit knowledge and professional skills. Finally knowledge as experience can be compared to *phronesis* or *wisdom*. It incorporates *analysis*, *evaluation* synthesis and creativity and is seen as the highest development phase by Bloom and Anderson and Krathwohl. It can take a relatively long time to master the full combination of these processes.

Thoughts about thoughts

In education today students, pupils and teachers are encouraged to reflect on their learning. One purpose is to close the gap between theoretical and practical knowledge. Thus students, pupils and teachers are asked to reflect on made experiences. In educational - and school contexts teacher reflection is, amongst other things, aiming to improve competence. It is often suggested that reflection takes its starting point in the situation in the classroom (Uljens, 2002). In Sweden in the Teacher Educations Committee´s final report (SOU 1999:63) a reflective way of working is seen as the foundation for the new teacher assignment and thus the person who is intended to become a teacher should be trained as a reflective and critical practitioner.

Emsheimer (2005) argues that reflection and a reflective activity need a connection to a situation. Reflection, according to Emsheimer, is a turning and twisting of a situation i.e an experience of something that is worked on in different steps. The process consists of us taking notice of something followed by understanding and creating meaning. It involves working with this meaning and reshaping or transforming the outcome in terms of learning. The process oscillates between action, observing, thoughts and thoughts about thoughts on different planes and

which relate to each other. The relating itself becomes the focus for the reflection. For this to be possible tools or techniques to structure and visualize thoughts in different ways help to aid understand of the situation. It requires, what Emsheimer (2005) calls, a structural repertoire. Reflective diaries and individual development plans could be seen as tools that offer ways of creating such structural repertoires.

Tools for reflection

In the teacher education faculty, Umeå University, we have used a web based tool for individual development plans i.e. (IUP). IUP aims to focus on the students learning process instead of solely focusing on the product. The aspiration is to structure the student work to enable them to progress in learning.

Process diaries, reflective diaries and process documents have also been used as a way of using a method to place the student and his or her creative learning process in focus for formative assessment and to facilitate the teacher to be present during the process (Bergström and Granberg, 2005; Hudson, et al., 2006). Teachers need an instrument to communicate this process and the students need a method and a tool to structure their thoughts to advance their reflections. The purpose of such tools in teacher education is to help make the students learning process visible, to help the students understand more about the learning process and, in the end, to assess the students´ learning. The factors of an approach to process oriented assessment encompass flexibility, reflective writing, dialog, cooperation and response.

For example, with process diaries the work is conducted in three phases. Through all phases, there is a communication between the student and the teacher to visualize gaps in knowledge and support the student to advance his or her thoughts. The first phase consists of explaining the requirements within the discipline of the course and ensuring that the student understands the goals. In the second phase, the student reflects on the tasks conducted in the course and also reflects on the literature and what he or she has learned. In the third phase, the student expresses his or her understanding of learning by formulating the, so called, 'key concepts', that is, how he or she perceives the core of the course content connected to the goals of the course. On the basis of these key concepts, the student will reflect on his or her learning in the course by going back and viewing the requirements and relating these to the description of the key concepts, their present knowledge and their description of the progression in their learning (see figure 3)

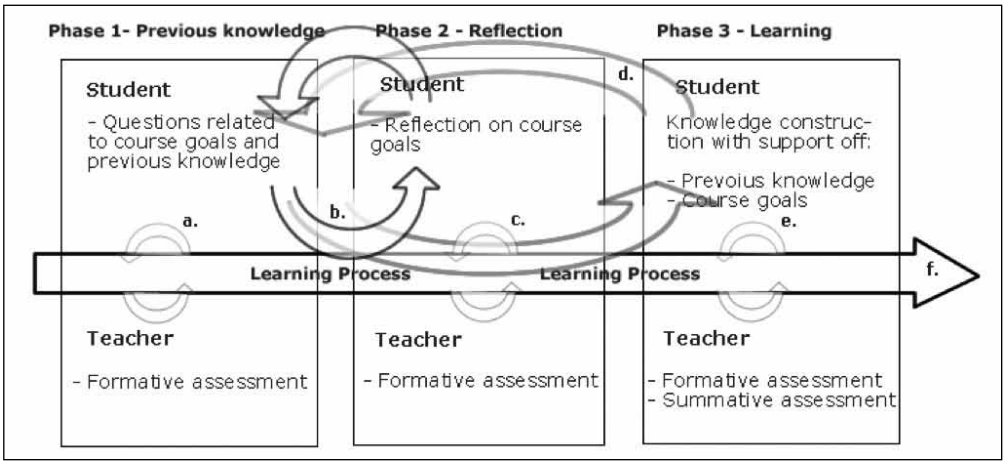

Figure 3. The three different phases in the template. The teacher is giving feedback to the student after each Phase (Bergström, 2007).

The template or tool, the headlines and questions are designed by the teacher and he or she shapes the structure after which the progression in the learning is built up. This procedure, by use of a web based tool and the structure of the template described above, is one way of trying to provide the students with a structured and progressive method to reflect on their learning.

To make learning visible

Planning and development is important for progression in lifelong learning (Warschauer, 2006). Warschauer believes that the form of competence, *academic literacy,* needed to succeed with academic work and education at school and university includes reading, writing, listening, speaking and "habits of mind", which are attitudes. He also argues that *digital literacy* is an important competence to possess, meaning ways to make sense of and interpret information in computer based worlds.

Digital literacy is about everything from being able to handle a computer or a mobile phone and its software to having a critical and reflective attitude to IT. *Digital literacy* is a reoccur-

ring theme in the EC commission's description of key competences where digital competence is one of eight key competences (EC, 2006). The basic idea is that both the traditional base competences and the digital competence will integrate in all subjects on their own premise. It is about being able to prepare the population for a lifelong learning where the new technical opportunities play a decisive role. The school and the university are more than ever connected to the world around and the ongoing social change (EC, 2006). Thus, academic literacy and digital literacy are two competences that interact with each other and it takes a thorough strategy from schools and universities in the planning of courses and in pedagogical design to enable pupils and students to develop the necessary progression (Warschauer 2006).

The digital generation

Pupils in schools and our young students are said to belong to the generation of digital natives. Dunkels (2007) describes how Prensky introduced the term to illustrate the gap between how adults (digital immigrants) and young people today (digital natives) view computers and the internet. A digital native is a person born into a world where computers and the internet are natural components. Digital immigrants are adults born before computers and the internet became an integrated part of our daily life. Our digital natives don't have preconceived notions and experiences in relation to technique standing in the way of thinking and knowledge about technology (Dunkels, 2005). The digital native skips the phase where digital immigrants devote time to meta reflections about the new technology, asking questions about what it can be used for, what is good and what is bad etc. The digital native knows how to use the technology simply because they lack previous models of thinking. The technology itself is transparent and the focus becomes "how I use it". However, eagerness to work with different multimedia tools can distract attention from the content and schools haven't been particularly successful in integrating ICT. Svensson (2007) suggests that while we cannot uncritically embrace technology we must be allowed to experiment beyond the usual way of delivering information.

Warschauer (2006) shows in his study that it takes thorough planning of progression and consideration of technical skills and how these skills are integrated in educational activities in a good way to give the students a deeper understanding and better skills in learning. For the digital immigrant one of the pedagogic dilemmas is to understand what the computer can be used for and in what ways ICT and multime-

dia can integrate with other tools in the pedagogic context . To use the computer in harmony with other resources and tools in pedagogic practice requires both resources and the practice. They are constantly recreated in relation to each other.

The following two cases illustrate different approaches using ICT and multimedia. The first case is based in the Swedish elementary school system; the second is an International Masters Programme. Both cases use ICT and multimedia as a way of making learning visible and thus support different approaches to reflection and assessment. Furthermore the learning activities draw together knowledge, skills, understanding and experience, promote digital literacy and encourage creativity.

Case one

The curriculum for the Swedish elementary school expresses in a more obvious way the schools responsibility for creative forms of expression. The curriculum states that the students are to have knowledge about media and their role in the society (Utbildningsdepartementet, 1994). Lundquist (2003) argues that practical work with different media gives the students possibilities to express themselves in ways other than speaking and writing. Working with different media renders possibilities to get the whole perspective so often wanted (Britzman, 1991). It opens up cooperation over borders between subjects and gives the students opportunities to show different talents in different ways and enable a creative process where components such as motivation, fantasy and creativity are included. Working with text, images, sound and video are ways to point out other aspects of narrating and skills than what the spoken and written word hold. Different media also gives other possibilities to interpret thoughts and emotions (Kress & Van Leeuwen, 2001; Lundquist, 2003; Jonsson, 2004; Lundberg & Mårell-Olsson, 2005; Lundberg et al., 2006; Jonsson, 2007).

For example in the following project the students, in grade 8, were given a home assignment to bake buns. The usual routine at school meant that the students went home with a paper on which they were supposed to, in writing; describe how they set about the task, how the result ended up and include comments from a parent on the implementation. A paper note like that may obviously be scanned if you want to save it digitally, but instead the assignment was presented on a computer with photos on the actual realization. This is how a girl wrote about her baking:

"We were given an assignment to bake something using yeast so I chose to bake buns. When I was baking the buns it went very well, they became very nice and creamy. I did the whole work completely by myself and didn't need the least of help from my parents. I used the recipe on the back of the flour bag and that recipe worked excellent well.
Everything went very well from heating butter and knead, rolling out, applying butter and sugar and finally, baking them in the oven. I think my buns will receive a grade 10 out of 10 =)"

And the parental comments:

"Stina worked in an independent way with everything from preparations (recipe, ingredients, placing bun forms etc.) to the actual baking she decided by herself that the buns had the correct colour (different options between 6-8 minutes). During the baking, she decided when the dough had the correct consistency and the correct amount of filling (i.e. butter, cinnamon and sugar) and the size of the buns.

The buns had a good size (a bit larger than usual) which made them succulent and soft. The baking was even and in my opinion they were good. (I don't like buns with too much colour). We were very impressed by Stinas independent work and its delicious result"

If you read the girl´s text alone, as the original report of the home assignment was expected, you will understand that the girl thinks her buns were nice and tasty and that she managed the home assignment without any help from her parents. The parental comment shows that the student has worked independently throughout the whole process. Adding the photos of the work process and the finished result, one gets a richer picture of what the girl and the parent are describing (see figure 4 and figure 5).

Figure 4. The Working Process

Figure 5. The Result
(Pictures Mårell-Olsson 2006)

Figure 4 shows the work process and supports the parent's statement about the consistency of the dough. Something that is difficult to describe in text may be easier to document with pictures. Figure 5 also shows that the buns look succulent and soft just as the parent described in the comments. This home assignment, with text and pictures, documents the girl's skills in baking buns in a better way than solely with a text presentation which is the usual routine in this particular school. The girl is reflecting and self assessing not only the result but also the learning process and this involves her in the assessment process. The parental comments are also shown as an example of formative assessment that involves parents. The photos support the textual presentation of the work process and may work as documentation and as a foundation for discussion around the girl´s learning in home economics. Had the assignment consisted of documentation of the learning by video, the result would probably have visualized the skills even more (Lundberg & Mårell-Olsson, 2005).

Case two

The second case illustrates the relationships and synergy created in an on-line learning environment through project based work and the use of ICT and multimedia in the form of a digital portfolio as a vehicle for reflection and assessment. The focus is a module in an International Masters Programme and builds on ongoing research (Hudson et al., 2006). In designing and planning the module considerable emphasis has been placed on enabling collaborative activity in multinational teams. The module design emphasises communication, interaction and collaboration together with a belief that modern information and communication technologies have much to offer in realising such goals. It draws on thinking associated with on-line communities of learning and emphasises the role that ICT and multimedia can play to support, facilitate and encourage communal aspects of study (Lave, 1988, 1996; Lave and Wenger, 1991; Salomon, 1999).

The learning activity focuses on the relationships that develop around an 'orchestrated' online project-based activity. The pedagogical design thus, builds on the relationships and synergy created in an on-line learning environment through project based work and the use of ICT and multimedia as a way of making learning visible for reflection and for assessment.

The students are expected to develop an overview and a critical appreciation of the development process and the potential and limitations of Digital Media Applications. The learning activity involves working online in international project teams to produce a Digital Media Application prototype. The activity is used as the basis for on-going personal reflection on learning which, along with the outcomes of the process, is compiled into a digital portfolio which includes the following:

- a team report including the DMA prototype
- a personal evaluation of the development process with evidence of individual contributions to the team effort.
- a personal critical reflection on the learning process.

Figure 6. An example of a digital portfolio (permission to use this example granted to A. Hudson by the student).

The digital portfolio is used to make both group and individual learning visible and is the main means of summative assessment.

A key aspect of the learning process and the portfolio is the ongoing reflective diary. Students are expected to post their reflective diaries in the open learning environment on a weekly basis. The diary is seen as one technique for accumulating data as part of an action learning approach and is intended as an aid for promoting systematic reflection on learning and as a tool for linking theory with practice (Hudson et al., 2006). By reflecting systematically on experience at an individual level, the aim is to help link theory with practice at the wider social and communal

level. The diary entries represent snapshots of the students' learning experiences, which are in turn utilised as study aids. The reflective component of the diary was designed to encourage students to think and re-examine their actions and activities, their obligations, and their sense of identity as students working together within an international and virtual context. The way in which the diaries are used at different times reflects the range of learning opportunities that are provided in the use of such a strategy.

A diary is generally perceived as a personal and private thing, yet in this context it was available for everyone to see and comment on, which provided an interesting insight into how the diary was used at different times and the specific functions it performed. The value of being able to share issues openly was instrumental in encouraging other team members and tutors to engage in wide-ranging discussion.

The ongoing evaluation has highlighted the importance of dialogue within the context of collaboration (Hudson et al., 2006). This was emphasised by one student who argued that collaboration in any environment is about needing each other.

> *To open a discussion, to publish work or ask a question, in short to let people know where you are in knowledge, thinking and questions is the only way to learn and get the support you need. The feedback and comments are essential to learning…* (Hudson et. al., 2006, p. 736)

In what way can ICT and multimedia support assessment and contribute to be the glue between different forms of knowledge?

We have seen in two cases that with the help of ICT and multimedia it is possible to creatively bring different forms of knowledge, skills, understanding and experience together with assessment to get progression in learning. Figure 7 (see below) attempts to illustrate how knowledge, skills, understanding and experience, together with the use of a structural repertoire of tools and techniques can be made visible.

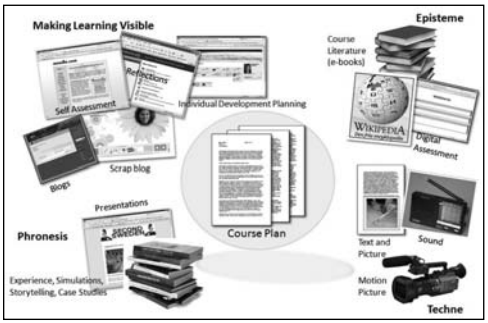

Figure 7. Making Learning Visable (Mårell-Olsson, 2008).

Fact knowledge or *episteme* can be received in a course or in a subject in different ways. Here we can imagine course literature or teaching aids and books of fact, lectures, expositions and information on the internet. One way to work on the received facts, with the aid of ICT, would be for a class or a course to commonly build a Wikipedia, an encyclopedia or knowledge bank around a subject with open content where everyone can participate and improve the content.

Working with multimedia and content where assignments might involve using text, pictures, sounds and moving pictures to illustrate and stimulate different forms of expression and where the knowledge form of *episteme* can be worked with and be presented can be seen as skills or *techne*. To use different forms of media belongs to the form of knowledge that is referred to as practical productive skills. The practical productive form of knowledge can show understanding (explain, define) and if we compare it with the 4 F: s it will be knowledge as understanding and knowledge as skills.

Phronesis or to gain experience and become wise takes a long time to achieve and demands many journeys into the unknown (Gustavsson in UR, 2003). While practical experience and the development of tacit knowledge underpins *phonesis,* case studies, stories, games and simulations are also ways of acquiring and communicating experience. Such techniques can be of importance in professional education. For example virtual worlds where the user may socialize, communicate and create voice offer opportunities for new challenges and new ways of thinking.

Conclusion

The authors of this paper thus, argue that whether a course is given as a distance course, in school or at a campus, good tools for communication, reflection, illustration and presentation have the potential to enhance the learning experience. Having a structural repertoire of methods, techniques and digital tools that support communication, presentation, reflection,

meta-reflection and assessment can also help to make the learning processes visible.

The affordances of such technologies that capture, document and visualize knowledge and skills over time also allow students to go back and observe what they have done previously and sort and collect information and reflect over their learning (Mårell-Olsson, 2004; Clegg et al., 2005; Hudson et al., 2006). The strategic use of ICT and multimedia on the basis of pedagogic ideas may constitute the glue between intellect and body and science and creativity. Planning for progression in learning with the support of technique and tools may perhaps repossess some of the ninety-nine lost languages refereed to by Malaguzzi at the start of this article (in Edwards et al., 1998).

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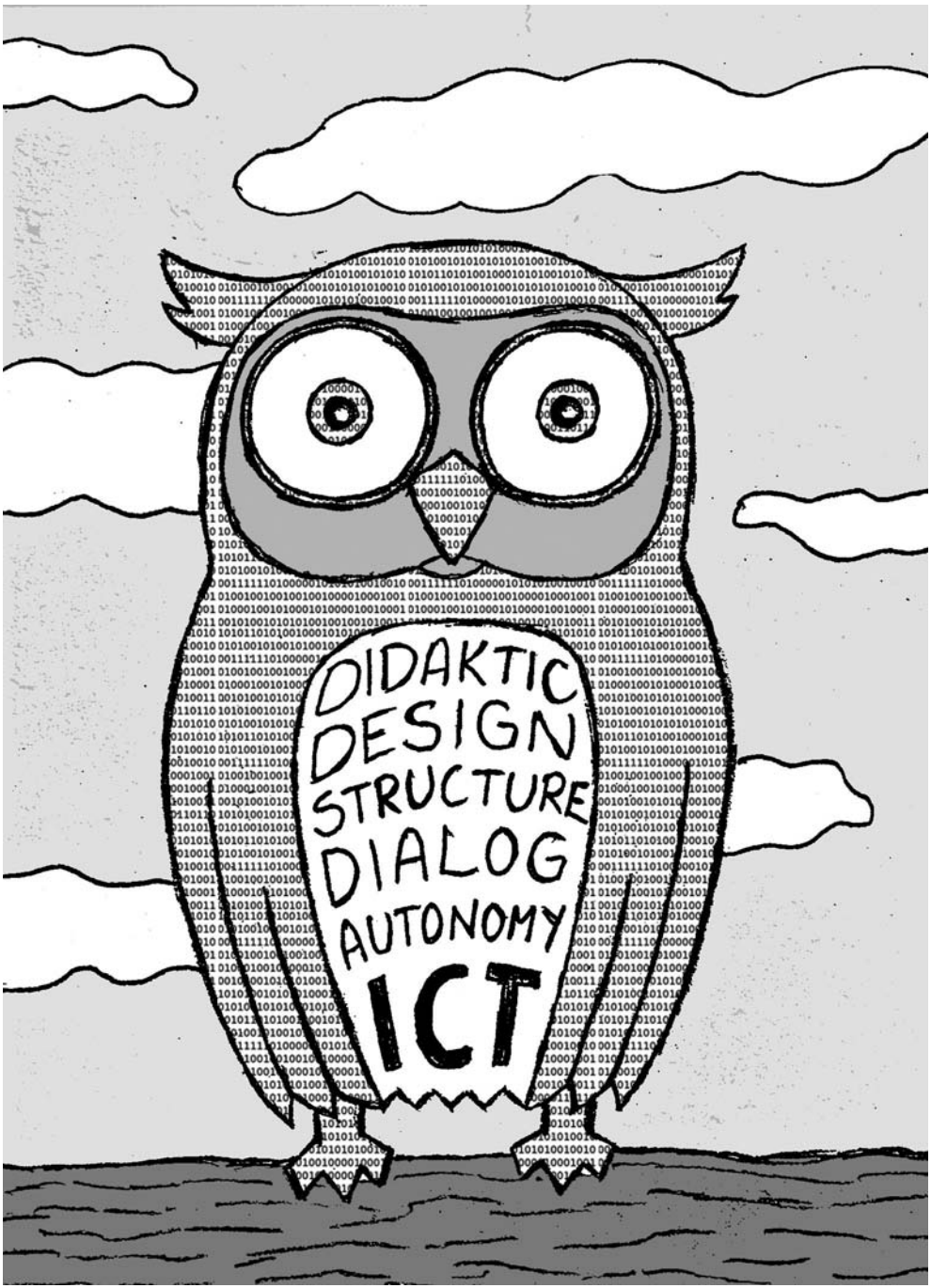
DIDAKTIC
DESIGN
STRUCTURE
DIALOG
AUTONOMY
ICT

A Didactical Design Perspective on Teacher Presence in an International Online Learning Community

Brian Hudson

Abstract

This paper is based on a study of the student learning experience in a particular module of an international Masters programme that included a large element of online learning. It builds on earlier work which highlighted the importance of design and development of social infrastructure for supporting the development of an online learning community by revisiting the data from the perspective of a didactical design framework. The overall aims of this study are to consider how, as teachers, we designed and developed teacher presence and how this was achieved in practice from the design of teaching-studying-learning processes through development to interaction in the online learning community.

Keywords: Online learning community; didactical design; social infrastructure; social presence; teacher presence

Introduction

The background context for the research study reported on in this paper is the international MSc *e-Learning Multimedia and Consultancy* that was developed through international co-operation arising from the Thematic Network for Teacher Education in Europe (TNTEE)[1] between the University of Oulu, Hogeschool van Arnhem en Nijmegen (HAN University) in the Netherlands and Sheffield Hallam University in the UK[2]. Subsequently it was the basis of an active and ongoing partnership between HAN University and Sheffield Hallam University. The design of the programme as a whole was framed within a didactical framework for student-centred technology supported learning as captured in Figure 1 and discussed more fully in Hudson et al. (2006b)

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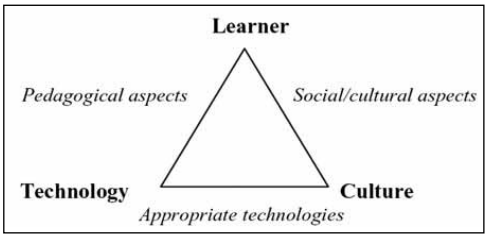

Figure 1: Didactical framework for technology supported student centred learning

The pedagogical, technological and social/cultural aspects of the didactical triad were reflected in the structure of the three core modules of the programme i.e. Open and Flexible Learning, Digital Media Applications and Communication, Consultancy and Change. These core foundation modules were developed within a Masters framework which included a module on Research Methodologies, a work based learning module (Project Studies) and a final integrative research study (Dissertation) as shown in Figure 2.

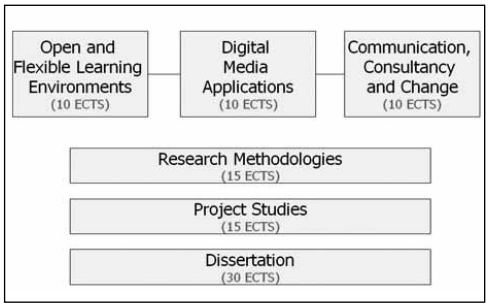

Figure 2: Structure of the MSc programme

The design of the foundation modules and the overall pedagogical approach was strongly influenced by work carried out at the Research Unit on Educational Technology at the University of Oulu. This involved the development of the technical platform which was based on constructivist learning principles and developed as part of the T3: Telematics for Teacher Training project of the EC Telematics programme (1996-98). It also involved the adaptation of the pedagogical model developed in a joint course between the University of Oulu and the University of Massachusetts Lowell, USA which is documented in LeBaron e. al. (2000). This course was seen to be 'among the first electronically networked, academic courses formally cross-credited between Finnish and American universities' LeBaron et al. (ibid). At the planning and design stage of the programme, consider-

able emphasis was placed on enabling collaborative activity in international teams. In relation to this aspect we shared the general perspective offered by Lehtinen et al. (1999) on collaboration that involves the mutual engagement of participants in a co-ordinated effort towards mutual problem solving.

The study reported on in this paper focuses on the experience in a particular module of the programme entitled *Research Methodologies in Education and Training* that took place during the second semester of 2002-03. This module involved fourteen students working together, based at the two local study centres in Nijmegen and Sheffield, together with two students based in Brussels, one working at a school in Linz and another in Kimberley, South Africa. It builds on work published earlier by Hudson et al. (2006a and 2006b) and Owen at al. (2006) which focussed mainly on the student learning experience. In contrast this study aims to illuminate teacher presence in these processes by revisiting the data presented in Hudson (2006a) from the perspective of a didactical design framework which has been elaborated more recently in Hudson (2008a and 2008b).

The initial analysis of this data highlighted the importance of a number of key aspects for the development of the online learning community. A particularly striking aspect of the feedback from students was the overall response to those questions which focussed on the affective dimensions of the experience. All the students felt a sense of belonging to the learning community, that they succeeded in the module and that the atmosphere of the learning community promoted their learning.

Aims of this study

In this paper, I revisit the data with the particular aims to consider how we designed and developed teacher presence and how this was achieved in practice from the design of teaching-studying-learning processes through development to interaction in the online learning community.

Research Questions

Accordingly the key research questions which this paper aims to address are:

- In what ways was teacher presence evident as a consequence of the initial stages of the design and development process of the course of study?
- In what ways was teacher presence enacted in practice during the interaction phase in the online learning community?

Conceptual Framework

The findings from the initial data analysis were found to resonate with those arising from the work of Bielaczyc (2001) who argues that one of the key factors in the successful implementation of computer supported collaborative learning is the need for the design and development of an appropriate 'social infrastructure'. Such infrastructure is seen firstly in relation to the philosophy and norms established between teachers and students, secondly in relation to activities carried out through social practices and thirdly in relation to the tools provided through the use the technology. Resonance was also found with the idea of 'social presence' that relates to the ability of participants in a community of inquiry to project themselves socially and emotionally (Garrison and Anderson, 2003) which is returned to later in the discussion.

Particular consideration is given to the idea of 'teacher presence' by Hult et al. (2005) in their study of Net-based adult education courses. Drawing on Vygotsky, they use the terms 'invisible' and 'absent' presence of the teacher. In doing so also they draw attention to the view of authors such as Salmon (2000) that the words teacher and teaching 'are unfashionable in the learning society' (Hult et al., 2005:1). The focus of their study is on the 'invisible presence' of the teacher and they note that for the majority of students in their study the teachers' importance lies in the way that they validate and legitimate students' efforts. They also highlight three particular orientations towards teaching, which they describe as an activity orientation to stimulate learning, a conference orientation to sustain learning and a validation orientation to corroborate learning.

In contrast to Salmon (ibid) a teaching perspective is seen to be a necessary starting point in the development of student-centred technology supported learning. From this perspective teaching is seen to be 'a dynamic endeavour involving all the analogies, metaphors, and images that build bridges between the teacher's understanding and the student's learning' (Boyer 1990, pp. 23-24) and at its best teaching is seen to go beyond simply transmitting knowledge to 'transforming and extending it' (Boyer 1990).

In Hudson (2007) I describe the way in which the study of Didaktik over recent years has given fresh perspectives on a number of issues related to teaching and learning. In particular, I relate these to five themes: meaning and intentionality, attention to studying, recognising and holding complexity, tools for holding complexity, and the role of the teacher. Accordingly the

consideration of these aspects gave rise to the development of an integrative didactical framework which takes account of the pedagogical, technological and cultural aspects of development (Hudson, 2008a). It focuses on the design of teaching-studying-learning processes as the central role of the teacher in the promotion of student-centred learning processes (figure 2).

So in thinking about the relationship between teacher, content and student, this can be considered as a didactical content relation that gives rise to the traditional didactical questions of what content, why and how in a wider context of the use of technology. The introduction of technology (ICT and media) into the picture highlights the didactical design relation when considering the relation between content and technology, giving rise to questions about what technologies, why and how? When considering the relation between the student and technology the focus shifts to the use of ICT and media i.e. a didactical interaction relation. The central role for the teacher at the core of the teaching-studying-learning processes is seen in overall terms as the design of teaching situations,

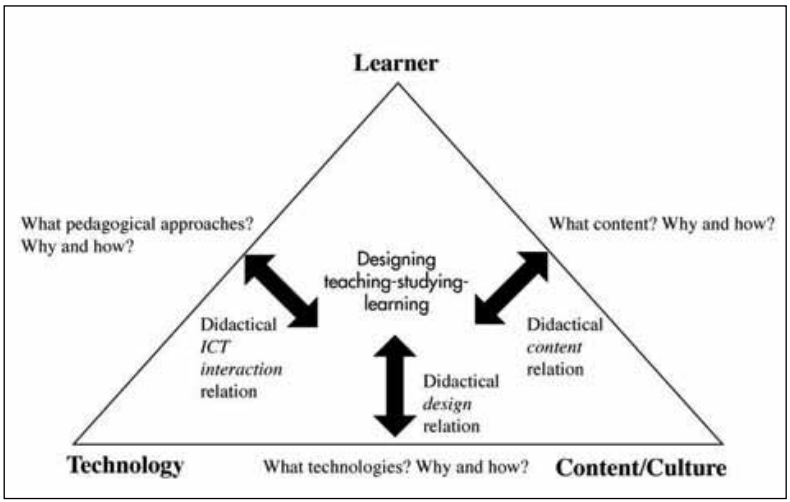

Figure 2: Didactical design for technology supported learning

pedagogical activities (studying) and learning environments.

The Didactical Design process

Accordingly the process of Didactical Design has been developed as an adaptation of the traditional Instructional Design model in the form of a cyclical process of Analysis, Design, Development, Interaction and Evaluation leading through to a subsequent process of re-design, by using and expanding Wolfgang Klafki's process of Didaktik Analysis (Klafki, 1998).

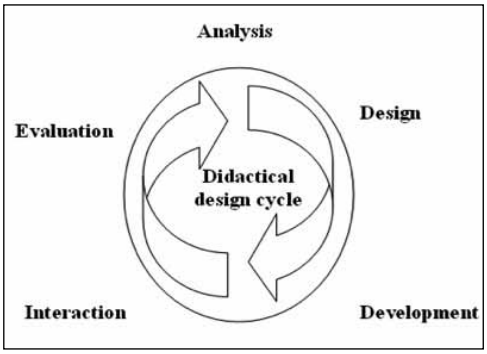

Figure 3: Didactical design process

This process if based on identifying some of the key questions at each phase as follows:

Analysis phase:

- What wider or general sense or reality do these contents exemplify and open up for the learner? What basic phenomenon or fundamental principle, what law, criterion, problem, method, technique or attitude can be grasped by dealing with this content as an 'example'?
- What significance does the content in question or the experience, knowledge, ability or skill to be acquired through this topic already possess in the minds of the learners? What significance should it have from a pedagogical point of view?
- What constitutes the topic's significance for the learners' future?

Design phase:

- What is the structure of the content which has been placed into a specifically pedagogical perspective by questions 1, 2 and 3?
- What are the special cases, phenomena, situations, experiments, persons, elements of aesthetic experience, and so forth, in terms of which the structure of the content in question can become interesting, stimulating, approachable, conceivable, or vivid for learners?
- What teaching situations, pedagogical activities and learning environments are to be designed?

Development phase:

- What are the potential roles for ICT and media in terms of designing teaching situations, pedagogical activities and learning environments?
- What materials and resources are to be developed to support the creation of teaching situations, pedagogical activities and learning environments?
- What is the role of the teacher?

Interaction phase:

- How will the students interact with the technology, with the teacher and with each other?
- How will the students demonstrate their achievement of intended learning outcomes?

Evaluation phase:

- How will the students evaluate what they have learned in a formative way? How will this activity be recorded? How does this aspect relate to formal processes of summative assessment, examination and accreditation?
- How will the quality of the teaching situations, pedagogical activities and learning environments to be evaluated?
- How will the quality of the student learning experience to be evaluated?

Research Methodology

The initial analysis of the data from the earlier study (Hudson et al., 2006a) aimed to illuminate the student learning experience in their own course of study. However in aiming to address questions in relation to teacher presence a need for another conceptual framework or set of lenses became apparent. This process can be seen as part of a process of 'constructive method synthesis' as discussed in Hudson (2003). This idea originates from the work of Klafki (1998) who argues that research which is intended to support pedagogical practice needs to be based on a combination of methods and methodologies. In doing so he proposes the following three method groups/methodologies and warns that the synthesis of these is not a simple addition:

- historical-hermeneutical methods
- empirical methods, and
- methods of social analysis and ideology critique.

A fundamental assumption is that each method group/methodology will involve the researcher being confronted by preconditions or limits that can only be overcome with the help of the other approaches. Thus when the knowledge that can be acquired through using a particular method

has reached its limits then this process as a whole can only be further advanced through a process of constructive method synthesis.

With regard to the first method group in particular, the use of historical-hermeneutic methods is intended to clarify and decode meaningful phenomena in a scientific manner. Furthermore all problems of *Didaktik* are seen to be set within the context of educational history which in turn is set within the wider context of social history. It is also recognised that such problems often have an international perspective and that this applies whether or not those who are involved are aware of this fact or not, whether they are curriculum developers, teachers or students.

The didactical meanings and the intentions and purposes for teaching and learning are also seen to involve ideas concerning the meaning of human life itself. These include the philosophical and ethical preconditions underpinning the relationship between the individual and society and the significance of childhood and adolescence in the process. From such a perspective this historical-hermeneutic approach aims to clarify the sense of decisions, developments, discussions, mechanisms in or relevant to *Didaktik*. This involves the analysis of the hidden historical conditions, the concepts of future and the philosophical implications. The aim is to make them intersubjectively verifiable, open to discussion and in turn help curriculum planners, teachers and also the student to become aware of what really lies in and behind their decisions, deliberations and actions. The process of didactical design reflects didactical intentions and purposes for teaching and learning and as such can be seen to be a part of such 'hidden historical conditions' as the concept of the 'invisible presence' of the teacher (Hult et al., 2005) captures so well.

The specific context for the study

The *Research Methodologies in Education and Training* module aimed to promote a critical understanding of various paradigms and methodologies in the conduct of educational research, in preparation for undertaking independent research for the students' dissertations. The teaching-studying-learning experience was structured around three strands which ran through the entire module, all of which contributed to the summative assessment of the module as a whole: These were:

1. Active participation through discussion and collaboration
2. The critical analysis of a published refereed

journal article leading to Assignment 1: A Critical Analysis.
3. The process of research planning leading to Assignment 2: A Research Proposal.

Each strand was an essential element of the whole. The aims of the active participation component included setting the context and content of educational research and also providing the scaffolding and support for the ongoing development of the other two elements. The module was based within the Blackboard platform that was supported by Sheffield Hallam University.

Figure 4: The technical platform for the module in Blackboard

Approach to the design of teaching-studying-learning processes

The module started at the end of January 2003 and spanned 18 weeks of which at least two weeks were holiday weeks in both centres. The first assignment, involving the critical analysis of a published research paper, was due to be submitted after 12 weeks and the second assignment, involving the development of a research proposal, was to be submitted at the end the module. The online communication, interaction and collaboration was scaffolded via the design of a number of activities which consisted of:

- Discussion Fora in response to set Reading Tasks
- Discussion Topics in response to reflections on prior experience
- Group Activities

The discussion topics included responses to the questions 'What is educational research?' and 'What makes a significant research question?', and also a response to a photograph in relation to data analysis and interpretation. The photograph that was used as the basis of the activity is entitled 'Gun Law' by John Gaps and is reproduced in Brown and Dowling (1998: 85). The activity was divided into two stages with the students being asked in the first stage to reflect on

the photograph and to simply analyse the image and to offer individual 'readings' or interpretations of what meaning was conveyed. The photograph was deliberately presented without a title or any description of the background context. These spontaneous responses were posted to the discussion forum, with the request to the students to resist reading other contributions prior to posting their own initial response. The second stage involved reading a short paper on data analysis and interpretation and responding to the questions posed as part of the preparation for the local meetings and associated video conference. In their discussion about quality in analysis, Brown and Dowling (1998: 80) make a useful distinction between information and data by arguing that *data* is *information* that has been read in terms of a theoretical framework or in terms of an analytic structure of some other kind. These aspects were interspersed with discussions based on set readings on the nature of inquiry and research design. In addition the first group activity involved the critical analysis of a research paper that was conducted in an international group. The second group activity involved the design, trialling and evaluation of a data collection instrument/technique(s) also in international groups. The students were asked to provide peer formative assessment on drafts of both assignments at set times within the module schedule.

Methods of data collection

There were 14 students enrolled on the module made up of 2 females and 12 males of whom 11 completed the student questionnaire at the end of the module (2 female and 9 male respondents). Data was collected from a variety of sources which comprised:

- A questionnaire that was completed online the students at the end of the module.
- A questionnaire at the end of the module completed by each local tutor
- A focus group discussion with all students and tutors via video conference between Sheffield and Nijmegen at the end of the module.
- A focus group discussion between tutors with 2 external examiners associated with each study centre via video conference between Nijmegen and Sheffield at the end of the module.
- An focus group discussion with student representatives, tutors and all module leaders in Nijmegen on completion of the module
- The module statistics collected automatically in the virtual learning environment.
- The dialogue contained in the various discussion fora, with the prior consent of the participating students following a request and associated statement of research ethics.

In addition outcomes of the initial process of data analysis and interpretation were provided to the students for their comments, feedback and validation by submitting a full draft of the paper (Hudson et al., 2006) to the virtual learning environment prior to final publication.

Data analysis and interpretation

The overall statistics collected by the virtual learning environment gave a broad indication of the degree of online communication and interaction with the learning environment by recording the total number of 'accesses' by participants. This amounted to over 71500 during the period of the module and represented over 2.6 times as many accesses as the previous module. In fact a small number of students had been unable to maintain progress at the anticipated rate due to sudden and unexpected changes in work patterns. These students reported a sense of 'being left behind' by the strong sense of forward momentum within the module.

In response to the questionnaire all the students who responded agreed that they felt as if they belonged to a learning community, that the atmosphere of the learning community promoted their learning and that they had enough support for the studying process. Also all these students felt that they had succeeded in the module. This sense of community was one that was shared by the tutor team. Two did not feel the benefit of peer support and three did not think that international collaboration with fellow students promoted their learning, though all except one student felt that the local study support promoted their learning.

The discussions at the end of the module revealed a number of particularly significant aspects to the module which reinforced the views of the members of tutor team. Accordingly we offered three accounts of particularly significant situations which we described as firstly 'the interpretation of the photograph', secondly 'how to do research' and thirdly 'the influences of the researcher's own perspective (subjectivity and biases)'.

Situation 1: Interpretation of photograph

Regarding the first of these, the most significant aspect of the module which came through from discussions with students and staff and the open responses to the questionnaire was the use of the photograph in relation to the discussion on the theme of data analysis and interpretation. An early contribution to the discussion forum came from Caroline:

Current Forum: Data Analysis and Interpretation	Read 35 times
Date: Sun May 4 2003 12:58 pm	
Author: Caroline	
Subject: Initial interpretations of photo by Caroline	
	Remove

* Unspeakable cruelty of human kind
* Ironic background presence of the press that is only interested to "shoot" the moment regardless the risk for their own lives
* People watching around, they seem that the view of the soldier-victim don't affect them much! (is it because it is a usual site? is it because they try to run away from the action field?)
* Foreground: Soldier-victim. The victim is A CHILD!
The position of the soldier against the victim indicates clear
oppression. Memories are rising of past events and recent wars.
* It crossed my mind that this photo is possible to come from a movie stand??? (I would like to beleive so!)

This contribution produced a number of direct responses. In particular Caroline made reference to the fact that during her vacation in Greece, she observed that the information available from the {then} current war in Iraq was very different to the information received in Holland. She asked where the line should be drawn between getting information to inform public opinion or in simply dramatising events. Also Karl noted that 'Well, after a second look I am quite sure that the soldier does not want to protect this guy. Concerning the question is he dead or not I am not sure ...'. A further thread within the discussion began by Marcus interpreting the photograph as a 'white soldier' physically suppressing the black young man. This led Martin to question Marcus about how he could be sure that the soldier was white and to several further turns in the dialogue. These contributions provide a short account of one aspect of the teaching-studying-learning experience on this module which reflected the strongly *emotional* aspects of a number of the responses, with many contextual factors and underpinning assumptions brought into the frame of reference. In local discussions what was especially interesting, was Matt's own evaluation of his contribution which he had intended as a neutral reading, based on his experience as a police officer. He questioned his own 'neutrality' in the way

in which he referred to 'peacekeeping', 'peacekeepers' and also to the stick on the ground as 'the weapon'.

Situation 2: How to do research

The second significant situation related to the discussion which took place at an early stage of the module in response to the first Reading Task on the Nature of Enquiry that focused on research as a systematic, controlled, empirical and critical process.

This episode was initiated by a contribution from Martin:

Current Forum: Reading Task 1: The Nature of Enquiry
Date: Thu Feb 6 2003 7:36 pm
Author: Martin
Attachment: martin - reading task 1.pdf (11462 bytes)
Subject: Herman's Reading Task 1

Remove

Ppfff! Heavy stuf this chapter. I learned a lot of new words, both in English and in Dutch!
In the attachment is my reflection on this chapter.

Reply

In his attachment, Martin wrote:

'*Research is the systematic, controlled, empirical and critical investigation of hypothetical propositions about the presumed relations among natural phenomena.* (Kerlinger.1970)

I had never thought about such a definition before and like in all definitions there are a few words that are essential. The term critical is very important in my view. You can do a lot of things systematic and controlled, you can have a lot of experience but it is the critical analysis of all the outcomes that makes research worth doing it.'

This prompted the following response from Klaas as a module tutor, which focused attention on the meaning of the term 'critical' and Martin's subsequent reply:

Current Forum: Reading Task 1: The Nature of Enquiry Read 19 times
Date: Tue Feb 11 2003 1:30 pm
Author: VAN VEEN, Klaas
Subject: Re: Martin's Reading Task 1

Remove

Dear Martin,
your reflections on chapter 1 are provoking. Nice! You state that in the definition of Kerlinger only a few words are essential and then you talk about the critical one. But what is critical actually? It is such a common word and every individual will describe him or herself as critical nowadays while others will say you are not critical. It's a vague word, and especially when doing research. I actually would like to argue that the other words are more important when doing research: systematic, controlled, empirical. Why? Simply because this are the characteristics that makes science a science, so to say. You state very nicely that we all do Mouly's five steps in real life, and then you ask, how do we know it is the truth? Well, the truth is hard to find, but we can try to create an agreement on what the truth is, namely by doing our research in a systemic way, controlled as much as possible, and especially empirical. That gives us proof of what the truth might be.
Of course, it is good to be critical (whatever it may be) but to be critical, you need data of which you know that you collected them in a systematic, controlled, empirical way. That concern is also part of a critical attitude, so that we do not construct our beliefs of truth on our own limited, non-systemic, uncontrolled ways of perceiving reality.
Cheers!
Klaas

Reply

The reference to 'thinking in a different way about research' was a typical reaction to this reading task as also was the expression of the level of reading difficulty, though this was by no means restricted to the students from the Nijmegen centre.

Situation 3: The influences of the researcher's own perspective (subjectivity and biases)

The third situation was highlighted in a similar way and illuminated the way in which the researcher's own perspective in terms of subjectivity and biases comes into the frame. This episode was initiated by the following contribution from Jane:

Current Forum: Reading Task 1: The Nature of Enquiry Read 24 times
Date: Fri Feb 7 2003 7:08 pm
Author: Jane
Subject: The nature of inquiry - reposted

Remove

Wow! My head is spinning and I feel like I've swallowed a dictionary.

…

In an ideal world, research should be completely neutral and removed from considerations of progress and policy. However in the real world, this is a realistic summary of what research might manage to achieve.

Reply

This prompted the following response from Klaas, which focused attention on the inherent subjectivity of the research process and on some of the ways of dealing with this methodologically:

Current Forum: Reading Task 1: The Nature of Enquiry
Date: Tue Feb 11 2003 1:38 pm
Author: VAN VEEN, Klaas
Subject: Re: The nature of inquiry - reposted

Remove

Dear Jane,
I also think that in an ideal world we still don't have neutral research or something like that, as long as we deal with human beings who always differ in the way they perceive the world, related to the glasses they wear. Also posivistic research, that has a claim to be neutral or more objective, has a very subjective base, namely as chapter 1 states, a certain view on reality and how to explore it. So, I would say, taken into account that subjectivity is inherent in research, a researcher should be open and clear about his or her assumptions and points of view, so that I, as a reader, will know.
Klaas

Reply

This exchange led to the further dialogue and further questions on ways of dealing with such subjectivity. It involved Klaas in expressing agreement that we all have preconceptions which affect any research we do. He went on to suggest that we should set out our assumptions within our research from the outset and also shared his own difficulty in recognising our preconceptions or assumptions so we can explain them to those who read our work. Furthermore he stressed how pre-conceptions are, by their very nature, things of which we are unaware.

Discussion

The aims of this study have been to consider how we designed and developed teacher presence and how this was achieved in practice from the design of teaching-studying-learning processes through development to interaction in the online learning community. The associated research questions relate to firstly the ways in which teacher presence was evident as a consequence of the initial stages of the design and development process of the course of study and secondly how such presence was enacted in practice during the interaction phase in the online learning community.

The ways in which teacher presence was evident as a consequence of the initial stages of the design and development process of the course of study

In relation to the first research question, all the students agreed that the module content met their personal learning goals and that the module activities were challenging and motivating. Furthermore all the students thought that the Reading Tasks and Discussion Topics promoted their learning and all except one student agreed that the Group Activities did so. A variety of aspects were emphasised in the open responses to the question of what most promoted student learning. The most cited aspects were the assessment items and the discussions in the local meetings with over half the students referring to these aspects. The other most cited aspects were to online group work, reading tasks and online discussions. Examples of specific responses in relation to what the tutors did to promote students included: 'the structure of the unit was well thought out' and 'well-planned activities, discussions, and assignments'. All these aspects could be described as evidence of the 'invisible presence' of the teacher and in particular they relate to the 'activity orientation' for stimulating learning as described by Hult et al. (2005).

How such presence was enacted in practice during the interaction phase in the online learning community

The responses to the photograph activity outlined in Situation 1 highlighted the strongly *emotional* aspects of a many of these, with many contextual factors and underpinning assumptions brought into the frame of reference. The willingness of the participants to project themselves socially and emotionally in a very full sense can be seen as an example of 'social presence' (Garrison and Anderson, 2003) having been established. In turn this can be seen to have resulted of the design and development of appropriate social infrastructure in relation to philosophy and norms established, to the activities carried out and to the tools provided through the use the technology. Whilst the establishment of such social presence had been problematic for this group of students in earlier modules on the programme, this learning experience was a positive one in which such social presence was widespread and very evident. This can also be seen to be the result of a successful didactical design overall and also in relation to the ICT interaction relation in particular. The dialogue outlined in Situation 2 in particular can be seen as an illustration of the importance of tutor providing intellectually challenging feedback to a student i.e. 'But what is critical actually? It is such a common word and every individual will describe him or herself as critical nowadays while others will say you are not critical. It's a vague word …'. This can also be seen as a form of *scaffolding* (Bruner, 1985). In this particular case the tutor reacted in a very direct way to the student, instead of presenting it in the form of questions for instance, or waiting for or challenging other students to react. The reaction of the student seemed to confirm that it had a positive effect i.e. now he understood why. The apparent success of this tutor-student interaction might be understood as an illustration of the Vygotskian notion of the ZPD (zone of proximal development) (Newman and Holzman, 1993) in practice i.e. the tutor intervention took the answer of the student to another level and this response seems to enable the student to have the feeling that he learned i.e. he understood. This also may be seen as an example of an orientation to sustain learning (Hult et al., 2005). Similarly in Situation 3 Klaas expressed his agreement that we all have preconceptions which affect any research we do and this may be seen as an example of an orientation to corroborate learning (Hult et al., 2005). Examples of specific responses in relation to what the tutors did to promote students also included 'the role of the tutors in giving feedback on drafts' and 'providing motivating feedback'

In relation to the analysis phase of the didactical design process it can be seen through the level of student engagement that questions of significance were opened up in this module. These built on previous experience, especially through the Discussion Topics, related to the development of their present understanding, for example of Reading Tasks, and also raised questions of significance for their future studies as illustrated in some of the dialogue from the discussion fora. With respect to the design phase in particular, the structure of the content was effective in this module through the way in which it combined teaching situations, pedagogical activities and learning environments that provided some special cases and phenomena which can be seen to have become interesting, stimulating, approachable, conceivable, or vivid for learners.

Regarding the development phase, ICT and media worked in a variety of ways in relation to teaching situations, pedagogical activities and learning environments. In particular the affordances of the technology provided the necessary preconditions for collaborative activity in the online learning community between students themselves, and also between students and tutors, and ways of supporting this, especially through the discussion fora. Undoubtedly it is the case that the technology provided affordances for international collaboration between both students and tutors on an ongoing basis that would otherwise not be easy to replicate via other media. The asynchronous nature of the discussion gave a degree of flexibility over and beyond that which would be available in a traditional setting. Furthermore the time available for the consideration of the contributions may have been a key factor in the depth of the issues considered in the ensuing interaction in the online learning community and in the generally high quality of dialogue that took place. Such affordances of the technology can be seen to have provided the preconditions for breaking down the physical and temporal barriers by removing time and space constraints through the use of asynchronous communication which allowed time for reflection in interaction. Furthermore the online discussions can function as a collective memory for the online learning community, by storing the history of the knowledge building processes. With regard to the most significant situation involving the photograph activity, this provided an example of the power of the technology being used to stimulate interest and create the conditions for engagement and dialogue in ways that would otherwise not be easy to replicate via other forms of communication which combined the use of

rich media with the ability to communicate across time and space.

Finally with regard to the role of the teacher and teacher presence in the interaction phase, this was complex and multi-faceted. For example the importance of the tutor in providing intellectually challenging feedback to students was highlighted, as was the role in providing *scaffolding* and in taking the role a more capable other in the ZPD. The orientations to both sustain and corroborate learning could be discerned through the role of tutors in giving feedback on draft assignments and also in providing motivating feedback. Another aspect of the invisible presence of the teacher which was not evident in the earlier study relates to the role of summative assessment, especially with regard to the research proposal which could provide an interesting focus for future similar research.

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Footnotes

[1] Thematic Network for Teacher Education in Europe (TNTEE) [WWW document] URL http://tntee.umu.se (Visited on 30 September 2008)

[2] In particular through EC Socrates-Erasmus Advanced Curriculum Development Masters in Multimedia Education and Consultancy (MMM) Project (1998-2001)

Peer Review for Learning in Online and Distance Education

Monica Liljeström, Agneta Hult and Ulf Stödberg

Abstract

In this article the authors' reports early findings from a project aimed to implement and evaluate peer review in online and distance university education. Data was collected through an online questionnaire with open and closed questions aimed to capture student experiences in a distance course, in which peer review preceded by criteria discussions was implemented. In this article the aim is to learn more about strengths and obstacles with peer review, and participation through ICT and text based communication. A majority of the students found that participating in peer review was valuable, although some found participation a bit taxing and too time consuming. Participation through ICT and text based discussions was found sufficient by the majority although a few students found it restraining. The conclusion is that it can be well worth continuing exploring peer review and how to design this element to support students learning in online and distance university education.

Keywords

Peer Assessment, Peer review, formative assessment, university education, online and distance education, examination, text based communication, evaluation

There has been a fast growth in online and distance education in Sweden; in 2007 every fifth student in higher education was studying on a programme or a course which was partly or fully facilitated by ICT. While more and more teachers are entering into this fairly new arena for teaching there are many challenges to be faced in addition to getting to know the strengths and limits of teaching with ICT. One challenge is related to the current educational discourse promoting education for autonomous, independent and self-directed learners, who takes responsibility for their own personal and professional development, thus changing the educator's role from expert to coach and facilitator. Constructivist and/or sociocultural theories

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are often consulted when setting the scene for this form of learning, with their emphasis on collaboration and learning as a social activity. Another challenge is to respond to the demands from international trends in Higher Education towards extremely fine-grained approaches to measuring student achievement in combination with "a strong social drive to help learners, some with histories of spectacular 'unsuccess', to obtain qualification" (Sadler, 2007).

The central theme in this article is to share our ideas and experiences of how to transform these somewhat contradictory trends into concrete learning activities. This is challenging enough in the familiar face-to-face environment but can be extra taxing when it comes to implementation in the still fairly unexplored context of ICT facilitated education. In this article we focus on involving students in commenting each others work in progress through peer reviews preceded by a discussion of the criteria, thus leaving the responsibility to grade the students achievements to their teachers while the students' contributions on assessing their peers has advisory purposes as a tool to enhance their learning. We will begin by offering a brief background to our interest in peer assessment and how we arrived at the decision to implement and evaluate peer review in our distance and online courses. We will also describe some of the principles of our design of the peer review element. Finally, we will report some early findings on how the students on a course in which we implemented peer review experienced this element, with a focus on these key issues:

- Strengths and obstacles of peer review
- Participation in ICT and the use of text based communication

Background

Frequent course assignments seem to be a popular strategy for teachers in Online and Distance Education to support and monitor their students' learning progress. Recent Swedish studies on assessment show that students in this study environment are likely to carry out a vast amount of assignments; in some cases a five week course can offer up to seven compulsory assignments which the tutor assesses and comments on (Hult, 2005, 2007, and 2008). Assignments in this perspective seem very central to building both the form and content of these courses. Similar trends are also visible in this context in other countries. Gibbs and Simpson (2004) reports that an Open University student in United Kingdom may receive up to fifty times as much feedback on assignments over an entire degree programme compared to

students at conventional universities. This could indicate that frequent assignments may have been found to be a fruitful strategy to merge the demand for more fine-graded measurements of the students' achievements with the change in the teachers' role towards that of a coach. These assessment patterns are well in line with what many researchers on formative assessment point out as providing good support for the students' learning. Through frequent feedback the students are provided with information about their progress and what they have to achieve to reach their learning goals. However, there could be a risk that they learn something other than what was intended as the frequent assessments may trigger the students to focus their studies on passing the exam. Gibbs and Simpson illustrate this with the following quote:

> *If you are under a lot of pressure then you will just concentrate on passing the course. I know that from bitter experience. One subject I wasn't very good at I tried to understand the subject and I failed the exam. When I retook the exam I just concentrated on passing the exam. I got 96% and the guy couldn't understand why I failed the first time. I told him this time I just concentrated on passing the exam rather than understanding the subject. I still don't understand the subject so it defeated the object, in a way* (Gibbs, 1992, p. 101 in Gibbs & Simpson 2004).

On the same note, Gibbs & Simpson (2004) want to draw attention to the risk of students' pretending to understand more than they really do:

> *Students can tackle assignments that are intended as learning activities so as to maximize the marks they obtain rather than maximising the learning achieved from engaging with the assignment. This may involve 'faking good' and pretending to be competent or knowledgeable, deliberately covering up misunderstanding and ignorance, telling teachers what they want to hear rather than what they as students believe, and so on"* (p.14).

Torrance (2007) also points out that the students, at worst, may learn how to produce a product which is likely to pass examination but without having developed a deeper understanding of the subject as intended. Thus the underlying risk of this frequent assessment pattern could be to produce reductionist learning and instrumental accountability, rather than meaningful empowerment. The frequent communication between individual students and their teachers could also make students more teacher depend-

ant which would work against the idea of the independent and self directed learner.

Although still acknowledging the valuable support for the students that frequent assessment patterns can enable in online education, these concerns raised our interest in peer assessment/peer review. Our interest in research on peer assessment is how this tool could work as a support for learning during coursework, rather then making students responsible for assessing final products. Most of the peer assessment studies we found were carried out in on-campus settings, which made us curious about implementing and evaluating it in an ICT-setting in online and distance education. As a result we initiated a collaborative project funded by The Swedish Agency for Networks and Cooperation in Higher Education, between Umeå University, Mid Sweden University and Luleå University. The aim of the project, which is now in mid-process, is to implement and evaluate peer review elements in our online and distance courses, to learn more about how peer review would work in an ICT-setting and if this element can be a good strategy to support the idea of learning as a social activity among autonomous, independent and self-directed learners.

Assessment beyond control?

Early research concerning assessment and examination in higher education points out its steering effect on student learning. Becker et al (1968), Snyder (1971), Miller & Parlett (1974) and Marton (1977) showed in different ways how student strategies for learning are influenced by the assessments they have experienced or expect to experience. A fundamental conclusion is that assessments are essential to student learning in the sense that they indicate to the student what and how they should learn.

Later research on assessment argues for formative assessments which not only summatively control expected learning outcomes at the end of a course but also formatively during the course give the students' information on their understanding and performance. In his classic article "Formative assessment and the design of instructional systems" Sadler (1989) argues for feedback as a key element in this formative assessment process. With reference to Ramaprasad (1983) Sadler points to the importance of feedback loops; feedback should serve as information about the gap between the actual performance and the expected learning outcome, as well as how to alter this gap. The goal of the feedback process is to make students not only understand standards and criteria, but also to be able to com-

pare their actual levels of performance with these standards. "A key premise is that for students to be able to improve, they must develop their capacity to monitor the quality of their own work during actual production"(p 119).

In a review of more than 250 studies of formative assessment Black & William (1998) summarise that learning and achievement benefited from feedback in varying content areas, knowledge and skill types and levels of education. When discussing learning assessment, Shepard (2000) argues for a change from understanding assessment as a tool for the teacher to deliver reward or punishment to the student, to seeing assessment as a source for insight and learning, that is, to "create a learning culture". With "dynamic on-going assessments" and teachers who deliver feedback aimed at improving student understanding of the task, two elements of a learning culture would be fulfilled. Other elements are for students to know the criteria by which they are being assessed and furthermore that they also get to assess their own and others work.

Summarising the research on formative assessment and feedback, Nicol & Milligan (2006) report seven principles of good feedback practice. Good feedback practice that can help support learning clarifies good performance, i.e. criteria or expected learning outcomes so that the students know what they are aiming for. If they do not understand and share the assessment criteria with the tutor they subsequently will not understand the feedback. Another principle emphasizes that feedback should facilitate 'the development of reflection and self-assessment in learning' (p 66). Good feedback practice also 'delivers high-quality information to students about their learning' (p 68) thereby helping them to a greater awareness of their strengths and weaknesses. Furthermore, good feedback practice encourages teacher-student dialogue rather than information transmission and it also 'encourages positive motivational beliefs and self-esteem' (p 71), which in turn affect what and how students learn. Finally, good feedback practice provides a chance to close the gap between existing and desired performance through resubmission and feedback on work in progress and it also provides teachers with information that can help focus their teaching.

Peer assessment

One strategy to preserve the ideas of formative assessment, while at the same time adding a more collaborative approach, is to turn to peer assessment. Topping, (1998, p 249) summarised the idea of peer assessment as something that "builds on an arrangement in which individuals

consider the amount, level, value, worth, quality, or success of the product or outcomes of learning of peers of similar status". One argument for using peer assessment is that it may contribute to the students' development of critical appraisal skills. Macpherson (1999) found indications of a growth in the students' reflective and critical thinking skills after participating in a peer/tutor arrangement in which the students were to give oral feedback on each other's literature reviews. Anderson et al (2001) found evidence that students participating in peer assessment developed their skills of making reasoned justification of arguments. According to Macdonald (2002) the students' viewings of fellow students' strategies to approach the assessment task seems to support the awareness of weaknesses in their own approaches.

Peer assessment can also support the students' understanding of the often tacit dimensions of academic disciplines. Gibbs (1999) points out that the teacher enters an assessment setting with a much deeper knowledge of the criteria and standards than the students, and with evaluative skills in making judgement about student performance. Students often struggle to understand what they are meant to achieve and they often have problems understanding feedback comments and interpreting them correctly. Many research studies indicate that participating in peer assessment helps the students to understand the deeper sense of the criteria to help direct their learning towards successful achievements (eg. Bloxham & West, 2004). Gibbs (2006) argues that since peer- and self assessment means that students internalise academic standards they also develop an ability to supervise themselves. O'Donovan, et al (2004) argues that the best ways to create meaningful knowledge of assessment and standards are both explicit communication and tacit transfer processes.

Peer assessment in higher education could also be linked to the idea of lifelong learning and the evolving needs of the global employment market, in which autonomous, independent and self-directed learners who take responsibility for their own personal and professional development are a fundamental idea (Lorraine & Stefani, 1998). Boud (2000) points out that assessment is vital for supplementing lifelong learning, and that "This means that it has to move from the exclusive domain of assessors into the hand of learners" (p 151). Boud also argues that the more complex learning is, the greater the need for interaction with others to help us test our understanding, reflect upon our ideas and provide other kinds of support. Further, he

proposes that we need "sustainable assessment", which he defines as "assessment that meets the needs of the present without compromising the ability of students to meet their own future learning needs" (p 151).

The need to prepare students for peer assessment

As pointed out above, the teacher enters a course with far more experience than the students about what criteria mean and how to put them to use in assessing the students' learning. Creating a common understanding of criteria between students and tutors seems a challenging task. Sadler (1989) pointed to the elusiveness and difficulty of defining criteria, partly because what a criterion means and implies for appraisal is hard to define without concrete examples that possess the property in question, "which in any case is usually only one of many properties. "Coming to an understanding of the property is therefore as much an epistemological as a technical matter" (p 135). As Sadler argues, criteria cannot be fully defined and transmitted to students; they are as novices by definition unable to fully appreciate implicit criteria for making refined judgements about quality. "Knowledge of criteria is 'caught' through experience, not defined" (p 135). More recent research also indicates that even if the criteria were presented in both written and verbal form, the understanding of some criteria differs among students and their tutors. (Orsmond et al 1996, 1997, O'Donovan, Price & Rust, C, 2004).

Therefore much of the research literature points out the importance of preparing students for peer assessment by discussing criteria. Students should also be offered direct and authentic evaluative experience guided by tutors, enabling them to develop their evaluative skills.

Price and O'Donovan (2006) point out that tacit knowledge among tutors about criteria obtained from a shared experience of marking and feedback can be used in supervising and engaging students in interpretations and negotiations of criteria as a preparation for peer assessment activities. By mediating this meaning, such discussions contribute to a deeper learning of the peer assessment process. Their findings were replicated over a three-year period and showed that students attending assessment workshops, containing both group and tutor-lead discussions of criteria and group as well as individual review of assessments, achieved significant improvements in performance. This improvement was also sustained at a significant level one year later.

In a meta-analysis of 48 quantitative peer assessment studies that compared peer and teacher marks results indicate that the criteria derived from students, or that students have agreed on, give a better teacher-peer agreement in marking than if the criteria were supplied by the teacher (Falchikov & Godfinch 2000). Results from the same study also indicate that the use of well understood and explicit criteria gives more accurate judgements than when students are left with little or no guidance on how to interpret the criteria.

The study

The findings reported in this article derive from a distance course within a programme in teacher education. The teachers who had been teaching this course for many years were open to the idea of implementing a peer review element, especially since this course was given at advanced level for the first time.

The 60 students were all teachers who had returned to studies to further their education. They were gathered on campus three times during the course; at the introduction, in mid course and during the final examinations which consisted of a portfolio with literature and lecture comments and a written report of a study the students had to plan and perform during the ten weeks of the course. The students were informed at the first on-campus gathering about the peer assessment project and that they were to participate in the peer review procedure using FirstClass, which was the standard platform used for online interaction in this programme. Participation in the peer review procedure was obligatory. The students were not given a specific number of how many postings they had to make on this matter, instead they were told to include examples of their own and others contributions to the learning process of the peer review process in a self evaluation which they were to include in their portfolio.

Based on the understanding we gained from previous research on formative and peer assessment, we designed a concept for implementing this in a course. We decided to introduce peer assessment in the form of peer review as our purpose for introducing this element was to explore its potential to enhance the students learning during the process. No matter how much the students interpret and are made familiar with the implicit dimensions of criteria, the teacher still will be the most experienced and knowledgeable of evaluating student achievements. Also the responsibility for assessing the students is the teachers', and the students' task in the assessment process is to use the assessment tool for advisory pur-

pose. We designed a workshop model in which the students were tutored with questions while interpreting and negotiating specific course criteria in the light of general steering documents. This was meant to help them to become more aware of the implicit dimensions of assessment criteria. They were to identify or formulate a few criteria they found to be constructive to use when giving feedback on each others' products during the learning process. At the end of these discussions the students were given a document with specific questions regarding how to identify more overarching academic qualities in reviews of texts and seminar discussions. Thereafter, the students were to apply their chosen criteria on the assessment of two example texts. Both example texts were deliberately of mediocre quality to trigger discussion, although one of the texts was more likely to pass a teacher's examination than the other one. The idea was to activate and tutor a discussion among the students about how to identify the qualities asked for by the criteria. After this, the students were to modify the criteria they had agreed upon based on (hopefully) new understandings, before moving on to the task of reviewing each others' work in process.

Each workshop seminar was accessible throughout the whole course but the time for discussion in each of them was set to between 3 to 5 days, depending on what task the students were to work on, to enable flexible participation.

Data collection

Data used in this article was collected through an online questionnaire with open and closed questions. The students answered these questions during the last meeting on campus. The questionnaire package included demographic questions, questions about the students' experience of the criteria discussion, the peer review element and their views on different aspects of text-based communication. Data analysis was conducted through the use of descriptive statistics for the closed questions and a content analysis of the answers from the open questions. The questionnaire was answered by 51 students (n=92% of the student group). Those who did not answer were students who did not participate in the on-campus meeting.

Findings

Although the students initially expressed to their teachers that they were confused about the role of peer review and criteria discussion in this course, they reported at the end of the course that they valued this element highly. This issue is for example mirrored in one of the students' answers to an open question:

At the beginning of the course it felt like a side track, but as the course progressed the meaning of the workshop became clearer to me. I developed a new understanding of earlier activities in the workshop. But as I said, it took a while before the knowledge and understanding became visible and obvious to me (All quotes in our translation).

The students' engagement in the peer review process could also be confirmed by the vast number of postings in their workshop forums, where most of their peer review tasks and discussions were carried out.

As shown in table 1, 84 percent of the students answered that reading and commenting peer students' texts had enhanced their own learning.

Table 1. My own learning was enhanced by reviewing and commenting texts made by peers

		Frequency	Percent	Cumulative Percent
Valid	Agrees to a little degree	8	15,7	15,7
	Agrees to a high degree	24	47,1	62,7
	I totally agree	19	37,3	100,0
	Total	51	100,0	

One student pointed out that:

It was time consuming but gave me an enormous amount. To see how one could think in different ways made me see different aspects of the texts and how you can formulate and structure the presentation of reflections on a subject.

Another student wrote that:

The review and commenting on other peers' a text has been valuable and I have learned from gaining insight into someone else's views. Additionally, it contributed to my own learning process.

What strengths did the students identify?

On the direct question if they found the peer review element unnecessary in this course, only four out of the 51 students answered that they agreed with this. As many as 84% of the students marked that they felt that participating in the peer review process had a positive effect on their development of independent and critical thinking skill.

Table 2. Peer review contributed to the development of my independent and critical thinking skills

		Frequency	Percent	Cumulative Percent
Valid	Agrees to a little degree	8	15,7	15,7
	Agrees to a high degree	26	51,0	66,7
	I totally agree	17	33,3	100,0
	Total	51	100,0	

One student expressed it like this in a comment: It has enhanced the depth and expanded my perspectives, it was incredibly good!

A majority, 42 students, also agreed that the peer review process had enhanced their understanding of knowledge building in the academic context. It is also interesting to note that 40 of the 51 students agreed that this element in the course was valuable for gaining an understanding of how to direct their learning in the course. In this context, the students' answers to the question if they thought that participating in the peer review process would enhance the chance that their examination products would pass the examination successfully are a bit puzzling as only 27 students answered that they thought it would. To the question if participating in peer review had a positive effect on their motivation to fulfil the course, 24 of the students replied that this was indeed the case.

Overall, it seems as though the collaborative structure of the peer review element was appreciated by the students. 43 of them found that it contributed substantially to their learning and only one student thought that concentrating on their own learning process instead of working collaboratively would have enhanced learning more. One of the students expressed that: If you haven't understood, you can be helped by your peers. You grow wiser together.

What obstacles did the students identify?

Although these are promising results from our project, it is important to note that some students found participating in peer review somewhat taxing. This was a group of students in mid life, with many life commitments competing with their studies. Even students who found this element valuable on many other levels expressed in their comments that participation meant hard work and commitment. Accordingly, nine students answered that they felt that the peer review element was too time consuming, although only three students agreed with

the statement that participating in peer review was a waste of time. It is notable that students who expressed that they had engaged fully in the peer review procedures also found the peer review element more valuable than those who answered that they had participated with lesser commitment.

One explanation for why some students did not value participating in peer review to a higher degree could possibly be that they thought they had missed out on more qualified feedback made by their teachers. As visualised in table 3, 18 of the 51 respondents answered that comments from the teacher would have been a better support than feedback from peers.

Table 3. The support had been better if the continuous feedback on my work was given by my teachers

		Frequency	Percent	Cumulative Percent
Valid	I don't agree at all	7	13,7	13,7
	Agrees to a little degree	26	51,0	64,7
	Agrees to a high degree	11	21,6	86,3
	I totally agree	7	13,7	100,0
	Total	51	100,0	

The students' views on asynchronous text communication

As a vast part of the peer review experience was carried out as text-based communication we found it valuable to capture the students' experiences of how participating in the peer review worked in relation to this aspect. It is notable that a majority of the students didn't find the text-based communication inhibiting.

The fact that this form of communication gives more time for reflection before utterance was pointed out as beneficial. Another benefit was that writing and formulating their thoughts in text enhanced a better understanding of their own standpoints in the matter discussed. One student pointed out that it triggered her to a higher level of abstraction. The fact that asynchronous text-based communication enables flexible participation in a discussion was also pointed out, as summarised in this student comment:

> *It suited me perfectly. I can reflect whenever I want to with anyone in the group. I can take my time and consider my own opinions. I also can go back and see how I thought before. I know that everyone in the group can read my reflections at any time.*

It also seems that some students found that communication through text had a great value in itself. One student wrote that:

> *It opened up the opportunity to freely communicate on a better level. It's easier to express oneself in text form.*

However not all students were happy with the written communication. Nine of the students remarked that it was hard to write posts that transmitted their meaning in a way that could not be misunderstood, and some commented that it is hard to express feelings through text. Additionally, six students answered that they felt it was hard to fully understand what their peers meant with their postings. Others pointed out that communication through text is more time-consuming than face-to-face communication. One student expressed that written communication is flat by nature and that it lacks nuances. One student captured these concerns in this comment:

> *It's hard to formulate in text since the words are weighted and are more visible when written. Face to face communication allows me to read body language and helps me judge if I have to express myself more clearly.*

Conclusions

Judging from this early data it seems as though the students found many advantages in participating in the peer review element in this particular course. Judging from the high activity in the discussion forums in which the workshops were carried out, this element seems to stimulate the students to engage in collaboration with their peers. But did it really mean that they understood the deeper sense of the criteria that Bloxham & West (2004) identify as an important tool for directing their learning towards successful achievements? From the data in this article it is impossible to draw any conclusions about what impact the criterion discussions and peer reviews had on their understanding of the deeper sense of criteria. It has to be kept in mind that all these students were teachers furthering their education, which means that most of them probably had some experience of criteria analysis previously. Perhaps they already were, as Sadler (1998) points out as important in formative assessment aimed to enhance learning, equipped with at least some of the evaluative skills that their teachers had. However, the fact that they found the peer review element taxing and time consuming and despite this showed high commitment could indicate that participation in peer review truly stimulated them to seek for deeper understanding. The fact that

so many of them found that participating in peer review had helped them understand how to direct their learning in the course can also support such conclusions. Another sign of this could be that so many, despite an initial confusion about the purpose and value of the peer review process, came to rate this element as highly valuable in the evaluation at the end of the course. Some of the students' answers to the open questions also indicate that they sensed that they gained a deeper understanding of what they were supposed to relate to when considering "the amount, level, value, worth, quality, or success of the product or outcomes of learning of peers of similar status" (Topping, 1998, p 249). Hopefully, a more in-depth analysis of their criteria discussions and peer reviews will confirm that they indeed developed an understanding about what they were expected to achieve in this course and that they also managed to put this understanding to use as support for their peers.

The students' responses to questions about what impact participation in the peer review activity had on their learning process are also promising. Although one must separate what people think they have learned from what they have actually learned and are able to put to use, it is positive that so many found that peer assessment contributed to their independent and critical thinking skills. If this result can be further confirmed by other data from the project, for instance their text discussions and comments on each others' assessment products, it will be possible to draw the conclusion that peer review could be an important strategy to use when setting the scene for the independent and self directed learner.

It is also interesting to note that the students gave their own examples of how they found that the reviews of others' examination products gave them insight into the variety of strategies to use when accomplishing a task. If this means that they could evaluate their peers' products on other levels than making explicit criterions such as formalities and structure, this could mean that peer review could prevent the instrumental learning that Torrance (2007) argues that formative assessment could trigger.

It was somewhat contradictory that so few students believed that participating in peer review would enhance the possibility of passing the final examination despite the fact that a majority seem to have found great value in the peer review element. As there is no explanatory data in this matter, we can only speculate about the reasons for this. One possible explanation could

be that they were already confident about their abilities and thought they would have passed their examination successfully even without this participation. Another way to interpret this could be that although they gained new understanding of the meaning of the criteria, they chose to use earlier strategies. Maybe it is easier to identify what needs to be done than to actually go ahead and do it when new to something. In that case, the eventual impact of the peer review element may not show until the students have advanced further into the programme. Yet another way to understand this could be that the students found it hard to trust that they had interpreted the criteria in the way meant, which they wouldn't be assured of until they received the results of the final examination products. After all, as many as 18 of the 51 students answered that they thought that feedback from the teachers would have been more valuable than feedback from peers. These are interesting questions which we will interpret further later on in this project.

Another interesting result was that so many students found the text-based communication sufficient in the peer review process. It is important to note that some students actually found the text-based communication better than face-to-face communication, with arguments such as; it provides room for reflection and enables everyone to express their views. But at the same time some students found it hard to communicate in this manner and wished for other means of communication in which they could use attributes such as body language and tone of voice to clarify meaning. One way to support both types of students could be to begin with text-based discussions but introduce audio-visual communication for conclusive discussions. Such an arrangement could also help make communication less time consuming, which was an issue pointed out by the students. Such ideas support our intentions to test what audio-visual techniques could contribute in this context in our further project development.

All in all, participating in the peer review process seems to have engaged the students and enhanced their collaboration, which correlates to sociocultural and constructivist theories of learning. The promising results on the benefits of peer review preceded by a discussion of the criteria in the online context makes it interesting to proceed with the project to learn more about its effect on the students' learning and interaction and to find out more about how to design the peer review element to enhance the students' learning.

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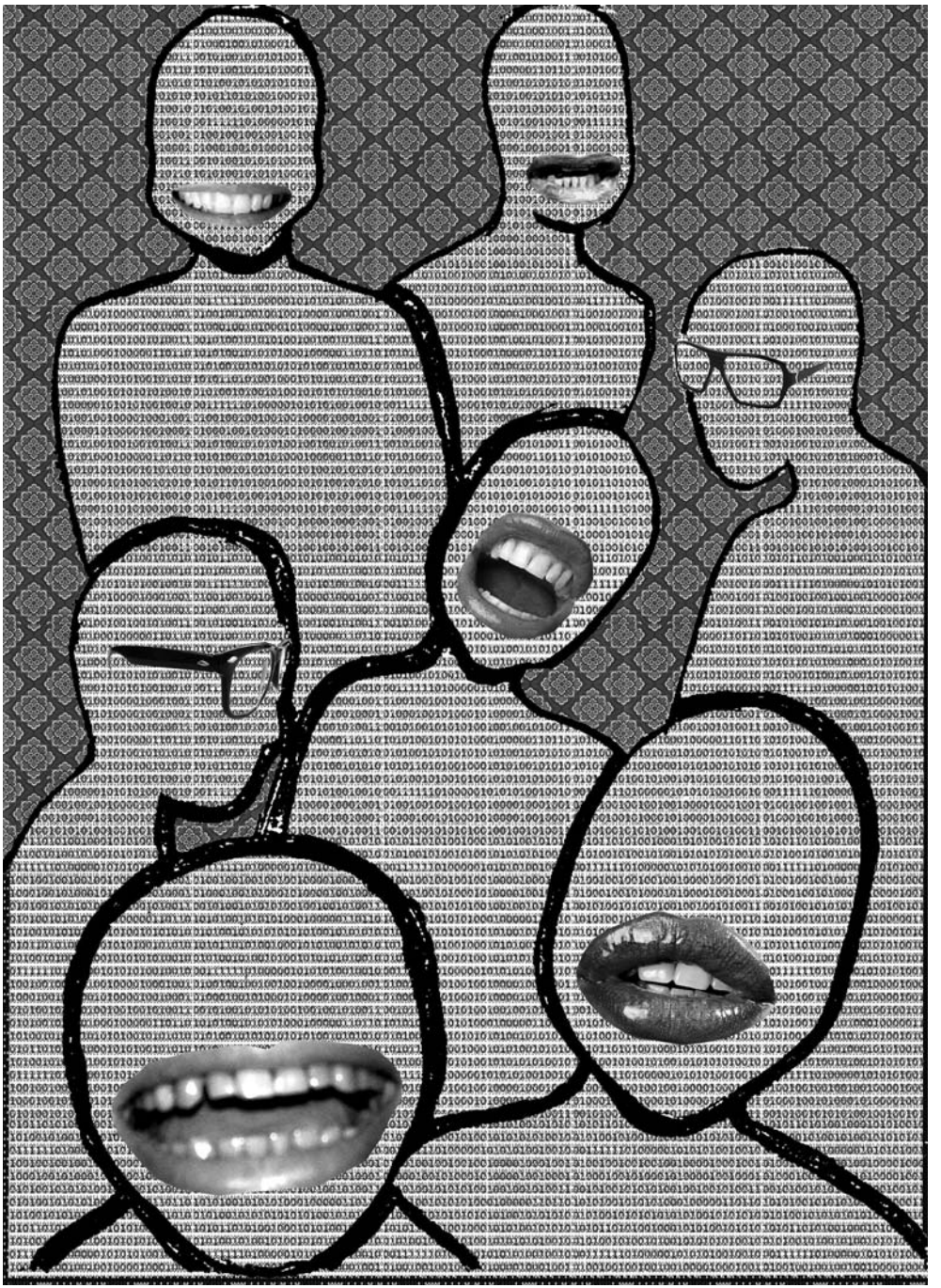

Lektion.se

– an Informal Swedish Online Learning Community for Shared Teacher Professional Development: a Study with Focus on Frequent Users of the Discussion Forums

Anders D. Olofsson

Abstract

The teaching profession is complex and in continuous change. To be able to educate and prepare students for the society of tomorrow, teachers are in need of professional development in order to reflect upon and deepen their understandings of their profession. In this paper, focus is on an informal arena for teacher professional development (TPD) in form of a Swedish online learning community (OLC), called lektion.se. Here some early findings from an ongoing larger study aimed at understanding why and how teachers use lektion.se for their professional development is presented. Special attention is paid on describing the personal and professional background of those members currently working as teachers and frequently using the discussion forums at lektion.se. Finally, a short discussion of lektion.se as an informal online learning community for TPD in order to inform teachers' everyday life in the Swedish classrooms is provided.

Keywords: Teacher professional development; online learning community, lektion.se, community of practice

Introduction

Teachers in Sweden seem to need to be active in their professional development (Lundström, 2007). Due to the development of the Internet this professional development appears to take place in various contexts, for example through so-called Online Learning Communities (OLCs) (Jaldemark, Lindberg & Olofsson, 2005). One important reason to why teachers actively develop themselves, seems to be that the teacher profession is understood as complex and intertwined with the message of a school for everyone (Assarsson, 2007; Borko, 2004; SOU1999:63) and situated in a practice with constant demands for change (Olofsson & Lindberg, 2007). To be able to manage this profession, different aspects seem important to recognise. Examples of this are teacher training

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and its content (Olofsson, 2007; Lindberg & Olofsson, 2006; Olofsson & Lindberg, 2006) and teachers' experiences of their profession (El Gaidi, 2007; Hugo, 2007).

Fraser, Kennedy, Reid and McKinney (2007) discuss how teachers choose and act in relation to their own professional development in terms of different arenas. These arenas are described in the dimensions planned/incidental and formal/informal. In Sweden, TPD often appear formal, planned and initiated on a governmental level with comprehensive directives concerning financing and organisation, content and realisation (Förordning 1982:608; Förordning 2007:223). One of the latest example is the so-called "Lärarlyftet" (U2007/3168/S), for which the Swedish government will spend SEK 2.8 to 2.9 billion for the period 2007-2010 to allow teachers working in compulsory schools or upper secondary schools to receive 80 per cent of their current pay while participating in higher education (U2007/3168/S) for professional development. The main reason for "Lärarlyftet" is said to be poor study results among pupils and that Swedish teachers through participation in "Lärarlyftet" will strengthen their competence and thereby better will be able to help students to reach the learning outcomes stated in the curriculum and other policy documents (U2007/3168/S).

TPD in a governmental framework has been researched and discussed both in a national and international context. For example, Strömberg (1994) and Englund (1992) put forth that governmental initiated TPD is used in order to make the teachers loyal to the curriculum rather than with the professions' own traditions. Diaz-Maggioli (2004) says that such governmental initiated TPD limits the ownership of teachers' own professional development. Similar thoughts are expressed both by Hargreaves (2006) and Goodson together with Hargreaves (2003), who state that teachers seeking continuous learning should be encouraged, rather than driven towards development demands from the government. Adey (2004) stresses the importance of continuous possibilities for teachers to develop professionally and Williams (2005) argue that TPD with an academic content always contribute to powerful changes in the ways teachers think and act in their practice, a line of thought also present in Connelly and McMahone (2007). Nichol and Turner-Bisset (2006) and Pushkin (2001) point out the risk for a "de-intellectualized" staff of teachers if governmental directed ventures not take place.

Garet, Porter, Desimone, Birman and Yoon (2001) is of a different opinion, namely that teachers themselves must take the initiative

for professional development. If not, there are risks that the TPD becomes both transitory and only marginally influence the teaching practice. Penuel, Fishman, Yamaguchi and Gallagher (2007) argue that this will be the case also if teachers within governmentally organized professional development are given no or limited time to reflect upon in what ways they can use their newly constructed knowledge in their everyday life in the classrooms.

When reviewing research concerning questions like how and with what content and intention TPD shall be organized it seems like opinions both in favor of informal TPD as well as formal, governmental initiated, TPD are present in the literature. In this paper, focus is on an arena for TPD, understood as being informal and planned (Fraser et al., 2007). More precisely, the article reports on some early results from a larger and on-going study aimed at understanding why and how teachers use the Swedish OLC, lektion.se, with the purpose of professional development (Olofsson, 2008). Lektion.se is here seen as a challenger to more traditional arenas for TPD and attention is in this article paid on personal and professional background of those members working as teachers attracted to and frequent users of the discussion forums present in lektion.se. This is carried out in a few steps. Firstly, some recent research on OLC and TPD is presented. Secondly, lektion.se and the study conducted are described. Thirdly, some results from the study focussing on background information about the members of the specific group targeted within lektion.se are presented and finally, a short discussion is provided of why informal and shared TPD carried out online through lektion.se can be productive.

Some lines of research with focus on OLC and TPD

Research on learning communities and TPD (see for example Hodgkinson-Williams, Slay & Siebörger, 2008; Fox, Haddock & Smith, 2007; McLaughlin & Talbert, 2006) and such development in a netbased context, or OLCs, (see for example Hlapanis & Dimitracopoulou, 2007; Barab, MaKinster & Scheckler, 2003) is quite extensive. TPD through informal OLCs is described as being productive, collaborative orientated and with a potential to be sustainable (Henderson, 2007) and additionally that it influences the teachers' own practice in their classrooms (Marks, 2005). Triggs and John (2004) say that OLCs have the potential to function as arenas within which teachers can develop into "one who has the capacity to respond to changing conditions, anticipate future technologies and re-define their practice so that they

are enabled rather than constrained by external policy agendas" (s. 427). Further important research here is such aimed at understanding how OLCs shall be designed in order to maintain both an informal structure and sustainability (Carlén & Jobring, 2007). Something that Schlager and Fusco (2003) mean can be the case if smaller and local, rather than extensive, OLCs are prioritized during the design process. In addition, research in line with Olofsson & Lindberg (2007) with focus on how OLCs can bridge or intertwine different stakeholders of school as a practice is of relevance to acknowledge in relation to the current study.

Before describing the method for the research and lektion.se, it is interesting to note that such an informal arena (Fraser et al., 2007) can be seen as a move away from some of the barriers articulated above in relation the government organised TPD. This is further examined in the discussion.

Method

This section starts with a brief description of lektion.se, the informal OLC understood as the empirical setting for the data collection. Thereafter the data collection procedure, the group investigated and the online questionnaire is described and problematized.

The informal OLC called lektion.se

Lektion.se was established 2003 (P. Malkert, personal contact, March 28, 2008), and have at the moment about 159 700 registered members. Lektion.se is with its idea and target group a unique OLC in Sweden. This kind of OLC can be described as a community with

> … *ensembles of agents, who share a common language, world, values in terms of pedagogical approach and knowledge to be acquired and pursue a common learning goal by communicating and co-operating through electronic media in the learning process. The common interest of this type of community is the common interest in learning* (Seufert, Lechner & Stanoevska, s. 47, 2002).

Lektion.se was originally built with the purpose of making it possible for teachers to submit, search and download lesson material produced by other teachers. Activities free of charge, driven by the members, voluntarily and with flexibility both in time and space. Today more functions are built in. For example a member initiated collection of web-links, there is an archive with job opportunities, possibilities to create your own page and private networks or groups, and a discussion forum (www.lektion.se). The discussion forum contains at present

about 20 smaller forums that are built up with threaded discussions. Several forums have over 250 threads and with over 1500 postings. The forum with most activity has at the moment over 9800 threads and 15000 postings. The numbers of members that have read all or some of these postings, but not themselves contributed with content to the discussions, are probably considerably higher. As a participant within the forums, you have the possibility to receive a notice every time a new message is written in the forums you follow. Many groups of stakeholders of the Swedish school are active in different discussions. Among others, one can find teachers working in pre-school, compulsory school, upper secondary school and different kinds of adult education. In addition, school leaders and school politicians are participating in the discussions.

Data collection

Already from the beginning of this study, an agreement was set up with the founder of lektion.se, who gave me access, that members participating in the study should be anonymous. It was in fact only by using the founder's authorities as a webmaster for lektion.se possible to get in contact with those members interesting for the study at hand. This being the case implied that the data collection procedure had to be planned and conducted in several specific steps.

The first step was accordingly to get permission by the founder of lektion.se to carry out the study. The next step was to write an introductory letter that also contained three links to three different online questionnaires constructed for the study. This letter was then sent to the founder who himself contacted specific members chosen. This was done by the founder with the use of an e-mail, which contained an explanation of why these particular members received this letter. Attached to this e-mail, was the introductory letter about the research study and links to the three online questionnaires. This procedure made sure that no knowledge of the members was, nor will be accessible to anyone outside of lektion.se. This procedure can be considered to be defendable also from a research ethical point of view.

The group investigated and the online questionnaire

For the study as a whole, a total number of 170 members at lektion.se were identified and among these teachers (K1-12), teacher trainees and "other stakeholders" are represented. Examples of members within the last group were school politicians and university teachers.

What qualified these members for the target group was that they all had used the discussion forums at lektion.se, commented other members' posts, started new discussions threads, or a combination or the two more than 15 times. As mentioned above, totally three online questionnaires were constructed, one for teachers, one for teacher trainees and one for so-called "other stakeholders". For this study, the group consisting of teachers was selected for further analysis.

Given the agreement with the founder of lektion.se about maintaining the members' anonymity, it was not possible to allocate a specific member to a specific group. Circumstances like these, i.e. not having a well defined and known population in combination with the use of online questionnaires, was possible to deal with. For example, MacLean and Scott (2007) argue that such choice of method in contexts such as this, when the researcher will reach a specific group through non-probability sampling or self-selection, is scientifically valid and therefore it was decided to follow their suggestion in relation to the study conducted and reported on here. The question that arises, however, is how you will guarantee that only teachers answered the questionnaire constructed especially for them. The answer is that it probably is not possible to guarantee such a thing. To meet that kind of guarantee, the study reported on here, given the specific circumstances, would not be possible to conduct. However, if accepting this, at least two additional aspects can be mentioned in order to legitimize the procedure in this the study. First, the founder of lektion.se informed the chosen members about the research study and in addition explained why he thought it was an important one. Second, that being part of an OLC often involves following "community values" (Wenger, 1998) that in this case means to act honestly and with good intentions, converted into the context of the present study – to choose the right online questionnaire.

The online questionnaire constructed for the teachers contained different themes, reflecting different aspects of being a member of lektion.se. For this paper, though, the theme covering background information was chosen and this will be presented in the next section.

Findings

In this section, findings from the research study's first data collection phase are presented, illustrating more specific aspects on issues about gender and age in combination of professional background and questions related to their membership at lektion.se. Data that was collected from members currently working as teachers who were considered to be frequent users of the discussion forums at lektion.se. In total 48 members have answered the online questionnaire constructed for members working as teachers.

The questions and the responses

In the first question, members were asked about their gender. As can be seen in Figure 1 a majority of the members who answered were females.

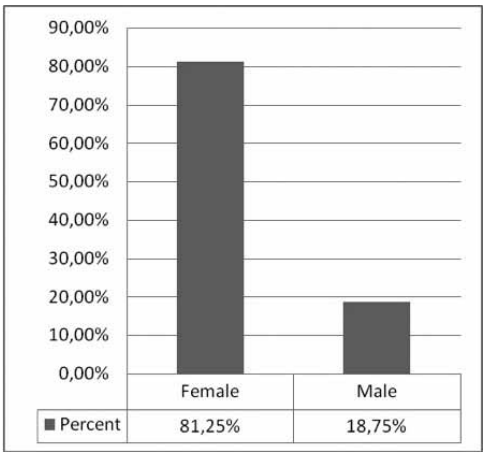

Figure 1

The second question concerned the members' age. As shown in Figure number 2, most of the members are between the ages of 25 and 44.

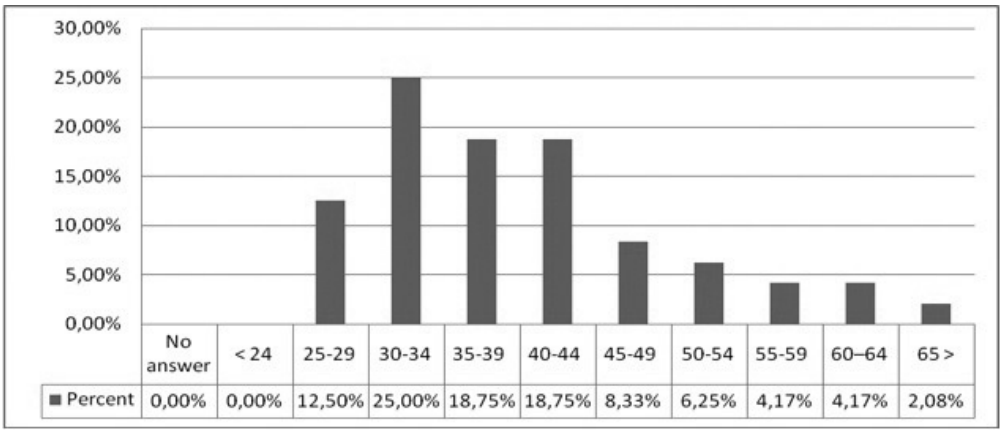

Figure 2

The third question concerned in which part of the educational system the teachers currently work. Figure number 3 shows that they were spread throughout the system and the least represented group were remedial teachers with only around 4% of the total number of teachers.

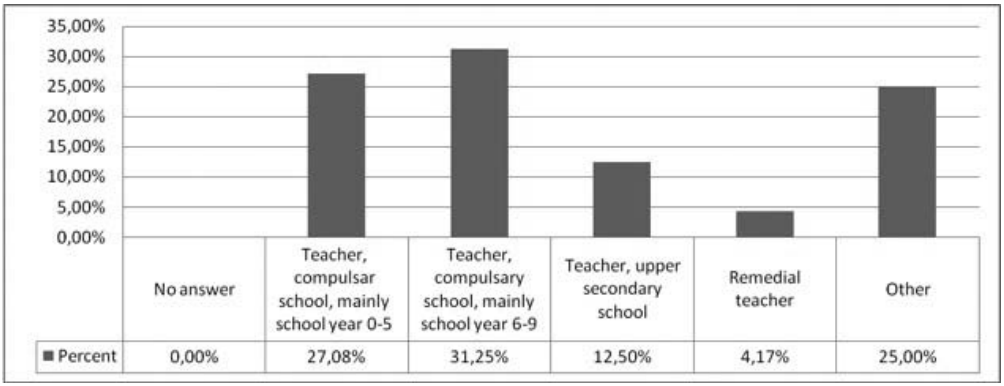

Figure 3

The fourth question concerned for how many years the members had worked as teachers. Figure number 4 shows that even if the number of years differed among the members, most of the them had worked between 0 and 4 years.

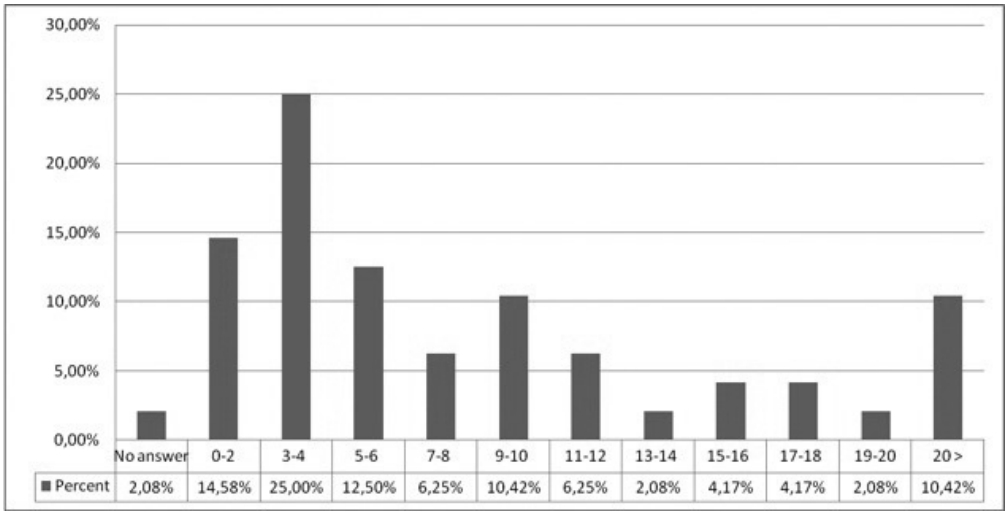

Figure 4

In the fifth question, focus was on how long they have been members at lektion.se. As can be seen in Figure number 5, most of them had been members for 1 year or more.

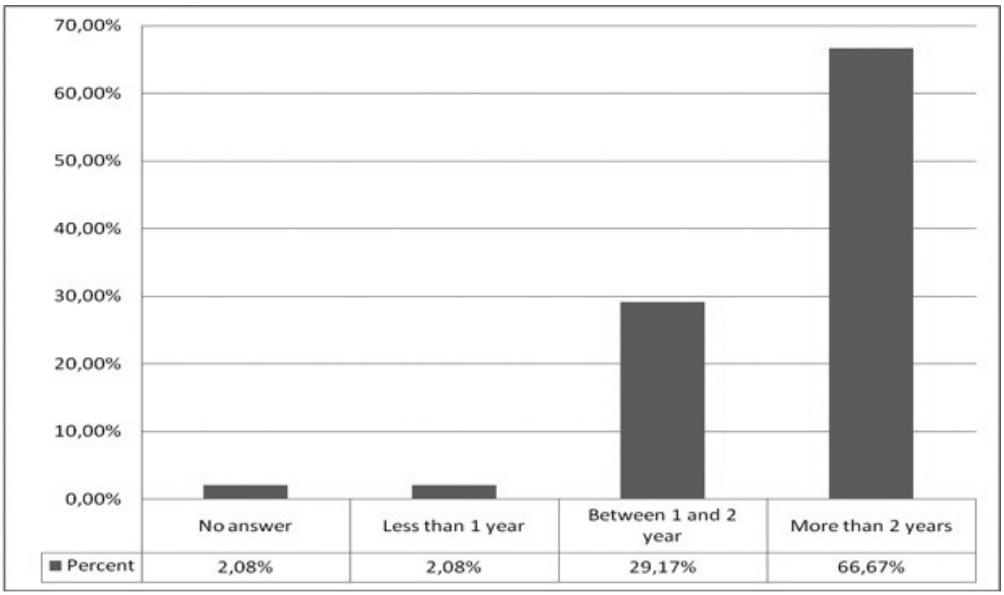

Figure 5

Discussion and conclusions

It is probably not very provocative to state that it is important with continuous professional development for teachers. There are many and challenging demands from students, parents and society. The practice in Swedish schools seems to be ever changing and will most likely remain so in the future. Teachers need to be prepared to over time function within this practice. The question of whether TPD is needed or not appears therefore irrelevant, instead the important questions seems to be how, on which and whose initiative and with what content TPD shall be carried out.

In this study the informal Swedish OLC, lektion.se is in focus; a challenger to more formal and government created arenas for TPD, for example the Swedish so-called "Lärarlyftet" (U2007/3168/S). It is interesting to point at

the relative large body of research claiming that TPD with a pre-specified and impersonal content in combination with a fixed arena for its realisation is difficult to make successful, effective and sustainable. Also it is difficult for this TPD to make a difference on teachers' own practices. Lektion.se seems to reflect none of this. Instead, the members of lektion.se are both creators of content and active in making decisions on how the content shall be dealt with, within which timeframes and on what times of the day the content shall be discussed.

An important aspect to acknowledge appears to be how the Internet here serves as a flexible and productive arena for TPD. The members (i.e. in this study the teachers) within the arena lektion.se have the possibilities to join discussion forums of their specific interest and when they need to take part in discussions that deals with school related issues important to them and their everyday practice in school. This appears to be the case when consulting the number of threads and posting present now in the discussion forums at lektion.se.

However, who is the typical member frequently active in the discussion forums? In this study, special attention was paid on investigating the personal and professional background of such members that in addition currently works as teachers. To begin with, it is interesting to note that 4 out of 5 members answering the online questionnaire were female. Why this is the case is difficult to state and unfortunately beyond the scope of this article. Nevertheless, it is most interesting and will receive further attention in future research on lektion.se. Further, most teachers work in compulsory school or in upper secondary school and are aged between 25 and 44. In fact, 3 out of 4 of all the respondents qualify within this age group. One possible understanding of this is that many of the members are relatively new in the profession and continuously seek answers or different interpretations of incidents happening in their own classroom practices. Inexperienced teachers use the possibility to through the OLC discuss school related issues they have confronted which are understood as being complicated and with no clear solution; issues that in a way are "real" or personal to the members, not something that for example the Swedish government have decided as important. Lektion.se seems to provide basic TPD. When taking a closer look at the answers to the question concerning how long they have been working as teachers, this actually strengthens such a conclusion. Over 50% of those who answered the questionnaire said they had worked as teachers between 0 to

4 years. Of interest is also that more than 10% of the members who answered the questionnaire have worked as teachers between 19 and 20 years. Such members are most likely able to put issues, experienced as being problematic or difficult to deal with, in different perspectives.

Another conclusion here is that the relatively young, and often female, members with comparatively few years of work experience are used to the Internet and the possibilities provided there. In other words, they see lektion.se as a productive OLC to be members of and to consult when seeking answers or possible interpretations of different work-place related questions. The fact that most of the participants in the study at hand, over 90%, answered that they have been a member of lektion.se for over 1 year might imply this is the case. That is, lektion.se seems to be a place to be for teachers in an early phase of their carrier.

To sum up, lektion.se seems to be an Internet-based context with great potential for shared TPD; a serious challenger to more traditional and government organised TPD. If considering the size of the OLC in terms of the large numbers of members in combination with that all questions discussed in the forums are member initiated and carried out on a voluntary basis, it seems that lektion.se is an OLC for teachers to be part of. It seems to function as an informal virtual arena for shared TPD, which contributes to inform on everyday life for teachers in Swedish classrooms.

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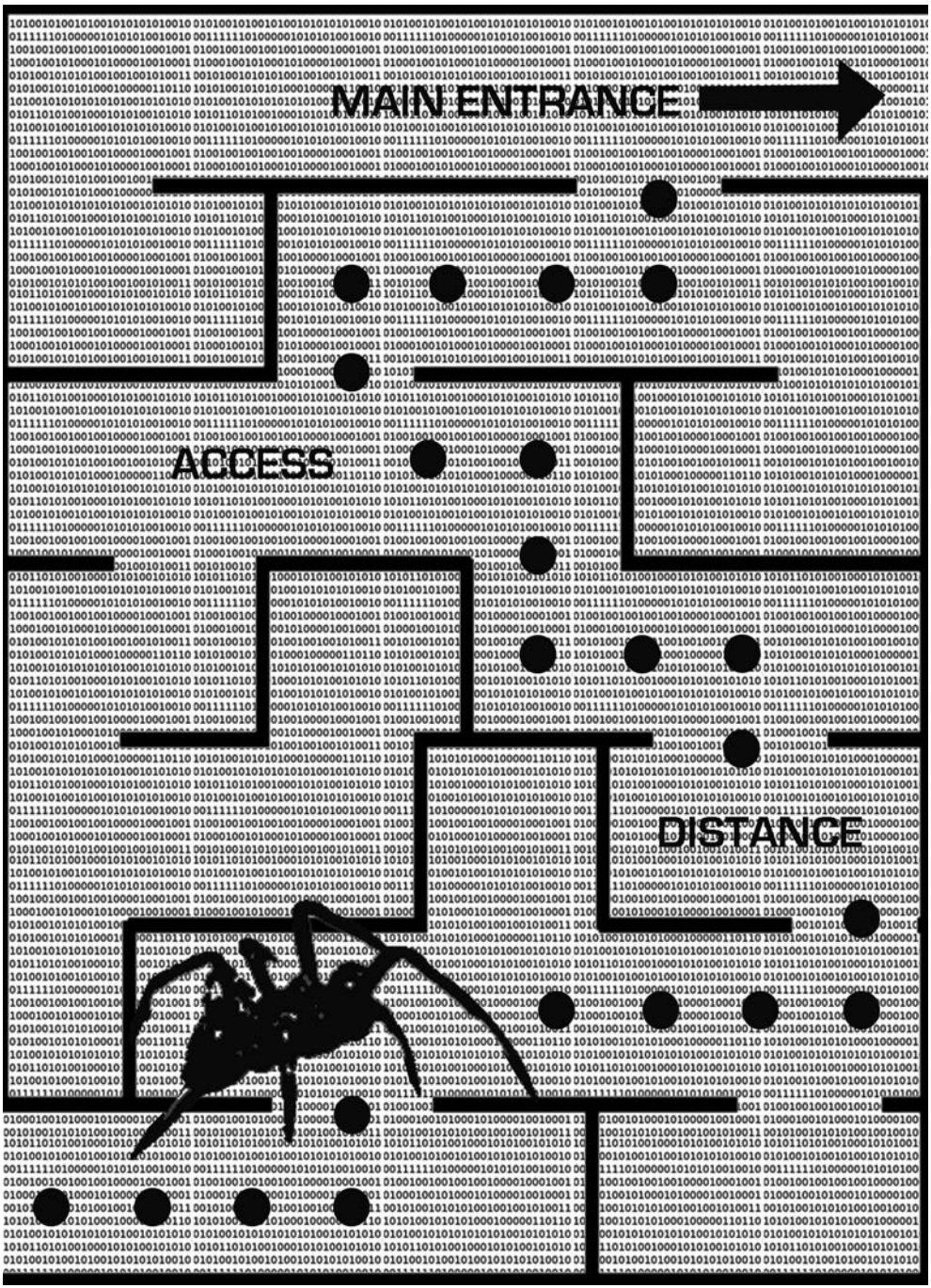
MAIN ENTRANCE
ACCESS
DISTANCE

The Spider: Connecting learning object repositories – strategies, technologies and issues

Fredrik Paulsson

Abstract

The rapid growth of digital learning resources (sometimes referred to as Learning Objects) has brought forward a number of issues concerning availability, distribution and use. Issues that are a mix of interplaited technological and pedagogical considerations. Some of those issues, mainly related to repositories and the distribution of digital learning resources, are described and examined in this article. A particular focus is put on how resources can be described and indexed using metadata, and on how access to digital learning resources can be improved and facilitated through federation and/or harvesting of metadata in order to tie several repositories together to provide a service that offers one single entry point for access. The study also examined how this single point of entry can be moved closer to the user (i.e. to the environment where digital learning resources are intended to be used) through simple federation of the service, enabling access to the network of repositories from any virtual learning environment. The study is carried out through experiments connected to a real-life case. The study concludes in several suggestions for how access to digital learning resources can be enhanced, as well as in the identifications of a couple of new issues that need to be addressed by future research.

The amount of digital learning resources[1] are increasing rapidly and a huge amount of commercial as well as open educational resources (OER) are now available. However, this rapid growth of digital learning resources also means that it becomes harder and harder to get an overview and to search and find suitable digital learning resources. At the best, digital learning resources (or metadata describing hem) are stored in a repository[2]. While repositories can be a good approach to indexing and cataloging digital learning resources, they also introduces a couple of new problems that need to be addressed:

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– Descriptions of digital learning resources need to be made according to a common standard and/or Application Profile (Heery & Patel, 2003) in order to be useful in a broader context.
– Repositories tend to become isolated islands that are often not indexed by general search engines like Google. This also means that users need to perform there searches in several different places in order to cover several repositories. To do this they need to be aware of where to find the different repositories.
– Repositories tend to be separated from the rest of the virtual learning environment (VLE) instead of becoming a transparently integrated part of the VLE. This is mainly a problem that is related to how VLEs are designed and implemented, discussed in (Paulson, 2008), but that, never the less, needs to be solved.

The Spider[3] project was set out to address the problems described above from a general perspective. Hence, the methodologies applied by the Spider should be applicable in other, similar cases, as well as being applicable to repositories for digital learning resource in general.

The remainder of this paper will describe how the above problems were addressed and how the solutions were designed and implemented in order to develop a broker service for learning resource repositories: *the Spider*.

The first part of the paper briefly describes the objectives, intentions and deliverables of the Spider project. The second part of the paper reviews some previous and related research, as well as similar projects. The third part of the paper describes how the problems described above were addressed and how the resulting solutions were designed and implemented. Finally, the paper ends with a brief discussion of the research presented in the paper and some suggestions for future research directions to solve some of the new and unsolved issues that were encontered during the project.

The Spider: background, objectives and service

The main objective of the Spider project was to offer a single point of entry for searching digital learning resources in repositories targeting Swedish schools. Therefore, existing digital learning resource repositories needed to be connected together in a "repository network" in order to accomplish the functionality needed for such service. In order to connect repositories in a network, a couple of basic conditions need to be met. Firstly, there is a need

for a common way of describing digital learning resources. Hence, common vocabularies, a common metadata standards and, preferably, a common Application Profile (Heery & Patel, 2000) are needed to ensure that resources are described in a uniform way and that concepts and terms are used in a consequent and coherent way. Secondly there is a need for a common way of connecting repositories in terms om communication interfaces, communication protocols and formats and query languages. These need to be simple and generic enough to be implementable in all repositories, but still powerful enough to support and make good use of the used Application Profile.

One of the conclusions that can be drawn from the issues described above is that even though the solution to accomplish a network of repositories is a technical implementation, a large part of the problem is likely to be related to consensus building. In part these issues are solved by the use of standards, but there is still room for interpretation that may lead to design decisions that make implementations differ and may by that also course interoperability problems. However, this paper mainly focuses on the technical solutions (assuming that consensus has been reached already) and how technology is able to fulfill the pedagogical needs of the end users (i.e. the needs within pedagogical practice), since there is a crucial, and often overlooked, connection between the technical approach and implementation and the offered pedagogical possibilities (Paulsson, 2008).

The original intent with the Spider project was to only make the service available through a portal offering the search service, but previous experiences show that it is extremely hard and resource consuming to make users (i.e. teachers and students) find and visit a portal in order to search for digital learning resources (Paulsson, 2002). For this reason it was decided that the service should also be offered in a way that made it possible for schools to integrate the Spider into their own infrastructure – their local portal, LMS, intranet or whatever it may consist of.

The Spider project is a real case and the results presented in this paper have been applied to a national digital learning resource repository broker that now runs as a service for Swedish schools. The service was launched in april 2008. Since this paper describes a study of a real case, it also means that most of the empirical data that constitutes the basis for this paper was collected in experimental studies, mainly using rapid prototyping. Prototype implementations have then been consolidated and stabilized in order to

reach production strength and the fact that the Spider is now implemented as a national service can be regarded as a proof of concept.

There is a significant amount of research that is, in one way or another, related to the research done in connection to the Spider project. The main reason for this is not that the same things has been done several times before. The reason is instead that the work underlying the spider is based on previous research from several fields that has been combined together in order to produce an added value. Some examples are the work done within the metadata field, such as the work done by Nilsson et al (2003), describing how the Learning Object Metadata (LOM) standard (IEEE, 2002) can be represented using RDF. However, Nilsson et al. (2006) also points out some serious problems with this approach and the approach taken in the Spider project. Problems that are discussed in the final section of this paper. The work done by Duval et al (2002), in sorting out some basic metadata issues for implementing metadata for digital learning resources is also of relevance for the work presented in this paper, as well as the research on (and definitions of) Application Profiles by Heery and Patel (2000). Application profiles were used to adapt the chosen metadata standard (in this case LOM) to the specific conditions for use by Swedish schools. This adaptation was accomplished by the development of the SWE-LOM Application Profile (Paulsson, unpublished). The spider also makes use of the LRE/Melt Application Profile in order to comply to the requirements of the Melt project, to which the Spider is connected as a Swedish node.

Setting up the Spider

The Spider brokerage service was set up using several existing technologies and platforms. The basis for the service is the Standardized Contextualized Access to Metadata (SCAM) system. In short, SCAM can be described as a framework for setting up advanced LORs. SCAM is basically a framework for metadata storage and repositories. What differs SCAM from most other LOR platforms is that SCAM uses *Semantic Web technology* (i.e. the *Resource Description Framework, RDF*) for representing data (Decker at al., 2000). The main reason for using this approach was to create the conditions needed for advanced metadata management where machine processable semantics can be utilized to create sophisticated metadata driven applications that uses ontological relations described by RDF-metadata. One example of this is the *Annofolio* project where digital learning resources were connected to the school curriculum by the use of Semantic Web anno-

tations (Paulsson & Engman, 2005). RDF is also an excellent format for data exchange in addition to potentially adding semantic interoperability to the syntactic interoperability provided by XML (see Decker at al., 2000). SCAM was described in detail by Paulsson (2003) and Palmer et al. (2004).

There is a wast amount of research related to metadata and repositories and a much of the research and experience is found within the field of library science (such as in Baldonado et al., 1997; Godby, 2004; and Robertson, 2005) . However, in recent years technologies and experience from library science have been applied to LORs and the organization and management of digital learning resources (see e.g. Reichle et al., 2008; Richards et al, 2001; Paulsson, 2005; McClelland, 2003; Najjar et al., 2003; and Neven & Duval, 2002).

There is also some research that examines different issues and approaches to connecting repositories in networks that is relevant for this paper, such as research related to the *Open Access Initiative* (OAI[4]). Especially relevant is the research that focuses on harvesting metadata using OAI-PMH, (e.g. Van de Sompel et al., 2004; Warner, 2001; Halbert et al.). Other relevant research comes from the *Federation of Internet Resources for Education* (FIRE[5]) project where an approach to federated searches for LORs is suggested based on the *Simple Query Interface* (SQI) (Colin & Massart, 2006; Massart, 2007).

The Spider service builds to a large extent on the research and technologies described above. However, the Spider service adds to this work by also exploring how those technologies can be used and combined in new contexts. The Spider project also adds a couple of new technologies that were needed in order to make better use of the service and to meet the requirements from teachers. One example of this is the service federation scripts that are described in the next section.

Implementing the Spider service

As previously mentioned, the basis for the Spider service is the SCAM repository framework. The Spider service mainly uses SCAM for storing metadata that was harvested from archives in the Spider network using the OAI-PMH protocol. However, SCAM is also set up to serve as a hub for a repository federation. The federation is currently using the Fire framework (Colin & Massart, 2006; Massart, 2007). In order to support the Fire approach to federated searches a fire plug-in was developed for SCAM.

This means that each query sent to the Spider triggers two different actions: one is a search query to the harvested metadata that is stored in the SCAM and the other action is a query to the repository federation (see figure 1). These results of these two queries are then compiled and presented to the user.

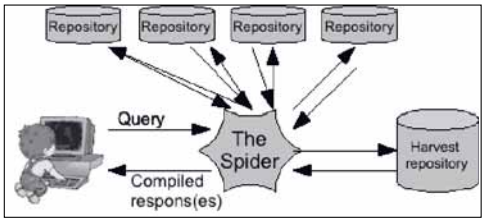

Figure 1. A schematic view of the function of the Spider service.

The Spider repository federation is currently implemented using the SQI and the *LRE Query Language*, LRE-QL (Massart, 2005b). The reason for those choices were that the development of the Spider service was partly done in connection to the european Melt[6] project where those technology choices were prescribed. Even though there may be more generic approaches and technology choices this doesn't affect the work with repository federations as a principle and this means that this choice is only relevant to a small part for the research presented in this paper and doesn't affect the overall results in more than serving as one example of several on technologies that can be used in repository federations.

The Spider services uses a the LOM based Melt Application Profile[7], and the LRE thesaurus[8] for controlled vocabularies. This choice was also made by considering synergies with the Melt project. However, the Spider also support the Swedish LOM Application Profile, SWE-LOM, and will also support the Dublin Core Education (DC-ED) Application Profile in the near future (see Sutton and Hillman, 2008). The DC-ED profile is also more suitable for use with RDF (in order to make better use of the potential of SCAM) since it is built upon an abstract model that is not document centric in the way that XML based metadata models tend to be (e.g. Nilsson, 2006; and Powell et al, 2007; Decker, 2000).

Even though the Spider supports the Melt LOM profile, the metadata reality is in general very different. The use of metadata in Swedish LORs is poor and most repositories doesn't implement a metadata standard for digital learning resources. For this reason, a subset of metadata fields was chosen to serve as a "smallest common denominator" and the smallest part of the Application

Profile that *must* be implemented in order to be connected to the Spider service. This core set of metadata (and the rest of the Application Profile) can be implemented in two different ways. The preferable way is to actually implement the right metadata set directly in the respective archives. This approach is especially urgent for repositories in the repository federation. The alternative approach that was used is metadata mapping, i.e. the existing metadata fields of a repository is translated (mapped) to corresponding fields in the Application Profile. This works to some extent, but it creates an unwanted overhead and there are cases where there are no corresponding field in the original repository, which courses the mapping to fail and the metadata to become corrupt. Bad metadata quality is also one of the biggest problems encountered in the development of the Spider service. The two most common reasons for bad metadata quality was incompatible metadata models (i.e the wrong model or failure to map metadata) and missing or incomplete metadata. There was also a certain amount of erroneous metadata due to human errors or plain negligence. Poor metadata quality is a problem that is hard to handle since it affects the overall quality of the whole brokerage service. If the accuracy of the response to search queries is low, users will soon loose faith in the service and ultimately stop using it and there are only a few chances to gain users confidence. The conclusion of this is that it is extremely important that standards for metadata and common Application Profiles, vocabularies and taxonomies are used and that metadata quality is secured. Preferable on the single archive level. To achieve this it must be made easier to index resources and it is therefore an urgent need for better and more flexible metadata tools. Metadata may also be managed at different levels where there are formal, but also less formal, "layers" of metadata where metadata can be added by other users than trained indexers, for example by teachers and students (Paulsson, 2007). An alternative (or rather complementary) approach to manual indexing is automatic indexing. Automatic indexing may work fairly well for some types of resources (See Olivié, 2002; Cardinaels, 2005). However, machine indexed metadata still needs a high degree of manual supervision. Alternatively, when turned around automatic metadata generation methods can be used for automatization of the evaluation of metadata quality as described by Ochoa & Duval (2006). Automatic indexing and automatic evaluation of metadata quality are areas that are candidates for further exploration in future research.

While the choice of SQI makes the Spider rather flexible, since it doesn't prescribe neither the

data format to be used, nor the query language (Massart, 2006), the choice of query language can potentially be a limiting factor. Previously to using the LRE-QL, the *Simple School Query Language* (S2QL) was used and the result sets were instead expressed using strict LOM. The use of S2QL and its simple semantic abilities limited the search quires to a smaller set of metadata fields (keywords, age range, and language), which in turn affected the search ability and the potential for filtering of relevant resources in a negative way, i.e. providing a less fine-meshed and flexible service. Even though the LRE-QL is a more complete choice of query language, it is still limited to the context of querying LOM-based metadata. This becomes a limiting factor since the SCAM repository and the Spider natively supports RDF and by that have the potential to support other types of more sophisticated query languages. An alternative approach would be to use a query language that is adapted for querying RDF data, such as the *Simple Protocol and RDF Query Language* (SPARQL) (Prud'hommeaux, 2008). The use of SPARQL would enhance the power and the flexibility of the service since SPARQL enables direct queries of RDF graphs and enables the return of RDF graphs as result sets for further processing of the search result. These are qualities that would be useful for connecting the Spider LOR network to services like the Annofolio and the swedish annotated curriculum (Paulsson, 2005a). However, in order to gain the full advantage of an approach using SPARQL the metadata in the connected repositories and in the Spider need to be represented using RDF. This is not the reality right now but might very well be so in the future. Alternatively, a part of the metadata (some layers) could be represented using RDF. This would not be a perfect solution, but it could at least provide some possibilities for utilizing machine processable metadata semantics.

Another interesting (and possibly complementary) approach would be to explore the work done within the Search/Retrieval via URL (SRU) initiative (see e.g. McCallum, 2006; and Sanderson et al., 2005). Sanderson et al (2005) makes a comparison of the SRU/W and the OAI protocols, and points out several synergies that are relevant to the future of the Spider and for make a better combination of harvesting and federation. It has become quite clear during the project that complexity should be avoided as far as possible. For each archive that is added (especially to the federation) the complexity increases and errors within one repository may multiply and spread to the brokerage service. This has for example been the case with character encoding,

for which UTF-8 should be used, but this was not always the case when it came to practice. For this reason, the brokerage service is more likely to succeed when starting out with only a few simple standard- and consensus based rules for data formats, communication protocols and metadata, based on solid and reliable technologies, rather than trying to solve everything from the beginning using complex and sophisticated technology. It is better to develop the service in an evolutionary way over a longer period of time in order to avoid problems that are related to complexity.

One of the most important issues that was addressed in the Spider project was the issue of how users should be able to interact with the service in the most suitable way and from their own point of view. Previous experience, such as from the Swedish schoolnet (Paulsson, 2002), has shown that it is very hard, as well as inefficient, to try to reach teachers via websites or portals that they are expected to visit in order to use the service. A combined approach was chosen for this reason and the approach was combined in so far as that the Spider service was exposed via a portal, but the same service was also exposed via a simple JavaScript API, called the SCAM JavaScript Syndication (SCAM JSS), which was implemented as a plugin module to SCAM. See listing 1. The basic idea of the SCAM JSS was to let anyone implement the Spider service in a simple way on any webpage, portal, LMS intranet or any other web based environment in good "Web 2.0 spirit". Hence, the spider is developed to be a service for inclusion in mashups that in its way is a merge of Web 2.0 technologies and ideas and concepts from the Semantic Web (see e.g. Ankolekar, 2007). In fact, the SCAM JSS is also the technology that is used to build the service on the official Spider portal at the Swedish schoolnet. An interesting effect created by this approach is that all updates to the service will get immediate impact everywhere without any additional work on the local level.

Alternative approaches to the SCAM JSS syndication was also discussed, but ease of use was the first priority for the Spider service and so far the SCAM JSS is the most simple solution (even though it is not the most powerful) to use for implementing the service locally. The only requirements for implementing the Spider service when using SCAM JSS is to cut and paste five lines of code to the <HEAD> of the webpage where the service will be exposed, plus six lines of code where the search form and search results shall be exposed on the webpage (side listing 1). The syndication feature of the

```
<head>
    <link rel="stylesheet" type="text/css" href="http://spindeln.iml.umu.se/spindeln/ext/resources/css/ext-all.css" />
    <link rel="stylesheet" type="text/css" href="http://spindeln.iml.umu.se/spindeln/css/spindeln-plugin.css">
    <script type='text/javascript' src='http://spindeln.iml.umu.se/spindeln/ext/adapter/ext/ext-base.js'></script>
    <script type='text/javascript' src='http://spindeln.iml.umu.se/spindeln/ext/ext-all.js'></script>
    <script type='text/javascript' src='http://spindeln.iml.umu.se/spindeln/js/spindelnResult.js'></script>
</head>

…

<body>
    <div style="width: 262px;"> <script> var xSrc="http://spindeln.iml.umu.se/spindeln/fireplugin/default-
event.action?  render=spindeln-simple&single=true&dest="+escape(location.href); document.write("<"+"script
src="+xSrc+"><"+"/script>");
    </script>
    </div>
</body>
```

Listing 1. An example of the SCAM JSS as it may be used on a web page.

Spider is frequently used and most common is to implement it at the municipality level or at regional media centers. This means that it will reach the users in their own virtual learning environments instead of relying on users visiting a portal. This approach is likely to have increased the use of the Spider service.

The next steps for the Spider will focus on enhancing the metadata quality. This is a complex task since it requires enhancements at repository level, which is technically out of our control as a service provider. At the same time this enhancing the metadata is important in order for the service to survive in the long run. This is especially important since one of the advantages of a structured and metadata based approach together with a brokerage service is the ability to add additional services that builds upon the brokerage service, such as with the Annofolio (Paulsson & Engman, 2007)

Other enhancements that have priority and that need to be addressed in future research are related to the syndication, both by enhancing the SCAM JSS functionality and by providing a more advanced alternative that utilizes the REST architecture in the upcoming version (4.0) of the SCAM framework (Fielding, 2000). It is important that the service is able to provide

an alternative API that is more advanced and built on a more solid technology base in order provide access to all existing and new functions that is/will be provided by the service. In parallel, there is also a need to further explore alternative approaches to federation and alternative query languages that can help in making the service more flexible.

It is likely that we will see several services in the future, which build upon similar principles, and that target schools in order to become a part of their learning infrastructure (Paulsson, 2008). The Spider service is provided as a module for inclusion in schools learning infrastructure. However, schools will be able to utilize the full potential of services, such as the Spider, first when their infrastructures becomes modular and it becomes possible to pick and chose from a pool (or toolbox) of services in order to assemble the virtual learning environment needed for a specific pedagogical purpose – in many ways quite opposite to the silo-like learning platforms that are in use today (Paulsson, 2008; Downes, 2002).

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Footnotes

1 Digital learning resources are sometimes referred to as Learning Objects. Learning Objects are regarded as a specific subtype of digital learning resources in the context of this paper, as discussed by Paulsson (Paulsson, 2008).

2 Repositories for digital learning resources are often referred to as Learning Object Repositories (LOR), a term that will be used in this paper henceforth.

3 Spindeln is the Swedish name of the project.

4 http://www.openarchives.org/

5 http://fire.eun.org/

6 http://melt.eun.org/

7 http://info.melt-project.eu/ww/en/pub/melt_project/melt_content_audit.htm#AP

8 http://insight.eun.org/ww/en/pub/insight/interoperability/learning_resource_exchange/metadata.htm

Do teacher training students experience that video feedback support reflections of their teaching skills?

Tor Söderström

Abstract

This paper investigates the notion of video recordings as a device for stimulating reflection on teacher training students' teaching skills. The argument is based on a two-year long student-centered video feedback project. It is suggested, that the adoption of video recordings as a method for creating reflections among teacher training students may be misleading. It is argued that, without careful course design, the effect from video recordings might only lead to an immediate feedback on students' performing self and do not call for reflection about the students' teaching. Using video projects follows popular discourses about learning and pedagogical methods while, at the same time, masking the fact that it may fail to live up to these ideals.

Introduction

To learn what to teach, when to teach it, and how best to do so is a critical component of good teaching (Schrader et al. 2003, p. 319). One important basis for teacher training students to integrate theory and practice and develop good teaching skills has been the teacher training practice periods (school-based studies). Nowadays, user-friendly technology makes it possible to also use video recordings in teacher education to facilitate students' integration of theory and practice. From a general perspective, motives for using video in education have varied from instructional purposes, e.g. to introduce a topic and to stimulate discussion (Houston, 2000) to use it in settings that mimic life situations (e.g., Cannings & Talley, 2002; Nemirovsky & Galvis, 2004), and to using video as an explicit way of giving feedback on students performance (Engel, 2003*;* Sörensen, 2003). The use of video is often connected to cases because it is assumed to strengthen the case methodology approach. It gives a sense of the act of teaching fostering, a 'how it feels to be in the situation' feeling, in comparison to text-based

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accounts (e.g., Nemirovsky & Galvis, 2004, p. 67). Fong and Wodruff's study on teachers' professional development (2003, p. 195) suggests similarly, that exposing teachers to video models of exemplary practice is a more powerful and efficient form of professional development than text alone (similar results are also expressed by Cannings & Talley, 2002; Copeland & Decker, 1996; Schrader et al., 2003). The use of video recordings is also claimed to enable students to reflect on their teaching because of the possibilities of rewinding and replaying sections alone or during discussions (e.g., Cannings & Talley, 2002; Dolk, Hertog, Gravemeijer, 2002; Hung, Tan, Cheung & Hu, 2004).

> *Sustained, repeated explorations of classroom instructional scenarios and best practices appear to enable students to understand the levels of complex decision making involved in real classroom situations* (Schrader et al., 2003, p. 323)

In this article, I will focus on whether physical education (P.E.) teacher training students experience that feedback from video recordings support reflections of their teaching skills. The analysis made in the article rests on a two-year long student-centered video feedback project in P.E. teacher education courses. The aim of the video project was to develop a virtual environment facilitating the integration of theory and practice in teacher training courses. The project focused on developing opportunities for reflections and discussions about authentic teaching situations to deepen learning.

As a way of addressing whether P.E. teacher training students experience that feedback from video support reflections of their teaching skills, I will first report data from P.E. teacher courses. Second, I analyze and discuss the notion of video recordings as a device for stimulating reflection on teaching skills.

Theoretical framework

Reflection is assumed to foster deeper learning. It can, as Hellison and Templin claim, vary from the analysis of beliefs in relation to actions, to instructional techniques necessary to achieve the objectives (Hellison & Templin, 1991). Dewey emphasizes that reflection involves a 'consecutive ordering in such a way that each determines the next as its proper outcome, while each in turn lean back on its predecessors' (Dewey, 1910, p. 2-3). Reflective thought is then 'active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it, and the further conclusions to which is tends' (Dewey, 1910, p. 6).

Mead suggests in a similar way that the basis for reflection is self-consciousness, and makes possible the purposive control and organization by the individual organism of its conduct, with reference to its social and physical environment (Mead, 1934, p. 91)

In order for reflection to take place is a felt difficulty, which can be based, for instance, in anything consciously employed as signs such as gestures, visual images, monuments etc (Dewey, 1910, p. 170-171). As Dewey suggests that a felt difficulty is necessary for reflection, Schön similarly claims that we are most likely to initiate reflection when we are dissatisfied with our performance (Schön, 1983). Schön's thoughts on reflection give us a more elaborate view. Schön turn against the technical rationality model and claim that instrumental adjustment of means to ends only based on scientific knowledge cannot fully explain and give understanding to professional knowledge. Schön uses two concepts to understand reflection; "reflection-on-action" and "reflection-in-action". Reflection-on-action follows the ideas from Dewey as it is about reflection on the past; what happened in the last game, why we acted as we did in specific situations etc. Reflection-in-action is about thinking about what we are doing while doing it. It is, as Schön puts it, about testing theories to develop further responses and moves and we cannot always rely on technical rationality since we have to connect prior understanding, feelings, intuition, tacit recognitions, judgments to theories in use creating new understanding and change in the situation.

> *Reflection in action, in these several modes, is central to the art trough which practitioners sometimes cope with the troublesome "divergent" situations of practice* (Schön, 1983, p. 62)

In this article, I will use Schön's concept reflection-on-action and reflection-in-action as an analytical framework for understanding the students' experiences of video recordings as a device for stimulating reflection on teaching skills.

The project

The project approach was inspired by theories and perspectives, which regard the learner as an active and reflective agent. These include, for example, constructivist ideas about learning as a process of creating meaning (e.g., Jonassen, Peck & Wilson, 1999), or the participation idea that learning relates to knowledge creation and identity formation through sharing - or mediating - meanings (e.g., Sfard, 1998; Wenger, 1998). The project was about letting students work with

video-assignments where they needed to select and capture meaningful situations from their practice (cf., Davies 2002). The video assignments were used in two courses followed by each other (see Söderström, Tärnklev, Andersson, Mikaels & Lundberg, 2004 for a more detailed description of the project).

In the first course, the physical education methods course (PE), students produced instructional film sequences (2-4 minutes): The students filmed each other and instructed on how to learn hammer throwing, floor ball etc. The students worked in groups consisting of 4 to 5 in each group. In the second course, the teacher training course, students worked in pairs in schools and filmed each other as they taught school pupils, e.g. starting up a lesson, giving feedback or instructions. Since it is problematic, from an ethical point of view, to record pupils the video recordings focused on the teacher training students' performance.

In both courses, students edited their film sequences and uploaded them to a database, which was available for only the student group and the university teacher. The film sequences were followed up at the end of the course and collectively reflected on in groups of 8-10 students moderated by a teacher. The perspectives from peers and teachers were assumed to reinforce performance and to lead to deeper learning. (cf., Davies 2002; Dysthe, 2003; Schrader et al., 2003). Both courses lasted for ten weeks and work with video cases was spread out during the courses. The students worked for approximately one and a half weeks in both courses on the video feedback theme.

In this article, results from two student groups are reported. Questionnaire data were collected from two courses (some of the results have been previously published in Söderström et al., 2004; Tärnklev, 2005). In student group A, 36 students participated (response rate 92/89%) and 44 students in student group B (response rate 93/61%). Table 1 illustrates the response rate.

Table 1 Questionnaire responses

Student group	Course	
	Methodology	Teacher training
A	33	32
B	41	27
Total	74	62

Evaluation of both courses was conducted with questionnaires. In this article, I will focus on the students' responses on how they related video feedback to their reflections and learning, etc. Answers were given either by grading statements on a five-point scale or by choosing one 'best fit' alternative, in most cases with the possibility of open-ended comments. Since the questionnaires were relatively extensive, they have not been translated and enclosed in this document.

Findings

The results showed that the students' motivation to work with film tasks were higher during the PE methods courses. The numbers in the tables and figures illustrate how many students that judged the statements to be 4 or 5 on a five-graded scale.

Table 2 shows that during the PE methods course, both student groups in higher extent thought that it was fun, easy, and meaningful.

The results show further, that group B judged that they were more motivated to work with video feedback during the PE methods course than during the work practice period. Overall, student group B replied more positively to both courses. The answer to the question whether working with video feedback motivates students to spend more time on their own learning showed that approximately 35 percent of the students in both groups thought that it motivated their learning. A majority of the students thought that working with film influenced them to think about pedagogical models and methods, except for student group A during the teacher-training course (31%).

Table 2 Percentage of how many students agreed on that it was fun, easy, and meaningful to work with video and if they were highly motivated.

	If it was fun		If it was easy		If it was meaningful	
Group	Method course	Teacher training course	Method course	Teacher training course	Method course	Teacher training course
A	84	37	57	37	69	44
B	100	60	50	32	93	74

Nearly all students in both groups and in both courses valued watching themselves and other students perform as teachers (e.g., Tärnklev, 2005).

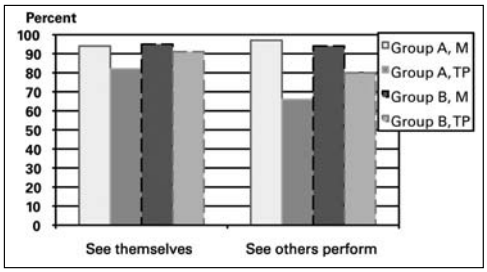

Figure 1. Percentage of how many students valued watching themselves and other students perform as teachers.

The figure illustrates that for both groups, the value of watching others perform declines during the PE teacher training course, whereas the value of watching oneself is the same in both courses. The students' answers on the question if they think that learning can be supported by working with video illustrate differences between the courses. An analysis of the 69 answers in the PE methods courses showed that approximately 20 % of the students expressed reflections that were categorised as having an impact on developing the students' teaching. Following answers illustrates this:

What you get is a totally different type of feedback on how you perform as a teacher
The way I see myself as a teacher deepens
Thinking of how to do things in order to be more instructive
It has made me think of how our teachers instruct.

No answers from the PE methods courses highlighted that comments from peers had been helpful.

In the teacher-training course, nearly 35 % of the 57 students' answers to the question whether learning can be supported by working with video were categorised as having an impact on developing the students' teaching. One student said that *you can see how you act in the teaching situation, and it can be troublesome to get an appreciation only based on one's own feeling of the teaching situation*.

A few answers from the teacher training practice course highlighted that comments from peers had been helpful. One of the students expressed, for instance, that it is a good way of discussing alternative ways of acting in different situations.

The differences between the courses are also shown in the students' comments on the question of which advantages they experienced in working with video during the courses. In the PE methods course, the answers are mainly oriented to the value of how to make movies technically, and that they thought it was fun. In the teacher-training course, 35 % of the students' answers were oriented to that video recordings are useful tools in order to critically judge their teaching performance.

When asked about the type of knowledge and skills the students thought the film-task stimulated, nearly all of the students thought that the course had encouraged them to understand, critically review, to take a stand and to develop their own personality. Only four students (n=74) during the PE methods course and four students during the teacher training course (n=62) thought that it was merely knowledge of facts the course and film-task have encouraged them to acquire.

Discussion

In previous papers from this project, there has been suggested that video recordings can be an instrument for supporting P.E. teacher training students to reflect on their teaching (e.g. Söderström et al, 2004). This study also shows that the students believe that feedback from video recordings support reflections of their teaching skills. The students thought the film-task stimulated, and encouraged them to understand and critically review their work. However, the experiences from the project can also be understood differently. The results suggest that the students thought it to be funnier, easier and more meaningful to work with video during the first PE methods course. This can be explained by the fact that in the teacher training course the students worked in smaller groups (reduced peer support), were spread out over different schools and did not have the same opportunity to immediate feedback from teachers and ICT support. Even though it is not as fun and more difficult to work with video assignments during the teacher-training course, the students' value to watch themselves and other students perform as teachers. However, the analysis of the students' answers to the question of if they think that learning can be supported by working with video show that a minority of the answers were categorised as having an possible impact to develop the students' teaching. In Dewey's terms, only one third of the reflections are truly educative (e.g., Dewey, 1910). One possible explanation for this is that the students might not experience any problems to be solved or any difficulties in their actions in

the videos recordings (e.g. Dewey, 1910). This may make the students only see how they act and look and not make any active, persistent, and careful considerations of what they did (cf. the performing self, Featherstone, 1994). This focus on themselves might also be one explanation to why opinions from peers do not seem to be of any importance in helping the students to reflect on their teaching.

In conclusion, the experiences shown by the P.E teacher students in this study are not any strong evidence of reflection-on-action. This indicates that an unreflective use of video assignments in teacher education will not stimulate an educative reflection-in-action. A careful course design is needed in order to avoid the mistakes made in this project and help the students to reflect on their teaching in such a way that it can develop their teaching. Otherwise, it is easy for students to feel that they act satisfactorily, which in Schön's terms brings reflection temporarily to a close (Schön,. 1983, p. 280) Even though there are not as many truly educative reflections as expected, there is a difference between the PE methods course and the teacher-training course worth mentioning. The students' reflections are deeper in the second course, the teacher-training course, which can be explained by it taking place in actual school situations. This indicates that it is of importance to consider how it feels to be in the situation feeling, in the course design process. Further, the teachers and their peers enable the uncertainty and dissatisfaction needed for reflection to happen. In order to have an educative reflection-in-action, for instance, how student actions influence pupils, teachers and peers in the follow-up seminars have to give comments on the student performance that may, in Schön's terms, lead to reflective-on-action that enables deeper reflection in action in the future. In this project, the results suggest, that teachers and peers have failed in asking the questions that might help the students to start reflecting since the students do not mention it to be of importance. Careful discussion themes are needed for leading the discussions since the visual signs in the video recordings in much higher extent than written texts turn the focus to the individual appearance.

Finally, in this article it is suggested that the adoption of video recordings as a solution for creating reflections among students may be misleading. Without careful course design, the effect of the video recordings might only lead to an immediate feedback on the students' performing self and not call for reflection about the students' teaching. Using video projects follows popular discourses about learning and

pedagogical methods while, at the same time, masking the fact that it may fail to live up to these ideals.

Acknowledgements

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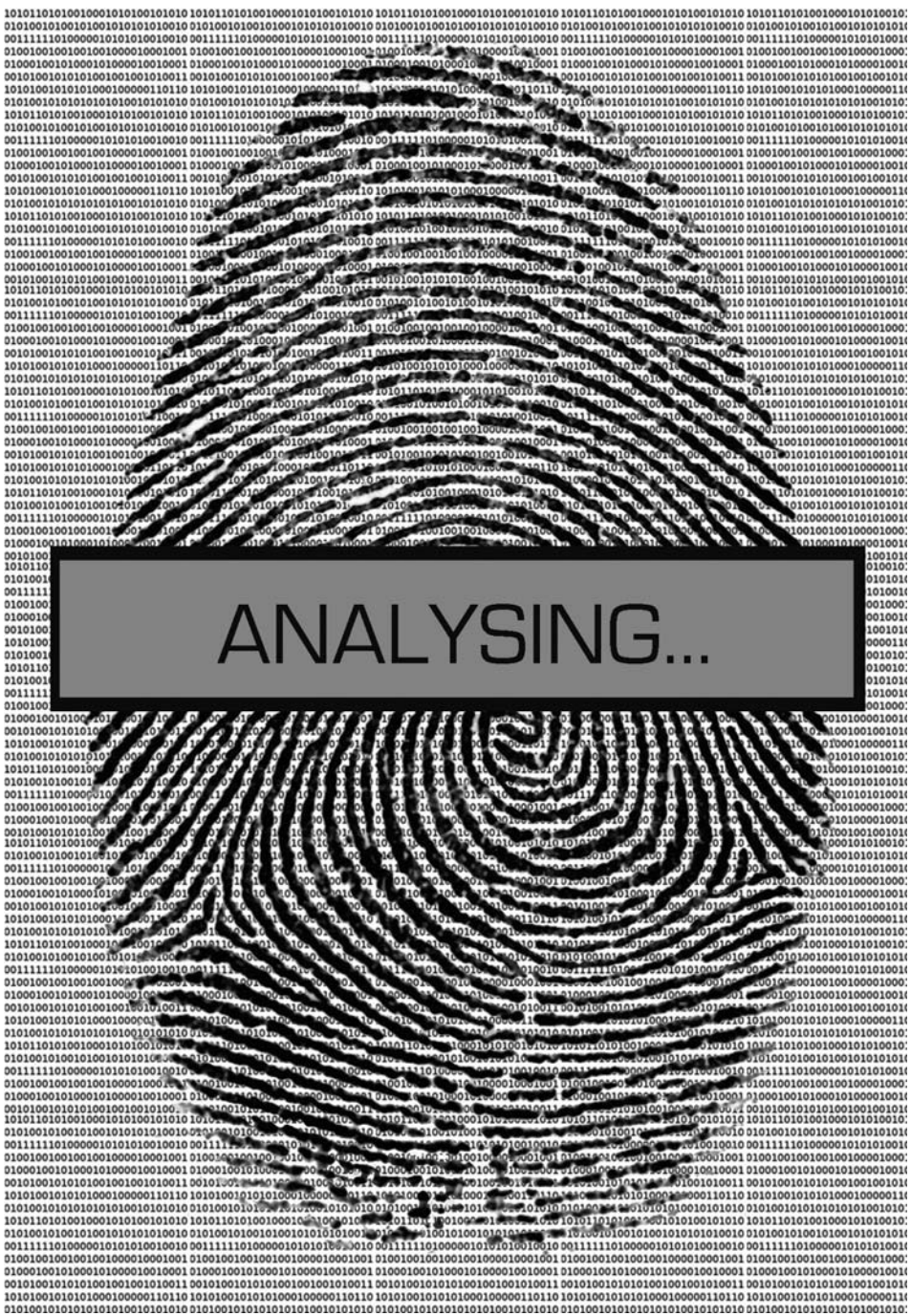
ANALYSING...

Who is Who and doing What in distance education?

Authentication and keystroke dynamics

Hakim Usoof and Eva Lindgren

Abstract

This paper presents a study of computer based text development processes performed by ten native English language writers. The aim of this study is to analyse the text development process at a micro-level using a computer to explore whether unique keystroke patterns exist that can be used to identify individuals and different writing tasks. Keystroke logging techniques have been used together with fuzzy-logic comparison engines to identify unique keystroke patters across different tasks. Results indicate that patterns can be defined that are stable within writers but different between writers. Finally the paper suggests future improvements to the comparison engines and discusses ethical issues that need to be considered if such an identification mechanism were to be introduced into online assessment systems.

Introduction

Authentication of a student's text that has been developed using a computer in a non-proctored environment, in distance education, has been a major reason against the use of such texts as means of assessment. Even though many computer hardware solutions have been suggested, they have not been successful in addressing all of the concerns of authentication. Thus, the most common way of assessment for the purpose of accreditation in distance education is still the proctored examination. The growing need for and the interest in distance education and the importance of assessment highlights the need to focus on an effective assessment method in distance education (Thorp 1998).

In this paper we investigate the use of keystroke dynamics for the purpose of authentication of computer-based written assessment. A combination of techniques, common in computer security as well as in writing research are used to

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examine their potential as tools for authentication of students as well as the text they develop for the purpose of assessment. The study aims to examine the existence of a unique keystroke (typing) pattern that may be used as a biometric identifier of an individual over a varied set of writing tasks.

The development of a text involves a continuous process of writers printing letters or pressing keys on the computer keyboard, pausing (Matsuhashi 1982, Spelman-Miller 2006, Ransdell *et. al.* 2001) and revising their text (Sommers 1980, Flower & Hayes 1981, Lindgren & Sullivan, 2006). When writers use the computer these patterns can be recorded in detail through keystroke-logging techniques (Spelman-Miller & Sullivan 2006, Eklundh & Kollberg 2003, Schmidt 2005), and thus these logs can be used for the study of individual writers' keystroke dynamics and their pause and revision patterns during the development process of the text.

Previous studies by Bleha *et. al.* (1990) and Monrose & Rubin (1997,2000) have shown that an individual keystroke dynamic patterns can be unique to that particular individual and therefore such patterns can be used as biometric identifiers. However, Bleha's and Monrose's studies included short and automatically retrieved phrases that were retyped several times. Thus, the studies did not include entire text compositions, which involve higher levels of cognitive processing during the writing process. In this study, we investigate the possibility for a detailed keystroke dynamic profile to be present and stable during a number of different writing conditions.

Previous studies on writing have shown that different writing tasks, such as descriptive, argumentative and copy tasks, show different patterns of pauses and revisions (Lindgren & Sullivan 2002, Olive & Kellogg 2002, Olive & Piolat 2002, Eklundh & Kollberg 2003, Olive 2004). Different text types, conditions and medium, cause variation in cognitive load, structure and development processes (Van Waes & Schellens 2003). In the development process of the text to be assessed, a student may also write chunks of memorised text. Furthermore a student may also paraphrase and copy text from both soft and hard documents, acts that are seen as major authentication issues in the assessment of non-proctored student work (Rovai 2000, Melissa 2002, Weller 2002).

The implementation of such a technological solution from research to directly solve the prob-

lem of assessment in distance education could be taken as an example of case where research is directly used to solve a real world problem.

Aims

The aim of this study is to investigate whether unique micro-level keystroke patterns can be identified that are stable within writers across different writing tasks.

Method

Overview

For the purpose of this study, we have considered four different types of writing tasks that may take place during the process of developing a text for the purpose of assessment.

- Descriptive writing
- Argumentative writing
- Writing text from memory
- Copying text from another source

Ten adult native English writers composed texts in their first language in the four conditions. All the writing sessions were observed through keystroke logging techniques (Inputlog, Van Waes & Leijten 2006) and analysed according to transition time between keystrokes (Wengelin 2002, Nottbusch 2005) and pauses (Wengelin 2006). Thus, the analysis includes *micro-level* analysis of pauses defined according to keystrokes involved in each transition.

Subjects

All writers were native English speakers as well as experienced academic writers. Their experience of the computer as a writing medium ranged from 8 to more than 20 years. The writers' ages ranged from 31 to 64 years. Five writers were male and five were female.

Task

The four tasks were given to them in random order to control for effects one task may have on another one.

In the descriptive task, the participants were requested to describe in detail the way they took to get to their workplace on that particular day (c.f. Eklundh 1994): "Describe with detail the way you took to get to your work place. Your description should be in such detail that a person who is unfamiliar with the area should be able to follow it to get from your home to your work place. There is no time limit. Let me know when you have finished."

The argumentative task consisted of a letter to a programme director (c.f. Alamargot *et. al.* 1999). "A television network company is plan-

ning to pull the plug on your favourite program. The main reason is that – according to the directing committee - not enough people watch the program. Write a letter to the program director to convince him not to stop. There is no time limit. Let me know when you have finished." In addition to these instructions, the participants were also provided with the following information.

- write your letter to: Ms. Annie Wegelius, program director
- choose a program you like very much
- you heard about the discontinuation of the program in an interview with the program director last night on the radio
- the program will be stopped within four weeks

The participants were given a template that was required to write the letter.

The copy task involved copying text from a hard document (Olive 2004). The writers were provided with the following instructions. "Here is a document. The task is to retype this document. There is no time limit. You could keep the document in a position comfortable for you." This task only consisted of copying text from a hard document due to the fact that any 'copy and paste' action from a soft document by the writer would simply show up as a block of text with no corresponding logged keys and therefore would not require any special effort to identify such an action.

The memory task was to write down a memorised text and the writers were provided with the following instructions. "Write a rhyme, song or any other text that you have memorised".

Apparatus and Material

The participants were allowed to use their own display, keyboard and mouse that they normally use in order to control for effects of the writers having to physically get used to new hardware. The same notebook computer with 1.5GHz Intel Centrino processor, 512MB of main memory, Microsoft Windows XP SP2 and Microsoft Word 2003 was used for all the writers to control for any effects of the software and hardware on the measurement of time during the keystroke logging process and to avoid software crashes and conflicts during the writing process. The software Inputlog 1.4 was used for the process of logging keystrokes. The hardcopy text used for the copy task was prepared to include as many keystroke combinations as possible with independent and unrelated sets of sentences. This was undertaken in order to avoid writers

assuming the next sentence without referring to the text being copied. The text developed using the font type Times Roman sized 14 pt. (Bernard *et. al* 2001) and double line-spaced for the ease of reading.

Procedure

The experimental procedure involves the following steps. First the general instructions were provided to the participants beforehand. The participants were also informed beforehand about the 'memory to text' task and they were also informed that the memorised text should consist of at least five sentences.

The study was conducted in the writers' own office rooms using their own displays and in most cases, their own keyboard or a comparable keyboard to control for effects of environment. The same computer was used in order control for effects of hardware and software on the results.

Prior to each of the four tasks, InputLog was launched and the parameters were set. On completion of this, InputLog launched Microsoft Word. The instructions for each task were read out loud and printouts with the same instructions were given to the participants. Then the logging process was started. Once completion of each task, the logging process was stopped and the MS Word document was saved for later analysis. There were no time limits for any of the tasks and the task order was randomised between participants.

Data selection and Analysis

The data selected for the analysis were restricted to motor-related pauses that occurred between the most commonly used bigrams in the English language.

We define motor related pauses as pauses between 0 and 250 milliseconds. A majority of the writers' pauses, 75 percent, occurred within this span. These pauses are thus assumed to be related to motor activity, when writers' fingers move automatically between keystrokes, rather than to cognitive activity.

In order to define the most commonly used bigrams in the English language 4,55 million bigrams were analysed form a corpus of 120 news articles, 10 research papers and 5 books. All bigrams with a frequency of occurrence of above 0.5 percent, a total of 56 bigrams, were included in the analysis.

A Fuzzy Logic Engine was designed and a software programme was created in order to anal-

yse one writer's text with other texts that had been written by the same writer or by a different writer. The deviation from the mean pause value for each bigram and the deviation from the standard deviation value for each bigram were used to calculate a "likeliness" value for each bigram and then averaged across the most common bigrams to create a "likeliness" value for the compared text. The output of the fuzzy engine was used to;

1. Compare different tasks by the same writer.
2. Compare a text between different writers.

The rule base used by the fuzzy engine is given below, where VH stands for Very High, H stands for High, AV stands for Average, M stands for Medium, L stands for Low, VL stands for Very Low, and Z stands for Zero.

		Deviation from mean				
		VH	H	AV	L	VL
Deviation from Std. Dev	Z	VH	VH	H	AV	L
	L	VH	VH	H	L	VL
	M	VH	H	L	VL	VL
	H	AV	AV	L	VL	VL
	VH	L	L	VL	VL	VL

Figure 1. Fuzzy Rule Base

The following models depict the way the fuzzy logic engine was used to conduct the comparisons.

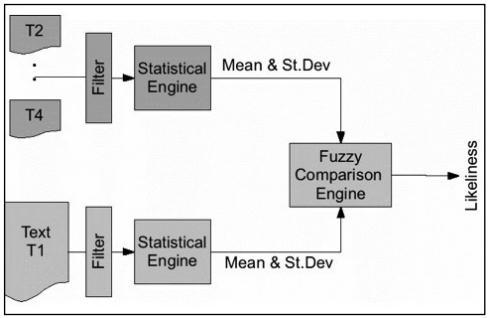

Figure 2. Analysis Engine to compare tasks within writers.

Figure 2 depicts how the Analysis engine compares Text T1 of a writer with Text T2, Text T3 and Text T4 produced by the same writer. In the above example, Text T1 is passed through a filter to filter out cognitive pauses. Next the filtered data is passed through a statistical engine to calculate statistical mean and standard deviation of pauses for each of the 56 bigrams. The same process is repeated for Text T2 and the statistical mean and standard deviation of pauses for each of the 56 bigrams are calculated. The data of Text T1 and Text T2 are passed through the Fuzzy Comparison engine to calculate the "Likeliness" value, which refers to "how likely is it that Text T1 and Text T2 are developed by the same writer". This process is followed for Text T3 and Text T4 to calculate the likeliness value for Text T1 and Text T3, and Text T1 and Text T4. Similar to Text T1, Text T2 is compared with Text T3 and Text T4, and Text T3 is compared with Text T4.

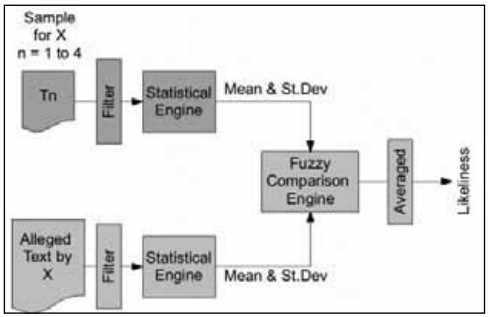

Figure 3. Analysis Engine to compare text between writers.

Figure 3 depicts how an alleged text by a writer is compared with known texts of the same writer. In the above example, the alleged text by the writer is first passed through a filter to filter-out cognitive pauses. Next the data is passed through a statistical engine to calculate the statistical mean and the standard deviation of pauses for each of the 56 bigrams. The same procedure is repeated for the Text T1, T2, T3 and T4 of the alleged writer. Next the data of the alleged text and the data of the four known texts are passed through the Fuzzy comparison engine to calculate four likeliness values. These four values are averaged to create an average "Likeliness" value that would give an idea of whether the alleged text is developed by the same writer or not.

The above Analysis engine in Figure 3 was used in a different manner during the analysis of the data gathered. During the analysis, each text of "Writer 1" was compared with the other three texts of all ten writers including "Writer 1". For example the text of task T1 would be compared with texts of tasks T2, T3 and T4 by the same writer and the other writers. The reason for this was that a fifth text was not obtained from the writers for comparison.

Results

WRITER	T1 vs T2	T1 vs T3	T1 vs T4	T2 vs T3	T2 vs T4	T3 vs T4
1	66.8	84.8	74.7	68.2	61.2	68.3
2	59.8	79.4	58.6	73.6	63.7	65.6
3	62.5	66.8	71.2	73.5	63.1	55.8
4	71.7	72.9	68.0	77.1	66.3	73.6
5	67.4	67.1	37.8	74.4	44.0	48.0
6	63.7	68.9	54.8	75.5	80.1	62.3
7	70.7	66.7	68.0	72.3	66.8	63.7
8	71.4	79.1	67.7	76.7	65.0	72.8
9	63.7	74.3	65.8	68.0	68.1	74.1
10	53.9	49.4	55.7	70.8	46.4	62.2

Table 1. Likeliness (in percentages) for comparison within writers and between tasks

Table 1 presents the likeliness value of one text being compared with the rest of the texts by the same writer. According to the above results the Analysis engine depicted in Figure 2 achieves likeliness values of above 65 percent , 67 percent of the time and values above 60 percent , 82 percent of the time. In general a high value of likeliness is shown when a text by a writer is compared with other texts by the same writer. This shows that a consistent pattern exist within writers and between tasks. The likeliness value is particularly high when T1 is compared with T3 and T2 is compared with T3. The reason for this scenario could be that T3 is a considerably long text and T1 and T2 texts are also of substantial length.

In comparison to the above high likeliness values, the Analysis engine in Figure 2 shows a likeliness value of below 50 percent, 8 percent of the time. These low likeliness values are observed in many of the comparisons with the T4 texts, which are the memory task texts. Examples of this are the likeliness values of T1 vs. T4, T2 vs. T4 and T3 vs. T4 for "Writer 5" where the size of the text of task T4 is only a few words. Furthermore low likeliness values are observed across "Writer 10", which could be due to the fact that the texts of "Writer 10" are very short in length.

WRITER	T1	T2	T3	T4
1	72.2	68.7	72.8	68
2	40	32.9	38.3	43
3	38.6	35.6	34.5	27.4
4	46.5	47.6	49.3	46.4
5	48.7	44	44.3	58.2
6	51.1	50.2	50.8	49.4
7	50.9	48.9	57.1	50.5
8	60.1	61.2	60.9	70.8
9	60	55.3	56.3	49.5
10	46.8	48.1	39.9	43.8

Table 2. Likeliness (in percentages) for comparison between other writers and "Writer 1"

Table 2 presents the likeliness values for comparison of "Writer 1" and the other writers. According to the above results the Analysis engine depicted in Figure 3 achieves positive identification with a likeliness value of above 68 percent for "Writer 1". The Analysis engine shows likeliness values of below 50 percent, 61 percent of the time. While it gives a false-positive identification likeliness values of above 60 percent, 14 percent of the time. This is quite visible in the likeliness values calculated for comparison of "Writer 1" with "Writer 8". The reason for this could be that the analysis engine is not sensitive enough to pick up subtle differences between writers. Furthermore, likeliness values may vary from negative identification to false-positive identification when the size of the text is small. A similar scenario to "Writer 1" can be observed during the comparisons for the other nine writers.

WRITER	> 95%	95% - 90%	90% - 85%	85% - 70%	70% >	Not compared
1	10	5	6	10	24	1
2	7	5	2	7	17	18
3	11	3	2	7	28	5
4	10	9	4	9	22	2
5	15	1	3	10	22	5
6	9	3	5	11	23	5
7	10	1	2	6	27	10
8	12	3	6	7	19	9
9	8	5	1	12	29	1
10	3	0	3	6	18	26

Table 3. Bigram Stability for different writers

Table 3 presents the bigram stability for different writers. Bigram stability can be explained as how stable a bigram is across different tasks by the same writer. One key observation is that the number of highly stable bigrams varies between writers. An example for this is while "Writer 5" has fifteen bigrams, which are above 95 per cent stable; "Writer 2" has only seven. Another observation is that even though writers 1, 4 and 7 have ten bigrams each with likeliness values above 95 per cent , the ten bigrams are different for each of them. Furthermore, in the case of "Writer 10" where the texts are very short,

the model does not have enough instances of the bigrams to compare, hence it gives a majority of the bigrams as "Not compared", there by leading to inaccurate "likeliness" values.

Discussion

The results indicate that there are micro-level writing patterns that are stable within writers and across tasks. This supports the claims made by Bleha *et. al.* (1990) and Monrose & Rubin (1997, 2000) that a unique keystroke pattern exists for individuals. The model clearly identifies stable bigrams for each writer and a notable fact is that the identified set of stable bigrams of one writer is different from another writer's set of stable bigrams. However, the model is highly dependant on sample size.

The model picks up not only on differences but also on similarities between writers. Therefore the model needs to be fine tuned in order to be able to clearly distinguish between different writers' patterns. Mouse usage patterns, use of shortcuts, frequent mistypes/misspells, motor-pause patterns of frequent words, synonyms analysis, factor analysis (Grabowski, J., 2008) and weighting bigrams could be used to complement the present model.

The ethical aspects of the above method of authenticating assessment need to be given a high level of consideration. Firstly, the involvement of a biometric identifier and the possibility of the misuse of such an identifier brings up issues of security concerns about how and where the comparison identifiers are stored and who has access to them. Secondly, the use of such a biometric identifier to authenticate a student's text submitted for assessment brings up issues of other factors that may affect the typing pattern of the student that may include the physical or the psychological state of the student. Thirdly, in the case where a submitted text is deemed to be inauthentic by the monitoring system, what other measures would the examiner be able to take and what other information would he have at hand in order to verify the result of the system, as well as, what proof can the examinee provide for his defence. The ethical aspects also include the possibility of the manipulation of the system and bypassing the system by the examinee in order to commit acts of plagiarism. What measures can be taken to ensure the proper function of the monitoring system is also an important issue needing consideration. Finally, it would always be argued that pedagogical means of giving responsibility to students to refrain from plagiarizing is always better than using technological means to deter it.

Conclusions

In this paper we have examined the potential of keystroke dynamics as behavioral-biometric identifiers of individual writers. The results indicate that writers produce individual micro-level writing patterns that are similar regardless of which type of text they are writing. The transition between some keystroke bigrams are conducted similarly in several conditions and considered stable. This therefore provides evidence that keystrokes of an individual have the potential of being used for identification. The potential of such a system that uses keystroke dynamics as a behavioral-biometric identifier can be vastly improved by complementing it with other individualistic writer features. This would make the system more robust and accurate, a must in the ever evolving domain of computer crime and security.

Today students choose to educate themselves in different ways and the educational system and the technology must be able to cater for their ever-growing needs. Regardless of whether the education occurs on campus or at a distance, students as well as teachers require secure assessment methods. The growing need for distance education has brought the importance of distance and online assessment to the forefront. Issues of authentication, where teachers need to know "who is who and doing what" has become key issues that have been holding back the potential of assessing at a distance as well as online assessment. The tentatively positive results of this study indicate that keystroke dynamics could become a powerful tool in the development of secure assessment methods in distance education.

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Peter Bergström, Doctoral student
Department of Interactive Media and Learning, Umeå University
peter.bergstrom@educ.umu.se

Elza Dunkels, Senior lecturer
Department of Interactive Media and Learning, Umeå University
Elza.Dunkels@educ.umu.se

Gun-Marie Frånberg, Associate professor
Department of Interactive Media and Learning, Umeå University
Gun-Marie.Franberg@educ.umu.se

Carina Granberg, Doctoral student
Department of Interactive Media and Learning, Umeå University
Carina.granberg@educ.umu.se

Alison Hudson, Doctoral student
Department of Interactive Media and Learning, Umeå University
alison.hudson@educ.umu.se

Brian Hudson, Professor
Department of Interactive Media and Learning, Umeå University
Brian.hudson@educ.umu.se

Agneta Hult, Senior lecturer
Department of Education, Umeå University
agneta.hult@pedag.umu.se

Camilla Hällgren, Senior lecturer
Department of Interactive Media and Learning, Umeå University
Camilla.hallgren@educ.umu.se

Monica Liljeström, Doctoral student
Department of Education, Umeå University
Monica.liljestrom@pedag.umu.se

Eva Lindgren, PhD
Faculty of Teacher Education
Eva.lindgren@educ.umu.se

Krister Lindwall, Lecturer
Department of Interactive Media and Learning, Umeå University
krister.lindwall@educ.umu.se

Anders D. Olofsson, Senior lecturer
Department of Education, Umeå University
Anders.D.Olofsson@pedag.umu.se

Eva Mårell-Olsson, Doctoral student
Department of Interactive Media and Learning, Umeå University
eva.marell-olsson@educ.umu.se

Fredrik Paulsson, Senior lecturer
Department of Interactive Media and Learning, Umeå University
Fredrik.paulsson@educ.umu.se

Ulf Stödberg, Doctoral student
Department of Education, Umeå University
Ulf.stodberg@pedag.umu.se

Tor Söderström, Associate professor
Department of Education, Umeå University
tor.soderstrom@pedag.umu.se

Hakim Usoof, Doctoral student
Department of Interactive Media and Learning, Umeå University
Hakim.usoof@educ.umu.se

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   Cummins, J. (1978a) Educational implications of mother tongue maintenance in minority-language groups. *The Canadian Modern Language Review* 34, 395-416.
   Cummins, J. (1978b) Bilingualism and the development of metalinguistic awareness. *Journal of Cross-Cultural Psychology* 9, 131-49.
   Genese, F., Tucker, G.R and Lambert, W.E. (1976) Communication skills of children. *Child Development* 46, 1010-14
   John, V.P and Horner, V.M. (eds) (1971) *Early childhood Bilingual Education*. New York: Modern Language Association of America.
   Jones, W.R. (1959) *Bilingualism and Intelligence*. Cardiff: University of Wales Press.
   Karmiloff-Smith, A. (1986) Some fundamental aspects of language development after age five. In P Fletcher and M.Garman (eds) *Language Acquisition:Studies in First Language Development* (2nd edn). Cambridge: Cambridge University Press.

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