Challenges with social software for collaboration: Two case studies from teacher training

Teemu Valtonen teemu.valtonen@uef.fi (corresponding author)

Sari Havu-Nuutinen sari.havu-nuutinen@uef.fi

Patrick Dillon patrick.dillon@uef.fi

Sini Kontkanen sini.kontkanen@uef.fi

Mikko Vesisenaho mikko.vesisenaho@uef.fi

Susanna Pöntinen susanna.pontinen@uef.fi

University of Eastern Finland
Faculty of Philosophy
www.uef.fi/toty

Abstract

This paper provides an insight into challenges with collaborative learning using social software. It reports two case studies conducted in a teacher training department in a Finnish university. Although the case studies were concerned with providing teacher students with inspiring and motivating experiences of using ICT in pedagogically meaningful ways, the research design was set up so that challenges could be identified and investigated. Results reveal several factors that are related to challenges of learning collaboratively with social software. The main challenge concerns students' understanding of what it means to learn collaboratively. It would seem that the added value of interaction and collaboration is poorly recognised. Furthermore, implications for teacher training are discussed.

Keywords: collaborative learning, social software, teacher training, teacher students, pre-service teachers

1. Introduction

The role of the information and communication technologies (ICT) is now central to the Finnish educational system. ICT has a presence in national educational policies and strategies and in curricula from kindergarten to higher education (Finnish National Board of Education, 2003; Ministry of Education and Culture, 2010). ICT is also topical because of different views about whether or not it is meaningful to call today's students 'digital natives' and the 'net generation' on account of the skills they are assumed to possess (Prensky, 2001; Tapscott, 2008). On the one hand it is argued that net generation students are ready and willing to adopt discovery-based and collaborative learning methods with ICT (Tapscott, 2008; Philip, 2007). On the other hand it is argued that such claims are based on everyday observations

instead of rigorous research (Bennet et al., 2008) and that the types of software that students actively use are rather limited (Valtonen et al., 2010). Dabbagh and Kitsantas (2012) claim that ICT is used for the purposes of entertainment rather than for learning. These matters are especially interesting in the context of the initial training of teachers (hereinafter 'teacher students' or 'students'). Today's teacher students can be seen as digital natives by their age i.e. most of them were born after 1980 (c.f. Lei 2009). According to Sadaf et al. (2012), these teacher students are skilled users of ICT and interested in it, especially Web 2.0, but mainly for meeting their personal needs. The challenge is to integrate these technologies into their future work as teachers. Lei (2009) suggests that teacher students might be considered as digital-native *students*, but they are not yet digital native *teacher students*, as they lack skills in using ICT for different pedagogical purposes. The challenge of teacher students using ICT in pedagogically meaningful ways is addressed in this paper.

The assumptions concerning digital native students' preferred ways of learning can be related to studies focusing on students conceptions of learning. Marton et al. (1993) described six different conceptions of learning varying from those that defined learning as increasing information where the student's role is passive, mainly memorising, to those that see learning as student-centred, where the student's role is active and aimed at a better understanding of the world. Tynjälä (1997) found a similar range of conceptions of the learning process held by students: at one extreme learning was seen as a process directed from the outside while at the other an interactive and creative process regulated from within. The assumptions about net generation students preferred ways of learning coalesce with the student-centred, active and creative conceptions.

The use of ICT for teaching and learning is typically equated with collaborative learning practices. Koschmann's (1996) review of paradigms of ICT in education culminates with computer-supported collaborative learning (CSCL). According to Koschmann (1996) the intellectual foundation of the CSCL paradigm is based on the perspectives of social constructivism, sociocultural theories and theories of situated cognition. Dillenbourg (1999) suggests that collaborative learning is a 'situation in which particular forms of interaction among people are expected to occur, which would trigger learning mechanisms'. Roschelle and Teasley (1995) refer to collaborative learning as a process in which students negotiate and share meanings relevant to a problem-solving task. Kreijns et al. (2003) outlines characteristics of collaborative learning that stress the active learning of students working in small groups, reflecting their own assumptions and thoughts while sharing their expertise, with the teacher supporting learning as a facilitator rather than a 'sage on the stage'. Collaborative learning emphasises the importance of students' awareness of their prior learning and the way they and others structure knowledge if they are to use the collective knowledge as a resource for further discussion and learning. In this way students are confronted with conflicting ideas and meanings and have to come up with ways to resolve the conflicts.

ICT in education has moved on since the widespread adoption of the CSCL paradigm. A recent development has been the use of social software for teaching and learning. There are hundreds of different social software available and according to Boyd (2007) similar types are actively used around the world. Bower et al. (2010) contends that we are still struggling to design learning experiences that make good use of social software although different models have been suggested (see Vartainen et al., 2012.). According to Ferdig (2006) the features of social software provide many possibilities for supporting students' collaborative learning. A common feature of social software is their emphasis on the active role of users and this has to be translated into the working practices of students and teachers. Instead of content prepared in

advance, social software provides environments and tools to produce, edit, comment on and publish content in different formats, and the means to support the interactive processes involved in all these activities. (Alexander, 2006; Sinclair, 2007)

Even though both the processes of collaborative learning and the various ways it can be supported through ICT have been well researched, implementing the mechanisms remains challenging. According to Vuopala and Järvelä (2012) passive students, the reluctance of teachers to take account of different educational backgrounds, setting the wrong type of tasks, and lack of time and motivation are among the factors that make collaboration difficult. Dewiyanti et al. (2007) suggest that the size of the group is also a factor affecting the success of collaboration. Also, they refer to a study by Kagan (1994) who suggests that students' negative ideas about learning collaboratively and their earlier experiences may inhibit participation.

This paper sheds light on some of the challenges of collaborative learning with social software based on two case studies conducted within a teacher training department in a Finnish university. The case studies are part of an on-going project aimed at developing student teachers' skills in using ICT for teaching and learning. Part of this project is to provide them with inspiring and motivating experiences of how to use ICT in pedagogically meaningful ways during their teacher education at the university and these elements of the case studies have been reported earlier (c.f. Valtonen et al., 2011a; Valtonen et al., 2011b). However, although the case studies were concerned with positive aspects of the use of ICT, the research design was set up in such a way that that challenges could be identified in students' use of social software for collaborative learning. In this paper we re-visit the two case studies and reflect on the hitherto unreported challenges. The research questions are: (i) what factors had negative effects on collaboration with ICT; and (ii) what factors caused students to have negative experiences of learning with shared lecture notes.

The first case study focused on an investigation where students were provided with the possibility of writing lecture notes collaboratively using a shared micro-blog space. The second case study involved the development of collaborative learning spaces using blogs and *Facebook* during an ICT course. Compared to the characterisations of collaborative learning provided by Kreijns et al. (2003) these cases do not present traditional collaborative learning situations with students' working in small groups on specified problem solving exercises (Sarmiento & Stahl, 2008). The aim in both studies was rather to give them the chance to interact and collaborate in learning situations, literally to 'see what happened' when they were given the technological resources for collaboration.

In the accounts of the case studies that follow, theoretical framing and contextual details are given for the initial aims of the studies, that is, for the free-format use of ICT for collaboration in different situations.

2. Case 1: building shared lecture notes with micro-blog

2.1. Theoretical background

In the traditional lecturing model, where students' make their own notes, there is limited scope for collaborative learning. Traditionally, teaching by lecturing is seen as a one-way, teacher-centred process of instruction where the student's role is to receive information (Phillips, 2005). Murphy and Sharma (2010) have outlined several ways to develop student participation in lecture teaching including small group conversations, clinical cases, debates etc. These

approaches foreground student's ideas and opinions which may then be used as a source for further learning and discussion (Murphy & Sharma, 2010). In our case study we set up a situation where students were provided with the chance to write lecture notes collaboratively using a shared micro-blog space.

For lecture notes, Piolat et al. (2005) use the metaphor of 'external memory' built on students' selection of information, thinking and comprehending. This metaphor provides insight into the ways students have interpreted the lectures, although the unique memories typically remain primarily the property of the individual student. Kiewra (1989) described two functions for note taking: first, the storing function where the lecturers' presentation is 'stored' in a way that can be used at a later date to facilitate recovery of lecture content; second, 'encoding' where students build connections between content from the lecture and their own ideas and experiences. Peper and Mayer (1986) call the second function the 'generative' mechanism of the note taking, a process that activates students' cognitive processes, building connections between lecture content and their earlier experiences and knowledge structures.

Students' notes containing unique ideas, i.e. encoded and generative interpretations, provide potential resources for further collaborative learning. These notes contain ideas that provide materials for other students as well as insights for lecturers about how students understand and interpret the content of the lecture. This investigation was designed to exploit these notes in order to bring elements of collaborative learning to the lectures.

2.2. Research context and analysis

The first case study was part of a teacher education course in which there was traditional lecture teaching and it was conducted with a group of 34 teacher students who could be categorised as net generation by their age. There was a total of 12 hours of lectures. The content focused on science education in the early years. Students were provided with mini laptop computers and a micro-blog called *Qaiku* (www.qaiku.com) to support their collaboration during lectures. *Qaiku* allows writing messages with a maximum of 140 characters or to comment on messages without any length restriction. *Qaiku* allows 'channels' to be built, i.e. shared areas for messages concerning some specific topic. Currently *Qaiku* is no longer available online, but other micro-blogs offer similar facilities. For example, *Twitter* (www.twitter.com) could be used to conduct similar investigations.

Each student had a mini laptop computer with access to the wireless network. *Qaiku* micro-blog contained a 'channel' for students' lecture notes. At the beginning of lectures there was a short introductory session focusing on the use of the *Qaiku* micro-blog and the aims of the investigation. Students were encouraged to write their notes online and to read and comment on each other's notes. They were also allowed to write notes using pen and paper. In parallel with the formal face-to-face lecture, students wrote their notes to the shared 'channel' and commented on each other's notes, thus having access to other students' 'encoded' (c.f. Kiewra, 1989) and 'generative' (c.f. Peper & Mayer, 1986) ideas.

Data consisted of: (i) the lecture notes produced by students in the *Qaiku* micro-blog; (ii) interviews with students about their experiences of the investigation as a whole. Notes were analysed qualitatively using content analysis (Roth, 2005) with ATLAS.ti software. Notes were coded based on the way they related to lecture content and the extent to which they showed collaboration between students. Thematic interviews were conducted with nine students (seven women and two men). The themes related to students' overall experiences, how they used notes, how they felt about the ICT, and how the

notes affected collaboration during the lecture. The students were selected for the interview based on their note-writing activity: three from the most active group, three from a 'middle' activity group and three from the least active group. Interviews were transcribed and analysed with ATLAS.ti software. The transcripts were analysed using open coding (Gibbs, 2007).

2.3. Results

2.3.1. Contents of the notes

Altogether 526 notes were produced and 367 notes were analysed, i.e. over one hundred notes were removed because the content was almost identical to other notes. The results show that participation for writing the notes was uneven. Students could be divided into three groups according to their level of participation, i.e. how actively they wrote notes online. Students in the first group (n=15) did not use the option for writing notes online or used it very little, the number of notes varied between 0 and 10 per student. Students in the second group (n=14) wrote more notes, the number varied between 11 and 35 per student. Students in the third group (n=4) wrote most of the notes, the number varied between 45 and 73 per students. This unevenness in participation is indicative of challenges concerning motivation and understanding.

Three categories could be drawn from an analysis of the lecture notes: *'Notes picked up directly from lecturers' presentation'*, *'Lecturers presentation represented in students' own words'* and *'Developments from the lecturers' presentation'* (table 1). The examples given are verbatim, i.e. without the English corrected.

Category	Examples	N
Notes picked up directly from lecturers' presentation	Notes made using same words Examples provided by lecturer Concept definitions	61
Lecturers presentation represented in students' own words	Notes made using their own words Notes containing summaries of lecture content	161
Developments from the lecturers' presentation	Notes containing students own ideas and opinions Notes containing topics other than lecture content Notes containing students own conclusions	49

Table 1: Categorisation of students' different kind of lecture notes

Notes picked up directly from lecturers' presentation
This category contained notes with direct citations, examples provided by lecturer and definitions of concepts in descriptions similar to those of the lecturer. Evidence of students' own creative thinking and ideas within these notes was minimal. Examples:

> The definitive characteristic = How a crow differs from a raven.

> It's important to use relevant scientific concepts.

Lecturers' presentation reproduced in students' own words

This category contained ideas presented by the lecturer but using students' own words. In these notes students connected and shortened parts of the lecturers' presentation. The notes were typically declaratory, partly direct copies from the presentation and with minimal evidence of students' own thinking and ideas. Examples:

> Learning books guide too much of the teacher's action. The learning books are not checked in advance and thus teachers' need to use books based on their pedagogical competence. The teacher is responsible for matching learning contents with children's developmental skills.

Developments from the lecturers' presentation

Notes in this category show students' thinking beyond the realms of the presentation but they were few in number. Students made connections between ideas and the lecture content, drew conclusions, and applied lecture content to different contexts. A glance at these notes serves to show that students had some concrete ideas about how to apply new knowledge. These notes also contained questions and problematic issues. Examples:

> The holistic approach in science education will be achieved by integration.

> Based on their previous experiences, the pupils have very varied concepts e.g. about the Earth -> take account in teaching!

The following are examples of the collaborative development of the ideas:

> Note: How the children react to science education?
> [Comment: The children see science learning interesting especially when they learn about animals or when they go on excursions].

> Note: The children's nature experiences form often out of school and with grandparents
> [Comment: I agree!]

2.3.2. Students' experiences

As can be seen in table 1 the use of shared notes did not give rise to a high level of collaborative learning. This section outlines factors related to the results presented in table 1 based on student interviews, how students experienced the learning with shared lecture notes.

The first challenge was the deficiencies of the *Qaiku* micro-blog. The students said that the *Qaiku* environment was not suitable for their ways of writing notes. Some students suggested that they usually make notes in more creative ways, using diagrams, flow-charts, concept maps, etc.; whereas the *Qaiku* environment only allowed notes in text form. Another problem with *Qaiku* was that the list of notes did not update automatically. Students had to update the page manually or the page updated when they posted new notes. It was agreed that this impeded greater collaborative interaction online.

> I use pen and paper to make notes and my notes resemble more like a treasure map or a mind map, so that there can be in my own ideas, lines and arrows… a sort of code language that only I can understand.

> Students wrote down same things because you didn't see what other students had written … If the software would have provided a real time

discussion, it would probably have launched more communication, so that one student wrote one note and others continue with it.

Interview responses suggest that some students did not participate in writing the notes to the shared environment, rather they used it for their individual learning needs; this inhibited collaboration. These students used the shared notes as a way of revising their own notes and to complete their notes in case they missed some lectures. For these students the purpose of note taking remained as it was in traditional courses, the difference was that the notes were written online instead of in a notebook.

> Some students had shared their own experiences or opinions instead of just the lecturers' speech … and of course these had to be written down to my notebook so that I can find them later.

> In case that I missed something, I could check it online and write it down for myself.

> But eventually I felt that when I wrote notes online I made the notes so that they were meant for me, for myself…even though it was a shared environment, I think that people used it for themselves, that everyone made the notes for themselves without thinking about the collaborative aspect.

The comments of the students interviewed generally point to a view of learning as a process of transmitting information rather than collaboration and shared creative thinking. This led to a situation where there were several similar notes based on the original lecture content.

> I felt it was difficult, the Qaiku was slow every now and then, so how could I write as fast as needed, because I write quite conscientiously, almost from word to word what the lecturer says.

> Basically it was like as in a basic lecture situation, so that you try to take as much you can from the lecturers speech as it was.

> It was so that I copied directly: what the lecturer said I wrote and that was it.

3. Case 2: Supporting collaboration with blogs and *Facebook*

3.1. Theoretical background

The second investigation was aimed at developing and testing a collaborative learning space using blogs (*Blogger*), *RSS-feed* and *Facebook* to explore the extent to which students familiarised themselves with the ideas and interpretations of their peers (Dillenbourg, 1999). These situations may set up *cognitive conflicts*, when an individual's interpretation and understanding of the content in question differs from that of his or her peers. The individual concerned then has to find ways of resolving this conflict.

Social software provides several possibilities for supporting interaction between students, for example *Facebook* provides ways to build environments for collaboration through discussion and social chats. According to Valtonen et al. (2010) most net generation students use *Facebook* on a daily basis. Moreover, Kabilan et al. (2010) claims that students have positive opinions about using *Facebook* for learning.

3.2. Research context and analysis

The second investigation was part of teacher education courses focusing on the use of ICT for teaching and learning. Altogether 147 first-year students participated in the course and out of these 50 volunteered to participate in the investigation. The learning environment used in the experiment consisted of students' personal blogs. Each student had their own blog where they made their assignments and reflected on their learning in a 'learning diary'. The blogs were linked together using *RSS-feeds*. In addition, a *Facebook* profile was made, which all the participants 'recognised' as their 'friend'. In order to support collaboration, all the blogs where linked to the *Facebook* profile using the *RSS Craffiti* application. Every time a student wrote a new entry to his or her blog it was simultaneously submitted to the blogs of peers and their personal *Facebook* profiles. At the beginning of the investigation the students were informed about its aims and were encouraged to take advantage of the possibility to read the blogs of their peers. A total of 118 feeds were submitted to *Facebook*. Each new entry to *Facebook* consisted of the first 50 to 70 words of the blog entry, which is equal to 5 to 7 lines of text, and a link to the actual blog.

Research data from this investigation consisted of students' reflections on the investigation. Students were asked to write about: (i) whether the use of *Facebook* changed their ways of learning, and if so, how; (ii) whether the use of *Facebook* affected the extent to which they read each other's ideas; (iii) the extent to which they found other students' texts useful for learning; and (iv) how they felt about using *Facebook* for learning. The length of responses varied from half to one page of text.

The qualitative data was analysed using an open coding approach (Gibbs, 2007) to describe factors affecting students' negative experiences. Data was first read through several times in order to gain an overall view of the content. Then the data was coded according to similarities of responses. Codes were combined into three larger categories described in the *results* section below. Supplementary data was collected through an online questionnaire containing statements concerning students' attitudes towards using *Facebook* for learning and the effects that experience had on their interaction, e.g. reading each other's blog entries (see table 2). A five point scale was used with '1' indicating strong disagreement and '5' strong agreement.

Separate statements were consolidated using principal component analysis with varimax rotation i.e. condensing original variables into a few subscales. (Afifi & Clark, 1996; Metsämuuronen, 2006). As a result, two subscales '*attitude*' and '*effect*' scaled from 1 to 5 were drawn up (table 2). Coefficients of reliability for both subscales were satisfactory; Cronbach's alpha values were over .70 in each new variable (Metsämuuronen, 2006). In order to highlight differences between students' attitudes and experiences concerning the '*effect*' of the investigation, the students were divided into three groups based on the percentiles (an average group of 50% and upper and lower percentiles of 25%).

3.3. Results

The mean values of subscales '*attitude*' and '*effect*' were close to 3 on the 1-5 scales (table 2). Only one statement 'Course contents on my *Facebook* page did not bother me' had a higher mean value of 3.8 indicating that students took to the content quite well related to university studies in their personal *Facebook* profile. Taken as a whole, these results indicate that students' reactions to the investigation were neutral.

Attitude: Mean 3.2 (alpha value .84)	**Effect**: Mean 2.9 (alpha value .82)
Having my course content on my *Facebook* page did not bother me (Mean: 3.8)	Use of *Facebook* increased my awareness of the work done by my peers (Mean:3.1)
I will use *Facebook* as part of my studies also in future (Mean: 2.9)	*Facebook* helped me familiarise myself with other students' work (Mean:2.8)
Facebook is well suited for higher education learning (Mean:2.8)	Having access to other students' work on my *Facebook* page increased my motive for the studies (Mean: 2.8)

Table 2. Attitudes and Effects (1= strong disagreement and 5= strong agreement)

When we look more closely at mean values based on percentiles, we note differences between students' attitudes and experiences concerning the effects of the investigation (table 3). Half of the respondents had neutral experiences of the investigation: the mean values from both sub-scales were close to 3 on the 1-5 scale. The third percentile had positive experiences, both mean values were 4.0. From the viewpoint of the focus of this paper, which is on challenges, the interesting percentile is the first one which has the most negative experiences. The mean value of the *'attitude'* sub-scale was 2.3 indicating rather negative attitudes toward the investigation. Also, the mean value of the sub-scale *'effect'* was only 1.7 indicating that for these students the use of *Facebook* did not have any effect on how much they familiarised themselves with other students' postings. Neither did they experience any strong motivational effects.

Percentiles	Attitude: Mean 3.2	Effect: Mean 2.9
25-negative	2.3	1.7
50-neutral	3.0	3.3
75-positive	4.0	4.0

Table 3. Differences between students

The data on students' reflections provides an insight into the factors related to the negative attitudes and effects of the investigation. Negative experiences drew attention to matters concerning students' lack of knowledge about the mechanisms of collaborative learning. These students suggested that they did not understand the reason why they should read each other's blog entries and thus they preferred to do their work and tasks without the collaboration or influence of their peers.

> Use of Facebook would probably have helped me to read other students blogs, but I did not do that. I did not find it important or even meaningful because I just wanted to get my own assignments done. I did the assignments without reading what other students had done, that was enough for me.
>
> I did not read any feeds related to the course in the Facebook. To be honest, I did not understand the reason why I should have read them, especially I did not understand what good would it would be for me, what is the additional value...
>
> Other students blog entries would have provided hints and ideas for my own studying but I decided that it is better if I write to my blog only my own opinions and experiences. If I rely too much on the work of my peers

> I don't have to think of the topics from my own perspective and the work will remain distant.

Responses also suggest that some students deliberately tried to avoid reading each other's postings, thereby suggesting that the posting of their peers may have had a negative effect on their own thinking and learning.

> I specifically tried to avoid reading other students blog entries when I was studying because I did not want to use others' ideas instead I wanted to think on my own.

> Actually I read other students texts only few times because I didn't want any influences for my own assignments.

The third reason for negative experiences was that some students did not want to use *Facebook* as an environment for learning, seeing it rather as an environment for leisure and fun. Some students said that several messages in their *Facebook* profile became intrusive i.e. the first messages were interesting but after a while these postings become annoying.

> I think that Facebook is for leisure, so using Facebook for learning is not my thing. Studying and leisure time need to be kept separated for my own well-being.

> At the beginning I every now and then read the texts of the feeds but after a while the feeds become annoying. They were frustrating when they filled the whole first page of Facebook so I turned the RSS of.

4. Conclusion and implications of both cases

This paper raises challenges related to the use of social software for collaborative learning. When designing the investigations reported in the paper, the assumption was that today's students i.e. net generation or digital natives (c.f. Tapscott, 2008; Prensky, 2011) would understand the value of using ICT for learning and especially take advantage of it for collaboration. The software used was already familiar to them, or could be readily learnt, suggesting that level of ICT skills ought not have been an impediment. Despite this, the results suggest there were challenges especially with initiating the processes of collaborative learning.

The first investigation studied a way of building shared lecture notes using the *Qaiku* online-environment. It was intended that students were to use the opportunity to familiarise themselves with some of their peers' ideas, to comment on them and further develop them. However, the notes mainly reproduced parts of the lecturer's presentation and participation within the note writing process was uneven in the group itself. Most students wrote notes to collect the lecturer's ideas and build their own synthesis of them. There were few instances where students mentioned their own ideas or questioned the topics dealt with during the lecture. There was minimal comment and development of other students' notes and ideas. This pattern of use is in keeping with the 'information storage' function described by Kiewra (1989) in which there is little evidence of the 'encoding' function.

The results also suggest that for some students learning collaboratively using blogs and *Facebook* was not meaningful. These students did not find these methods useful and they did not exploit the possibility to read each other's postings. On the whole, it appears that they did not see any added value in interaction and collaboration in learning, rather they wanted to do their

assignment alone without being disturbed. These findings conflict with those of Kabilan et al. (2010), who argued that students have positive opinions about using *Facebook* for learning. For some students *Facebook* has the status of an environment for leisure and fun which they do not want to 'spoil' with learning assignments.

The findings reported in this paper are in some respects similar to earlier studies concerning factors that support or hinder collaborative learning. According to Vuopala and Järvelä (2012), challenging factors are the passive role of the students and factors related to the ICT used. Both factors are evident in the first case study. Some students did not participate at all in writing the notes, thus reducing the potential pool of resources for collaboration. Moreover, the content was similar in several notes thereby suggesting that the software used was not ideal for the purpose i.e. students did not see other comments automatically as would have been the case in, for example in chat software. With chat-like software this problem could probably be avoided, providing students with direct access to the notes of their peers. Vuopala and Järvelä (2012) suggest that students' motivation is an important factor affecting the success of collaboration, and motivation may be connected with students' ideas about and earlier experiences of learning collaboratively (see Dewiyanti et al., 2007).

The results of the first case study suggest that some of the students saw learning as information transmission. Instead of launching collaborative practices these students saw the lecture as a one-way process based on teacher-centred and instructive learning activities, as noted by Phillips (2005). When comparing these results with earlier studies describing students' conceptions of learning (Marton et al., 1993) and their conceptions of the learning process (Tynjälä, 1997), we can see some similarities with learning as the transmission of information and learning as a process directed from the outside. Also, the experiences from the second investigation indicate that for some students the learning process is not something done with peers, rather it is a process to be conducted alone. Respondents suggested that they did not see any reason for reading each other's blog entries, or developing the ideas of their peers. It seems that they were not familiar with arguments about the benefits of learning collaboratively. This suggests that for these students collaborative practices with ICT and social software do not offer added value for their learning. Learning to use different ICT and software for supporting collaboration may appear only as meaningless extra work for these students.

The main reason for the challenges with collaboration brought up in this study seems to be the lack of knowledge about mechanisms and benefits of collaborative learning. At the beginning of both investigations the reasons for emphasising collaboration were discussed and students were encouraged to participate, to share their ideas and comment on and further develop the ideas of their peers. Still, it seems that the mechanisms of collaborative learning suggested by Dillenbourg (1999) need to be outlined more clearly and given greater weight. Collaboration is important in teacher training if students are to make use of it in support of learning when they become practicing teachers. Providing social software is not enough, rather it is necessary to provide teachers in training with inspiring and motivating authentic experiences of collaborative learning with social software which they can adapt and apply professionally. This suggests including introductory activities illustrating the benefits of interaction and collaboration such as coordinated production of talk and action, developing a common understanding, adding structure to content (Sarmiento & Stahl, 2008) and of exploring the possibilities of improvisation. Such activities might allow students to develop from digital-native students to digital native teacher students and later to digital native teachers.

References

Afifi, A., & Clark, V. (1996). *Computer-aided multivariate analysis*. London: Chapman & Hall.

Alexander, B. (2006). Web 2.0 A new wave of innovation for teaching and learning*? EDUCAUSE Review*, 41(2).

Bennett, S., Maton, K., & Kervin, L. (2008). The 'digital natives' debate: A critical review of the evidence. *British Journal of Educational Technology*, 39 (5), 775–786.

Boyd, D. (2007). Why youth (heart) social network sites: The role of networked publics in teenage social life. In. D. Buckingham (Ed.), *MacArthur Foundation Series on Digital Learning – Youth, Identity, and Digital Media Volume*. (pp. 119-142) Cambridge, MA: MIT Press.

Dabbagh, A., & Kitsantas, A. (2012). Personal learning environments, social media, and self-regulated learning: A natural formula for connecting formal and informal learning. *Internet and Higher Education*, 15(1), 3-8.

Dewiyanti, S., Brand-Gruwel, S., Jochems, W., & Broers, N. (2007). Students' experiences with collaborative learning in asynchronous Computer-Supported Collaborative Learning environments. *Computers in Human Behavior*, 23(1), 496–514.

Dillenbourg,P.(1999).What do you mean by collaborative learning? In P.Dillenbourg (Ed.), *Collaborativ e-learning: Cognitive and computational approaches*. (pp.1–19) Oxford: Elsevier.

Ferdig, R. (2007). Editorial: Examining social software in teacher education. *Journal of Technology and Teacher Education*, 15(1), 5-10.

Finnish National Board of Education (2003). *Lukion opetussuunnitelman perusteet*. [Basis for curriculum, upper secondary level]. Vammalan Kirjapaino Oy, Vammala.

Gibbs, G. (2007). *Analysing qualitative data*. London: Sage Publications.

Kabilan, M., Ahmad, N., & Abidina, M. (2010). Facebook: An online environment for learning of English in institutions of higher education? *The Internet and Higher Education*, 13(4), 179–187.

Kiewra, K. (1989). A review of note-taking: the encoding storage paradigm and beyond. *Educational Psychology Review*, 1(2), 147–172.

Koschmann, T. (1996). Paradigm shifts and instructional technology: an introduction. In. T.

Koschmann (Ed.), *CSCL: Theory and Practice of an Emerging Paradigm* (pp. 1-23). Mahwah, New Jersey: Lawrence Erlbaum.

Kreijns, K., Kirschner, P., & Jochems, W. (2003). Identifying the pitfalls for social interaction in computer-supported collaborative learning environments: a review of the research. *Computers in Human Behavior*, 19(3). 335–353.

Marton, F., Dall'Alba, G., & Beaty, E. (1993). Conceptions of learning. *International Journal of Educational Research*, 19(3), 277-300.

Metsämuuronen, J. (2006). *Tutkimuksen tekemisen perusteet ihmistieteissä 3, tutkijalaitos* [Basics of research in social sciences, researcher's edition]. Gummerus Kirjapaino Oy, Jyväskylä.

Ministry of Education and Culture (2010). *Koulutuksen ja tutkimuksen tietoyhteiskuntakehittäminen* [Developing education and research toward information society]. Department for Education and Science Policy. Retrieved from: http://www.minedu.fi/OPM/Koulutus/Liitteet/tietoyhteiskuntakehittaminen.pdf

Murphy, R., & Sharma, N. (2010). What don't we know about interactive lectures? *Seminar.net – International Journal of Media, Technology and Lifelong Learning,* 6(1), 111–119.

Peper, R., & Mayer, R. (1986). Generative effects of note-taking during science lectures. *Journal of Educational Psychology*, 78(1),34–38.

Philip, D. (2007). The knowledge building paradigm: A model of learning for net generation students. *Innovate*, 3(5).

Phillips, R. (2005). Challenging the primacy of lectures: the dissonance between theory and practice in university teaching. *Journal of University Teaching & Learning Practice,* 2(1),1–12.

Piolat, A., Olive, T., & Kellogg, R. (2005). Cognitive effort during note taking. *Applied Cognitive Psychology,* 19(3), 291–312.

Prensky, M. (2001). Digital natives, Digital immigrants. *On the Horizon*, 9(5), 1–6.

Roth, W. (2005). *Doing qualitative research. Praxis of method*. Rotterdam: Sense Publishers.

Roschelle, J., & Teasley, S. (1995). The construction of shared knowledge in collaborative problem soving. In C. O'Malley, ed. (Ed.) *Computer Supported Collaborative Learning* (pp. 67-97). Berlin.

Sarmiento, J., & Stahl, G. (2008). Extending the joint problem space: time and sequence as essential features of knowledge building. *Proceedings of the 8th international conference on International conference for the learning sciences*, 2, 295-302.

Sinclair, B. (2007). Commons 2.0: Library spaces designed for collaborative learning. *EDUCAUSE Quarterly*, 30(4).

Tapscott, D. (2008). *Grown up digital: How the net generation is changing your world*. McGraw-Hill.

Tynjälä, P. (1997). Developing education students' conceptions of the learning process in different learning environments. *Learning and Instruction*, 7(3), 277–292.

Valtonen, T., Dillon, P., Hacklin, S., & Väisänen, P. (2010). Net Generation at social software: challenging assumptions, clarifying relationships and raising implications for learning. *International Journal of Educational Research*. 49(6), 210-219.

Valtonen, T., Havu-Nuutinen, S., Dillon, P. & Vesisenaho, M. (2011a). Facilitating collaboration in lecture-based learning through shared notes using wireless technologies. *Journal of Computer Assisted Learning,* 27(6), 575-586.

Valtonen, T., Koponen, T. & Vesisenaho, M. (2011b). Linking school's learning environment to students' personal online environments: students' experiences. In H. Ruokamo (Eds.), *Proceedings of the 4th International Network-Based Education 2011 Conference, The Social Media in the Middle of Nowhere* (pp. 146-153). University of Lapland Publications in Education 25.

Vartiainen, H., Liljeström, A., & Enkenberg, J. (2012). Design-Oriented Pedagogy for Technology-Enhanced Learning to Cross Over the Borders between Formal and

Informal Environments. *Journal of Universal Computer Science*, 18 (15), 2097-2119.

Vuopala, E., & Järvelä, S. (2012). Yhteisöllistä oppimista edistävät ja vaikeuttavat tekijät – opiskelijoiden kokemuksia verkkokurssilta [Factors supporting and hindering collaborative learning – students' experiences from an online course. *Kasvatus*, 4, 406-422.