ICT and active learning processes as challenges and possibilities in teacher education

Marit Ulvik
University of Bergen

“We can’t be future-oriented just for the case of being so. We need to have a purpose and a reason for doing what we do. And I can’t see any reason to a lot of what’s done when it comes to computers” (student teacher).

Abstract

This paper presents a study of students enrolled in a one year education course (PGCE) at the University of Bergen in Norway. The aim of the study is to try to understand what students themselves experience as the most important aspects of the education, related to their future work as teachers, and how this corresponds to more active learning processes combined with the use of Information and Communication Technology (ICT). Active learning processes seem to support important aims in teacher education, and the use of ICT provides a positive supplement offering something else and will not replace other ways of working.

Keywords: ICT, active learning processes, teacher education

Background and research question

This paper presents a study of students enrolled in a one year education course (PGCE) at the University of Bergen in Norway. The aim of the study is to try to understand what students themselves experience as the most important aspects of the education, related to their future work as teachers, and how this corresponds to more active learning processes combined with the use of Information and Communication Technology (ICT).

Initiated by the Bologna process and supported by the Parliamentary Proposition no. 27; 2000-2001, assessment for learning purposes by means of portfolios and group activities in combination with use of ICT and Learning Management Systems (LMS), are now frequently used in higher education in Norway. There has been a change from traditional class teaching to an active student role. The main aim has been to meet every student through a qualitatively better education. As expressed in the National law for teacher education from 2003, teacher education is part of these changes in higher education. However, have the changes fulfilled their intentions? Do ICT and active learning processes promote student teachers' competencies?

We know a great deal about use of ICT in teacher education due to a national innovation-project initiated by the Norwegian government. This program was the government’s main initiative within innovative teacher education reform in the years 2000 to 2004. Research in this Program for Teacher Education Technology and Change (PLUTO) was conducted by external researchers and by participants directly connected to the project. Rapports from the program (Sluttrapport, 2004, Pluto-sluttrapportering, 2004) show that use of ICT has caused fundamental and positive changes in learning environment including more co-operation and more processes writing. Digital portfolio method seems to be the most important element to cause changes. The conditions are a well function infrastructure and ICT support, and that
ways of working are related to the profession. There is, however, some signals telling us that students become stressed by deadlines and control that often accompany use of LMS. In Norway most students are digital literate and have access to a personal computer and to the Internet. What has occupied educators are to use ICT in the purpose of learning and in a pedagogical way. In teacher education the overall aim has been to use ICT as tool for developing knowledge and reflection, and to see if and how ICT can contribute in educating teachers.

These active learning processes in higher education emphasize reflection and writing. The question is if that should be prioritised in a one year course for students with an academic degree and long experience exactly in reflection and writing. What should be stressed in this kind of teacher education? What do these students need to develop professionally? In the current study, we came up with some of the same answers as shown in the mentioned reports. How will this correspond to aims for teacher education as you find them in official documents, theory and students expectations? How is teacher education meant to be?

By the time this study was conducted, 2001-2003, use of ICT and LMS in schools were rather rare. Schools were equipped with computers, but they could be old, placed in laboratories and in most schools not a part of day to day life in the classrooms. Students were often more digital literate than their teachers and teachers struggled to use ICT in the purpose of learning. So in fact, in Norway, ICT was implemented in higher education before it became usual in schools. Since then the situation has changed, and from the autumn 2006 digital literacy is one of five basic skills, according to a new curriculum plan, in addition to writing, speaking, reading, and do arithmetic. To day teachers have to use computers and teach their pupils how to use them in a critical way and for the purpose of learning. Then student teachers will be more motivated to deal with computers in their education. Still I think that we can learn from this study and get an understanding of possible ways of using ICT. In the following I will present and discuss the students’ experiences and try to underline what I today, looking back, regard as positive use of ICT and how ICT can support what students regard as important in their teacher education.

This paper is based on a project within the framework of PLUTO, the governmentally initiated program. “BuiIdung”, assessing information and arguing in science were the keywords (Kolstø, Ulvik m.fl., 2004, ). The project was built around two teaching programs but it is the use of ICT in the project that is emphasised here and what the students experienced as positive and negative use of ICT. The project was influenced by socio-cultural learning perspective with emphasis on use of language, both oral and written, participation and co-operation (Dysthe, 2001, Säljö, 2001). A central aim was to make use of more student active ways of working and to integrate ICT in ways that supported knowledge production and provided students with experiences relevant to their future works as teachers. In this way it was tried to integrate theory, experiences and reflection that probably always will be a challenge in teacher education. Both The National Law for teacher education (2003) and theory agree that teacher education should help to develop teachers who are able to act on different levels and in relationship with different participants, and to give reasons for their acting, furthermore to analyze, reflect and assess critically (Dale, 2001, Lauvås og Handal, 2000, Dewey, 1961, Romano, 2004, Korthagen og Vasalos, 2005, Schön, 1991). The students however, focus on surviving in the classroom (Smith and Sela, 2005). They want to master the school as it is. This can cause a mismatch between the offered and the wanted education. Smith an Sela (2005) propose action research as a way to combine theory and practice, and to
support student teachers as well as teachers in their day to day practice and in developing their practice.

The project described in this paper, demonstrated how difficult it can be for teacher education to be innovative and then send students into schools where they find few traces of what they were told at faculty. There can easily be a gap between what the students expect and what they actually get. They have a strong need to master the school as it actually is, not as it is supposed to be in the future. In this perspective; is it possible to educate teachers who can contribute to change in schools? It is a challenge for the teacher education to qualify for a future school and at the end of the paper; some possible solutions will be suggested.

Methodology
The study was conducted among 30 teacher students in three different year courses from 2001 to 2003, actually all the students who took part in the ICT based project. The project was a co-operation between pedagogy and subject didactics in science and all the students had an academiscience degree. (See more about the science part of the study in Kolstø et al., 2006.) The project implied varied use of ICT, e.g.: The students collected and assessed information from the Internet. They co-operated within different items both in front of the computers with their peers at campus, and through the computers with their local peers and with students in a similar project in an other town. They presented their results using different tools and techniques and criticised each other. They learned to master new programs and to use ICT and they had meta discussions on LMS. At the end of each year 6-8 students participated in a focus-group where we tried to sort out a variety of students. The project was assessed through these groups focusing of the use of ICT. In addition half of the students were interviewed before and after the course. In the interviews which took place before they started, they were asked why they wanted to become teachers and how they wanted to perform as teachers. In the post-interviews they were asked if they had changed, and if yes, why? Then they got the same questions as previously, supplied with a question about what they found more or less valuable in the course, related to their future work as teachers. The students’ responses were analysed by the software Nvivo and discussed between the two researching teacher educators and in a member check (Merriam, 1998) with students in the following course. In the analyse the focus was put on four issues:

- Advantages of ICT
- Disadvantages of ICT
- Important in teacher training
- Less important

Findings
Advantages of ICT
How could ICT support learning processes? Students claimed that they learned by examples as this quote illustrates: “It’s nice to do it yourself, if you are going to do it in your teaching”. Furthermore, they got a deeper understanding through use of LMS:

But there’s one thing I have thought afterwards, even if I didn’t like it then. May be I remember it better because I wrote it myself. Things you say and just come up with there and then – you don’t remember them in the same way. Writing has a great impact.

This was said by a student who at first objected to written discussions.
As a last positive aspect, students learned through co-operation. It is more fun to work in that way, and they got access to different points of view, the students claimed:

Group work is fun. You are more people, so you can discuss things. You got different points of views. There are lot of things you have to make up your mind about and be critically towards. It’s more easy when you co-operate.

**Disadvantages of ICT**

On the less positive side, students found that ICT lacked relevance for teachers. They experienced that ICT was not an important item in schools. They had practical problems like limited access to the Internet and that computers in schools did not work. Furthermore they found it difficult to use ICT for the purpose of learning. A student teacher claimed that students in school cut and paste and downloaded some crap from the Internet. In teacher education the use of ICT was not adapted to different competencies. Some students mastered ICT very well, others were novices. Aims were indistinct. Should they learn from or learn about ICT, learn something or learn to teach it? They found it socially artificial to communicate, as one of them put it, “to the one next to you through the Internet”. This happened when students commented each other's work and sat side by side in the computer laboratorium. To day when most students have access to Internet at home this is not a problem.

**Important in teacher education**

Most of all the students regarded school practice and everything that could be related to that to be important in teacher education. They wanted hands on practical recipes. Furthermore they appreciated discussions. Interpretations of what they read, observed and experienced in schools can differ. “You can’t take it for granted, you have to discuss it”, claims one of the students. They need to reflect on their own thoughts in light of others reflections and thoughts, and to internalize theory and practice. The third element they put forward was written exercises which gave a deeper understanding.

**Less important in teacher education**

What do they find less important? First and foremost they mentioned lectures within large groups. In this case, a large group consisted of about 60 to 70 students. They became passive, they got no real dialog and students withdraw themselves. A lecture can be good, but the learning-outcomes from other activities mentioned are better. These experiences support the changes in higher education to be a right course. While all the students appreciated school practices, the value of theory varied. Inexperienced students are not able to link practice to theory. They found some of the theory abstract and not related to what happened in schools, but they all agreed that you need some theory:

"I don't think it would be that easy. For example if you are an unqualified teacher, I mean you lack a lot; like frames of concepts, like being a teacher, and to put names on what you experience and interpret what happens".

**Discussion and implications**

From the students’ point of view it is not surprising that the practice in teaching and activities connected to this practice corresponds to the students’ expectations to teacher education. They appreciate all activities that have any relation to schools and education. Pedagogical theory has value only if it can inspire new ideas and thoughts, and function as a tool for analyzing school activities. Furthermore, the students as future teachers seem to understand the need for reflection. They value deep discussions and learning through writing as important tools for reflection. And what about the use of ICT? The students appreciate that LMS are transparent in a way that give them access to other students’ work. But at the same time, ICT seems to function like the other activities; the students need to see that they can use it in school. The
aspects the students valued in their course are not dependent of ICT. So one can ask what differences and possibilities ICT provided. Through the use of ICT students got experiences with both technical and pedagogical use of ICT, which they are supposed to according to the National law for teacher education (2003). They got familiar with ICT and learned from examples how they could use it. Through discussions they became more aware and critical towards use of ICT within a pedagogical framework. Through LMS writing processes became transparent. Their own processes became visible and they learned from reading and assessing their peers’ writings. Written dialogs can not replace oral ones, but they seem to be a supplement offering something else. Everyone is able to and has to participate, and reflections are preserved.

Through this study some dilemmas, especially in a one year teacher education course, came up. You cannot deal with all aspects and items, you have to select the most important ones. Should you go into depth or width? Should you follow the tradition or exceed tradition? When students value certain experiences only afterwards, should you count on voluntary assignments, force or negotiation? Peters (1992) writes about education as initiation and claim that there has to be a minimum of understanding and voluntariness.

To sum up: Part from practice, students emphasised three conditions. 1) You should go deeply into things, less is more. 2) Discussions are important. You get involved and challenged, and are given a possibility to express your own point of view and listen to others. 3) Lastly: Through writing you got a deeper understanding, and you are able to work with and link together theory and practice. The three mentioned factors were all strengthened through use of ICT and the students became more prepared to meet ICT in schools in a conscious (bevisst) way and to make up their own minds. Today the numbers of computers are high and the broadband is fast in Norwegian schools, but a recent rapport concludes that when it comes to use in the classrooms, we still do not know (ITU-utredning, 2004).

Lastly: How can we get a future-oriented teacher education and make teacher education innovative? Action research with basis in challenges in the classroom seems to be a good idea. If student teachers learn to perform as researchers they are provided with a tool they can use in their future work. Smith and Sela (2005) propose to use action research in an induction year. We were not able to try that out, but experienced that experiences on campus (through the two teaching programs) can replace experiences in classrooms and does not provide material for action and reflection.

To conclude: Active learning processes seem to support important aims in teacher education, and the use of ICT provides a positive supplement offering something else and will not replace other ways of working.

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