DIGITAL PORTFOLIO AS TOOL IN DISTRIBUTED EDUCATION

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Abstract: Portfolio assessment is a form of evaluation, which is in increasing use in Europe. The use of digital portfolio supports flexible forms of education and learning. The use of portfolio is various and divided in different countries. This study focuses on the process of developing and use of portfolio in the subject of ICT and learning in the distributed teacher education at Nesna University College. The process is founded on theoretical influence of socio-cultural theories, teachers' experiences and students' preferences and achievement. The development and use of portfolio is based on an ongoing evaluation process, which is formulated as "Guidelines of portfolio assessment".

Keyword: portfolio assessment, activity theory, distributed education, teacher training

Socio-cultural view on learning

A way to approach the use of portfolio is to analyze the learning of students (Dysthe & Engelsen, 2003). Socio-cultural theories of learning emphasize people as member of communities where social interaction and the use of tools is a foundation of learning. Man use tools to develop and change an object (Vygotsky, 1978). Leontév (1978) developed this viewpoint as a collective activity. The theory of activity is seen as development of Vygotskys theories of learning and a part of socio-cultural theories. This foundation was expanded by Engeström (1987) into a model where the use of tools where based on the interaction in community. Tools are to be understood as a mediating artefact. The rules and the division of labour make the use of tools to an activity, which develop both social and individual knowledge. Third generation Activity theory deals with at least two integrated activity systems as its minimal unit of analyses. These activity systems are sharing a common part of an object (Engeström, 2001).

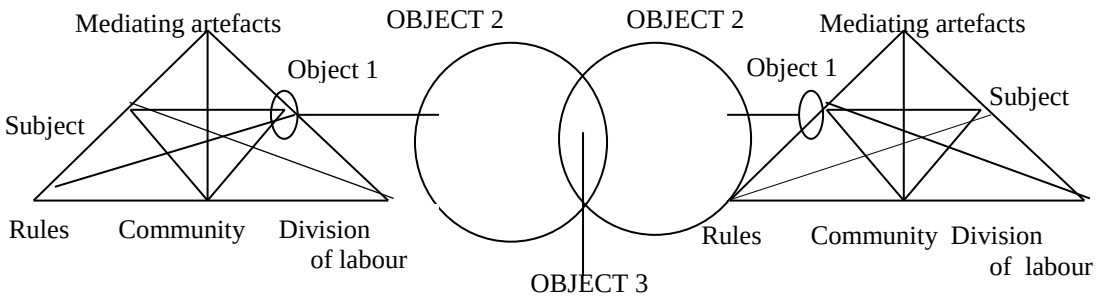

Figure 1: Two interacting activity systems with a partially shared object (Engeström, 2001, p. 136)

This figure illustrates how the subjects in two activity systems use tools as mediating artifacts in communities based on rules and division of labor to affect the objects. Lines in the figure show how all parts in the activity interact. The figure illustrates how objects (1) develop and change in the process (2) and how parts of the objects are partly shared (3).

Knowledge and information

To understand the use of portfolio it is important to see how knowledge and information contradict and interact. According to Wells (1999) information is second hand and can be distributed and shared. Information is an important part of the learning process, but information it is not knowledge. Wenger (1998, p. 220) points out the difference between information and knowledge: "Of course, availability of information is important in supporting learning. But information by itself, removed from forms of participation, is not knowledge". Knowledge is personal built in a social setting. A socio-cultural view on learning focus on action, tools and community. Language is the basic tool. According to Seljø (2000) "the core of knowledge is speech and action in social context". Wells (1999, p. 91) formulate the process of knowledge building:

> Knowing starts with personal experience which amplified by information, is transformed through knowledge building into understanding, where understanding is construed as knowing that is oriented to action of personal and social significance and to the continual enriching of the framework within future experience will be interpreted" (ibid.).

The interaction between knowledge and information is described in this way (ibid.): " ... the level of information that has little or no impact on students' understanding until they actively engage in collaborative knowledge building...". Nardi puts it like this: "Cognitive science has concentrated on *information*, its representation and propagation; activity theory is concerned with *practice*, that is, *doing* and *activity*, …" (1996, p. 14). This view on knowledge building is central in the work of customization the use of portfolio in ICT and learning.

A study of the developing process of portfolio in ICT and learning

ICT and learning

ICT and learning is a subject in the teacher training of Nesna University College and the continuing teaching of people working with education. The subject is one year of study divided into 2X 30 e-credits. Each half-year study consists of tree modules of 6, 12 and 12 e-credits. The content of the subject emphasizes basic problems in ICT, ICT as tools in learning processes, ICT used in work and society and the developing of digital literacy. It was established 1984 and from 1995 also given as a part of distributed education on Internet. The education was offered both in classroom and on Internet until 2001. At that time the students of classroom had access to each other in the classroom community, the teachers of the class, the IT-support system and the teaching given on Internet. From 2001 the only option given was on Internet. In 2002 the portfolio evaluation was established. Later the use of LMS Moodle was implemented. The changes of the subject ICT and learning in the first years of 2000 was based on teachers experience and internal discussions, influence of socio-cultural theory, interviews and a survey completed in 2000.

Method and research question

The question of this research is: How did evaluation processes establish and develop the use of portfolio?

The design of the research is founded on a case study concept (Yin, 2009). This kind of case study recognizes both quantitative and qualitative data as evidence in analyzes (Ibid. p. 132). It also emphasize a theoretical foundation: "… the better case studies are the ones in which the explanations have reflected some theoretical significant propositions." (Ibid.).

A questionnaire of the year 2000 is central to answer the research question. The survey had 25 questions with five grades between agree and disagree. In the survey there also was three open questions, which focus on learning achievement and improvement of the given education. Internal discussions, meetings and seminars among the teachers are part of this process (Holteng & Hegerholm, 2004). The students written reflections of the study are also main sources for this analyze. In the period before the implementation of the portfolio the student's reflection on the given education were a separated expression based on teacher's questions. Later, this kind of reflection is integrated in the students' work as a continuing process. To understand the view of the students, a group of five students were interviewed in 2001 about the quality of learning achievement and the education. The description of parts of the survey of

2000 and the evaluation process is published as “En begrunnelse for endring av evaluering” (Hegerholm, 2004).

Analyzing the process of developing digital portfolio

The data is analyzed as a case study research (Yin, 2009). Such an analyze will here be explanation building on a repeating case with multiple sources (Ibid p. 142). The case is the developing process of portfolio in ICT and learning which is expressed theoretically as two activities. The sources are written and spoken opinions and experiences of alternating students and teachers over the years in ICT and learning. Developing the Guidelines of portfolio assessment is an ongoing process, which has the roots back to the year of 2000. These sources together with the theoretical foundation enlighten the case of the developing process of the guidelines.

Evaluation of classroom- and Internet students

Looking into the answerers of the survey of 2000 and the reflections of the students, some tendencies can be summarized. On the question of the importance of your own work on your private computer and software, it was a difference of the answers of Internet students and classroom students. The Internet students valued their own work as more important than the classroom students (Hegerholm, 2004). This is reasonable since classroom students can rely on help from teachers and the IT-service on the campus. The Internet student is more alone with her computer. Internet students had to use their own computer asking for support of other distant students. Internet student had to lean on distributed cooperation. Another question in the survey asked the students if they are satisfied with the scope and angel of the working tasks. Internet students prefer comprehensive working task as foundation of teachers guiding and evaluation. Internet students also valued the opportunity of giving written explanations of the working process. Questions in the survey – one of them open, ask the students if they are satisfied with the information in the study. Internet student valued formal and detailed written instructions and guidelines in their work and in depth guidance of teachers (Ibid).

Before the year of 2000 the evaluation of students was based on a four hour written examination – the student had to handwrite answers on written questions. This was done in a large room where both classrooms and Internet students s where placed together with many other students, without help or cooperation. No aids were allowed.

A comparison of the student marks, summarized by the university college, shows that the Internet students had a better result and marks than the classroom students (Hegerholm, 2000). To the teachers this was strange. The classroom students had access to both the teaching and support system of the classroom and the one on the Internet. There could be different explanations on this tendency. Motivation and age could be such explanations. Focus in the study, however, is on evaluation. The response from the students described an evaluation situation where reproduction of information was valued instead of giving credit to knowledge. Reflections on this matter were expressed in interviews in 2001. Such expressions are formulated in this way (translated from Norwegian). Per: "To write with a pencil about what we have installed and fixed on the computer seems like a vaster. It do not give credit to what we have learned." Grete: "To try to rewrite software without ordinary aids seem useless". Karen: "All the important work I have done with my own teaching with ICT tools is without importance on such an examination".

An analyze of he content of examinations shows fairly 70% of the questions (Hegerholm, 2004) asked for reproduction of written or oral information. In this situation the location of the education – Internet or classroom, seems without importance. The reproduction of books and other information has not been the goal of student's work and actions in the study. The learning process of developing achievement - for example in their own teaching, was in this context without importance. It was obvious for the teachers that the evaluation had to be changed.

Evaluation and digital portfolio

Traditionally these forms of evaluation are in use in Norway:

- Oral examination
- Written examination
- Practical examination (vocational education)
- Multi Choice (questionnaires)
- Home examination
- Dissertation / thesis
- Portfolio

For teachers the main purpose was to leave the form of evaluation, which favoured reproduction of information. The goal was to develop a form of evaluation that gives priority of knowledge building. At this time the use of portfolio was recognized in EU (Hamp-Lyons & Condon, 2000) and developing in higher education in Norway (Ellmin, 2000).

Zubizarreta (2009) summarise the advantages of Electronic portfolios in the US Department of Educations' initiative of "Creating and Using Portfolios on the Alphabet Superhighway" in this way:

- Electronic portfolios foster active learning.
- Electronic portfolios motivate students.
- Electronic portfolios are instruments of feedback.
- Electronic portfolios are instruments of discussion on student performance.
- Electronic portfolios exhibit "benchmark" performance.
- Electronic portfolios are accessible.
- Electronic portfolios can store multiple media.
- Electronic portfolios are easy ton upgrade.
- Electronic portfolios allow cross-referencing of student work.

According to Dysthe and Engelsen (2003) portfolio have purposes and goals for society, school courses, teachers and students working and learning process. The most important condition, in the context of ICT and learning, is the possibility to evaluate and interact on the achievement and product of students work during the course. Portfolio evaluation establishes the student's marks as an end–evaluation. This gives the teacher the opportunity to guide the students during the course. It also gives the students opportunity to cooperate and build different kinds of communities. Portfolio integrates processes, which value the student's reflections. Reflection can be feedback to the teacher and the school on the quality of the course and the teaching. Portfolio rates the student individually. This can be used to sort students according to the rules of the society. The developing of portfolio artefacts tells the school and the teachers about the quality of student work.

Based on the students and teachers experience the teachers of the course of ICT and learning formulated the first Guidelines of portfolio assessment in 2002 (Holteng & Hegerholm, 2004). These guidelines are formally discussed and revised every year. Informal there is a continuous process of work and discussions – both among students and teachers, to integrate and adapt these guidelines to new situations and challenges in ICT and learning (Ibid).

Digital portfolio in the activities of ICT and learning

It is possible to see portfolio as a tool for both teachers and students. The students and the teachers are subjects in different activities. The students direct their work towards an object of work tasks, the teachers towards evaluation. In both communities the portfolios are tools to meet the requirements of the education. Portfolios are tools in both a work and an evaluation process. Both the evaluation process in the activity of teaching and the working task of the activity of learning has a shared object: "Guidelines of portfolio assessment".

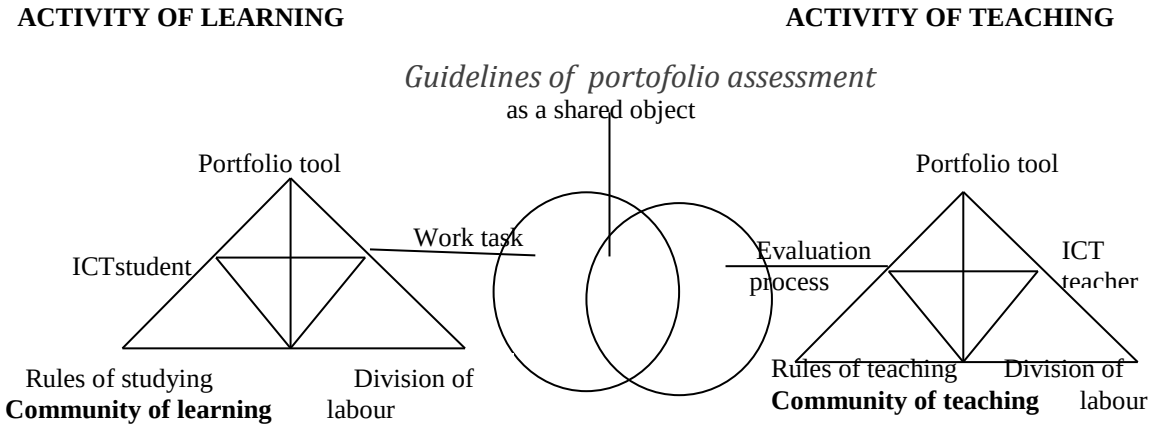

Figure 2: Two interacting activity systems with a partially shared object (After Engeström, 2001)

This figure illustrates how the shared object interact with the two main activities of ICT and learning. The "Guidelines of portfolio assessment" is the shared object of the working task and the evaluation process. It shows the digital portfolio as a tool in the teaching and the learning process. The guidelines influence on the use of the digital portfolio tools. It also guides the rules of teaching and the division of labour in the communities of the teachers and learners.

Conclusion

According to socio cultural theories the activities of teacher and students in ICT and learning are founded on actions with tools in communities. The communities have the rules and division of labour as central elements. Learning is a process of knowledge building where information is an important part. The use of digital portfolio is directed by the "Guidelines of Portfolio assessment". The developing of the guidelines have been an evaluation process where teachers experience and the opinions of the students, focus on these central conditions:

In the working and evaluation process *the teachers organize and distribute the information*, which the *students are going to use in their knowledge building*. The guidelines of the portfolio evaluation presuppose a division of labour where *working process integrate both individual responsibility and cooperation in groups*. Both processes are *certified in a reflection report*. The *portfolio evaluation rates the student as an end-evaluation* where *the teacher is the guide in the working process*. This foundation is implemented in "Guidelines for portfolio assessment" The "Guidelines of portfolio assessment" is now used in the international course of ICT and learning and is attached to this paper.

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Appendix

Guidelines for portfolio assessment for ICT and learning

Portfolio assessment is a form of working and assessment that are in increasing use and can replace the traditional written examination. It involves an educational viewpoint that emphasizes self-development, reflection and cooperation. However, the concept of portfolio assessment has not yet found its final form. Therefore, portfolio assessment used differently in various subjects and contexts. We will therefore attempt to describe how the Section of Informatics in the University College of Nesna wants to carry out our form of portfolio assessment.

Work Requirements
Each student will in the course of the program carry out a specific number of work requirements to cover the objectives for the course. Work requirements represent goal in curriculum, and shall be delivered to guidance and censorship in digital folders designed for portfolio assessment. Work requirements are the foundation of the students' work during the course, and will be evaluated at the end of the course.

All work requirements are individual, but still there will be required to cooperate with others. This means that work requirements can be developed in collaboration with other students, but final products shall be individual. Cooperation can take place "face to face" or "online" as a form of group collaboration. Cooperation can also be developed by the fact that students can consider and comment on each other's work, thus contributes to make them better. Students can cooperate with and can receive response from user groups and colleagues. On the basis of self-assessment, feedback from teachers, fellow students, colleagues and user groups, work requirements can be improved and changed, until submitted for final assessment. Collaboration shall be described and documented in a reflective document.

Document of reflection
Each work requirements shall be accompanied by a document of reflection, which describe the student work- and learning process. Document of reflection shall describe changes and development of the product. Such documents should always be developed as a part of work requirements. Reflection documents are individual.

Reflection document should contain the following:
• Explanation of the key point in the product.
• Description of the learning process and learning outcome
• Description of what kind of cooperation there has been
• Possible documentation of the division of labor between you and fellow students
• Description of feedback from user groups, group work, discussions with colleagues and fellow students
• Changes as a result of advice and guidance of teachers.

Otherwise, details can always be clarified with the teacher in each subject.

Guidance
Students will receive fast responses to inquiries about academic matters. For each work requirement, students have the right to one guidance from the teacher, assuming that the product is delivered before the deadline has expired. This guidance aims to strengthen the learning process in the subject as well as to improve the quality of answers. The guidance to each work requirements will be given for a limited time.

Assessment
The date for final submission of the Portfolio is set in advance. When the products are delivered, there will be a process of final assessment and determination of grade for the course. Formal aspects of assessment are described in the Examination Regulations of The University College of Nesna.

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