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# Theoretical background for portfolios as learning and assessment tools in teacher education

This seminar is based on a project named "Alternative Assessment in Teacher Education". Three institutions are represented, the Department of Teacher Education at the University of Oslo, the Department of Teacher Education at the University College of Vestfold and at Stord/Haugesund. The main focus of our presentation is to investigate how portfolios, and in particular digital portfolios, can support collaborative learning processes.

In this paper I will first clarify different understandings of the term 'portfolio', including the definition used in our project. Portfolios have been called 'cameleons' who change colours according to the view of knowledge and learning they are based on, and since our project is based on sociocultural theories, I will discuss central aspects of sociocultural perspectives and their relevance to portfolio processes. I want to underline that this is a preliminary paper, and all comments are welcome.

I. Portfolio models

Defining the portfolio in education is no easy task. In international literature there are a great variety of portfolio models (Black et. al. 1994, Yancey & Weiser 1997). Even its short history in Norway provide examples of very different models (Dysthe 1999, Taasen, Jensen, Havnes & Lauvås 2000). A common element is that assessment is based on a collection of student work done over a period of time, as opposed to timed sit-down exams.

In Great Britain 'coursework assessment' has been the term used about assessment based on a collection of assignments, formulated either by an external exam board or by the teacher and done by the student throughout a whole course. 'Coursework' has become increasingly common at all levels of the British educational system and across disciplines for the last 20 years, usually combined with a traditional written examination. It should be noted that course work is viewed as mainstream and not as an alternative form of assessment in Great Britain, and the term 'portfolio' is not synonymous with coursework. Portfolio-based learning is used for a collection of evidence that learning has taken place, including "extended reflective writing that describes and analyses the experience and demonstrate how the experiences produce the learning claimed and meet the criteria of the programme" (Brown, Bull & Pendlebury 1997, p.192). In Norway, however, where we have no tradition in higher education of letting 'coursework' count for the final grade, except the use of term papers in some disciplines, the Norwegian term 'mappevurdering or 'portfolio assessment' is being used for both. I have chosen to distinguish between a "simple" and a "complex" form of portfolio model.Because reflection is such an important aspect of learning and because it is as part of all portfolio models in international literature, I suggest that reflection is included also in what I call a 'simple' portfolio model, even though this not is the case today.

Assignment ⟶

Assignment ⟶   **PORTFOLIO**   ASSESSMENT

Assignment ⟶

         Reflection
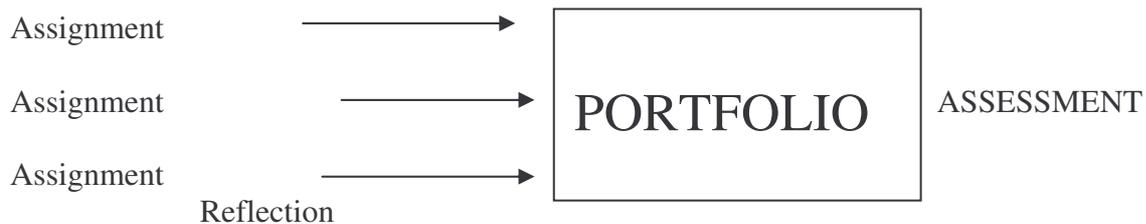
Fig. 1. A simple portfolio model ("coursework assessment")

A recent Norwegian example is the change in assessment practices in the introductory philosophy course at the University of Bergen. Instead of an end of term final exam, students may choose a portfolio model where they write three papers on self chosen topics, one in history of philosophy, one in logic and one in theory of science. These are collected in a portfolio and graded by an external assessor. Students are required to attend seminars where they discuss drafts of their papers with peers and the teacher. This is a good example of how the change to an alternative assessment method has changed the learing processes in the direction of more collaboration, response and supervision as well as more structure and control (Kavli 2001). Student satisfaction has gone up and failure rate dramatically down in this course at the University of Bergen.

A much more complex portfolio model originates in art education where students have collected their work in a variety of techniques in big portfolios. When they are to be assessed they select their best pieces of work. This "show case" or "presentation portfolio" is then evaluated. If results alone counts (for instance when they seek employment), the portfolio only contains products, while in a course of study students are often asked to document the process as well.

Assignment →
Assignment →   **WORKING**   selection   **PRESEN-**
Assignment →   **PORTFOLIO**   **TATION**   **ASSESS-**
                                                ➤   **PORT-**   **MENT**
Assignment →   reflection   **FOLIO**

Assignment ⟋   self assessment

Fig. 2. A complex portfolio model

Reflection and *self assessment* are new and important components of this portfolio model compared to the first one, as the student has to select items for the assessment portfolio. The most well known American portfolio project, Art Propel, initiated by H. Gardner at Harvard Graduate School of Education belongs here. "Collection, selection, reflection"are essential aspects or a complex portfolio model.
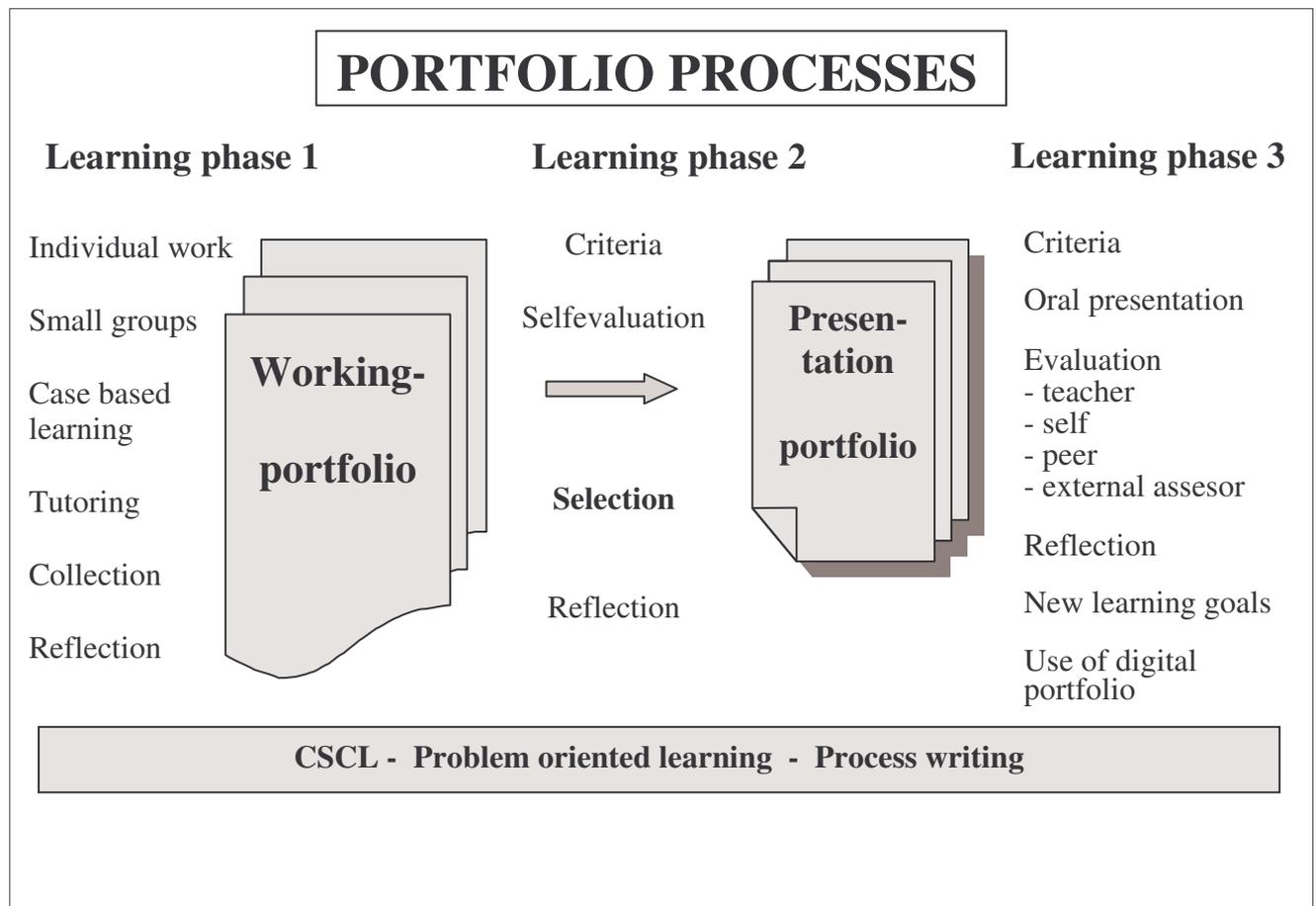
What characterizes our portfolio project?
Our project has adopted the following definition of portfolio, "Portfolio is a systematic collection of student work which shows effort, progress and performance in one or more areas. The collection must include student involvement regarding content, selection criteria and evaluation criteria and it must show student self reflection. (Paulsson,

Paulsson & Meyer 1991, p. 60-61). This does not mean that all the elements in the definition are equally emphasised in each of the project sites, but the definition functions more like a set of guiding principles. It should be noted, however, that the portfolio work started in each of the three participating institutions *before* the "Alternative asessement project" was set up. There was therefore no unified conception of portfolios from the beginning and discussions are continuing about useful portfolio models in each context.

Portfolios can include documentation of learning processes as well as the products of these processes, but except for the inclusion of reflective texts, the portfolios in our project have been product oriented. The final evaluation is based on the portfolios combined with other forms of oral or written exams. Specific issues relating to assessment will be dealt with in the next phase of the project.

A constructivist perspective on knowledge and learning is common to most portfolio projects in teacher education (Mc Laughlin & Vogt 1996), and reflection is a key concept in most of them, very often with reference to Donald Schon's relective practitioner. The international literature on portfolios, however, is mainly concerned with practice and theoretical discussions are relatively rare. In our project an identity mark is the specific focus on a sociocultural understanding of learning and the emphasis on collaborative learning processes. Our seminar presentations will focus on *the portfolio as a learning tool* more than as an assessment tool. We recognize that these aspects are closely connected, and that this combination present a particular challenge, but we do not discuss the specific problems of evaluating a portfolio here.

PORTFOLIO PROCESSES

Learning phase 1

Individual work

Small groups

Case based learning

Tutoring

Collection

Reflection

Working-portfolio

Learning phase 2

Criteria

Selfevaluation

Selection

Reflection

Presen-tation portfolio

Learning phase 3

Criteria

Oral presentation

Evaluation
- teacher
- self
- peer
- external assesor

Reflection

New learning goals

Use of digital portfolio

CSCL - Problem oriented learning - Process writing

Fig. 3. Portfolio processes in the project "Alternative assessment in teacher education"

The portfolio learning process should be regarded as a continuous process. The division in three learning phases in the figure above done in order to illustrates some of the specific learning activities that may take place within each phase. Various forms of problem oriented learning combined with CSCL and process writing can be seen as basic learning principles which run through the whole portfolio process.

Learning phase 1, the period when   students work individually and collaboratively with portfolio assignments, is the major arena for content oriented learning tasks. These assignments may be teacher or student initiated, but in our project so far mainly the former. Students work individually and in collaboration organized in small groups Case based learning is a central aspect of in teacher education at, the University of Oslo. Peer response and teacher tutoring are constitutive elements in all our sites. Information technology is integrated, not only as a communication tool and a vehicle for storing the portfolio artefacts, but also as a potential for transformational learning (see Otnes on the use of hypertext). Individual and collective reflection are important elements.

Learning phase 2 is connected to the selection for the Presentation or Assessment portfolio. (In some of the literature this portfolio is often called "showcase portfolio", but I avoid this term since it is associated with an approach focusing on product more than process) The learning in this phase is dependent on self assessment and individual reflection, but unless there is an emphasis on developing evaluation criteria and collective reflection and discussion of what constitutes good quality in each discipline, the individual student will lack the essential learning tools.

Learning phase 3 is connected with the final evaluation of the portfolio, and the learning is dependent on how the students are involved in this phase. The students may present their portfolios in various ways for the exam commission, and a dialogue may follow from the portfolio content. Another alternative is written or oral exams based in some way on the portfolio content and processes. The digital portfolios which are publisized on the web can be used actively as a learning tool to an extent which is impossible with paper based portfolios. This use is not restricted to phase 3.

II. Portfolio assessment in light of sociocultural theories of knowledge and learning

In order to provide a backdrop for the empirically based papers, I will now briefly outline the theoretical perspectives on which this project is based and discuss some consequences for the use of portfolios. I have chosen to present more theoretical concepts than will be followed up in the papers, as this is an exploratory stage as far as theoretical foundation is concerned.

Sociocultural perspectives on knowledge and learning have their roots in pragmatism (Dewey), social constructivism, cultural historical theory (Vygotskij) and dialogism (Bakhtin).While constructivism arose from Piaget's theories in developmental psychology and focused on the mental processes in the mind of the learner, the socioculturally oriented versions of constructivism view the construction of knowledge as essentially social and embedded in a community. A major influence has been Vygotskij's general genetic law of cultural development which claims that learning always occurs on two planes, first on the social and later on the individual plane

(Vygotskij 1986, 2001). While Vygotskij in his own work focused mainly on the role of language in learning processes, followers like Leont'ev (1981) emphasised the role of activity in human development, and both aspects are equally relevant in learning processes. Looking at dialogic and discursive elements is particularly useful for understanding learning processes per se, while activity theory provides a tool for describing the interrelationship of different levels of a learning system and their connections to the wider contexts.

In my discussion of sociocultural theory I have chosen to concentrate on the following key aspects: Knowledge and learning are 1) situated, 2) social, 3) distributed, 4) mediated, 5) dependent on language, and 6) dependent on participation in communities of practice (Dysthe 2001). Some would argue that these aspects are more characteristic of learning in the workplace than of learning in institutional settings, but the challenge right now is to document how and to what extent this view of learning helps us understand and improve learning environments in higher education. As a consequence of this perspective, CSCL (Computer Supported Collaborative Learning) is the paradigm for introducing information technology in this teacher education project (Solomon 1995, Koschman 1996). The sociocultural perspective also governs the understanding and practice of assessment, notably as closely integrated in the learning processes instead of as a separate event after the learning has taken place.

Knowledge, learning and assessment as situated
The term 'situated' (for instance in 'sitated cognition', 'situated learning', 'situated activity') is found in several disciplines with slightly different meaning, for instance linguistics, psychology, anthropology and all of them have influenced how the term is used in education. The cultural historical understanding is that thinking is always embedded or situated in a context, and the same goes for the content and production of knowledge. In theories of 'situated cognition' learning is seen basically as a process of enculturation into a community of practice (Brown, Collins & Duguid 1989, Lave & Wenger 1991). This means that if we want to understand the learning processes that teacher education students are engaged in, we have to study the different contexts where they take place.

From a situated perspective we should not be surprised at resistance from teachers who are inculturated into an assessment culture deeply embedded in a different view of knowledge and learning. It is important to realize that even though the teachers and students who participate in a portfolio project theoretically embrace a sociocultural view of knowledge and learning, their own experience as students and as teachers may be based in a different learning paradigm. Our portfolio project is therefore as much about developing a new teaching and learning culture as about assessment and the use of technology.

Learning is social
When talking about learning, the term 'social' is used in at least two meanings (Wertsch 1998). One emphasizes the historical and cultural context which the individual learner is situated in, the other the relational and interactional aspect.

While cognitivism takes the individual as the basic unit, the situated perspective claims that learning can only be understood by looking at the learner in context. Cole (1996) argues that context should not be seen as 'that which surrounds' the learner, but that metaphors of weaving help us understand the interconnectedness of all elements. In order to understand what functions portfolios may have in the learning processes in

different contexts, we need for instance to study the particular kinds of learning communities they are part of. This is why empirical studies of portfolios are important.

The second view of 'social' looks at the interaction processes. As shown in the Fig. 3 (Portfolio processes), collaborative learning processes are basic to what I have called "Learning phase 1". Koschman (1996, p. 13) points out that it is easy to recognize examples of 'collaborative learning', but difficult to define what it is. While Bruffee (1993) focused on the goal of collaboration as inculturation into communities of practice, Roschelle & Berend (1995) described it as mutual engagement in problem solving. "This latter definition highlights several facets of the method: a commitment to learning through doing, the engagement of learning in the cooperative (as opposed to competitive) pursuit of knowledge, the transitioning of the instructor's role from authority and chief source of information to facilitator and resource guide" (Koschman p. 13). Salomon (1995) emphasized "genuine interdependence" as the main prerequisite for collaborative team work, and he has also pointed out some of the common pitfalls for productive group collaboration. Case and problem oriented learning, various forms of small group learning are examples of collaborative learning methods in our project. Technology may serve as support to such collaborative processes (CSCL). A central goal of this project is therefore to find out in what ways the *digital portfolio* may enhance the collaborative learning processes.

Collaborative knowledge production may be documented in individual portfolios or group portfolios, ideally both the quality of products and processes should be documented. The portfolios in this project have been individual. Since students so far have more experience producing individual products and teachers likewise have more experience in evaluating those, there is a need for developing expertise on collective portfolios.

Knowledge and learning as distributed

When knowledge *production* is in focus instead of knowledge *reproduction,* the notion that knowledge is distributed becomes of practical importance in the learning activities. Learning is dependent on how well the group is able to draw on the different skills and insights of its members and thus extend beyond the capacities of the individual. It is worth investigating in this project to what extent students become aware of and utilize the distributed knowledge. The digital portfolios open up new opportunities of making visible how the knowledge of different students complement each other, on the one hand because they gain access to other students' portfolios, on the other hand through making hypertextual connections (see Otnes' paper with examples from a literature portfolio project where students from two institutions collaborated). An important issue to investigate is to what extent coproduction of knowledge and distributed learning actually takes place, or whether it is juxtaposition of different persons' knowledge which often is the case when students coordinate different tasks. The portfolios should reflect not only the contributions of each member but also the 'added learning value' of dialogical interaction of different voices (Dysthe 1996).

Portfolios as mediating artefacts for learning

The terms 'mediation' and 'artefacts' comes from the cultural historical school of Vygotskij, Luria and Leont'ev. They underlined the fact that human beings devlop and use physical, technical an semiotic tools. Tools are intellectual and practical resources which we have access to and which we use to understand the world around us and to act on it. In sociocultural literature the term 'artefact' is often preferred to 'tool' when describing the cultural elements which mediate activity, because 'artefact' includes

more of creativity while 'tool' may sound more mechanical (in Norwegian this connotation of 'artefact' is not obvious).

Portfolios can be seen as tools or artefacts which mediate learning. The physical and cultural aspects of the artefacts are important, and also what rules and routines and processes the portfolios are surrounded by and embedded in. When portfolios are seen solely as an evaluation tool, it is easy to focus just on the products. In our project it is important to document the practical aspects of portfolio work and how these influence learning. It is a challege also to include other types of artefacts than written texts.

The digitalization of portfolios provide an interesting example of how learning processes change when the mediating tool changes. The first step is to use digital portfolios just as a different medium of storage, but this projcet also explores the new learning potential in digitalization (Otnes 2001). This relates to the production phase which I have called Learning phase 1 (Fig. 3), but digitalization also opens up new learning potential as a result of the increased accessibility of portfolios on the web. How teachers and students utilize this learning potential, has not been investigated yet, but is an important area to follow up.

Language, learning and assessment
In higher education the ability to use language has always played an important role in exams, although usually a tacit one. The close connection between language and knowledge is undertheorized and in most disciplines it has not been explicitly discussed with students (Dysthe & Kjeldsen 1997, Dysthe & Breistein 1999).

From a sociocultural perspective communicative processes are vital to learning and development. Language is not just a mediating tool for learning, but closely bound up with thinking itself (Vygotskij 2001). Language is at the same time a collective, interactive and individual sociocultural tool and functions as a link between individual thinking and the wider culture (Dewey 1916, p. 9, Säljö 2000, p. 87). According to Bakhtin (1981,1996) and Rommetveit (1974, 1996) all communication is dialogic in the sense that understanding and meaning are created in the interaction between speaker and listener, writer and reader. This view of language has consequences for how learning processes are organized.

Language is part and parcel of all phases of portfolio work, not only when the documentation is a written product. Collaborative learning processes, as exemplified in Fig. 3, phase 1, are dependent on shared oral and written information and on dialogic interactions at all stages of knowledge production. Portfolios may include sound and video documentation. In the future it is to be expected that all portfolios will include multimedial texts. Today it is still a danger that portfolios place too much emphasis on written products in disciplines which are not served well with such a development. We use a wide definition of text in this project, and are interested in exploring new documentation genres.

Learning as participation in communities of practice. Portfolios as reification
A fairly new but useful way of understanding learning is to view it as participation in 'communities of practice' (Lave & Wenger 1991, Wenger 1998). A community according to Wenger is characterized by *mutual engagement, joint enterprise and shared repertoirs*. To define a teacher education class as 'a community of practice' presupposes that the individual students share a mutual engagement in learning, that they are willing to define the particular learning task as a joint enterprise, and that they share 'repertoirs', for instance learning strategies for group work, for how to give response or for how to create hypertextual links. Because our traditional view of

learning has focused on individual cognitive activities, students may need time to understand and accept the implications of the community concept.

’Participation’ is both personal and social and the term describes ”a complex process that combines doing, talking, thinking, feeling, and belonging (Wenger 1998, p. 56). Participation includes all kinds of relations, not just collaborative, but also conflictual and competitive. This is in keeping with Bakhtin’s view of dialogue where the creative potential lies in the tension between multiple voices and conflicting perspectives (Bakhtin 1986, Dysthe 2001).

’Reification’ is another concept introduced by Wenger which may be useful in order to understand the role of portfolios in collective learning processes. Etymologically the word means ”making into a thing”, but Wenger uses it in a more general sense of processes that give form to our experience by producing objects, processes that include for instance ”making, designing, representing, naming, encoding” (Ibid p.s 59), as well as the products of such processes. According to Wenger participation and reification are complementary and they cannot be considered in isolation from each other. Products presented in portfolios may vary from written or multimedial texts to material objects and video of a drama performance. What are the implications of understanding portfolio products and processes as reification? This needs exploring, but one implication may be that portfolios must be viewed not just as a manifestation of the individual student but as somehow representing the group or community. Portfolios could then open up a new room for reification, for making tangible and visible both the processes and the products of participation in learning by providing a wider scope for various ways of documentation. A much more detailed analysis of portfolios is needed to substantiate how various forms of reification influence learning, but also how to transcend our dichotomized thinking about individual and collective contributions.
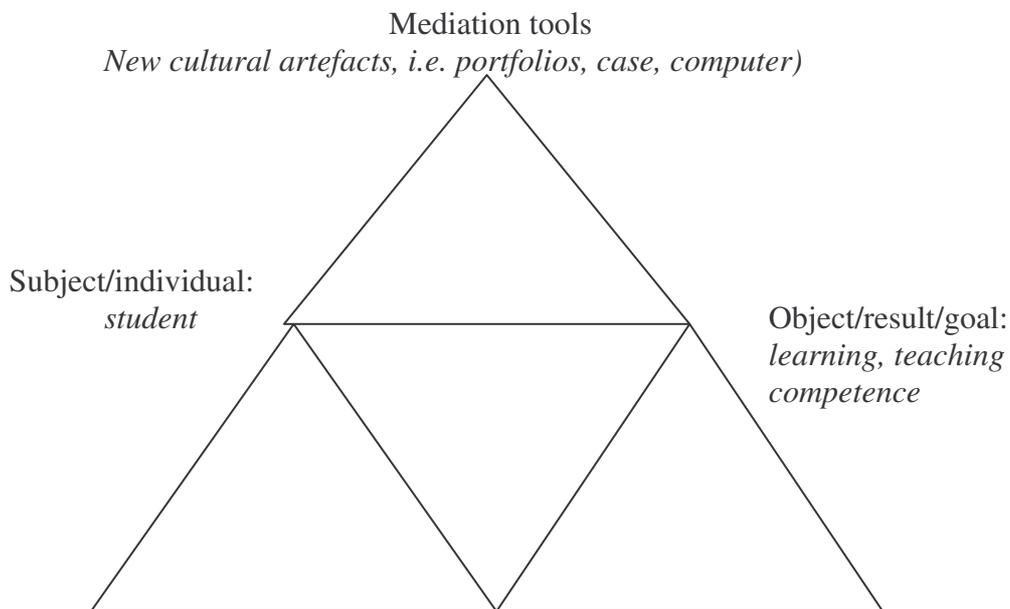
Teacher education students participate in several communities of practice, most notably different are the disciplinary contexts where they learn for instance math, English or educational theory, and the school practice contexts where students engage in authentic teaching activities. One aspect of this portfolio experiment is to find out whether portfolios (and in particular digital portfolios) may function as ’boundary objects’ (Wenger 1998, p. 107, Ludvigsen & Flo 2001). These are objects (reifications) which serve to coordinate and tie together the perspectives of multiple practices (see also Engelsen’s paper).

Another fruitful perspective gained from the social learning theory of Lave and Wenger is viewing learning as movement from a position of ’peripheral participant’ to a more central position in the community, as the student gradually increases her understanding, knowledge and skill (Lave 1997). This is particularly relevant when the goal of learning is as complex as teaching competence. Portfolio documentation can then be seen as a way of visualizing ’trajectories of participation’ for the individual student. The challenge then is to combine this with the community aspect. Portfolios cannot serve all purposes at the same time, and it is obviously very important to discuss the primary goals for using portfolios in this project and whether the use differs between the three sites.

Portfolios in an activity theoretical perspective
Because CSCL is very often discussed in an activity theoretical framework, I will briefly present Engestrøm’s model and indicate how the elements in our portfolio project fit into the model. The advantage of activity theory is that it provides a framework for understanding how each aspect and level of the learning processes are

connected with the cultural activities in which they are embedded and how they mutually interact.

Mediation tools
New cultural artefacts, i.e. portfolios, case, computer)

Subject/individual:
student

Object/result/goal:
learning, teaching
competence

Rules, rituals,	Communities	Division of labour
i.e.group and response rules	*Basis groups*	*Student,teacher, peer*
	teacher ed. class community,	
	school community, practice school	

Adapted from Engestrøm's (1987) model of an activity system

In Engestrøm's modell individual action is represented by the upper part of the triangle. Portfolios and computers are conctete and physical mediating tools (artefacts) of learning, while case method, project- and problem oriented forms of learning and process writing may be seen as other types of mediating tools for learning. The immediate result or goal is qualitatively good portfolio products, while the long term goal in teacher education is knowledge and skills which make students comptent teachers.

From an individually focused view of learning the upper triangle is the important one and traditional teaching concentrates on this. From a sociocultural perspective, on the other hand, individual acts are always situated and embedded in a wider social, cultural and historical context, here illustrated by the upper triangle being connected with the lower. Each teacher education student participates in a number of different communities of practie which all influence learning. One example may be a basis group, which over time develops its own rules and rituals for how to function together. This group develops a shared history throughout the year. The student is also a member of the community of practice constituted by the teacher education class and during the periods of practice teaching, the student becomes a member of a school community of practice with its particular culture.

Traditionally the division of labour was clear and unambiguous: the teacher lectured, asked questions and evaluated answers while the students listened and answered, in oral or written form. In todays' classroom communities of practice the division of labour is changing and peers take over some of the work of the teacher, including response and feedback; sometimes also evaluation. The portfolio processes mirror this development which in Norway is most clearly mandated in the socalled "Quality reform" based on Stortingsmelding 27.

.   The relations between the different parts of the triangles are not static; they mutually influence each other. According to Jonassen (2000) schools are activity systems which differ from everyday activity systems because the learning activities do not have any concrete production goal. The lack of such concrete goals is a problem, and one of the reasons for the popularity of portfolios may be that they serve as visible and concrete products of activities which usually are invisible. Such concretization is useful, but the danger is there that portfolios become an aim in itself .

While cognitive psychology tradtionally has focused on mental representations alone and ignored artefacts and other mediational tools, activity theory claims that it is impossible to understand activity systems without looking at how artefacts are integrated in different social practices. In this project we will try to illustrate how portfolios may function as mediating artefacts in collaborative learning processes where information technology, casebased and problembased learning are central, and how different contexts may create different portfolio practices.

A paradigm shift in views of learning and assessment?

I have earlier mentioned that this project is not just about portfolios but also about developing new ways of thinking about and practicing teaching and learning. In our tradition teaching and learning have been closely connected with 'the conduit metaphor' of communication (Reddy 1979, s. 235, 286, Wertsch 1991, s. 71-72). This lies behind the most common communication model: Sender – Message – Receiver. Teaching has been understood as different ways of transmitting the message. Assessment was seen as checking what the learner had understood and remembered. This is a simplistic and technified view of how human beings communicate and learn.

Alternatives to the transmission model are rooted in different forms of constructivism and based on a distinction between 'information' and 'knowledge'. Information becomes knowledge only in confrontation with our prior knowledge and experience. While cognitive learning theories focus on individual knowledge construction, sociocultural theories underline that meaning and understanding are developed in cooperation and dialogue. As I see it, these processes are mutually dependent.

Assessement is situated in particular cultural contexts and shaped by them It is a problem that evaluation theory and practice mainly have been devloped within behaviouristic views of learning (Geeeno, Collins, Resnick 1996). Techniques which were developed to test intelligence (Binet) were transferred to evalution of school disciplines. Such tests composed of isolated questions were meaninful from a quantitative view of knowledge, as they answered the "how much?". When the purpose of evaluation is to measure how much students have learnt in a discipline, the consequence is foten that students are more concerned with reproducing than with developing knowledge

We are now in a transition phase where both cultures of learning and cultures of assessment are changing and live side by side in all educational institutions. It is therefore necessary to analyze what characterizes the cultural contexts in higher

education, particularly what view of knowledge and learning the teachers adhere to. Traditional sit down exams where student collaboration is banned, was the result of a view of knowledge as objective and transferrable and individually based. It is therefore logical that reproduction of knowledge and not the production was foregrounded in this assessment culture. If portfolio assessment is introduced into a culture dominated by a traditional view of knowledge and learning, the outcome may either be an instrumentalisation of portfolios or a change in the culture itself. Portfolios are a strong change agent, but there is always a danger that it will be used only to document knowledge reproduction. I will argue that this is the if case teaching goes on as before and the only difference is that students on an indiviudal basis produce objects which are placed in a portfolio. In a traditional assessment culture, where the control aspect of evaluation is highlighed, there will be considerable resistance against making portfolios alone the basis of assessment. The compromise is often that in combination with a traditional exam, the latter accounts for most of the grade.

Teacher education must provide students with basic disciplinary knowledge and teaching skills which enable them to function well in their first job as teachers. It is impossible, however, to provide them with everything they need, and therefore one of the most important tasks of teacher education is to educate teachers with the ability to self assess their own work, to discern for themselves what they need to learn and adopt adequate strategies of learning. In school contexts this means among other things to be able to learn from their colleagues and be critical to established cultures at the same time. Maybe this is where the ultimate goals of collaborative portfolio models lie.

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