

Project thinking, project practice: Experiences using rich pictures in a project of academic development

Jon Amundsen
Faculty of Education, Oslo University College
Postboks 4, St. Olavs plass, 0130 Oslo
jon.amundsen@lu.hio.no

Laurence Habib
Centre for Educational Research and Development, Oslo University College
Postboks 4 St. Olavs plass 0130 Oslo
laurence.habib@hio.no

Hilde Harnæs
Faculty of Education, Oslo University College
Postboks 4 St. Olavs plass, 0130 Oslo
hilde.harnaes@lu.hio.no

ABSTRACT

This paper describes a ‘methodological experiment’ whereby some elements of Soft Systems Methodology, in particular the concept of ‘rich pictures’, have been used to support academic development work. It provides some insights into how identifying stakeholders and involving them in a collective ‘rich picture drawing’ process can be beneficial to a project of academic development. The paper also draws attention to various levels of ‘filtering’ that may occur when planning and performing the drawing of rich pictures as a collective endeavour.

INTRODUCTION

Over the last few years, institutions of higher education in Norway have increasingly focused on promoting educational research and development (R&D), with a particular emphasis on reporting results from R&D activities. Academic development is an intrinsic part of the organisation of an institution of higher education, both among managerial, administrative and teaching staff. New teaching techniques, new methods of assessment, new learning forms are frequently devised, tried out, evaluated and either further developed or abandoned. However, this process is often informal and seldom documented.

This paper is not a full-fledged presentation of extensive empirical material. Neither does it pledge to make significant contribution to theory. Rather, it presents some preliminary results and insights from what could be referred to as a ‘methodological experiment’. This experiment is a modest attempt at trying out the applicability of a methodological tool mostly used in the discipline of information systems to structure some of the processes that pertain to the field academic development and to render such development more participative. This experiment took place at the Faculty of Education at Oslo University College (OUC) during the 2005-2006 academic year and was initiated by the course tutors of a third-year elective in the societal, scientific and technological aspects of environmental issues.

OVERVIEW OF THE PROJECT

Description of the programme

Background

The teacher education programme is a 4-year programme providing formal professional teacher qualification for primary and lower secondary school. The programme follows the standard curriculum approved at the national level and is subject to national accreditation. The current framework for the programme was introduced in 2003. The first two years of the programme consist of a range of compulsory disciplines including educational theory, Norwegian, religious studies and mathematics. During the last two years of the programme the student teachers can choose amongst a number of options consisting of school or school-related subjects. In addition to the theoretical studies, the programme includes a 20-week placement in schools where student teachers are supervised by experienced teachers.

The Norwegian Ministry of Education and Research has devised several plans for information and communication technology (ICT), requiring that institutions for teacher education get involved in the development of computer-supported teaching and learning methods (UFD 2003; Ministry of Education and Research 2006a; 2006b). The last plan to date (Ministry of Education and Research 2006b) envisions ‘digital competence for all’. It states that all teachers and school managers are expected to be ‘digitally competent’ by 2008 and that it is the responsibility of institutions for teacher education to achieve this goal. The latest reform within primary and secondary education, ‘Knowledge Promotion’ (‘Kunnskapsløftet’ in Norwegian) defines ‘the ability to use digital tools’ as one of five ‘basic skills’ that are deemed to be “an important foundation for all other learning”¹.

¹ The notion of *digital competence* is relatively complex and often ill-defined. An extensive discussion of the meaning of the term is, we believe, beyond the scope of this paper. It could, however, be the focus of another paper that would concentrate on gathering information about how different stakeholders relate to the notion of *digital competence* with the help of a ‘rich picture drawing process’ and analysing this information in the light of the existing literature on *digital competence*.

Description of the student group in our study

The 23 students in our study have completed the first two years of their teacher education programme, i.e. with the compulsory courses in the required disciplines. They have in their third year chosen a one-year interdisciplinary course focusing on issues of environmental literacy, which is based on a number of related disciplines within the realm of social and natural studies. Two of the authors of this paper are the course tutors and have been responsible for most of the teaching and the organisation of the course.

Through the different parts of their 4-year programme, the student teachers are expected to achieve a relatively high level of digital competence. The lecturers at the Faculty of Education are therefore expected to design a variety of learning activities in order to develop their students' digital competence. In their third year, the student teachers go on a 6-week long placement in a local school and are expected to use the online learning environment (OLE) available at their placement school with the class they have been assigned to follow.

It seems important to pinpoint that teacher education is different from other higher education programmes in at least one respect: although the student teachers are students of higher education with the same challenges as other students when it comes to their own learning, they are also preparing for supporting the learning of their future pupils. The lecturers at the Faculty of Teacher Education have therefore a special challenge in communicating this perspective. The existence of this double role both for student teachers and for lecturers at the Faculty is bound to affect the student teachers' perspective on learning and their understanding of pedagogical issues. This article will show that using a rich picture to map out the activities of the Faculty and of their students might be useful in shedding light onto the implications of those two sets of double roles.

We consider that both the student teachers' mentors and the lecturers at the Faculty can be referred to as *teacher educators*. Those two groups have different, but complementary roles in developing the student teacher's pedagogical competence and in particular their digital competence. It is to be expected that the two groups will see the issues of pedagogical competence and digital competence from two different perspectives, which renders a tight cooperation between the groups necessary. Such cooperation needs to be based on a common understanding among teacher educators of their joint responsibility in developing teacher competence. Typically this cooperation takes the form of meetings between lecturers and mentors at OUC, and discussions between student teachers, their mentors and their OUC lecturers when the lecturers visit the school during their placement. Our experience is that organising and attending physical meetings is often a time-consuming process, and we have therefore been looking for some time into the possibility of expanding those arenas of cooperation.

One of the goals of our development project is to complement the existing forms of cooperation with a new communication canal, namely a shared "room"² in Fronter where student teachers, their mentors and their OUC lecturers communicate. The

² Fronter uses the 'room' metaphor to refer to a closed online space where a group of users can share documents as well as communicate with each other using functions such as chats and forums.

implementation of this scheme has gone through several stages. During the first year of the project, only mentors and lecturers had access to the room. The year after, we also gave student teachers access to the room. The project is now in its third year and we are continuously developing the concept of a shared room for teacher educators and student teachers. Building such a room is a straightforward task from a purely technical point of view. The real challenge consists in customising the room in such a way that it promotes the development of the student teachers' general and digital competence. We are currently in the process of completing the implementation of such a room and this article presents one of the methods used so far in order to identify the requirements from the various types of stakeholders.

Description of the software

An OLE³ generally consists of a set of online functions that are meant to enhance learning and facilitate teaching. OLEs are usually marketed as systems that will allow for easier and more fruitful communication among students and teachers, with a particular focus on teacher-student or mentor-student interaction. Many OLEs also allow for the tracking of student activity and achievements. Although the term OLE conjures up images of distance education where students and teachers interact exclusively online, OLEs are also widely used to support and complement campus-based courses.

The OLE used at Oslo University College, Fronter, is a commercial software package developed by a Norwegian company, Fronter AS. It is used in a large number of other Norwegian university colleges, as well as schools, universities, public and commercial organisations within or outside Norway. This software package offers a range of standard functions, as well as optional functions that can be purchased separately. However, Fronter is not an 'off-the-shelf' package, as each implementation requires a certain amount of involvement of the developing company.

The teachers that use Fronter are typical end-users with no or little influence on the development of the product. Although there is room for some customisation of the software at the institutional level, at the departmental level, and at the individual level, Fronter is nevertheless a standardised product. Whenever a need for a new or improved technicality is uncovered at OUC, it is to be reported to the 'head OLE coordinator' at OUC, who in turn informs the developers of the products. All the reported requests for changes in the product are then listed and prioritised by the development team at Fronter AS, who choose what feature they will modify, as well as how and when this will be done. In other words, users have no direct influence on the design of the product, and their indirect influence is somewhat limited as OUC is only one customer among many others.

³ In this paper, we choose to use the term Online Learning Environments to refer to the system in use at OUC. Such systems may also be referred to as Virtual Learning Environments, Learning Management Systems, Managed Learning Environments, Course Management Systems

USING RICH PICTURES AS A METHODOLOGICAL TOOL

Research approach

This project is first and foremost a development project. However, the practice-based experiences gained throughout the project are expected to bring some insights into more general questions such as what desirable and feasible academic development is as well as what technology can be used to support it and in what way. In that sense, this project is carried out as 'reflective practice', or 'reflection in action', to use terms popularised by Donald Schön (1983, 1987).

Soft Systems Methodology

Soft Systems Methodology (SSM) was developed by Peter Checkland and colleagues at the University of Lancaster (Checkland 1981, 1988; Checkland and Scholes 1990; Checkland and Poulter 2006) and can be seen as affiliated with earlier literature concerned with accounting for the complexity of organisations, as for example von Bertalanffy (1973) and Vickers (1965, 1970). SSM was developed as an alternative to 'hard' and systematic approaches to problem solving that seemed to dominate the field of information technology in its early days. 'Hard' problems are characterised as being well defined and with a definite solution. In contrast, 'soft' problems (or, more accurately problem situations), are entangled in a web of organisational, political and social considerations, and are thereby ill-structured and difficult to delimitate.

Checkland (1981) proposes a seven-step model of inquiry, meant to provide tools for a thorough investigation of a given problem situation, with a particular focus on the elicitation of the different world views and belief systems held by the various actors or stakeholders in the process. One of these tools consists of drawing a 'rich picture' of the situation that is considered problematic, so as to bring to light not only the various elements and actors in the problem situation but also their relationship with one another, with a particular emphasis on the existing and potential conflicts and alliances.

SSM has been used both in academic and in non-academic settings as an approach to explore complex problem situation, and often as a problem solving tool. SSM has found resonance in a wide variety of disciplines, including psychology (e.g. Kennedy, 1996), healthcare (e.g. Carr, et al., 2006), agro-technology (e.g. Mills-Packo, et al., 1991), community development (e.g. Cook, 1987) and development sustainability (e.g. Presley and Meade, 2002). However, to our knowledge, SSM has rarely been applied to the field of academic development, which constituted an additional motivation for trying it out.

A new area of use

The project described in this paper is not a software development project. It is a project of academic development in which the main emphasis is on supporting the students' learning with the help of an OLE. However, we would argue that this project could also be apprehended as a systems development project, in the wider sense of the term. In other words, the pedagogical framework of the course could be considered to be a system that

is under continuous change due to the pressure from the outside environment (both from 'above' - e.g. managers at the College and decision-makers at the national level - and from the 'grassroots' - e.g. student feedback, requests from the placement schools, etc.) and from the motivation of the course tutors themselves.

There is no universal definition of what the term *academic development* refers to. However, it is possible to propose a broad definition of the term as consisting of designing, developing and evaluating teaching and learning programmes, activities and materials (Bird 2004). This embraces work performed by lecturers when they develop a course, planning activities performed at the departmental or institutional level to build a consistent and coherent curriculum, as well as advice provided by external academic development consultants.

Trying to define academic development is especially challenging because there is no agreement as to whether it is a practical activity or academic work in its own right. At OUC, when carried out by the lecturers of the course themselves, academic development is viewed both as a practical activity - i.e. an integrate part of their daily teaching practice - and as a development activity which would then belong under the "Research and Development" (R&D) umbrella. When carried out by academic development advisors, i.e. persons who are not teaching the course directly themselves but are helping out teachers with the design and evaluation of their courses, it is considered both a consultancy activity and an R&D activity. When administrative and management staff are involved in academic development, however, it is more often seen as part of a broader process of organisational development than R&D work as such.

From what we can gather from our experience and from conversations with colleagues at various university colleges around the country, academic development is often an ad-hoc activity. Course developers at OUC and in other colleges in Norway seem to have a 'traditional' methodological training, in that sense that it is primarily focused on learning how to carry out research activities and is rarely directly applicable to activities of academic development. Our understanding is that there is a growing need among academics conducting academic development work for tools that would help them structure their development process. Another issue that seems to be of growing significance for academics involved in development work is the need for alternative forms of documentation to supplement the more traditional forms such as reports, conference papers, journal articles (Oftedal 2006).

In addition, academic development at OUC has long been a rather individual, almost 'private' affair, as lecturers have often been free to develop their teaching independently of the rest of the faculty, and with no or little involvement from for example students, or non-academic staff. This thinking, however, is becoming less and less prevalent, as institutions and departments increasingly promote academic development as a team effort. What is still sometimes unclear is who is supposed to be part of those teams, and what form this collaboration is supposed to take. We imagined that one way to address the problems identified above could be to borrow some of the conceptual tools offered by Soft Systems Methodology, in particular the drawing of a rich picture of the problem situation.

PRELIMINARY INSIGHTS FROM EXPERIENCE WITH THE METHOD

Summary of our experience

Developing the digital competence of student teachers has long been a priority among members of the faculty, both through the studies ‘on campus’ and during the placement periods. Familiarity with digital tools has become a prerequisite for performing assignments and examinations. In addition, student teachers get first-hand experience in using digital tools to create pedagogically sound educational activities for their pupils. The need for a better coordination between placement organizations and institutions of professional education has been a recurring theme in discussions among academic staff in University College education over the last years. One of the major aims of our project is to strengthen the cooperation between the Faculty of Education and the placement schools, and we have chosen to use Fronter as an additional platform for communication and information exchange between lecturers, student teachers and mentors.

Student teachers use OLEs for a number of purposes. First, they use the College’s OLE as a platform to support their own learning process (they download lecture notes and other relevant information, hand in their assignments and get feedback online via the OLE). The OLE is also an administrative tool in the sense that students use it to find practical information about their course. In addition, they encounter OLEs in their teaching practice in their placement schools, which use OLEs both as a tool for supporting the children’s learning process and as a tool for communication between the school and the children’s homes.

We felt that such a complex project would benefit from a method that would provide tools for structuring the development process while preserving its ‘richness’. In that respect, Soft Systems Methodology appeared to be a very promising candidate. In particular, we felt that the concept of rich picture was particularly adapted to the needs of our project. The first challenge was to determine who the stakeholders of the project were and who would be representing them in the process of drawing a rich picture. There appeared to be four major groups of stakeholders in the project in addition to ourselves: the student teachers, their mentors at the placement schools, as well as management and administrative staff at the College.

We therefore invited two student teachers, two mentors from placement schools, the Head of studies, and two members of the administrative staff (one of them specializing in organizing the students’ placements) to participate in a two-hour seminar around the issue of “developing student teachers’ competence using Fronter”. The reaction to the invitation was overwhelmingly positive. Our feeling is that the stakeholders, although they were somewhat taken by surprise, all responded positively to an initiative which they felt was meaningful.

We opened the seminar by presenting Soft Systems Methodology and introducing the notion of rich pictures, after which we started drawing a rich picture of the situation at hand. In order to document the process, we used large flip-over sheets and took digital pictures both of the process and of the end result. The response from the group was by and large positive to the method from the start. However, some of the participants were somewhat taken aback by the apparent naivety of the method, at least at the beginning. The novelty of the method was also a challenge for some of the participants. One of them suggested that it would have been preferable to introduce the method prior to the seminar, so as to allow them to come to the seminar somewhat prepared. All the participants, however, including those who started off with a feeling of reticence, seemed to 'warm up' to the method after a while and entered willingly and eagerly into the discussion.

The extent of our participation to the discussion and the roles taken during the seminar was much influenced by our formal role in the project. Two of us are tutors for the course and have been involved in the organization and the building of content for the course in a much greater extent than the other participants. As a result the two of us ended up participating less in the discussion for fear of intervening too much and imposing their views onto the other participants. The third author, who is not involved with the organization or the teaching of the course, was chosen to be the 'drawer' as well as the discussion moderator. This turned out to be a rather complicated task, as suggestions were popping up from all sides and it became difficult to both keep track of a lively discussion and 'translate' each suggestion into a pictorial representation. Another challenge we encountered was that the ideas that were expressed first were, naturally enough, drawn up first. Those first images became a sort of framework for the rest of the discussion, and subsequent ideas that did not fit in with the early framework were either added somewhat awkwardly to the picture or even discarded.

Insights

We had several discussions about principles as well as practicalities both prior to the seminar and after it. The questions we pondered touched a variety of issues. First and foremost, identifying the stakeholders is not a straightforward task. Moreover, as it is practically impossible to gather all the stakeholders around a table, there is a need to identify groups of stakeholders and choose one or more representatives for each group. This raises the question of how those representatives should be chosen or elected, and by whom.

Another question is whether an incentive should be offered to reward participation to the rich picture process. On the one hand, if participants are offered a reward for participating in the process, there is a risk that they might say what they believe the organisers would like them to say in order to remain in the process or even in order to feel that they are 'worthy' of the trust the organisers have shown them. On the other hand, if no incentive is proposed, there is also a risk that the data gathered will be biased, as it is probably that only the stakeholders that have very strong opinions about the project (either positive or negative) will make the effort to attend the meetings.

Another significant issue is that of the drawer's privileges. The framework we have worked with is that participants were gathered around a table in order to try and come up with a common rich picture of the problem situation. For practical reasons we chose to have only one person standing at the board and doing the drawing. This means that it is up to the drawer to select what statements to take into account when drawing the picture. It is also up to the drawer to choose what pictorial tool to use to represent the ideas expressed by the participants. It is unavoidable that the choice of pictorial tools will be affected by the drawer's frame of reference, world view and preconception about the project.

Another important element is the role of the picture in the dynamic of the discussion. It is not unlikely that whatever will come into the picture and how it is drawn will influence the rest of the discussion. We observed that, during the seminar, the conversation started with participants looking at each other, but that, as the picture was starting to take form, they increasingly turned their gaze towards the whiteboard and less and less towards each other. This pattern might have been accentuated by the way the room was organised. The room we used for the seminar was a teaching room with a traditional classroom setting, i.e. with rows of tables and chairs facing the whiteboard. As all the participants sat on the first row, it probably felt more natural for participants to look at the whiteboard than to look at each other. Perhaps a "U-setting" might have been more appropriate for such teamwork, as participants would then have faced both each other and the board.

Those three elements could perhaps be seen as constituting three levels of filtering taking place in the process of organising and carrying out a 'rich picture drawing session'. The first level of filtering happens as the project managers identify the stakeholders and choose which representative of each stakeholder groups will be invited to attend the session. The second and third levels of filtering come about during the session itself. In a first instance, the drawer's interpretation of the participants' statements acts as a filter between what is said and what is represented on the picture. In a second instance, the participants' own interpretations of what is represented on the picture act as a third filter to the discussion that takes place during and after the drawing of the picture.

Gathering people around a table to draw a rich picture is bound to affect the project in a number of ways. First of all, involving stakeholders might increase their awareness of the role they play in the project and highlight the relationship they have with one another as far as the project is concerned. This approach differs greatly from a more 'traditional' approach whereby a small project team gather information from different sources without a dialogue between the sources and without an involvement of the sources in the process of data analysis. In particular, if the project team only conducts one-to-one interviews with stakeholders in a project, those stakeholders might consider themselves to be mere informants, rather than genuine actors. Inviting the stakeholders to contribute to the process of outlining and defining the project might positively affect their perception of the project and contribute to making them feel that they have an active part to play in the project. In addition, organising and carrying out the rich picture drawing process as a collective endeavour may shed light on the project managers' own role as both actors and mediators. It can also help them appreciate how much the information they get is situated.

Drawing a rich picture together with other stakeholders in the project may increase the stakeholders' awareness of the wide variety of perspective and interest that may come about in a project. Furthermore, the group of stakeholder representatives gathered for the purpose of drawing a rich picture is likely to develop some sort of common frame of reference, which can be a more solid basis for future dialogue than just receiving information from the project manager. The stakeholders can then more easily develop a feeling of being part of a multi-actor process whereby the information they provide and the actions they carry out have an impact on the whole project.

One of the key factors in teacher education is the relation between the Faculty of Teacher Education and the schools where teacher students have their classroom practice. The communication between the placement schools and the teaching and administrative staff at OUC has often in the past been inadequate, affecting both the institutions themselves and the student teachers having to relate with two 'worlds' that did not have a satisfactory dialogue with one another. A recent report from the Norwegian Agency for Quality Assurance in Education (NOKUT 2006) has identified the lack of cooperation between faculties and the placement schools as a general problem for teacher education in Norway. Our personal experience is that using rich pictures to describe the situation involving all the parties in teacher education, is a way to 'bridge the gap' between OUC and the educators working with the student teachers in the classroom. We all became 'reflective practitioners' with different perspectives on a common topic of teacher education, i.e. the students' digital competence.

Using rich pictures to describe a complex situation can also help articulate some of the implicit beliefs that underlie our academic practice but are seldom put into words. For example, in our case, much of the discussion turned out to be centred on the digital competence of the student teachers in the schools, and less on the students' own ability to deal with the digital challenges they are to face during their studies. Drawing a rich picture of our daily practice made it clearer that our focus was chiefly on the lower-grade educational system where student teachers are meant to enter after they have completed their degree.

An additional challenge we had to face in the process of drawing a rich picture of our practice is that the schooling system in general and computer use in schools in particular are popular topics both within and outside the Faculty of Education environment. Therefore, it is not improbable that a discussion even remotely related to the issue of children's digital competence would rapidly turn into an argument centred on that particular issue. This is but an example of a complex situation that is artificially simplified because one of the secondary elements of the situation becomes the anchor point of the debate. For that reason, organisers and moderators of rich picture drawing sessions may need to think carefully before embarking on discussions that can 'zoom in' too early on one particular topic. Rich pictures are meant to preserve the complexity of a given problem situation, and it would seem that the method would lose much of its function if the discussion converges on one or a few particular issues.

A last insight gathered from our experience is that the format of the rich picture is quite appropriate to help identify the various ‘Weltanschauungen’ (world views) of the participants to the process. Laying the participants’ perspectives on paper in a slightly caricatured way (using hearts, swords, brick walls, etc.) can perhaps help the participants visualize each other perspectives more easily and can possibly be the first step towards a collective reflection on exactly what preconceptions lie at the heart of the those perspectives.

THE WAY FORWARD

The use of rich pictures as a tool to involve and engage stakeholders has so far been fairly successful within the realm of our project. We therefore plan to carry out more regular meetings with a focus on developing the existing rich picture or on drawing new ones in the future. This will, hopefully, contribute to strengthening the group of stakeholders and consolidating the feeling of belonging to a wider project where the individual actions of each participant have long-term consequences on the development of academic practice. For example the student teachers’ mentors in the placement schools can get a more accurate picture of how their mentoring activities might contribute to the students’ combined digital and pedagogical competence.

The next phase of our research will be less experimental and will use more ‘traditional’ research methods such as in-depth interviews of the participants to the rich picture sessions, recording and transcripts of meeting discussions, as well as an analysis of the various rich pictures drawn during those sessions. It will also focus more particularly on gaining a more comprehensive understanding of what the notion of digital competence entails for the various stakeholders, and how the various visions may recoup or contradict each other. In order to gather as much first-hand information as possible from the sessions, we will consider bringing in an observer who is not a stakeholder to take minutes of the discussions taking place during the rich picture sessions. This observer could also be given an additional role as ‘questioner’. In other words, he or she would have the task to question the stakeholders’ perspectives, or, more precisely, to elucidate the reasons behind the perspectives presented by the stakeholders.

A rich picture is, almost by definition, everything but a harmony model. It is bound to highlight a range of diverse and often conflicting perspectives. In spite of this - or perhaps precisely because of this - we believe that rich picture drawing can be a very constructive step in an academic development process, whether it involves information technology or not. The process of collectively drawing a rich picture can help create an open and dialogue-oriented atmosphere, which can help the stakeholders getting a deeper understanding of their own perspectives as well as a better grasp of the other stakeholders’ positions, and can thereby constitute a ‘richer’ base for future decisions and actions.

As suggested in the introduction, the experiment presented here is fairly limited in scope and in explanatory power. Further empirical data will be needed in order to draw more

general conclusions regarding the applicability of Soft Systems Methodology to the area of academic development, and the adequateness of rich pictures as a tool for supporting stakeholder involvement in academic development projects. Borrowing conceptual tools from one discipline to use them in another is generally not a straightforward task. It can therefore be expected that a certain amount of adaptation will be needed in order to make the original methodology suitable for a new area of use. We hope that the rough ideas presented in this paper can form the basis for a more systematic development of the method for the purpose of supporting academic development projects.

BIOGRAPHY

Jon Amundsen is Assistant Professor at Oslo University College, Faculty of Education since 1992. He is teaching Social Science and History. His prior work experience includes teaching History at University of Oslo and the University Colleges at Lillehammer and Telemark. His research interests have been social and political history in Norway in the 1930's, with emphasis on the working class movements. His current research interests include academic development of digital learning technologies and programs in the field of teacher education in History.

Laurence Habib was awarded her Ph.D. degree in the Information Systems Department at the London School of Economics in 2000. She is now Associate Professor at the Centre for Educational Research and Development at Oslo University College. Her prior work experience includes systems consultancy at Agresso Group and research into new media at the Norwegian Computing Center. She is a regular reviewer for a number of international journals and conferences and has been Associate Editor for the Social, Behavioral and Organizational Aspects of Information Systems track at the International Conference for Information Systems in 2006. She is the initiator and manager of the GOLEM project (Generating learning using an Online Learning Environment as a Medium), which involves several Norwegian institutions of Higher Education. Her current research interests include the pedagogical, societal and organisational consequences of learning technologies as well as the methodological aspects of academic development.

Hilde Harnæs is Associate Professor at Faculty of Education at Oslo University College. She has worked in teacher education from 1988 including teaching and R&D in the field of physics, science and environmental education. Harnæs was head of studies from 1996-2000. She was the leader of the national group evaluating the teacher training programme in 2002 and participated in the group evaluating the Danish programme in 2003. Harnæs has published textbooks for schools and worked as a teacher in lower secondary school. The last years she has had a special research interest in developing the student teacher's digital competence and digital learning technologies

REFERENCES

- Bird, J. (2004) "Professional navel gazing: Flexible learning professionals into the future," in R. Atkinson, C. McBeath, D. Jonas-Dwyer & R. Phillips (Eds), *Beyond the comfort zone: Proceedings of the 21st ASCILITE Conference* (pp. 123-133), Perth, 5-8 December.
<http://www.ascilite.org.au/conferences/perth04/procs/bird.html>
- Carr, S. M., Clarke, C. L., Molyneux, J., & Jones, D. (2006) "Facilitating participation: A health action zone experience," *Primary Health Care Research and Development*, Vol. 7 (2), pp. 147-156.
- Checkland, P. & Scholes, J. (1990) *Soft Systems Methodology in Action*, Salisbury: Biddles Ltd.
- Checkland, P. (1981) *Systems Thinking, Systems Practice*, Avon: Pitman Press.
- Checkland, P. (1988) Information systems and systems thinking: Time to unit?, *International Journal of Information Management*, Vol. 8, pp. 239-48.
- Checkland, P., & Poulter, J. (2006) *Learning for Action: A short definitive account of Soft Systems Methodology and its use for practitioners, teachers and students*, Chichester: John Wiley and Sons.
- Cook, R. J. (1987) *Soft-Systems thinking for community development decision making: a participative computer-based modelling methodology*, Doctoral Thesis, University of Wisconsin, Madison.
- Kennedy, B. (1996) "Soft Systems Methodology in applying psychology," *Australian Psychologist*, Vol. 31(1), pp. 52-59.
- Mills-Packo, P.A., Rotar, P., & Wilson, K. (1991) "Highlights from the use of soft systems methodology to improve agrotechnology transfer in Kona, Hawaii," *Agricultural systems*, Vol. 36(4), pp. 409-425.
- Ministry of Education and Research (2006a) *What is Knowledge Promotion?*
<http://odin.dep.no/kd/english/topics/knowledgepromotion/what/070081-990046/dok-bn.html>
- Ministry of Education and Research (2006b) *Program for digital competence*
<http://odin.dep.no/kd/norsk/tema/utdanning/ikt/bn.html>
- NOKUT (2006) *Evaluering av allmennlærerutdanningen – Hovedrapport*,
http://www.nokut.no/graphics/NOKUT/Artikkelbibliotek/Norsk_utdanning/SK/Rapporter/ALUEVA_Hovedrapport.pdf

Oftedal, G. (2006) "Førstelektor – med fokus på utviklingsarbeid," *På nivå med ... Arbeidskonferanse om førstelektorkvalifisering i høgskolesystemet*. Høgskolen i Oslo, 8-9 mai 2006, <http://home.hio.no/pus/forstelektor/forstelektorkonferansen/oftedal.pdf>

Presley, A., & Meade, L. (2002) "The role of Soft Systems Methodology in Planning for Sustainable Production," *Greener Management International*, Vol. 37, pp. 101-110.

Schön, D. (1983) *The Reflective Practitioner. How professionals think in action*, London: Temple Smith

Schön, D. (1987) *Educating the Reflective Practitioner*, San Francisco: Jossey-Bass

UFD (2003) "Rammeplan for Allmennlærerutdanning," fastsatt 3. april 2003, http://www.odin.no/filarkiv/175666/Rammeplan_2003_allmennlaerertd.pdf

Vickers, G. (1965) *The Art of Judgement*, London: Chapman and Hall.

Vickers, G. (1970) *Freedom in a Rocking Boat*, London: Allen Lane.

Von Bertalanffy, L. (1973) *General System Theory*, Harmondsworth: Penguin Books.