Country Specific Developments
The Norwegian Network for IT-Research and Competence in Education: Semantic Web and Wireless Networks in Teacher Education

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Abstract

Many countries are implementing educational objectives aimed toward preparing citizens for the information society.

The Norwegian teacher education is still in the relatively early stages of adopting ICT. Although there seem to be numerous shortcomings in teacher education, a number of relatively innovative projects are under way several places. This paper will present innovative cases.

ICT in teacher education shifts the emphasis away from lectures, where students passively take in information which they are expected to parrot back, towards more active ways of acquiring information. Experiments and new practices where ICT has been courageously applied to teacher education have been motivating and important experiences for the participants. A national web-site; LUNA develop dynamically generated results from projects and share the collective knowledge from innovative practice.

The Network Is The Message

"Internet is the fabric of our time " (Manuell Castells). Many countries are implementing educational objectives aimed toward preparing citizens for the information society. The pervasiveness of ICT is seen as both the genesis and potential facilitator of this goal. In this vision of cyber schools, the increased flow of information is associated with more autonomous learning environments, environments rich with ICT and people that support pupils/student learning.

The Norwegian Research and Competence Network for IT in Education's (ITU) goals for its research projects are that they should contribute to raise the Norwegian educational system from the traditional, teacher-focused transfer of knowledge, towards more active, participatory, problem-oriented, project-based learning and work. Pedagogically, this points in the direction of a constructivist classroom and collaborative learning. At the same time, this also implies a reorganization, where schools leaders' development and teacher competencies are central.

ITU's projects aim at optimization in the use of ICT. ICT must be adapted to the various learning situations, the teacher, context, pupil/student and content. Through its activities, ITU can contribute to the implementation and use of ICT in education, as well as to draw implications of ICT's incorporation in education, where ITU also focuses on multicultural and gender aspects. ITU's development projects are built on the results of research.

PLUTO, which stands for Programme for Teacher Education, Technology and Change, is an initiative in the Research and Competence Network for IT in Education's (ITU) priority focus on innovative change in teacher education. The programme is anchored in The Ministry of Education's action plan "ICT in Norwegian Education - Plan for 2000-2003", where ICT in teacher education is one of six prioritized areas.

In the Norwegian ICT action plan "ICT in Norwegian Education- Plan for 2000-2003" the aims for the period are formulated as follows:

"ICT is to be used in education in order to contribute to better organization, greater skills and pedagogical competence within an education system that develops and exploits ICT as a subject. The potential of ICT is to be exploited within teaching and learning so that the skills requirements of the individual and the society as a whole can be met."

(ICT in Norwegian Education - Plan for 2000-2003:9)[1]

The PLUTO-programme is anchored in the Ministry of Education's Action plan (2000-2003). The main goal of PLUTO is: To contribute to innovative restructuring of teacher education through the use of ICT. The project's aims are: To develop pedagogical and organizational models for the adaptation and accomplishment of study and learning activities in teacher education, where ICT makes up a substantial part.

Although there seem to be numerous shortcomings in teacher education, a number of relatively innovative projects are under way several places. This paper will present to innovative cases.

Case 1: LUNA - Semantic web or beginning of a national learning community for teachers and teacher educators?

LUNA is the Norwegian national teacher education web. A learning community for teacher educators (teachers and teacher students) for exchanging experiences and do network building. The collective information of the LUNA web-site is stored in an
object-oriented database and accesses using the Zope web-publishing system.

The dynamic structure and associative navigation capabilities of the ITU/LUNA sites is as a result of a unique synergy of Content Management and the domain modeling attributes of the new Topic Map standard. The Topic Map domain model can grow and change organically, managed through the web by a distributed group of maintainers. The model becomes a framework for all published content, and has proved to be a highly flexible and intuitive organizing principle.

As every Topic on the site has a unique URI (Uniform Resource Identifier), the Topic-centered model may effectively serve as a foundation for powerful new applications inspired "Semantic Web" vision.

The ITU/LUNA web application was developed around a combination of the Zope Content Management Framework (CMF) and a topic map structure which represents the relationships between projects, organizations, people and publications. On the web-site itself, nearly every page is dynamically generated from a topic in the database. The page display consists mainly of topic characteristics such as names, occurrences and association roles. The occurrence role and association role types are used to name the headings on the page. For example, from a page describing an individual, links are presented titled "Works for", "Project leader for", "Author of" and so on - these links are not taken from fixed fields in the database but are found by traversing the associations from the topic and using the information about each association to derive the correct title for the link. This means that if at a later date new links are required between the Person topic and some other topics, they can be simply added to the database while the application code itself remains unchanged.

Also of interest on the ITU/LUNA site is the alternative means of navigating between topics - the topics are displayed in the upper-right hand corner as text of differing sizes "floating" in a rectangle, implemented using Macromedia Flash. The text displayed is the names of the set of topics "most closely linked" to the topic displayed on the page - the system uses a mechanism of weighted traversal of associations to determine the topics to be displayed.

**Case 2: Mobile and wireless teacher education, Østfold University College**

The project involves Østfold University College (OUC), Telenor Company Ltd., Compaq and network schools. The general idea is to integrate ICT into the teacher education and change the working methods and contents in the direction of more project based and problem based work. ICT is also the foundation for changes in the practicum. Students and teachers work with high-speed GSM connection to the Internet/WLAN and have their own laptops. This is probably one of the first and largest projects using high speed GSM-connection to the Internet. The aim is to give the students necessary ICT skills through active use of technology in their studies.

The project has developed a cooperative network that comprises the general teacher training at OUC, the tele-communicating company Telenor Ltd., Compaq Norway Ltd. and 13 elementary schools in Østfold. This is a full-scale implementation of ICT in a new, pedagogical context. ICT becomes an important tool for both students and teachers in their study work, but it also serves as a medium for communication and learning in the practical training.

The students are organized in basis groups (4-6 students). Each group is connected to a compulsory school class and a network teacher. The students are in contact with the class all through the study year (both directly and via the Internet) in a flexible practice system that makes the life of the network school its starting point. The teachers at OUC are organized in a multidisciplinary team. The theoretical studies are characterized by close connections to the practical training and our teaching methods focus more on student activity and problem-based learning. The term alternates between periods with single subjects and multidisciplinary project weeks.

ICT is an integrated tool in the students’ and teachers’ daily work, and also a channel for communication and guidance.

**Conclusion**

The Norwegian teacher education is still in the relatively early stages of adopting ICT. Including ICT in teacher education studies requires changes both in the curricula and changes in the teaching culture of teacher education, ICT in teacher education shifts the emphasis away from lectures, where students passively take in information which they are expected to parrot back, towards more active ways of acquiring information. Experiments and new practices where ICT has been courageously applied to teacher education have been motivating and important experiences for the participants. At the same time, there has also been the danger that innovative practices enrich only project participants, without enabling other students or teachers to benefit form experiences gains in projects. A national web-site; LUNA develop dynamically generated results from projects and share the collective knowledge from innovative practice.

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**References**