Design of teacher e-learning:
The scenario model

Bent B. Andresen
Danish University of Education, Copenhagen, Denmark

Abstract: This paper deals with design principles for teacher education. In particular, it reveals the findings of research funded by UNESCO, the EU and the Danish Ministry of Education concerning scenario-based e-learning. According to this approach, learning scenarios can be considered as a focal point in the process of the design of computer-supported collaborative learning events tailored to the professional development of teachers. The teachers mainly produce these learning scenarios in order to develop knowledge about the learning potentials of information technology (IT) and planning competences regarding the implementation of IT into various learning environments.

Keywords: teacher professional development, learning scenario, use of information and communication technology, e-learning

1. INTRODUCTION

This paper reports findings from research, currently in progress, concerning teacher professional development. The research indicates that a crucial point in the development of teachers' competences is the design of learning scenarios.

A scenario of learning can be defined as a postulated sequence of imagined events aimed at someone's learning. It is characterised by particular roles of the learners, the teachers, and the IT.

Previous research (Nordenbo, 1989) concerning the planning processes, when teachers make decisions about situations of teaching and learning, indicates that teachers need knowledge about such scenarios. Choosing the best scenario can improve teaching efforts and increase learning outcomes. Therefore, it is recommended that the curriculum of both pre-service and in-

service teacher education contains topics and tasks where teachers construct and describe innovative learning scenarios with IT integration.

By producing learning scenarios, teachers can learn to implement IT productively, creatively, and effectively into their classes in order to foster their students' learning. These learning scenarios can then support the teachers in imagining and reflecting on their domain of practice.

2. LEARNING SCENARIO BACKGROUND

The flow of a learning scenario can be compared to a journey. The activities of the students and the teachers are the important steps of the journey. Like a journey, a learning scenario has a starting-point and an end-point. The starting-point is the learning potentials of the students, which depend, among other things, on the pre-requisite knowledge and skills of the students. The intended learning outcomes are the end-point.

Learning outcomes can be expressed in terms of the competences, which the students will be in a position to demonstrate when they have successfully finished the learning event. A competence framework can include personal and general competences, for example, the competence to co-operate and communicate by means of IT (Andresen, 1996) and fluency with respect to IT (Being Fluent with IT, 1999).

The scenario-based approach also deals with particular teacher competences. In this paper, the notion 'teacher competence' refers to teachers' knowledge and skills concerning reflective planning, performance, and evaluation of learning when students use IT in various ways to foster learning.

The traditional curriculum-related competences and the new IT-related competences complement each other (Andresen, 1998). Teachers thus need competences in both areas as illustrated in Figure 1.

The IT-related competence reflects the application of a variety of software genres into education. The mainstream IT genres are, among others, word processors, painting and drawing genres, spreadsheets, e-mail, and web-based sources and services. Thus, teachers must be capable of deciding how to use each of these genres according to the overall goals of the students' learning. In making these decisions, teachers benefit on having knowledge about how to use the IT genres most effectively in relation to subject-related and cross-curricular learning objectives. In particular, teachers appreciate being able to recognise and judge the specific contribution that the use of the genres makes to students' learning.

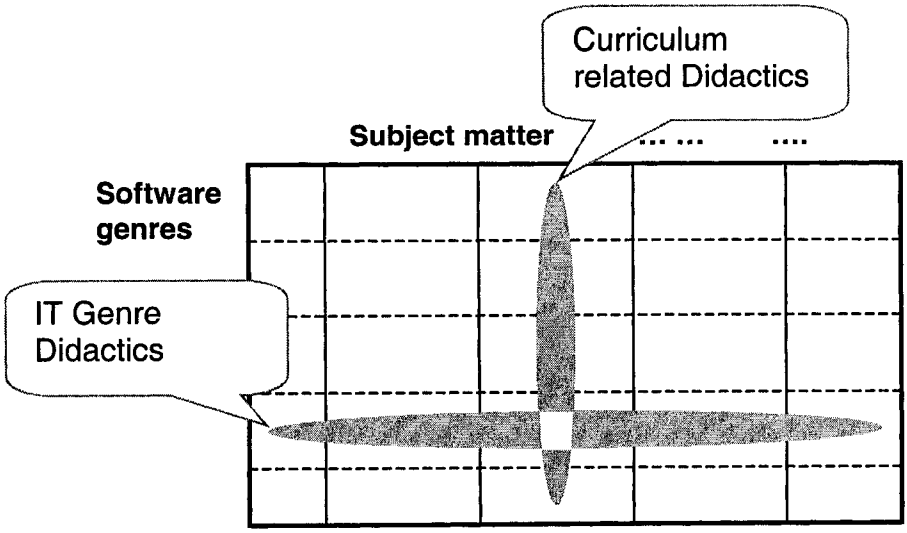

Figure 1. Two perspectives considering the application of IT genres into education

For those aspects of learning where an IT genre is to be used, teachers must be able to identify in their planning the way(s) in which it can be used to meet learning objectives. This encompasses knowledge about: 1) ways to assess students' progress and to make sure that the use of IT is appropriate to the particular students' capabilities; and 2) ways of teacher intervention in order to stimulate and guide students' learning (DfEE, 1998). In particular, teachers' competence encompasses knowledge about how to organise the work of groups of students dealing with IT for collaborative efforts ensuring that teacher coaching takes place when appropriate.

In short, teachers have to be capable of planning, implementing and evaluating learning scenarios, which reinforce teaching efforts and foster students' learning.

3. FOUR EXAMPLES OF LEARNING SCENARIOS

The number of scenarios is enormous. It is, however, possible to identify some ideal types of scenarios, which are typical of the everyday life of teachers in primary school, secondary school, at university, etc. Table 1 describes four learning scenarios with the use of web-based products. The scenarios vary with respect to the role of the students and the role of computers. The widespread use of IT is not limited to these four scenarios.

Developing technology competences among Egyptian college of education students

Magdy M. Aly
Curriculum and Instruction Department, Faculty of Education, Ain Shams University, Cairo

Abstract: Colleges of education in Egypt are implementing initiatives to promote new and more effective teaching methods grounded in information technology and the improvement of teaching skills of undergraduate students in professional education programmes. The goals for participating faculty members are to integrate information technology competencies into not only the content of the courses that they teach, but also into their instructional methods of teaching. An initiative grounded in existing coursework, extant resources, and prior experience is described in this article. The effort provides a comprehensive, practical model for addressing the growing need for altering instructional methods to accommodate technology innovations for school personnel in meaningful ways.

Key words: competencies, information technology, standards, operational skills, professional use of technology

1. INTRODUCTION

The information age has created increasing needs for teachers and other school personnel at all levels of education to develop, use, and disseminate skills for including technology as the driving force behind preparing students for life in the 'real' world (Bailey, Ross and Griffin, 1996; Petrakis, 1996; Stanley, Linauer and Petrie, 1998). Technology has a significant foot in the door of Egyptian classrooms, and the schools will never again be the same (Funnell and Owen, 1992; Lowther, Lumley and Bailey, 1996; Mehlinger, 1996; Fisher, 1997; Bassoppo-Moyo and Morrison, 1998). Yet, most educators are provided with little training in how to use new technologies, so it is no surprise that many of them continue doing what they were doing

rather than spending time learning how to use the innovations that are being provided for them (Hunt, 1995; Bailey, Ross and Griffin, 1996; Furst-Bowe, 1996; Hill and Somers, 1996; Ley, 1997; Stanley, Linauer and Petrie, 1998). Too often, technology innovations go unnoticed, ignored, or seldom used in today's schools; and, the effects of failing to keep up continues to downgrade the Egyptian educational system. The exclusion of information technology from the processes of planning, managing, and implementing curriculum innovations means that change in education is moving at a snail's pace and serves to maintain stagnant, sometimes mediocre instruction as the rule in efforts to 'reform' the schools (Morton, 1996).

There is a growing and continuing need for systematic efforts to infuse instructional technology in relevant ways in all professional education programmes preparing administrators, teachers, and counsellors (Otter, 1992; Kitagaki, 1995; Hill and Somers, 1996; Northrup and Little, 1996;). The scope of skills, attitudes, and knowledge is changing rapidly, and there is far too much for anyone to retain more than a small part. Therefore there is little value in storing up large quantities in memory, as was the aim of traditional education. Instead, what the knowledge society requires is, according to Beriter (1997):

1. Just-in-time delivery of knowledge that is up-to-date and appropriate to the task at hand.
2. Skills in knowledge search and retrieval.
3. Thinking skills and creativity.
4. Life-long readiness to learn and unlearn.

Like most conventional wisdom, this has powerful commonsense appeal. So what is wrong with it? Almost everything. To wit, although knowledge is increasing rapidly, very little of it becomes obsolete. The principal determinant of learning is what the learner already knows about the subject. Successful knowledge search depends on extensive and well-organised knowledge of the domain being searched. Expertise, including creative expertise, depends on deep intuitive understanding of the principles, problems, and tools of a domain. It is doubtful whether there are learnable thinking skills that can be acquired independently of sustained work in a field. Little is known about how to foster a life-long readiness to learn or even what this would mean. Love of learning should not be confused with readiness to tackle problems at the edge of one's competence. The only new idea is just-in-time knowledge delivery. The rest have been part of conventional educational wisdom for half a century.

2. EDUCATING TEACHERS FOR A KNOWLEDGE SOCIETY

Children may be growing up in a digital media culture, but this does not mean they are growing up in a knowledge culture. Some are by virtue of a family or community that puts them on familiar terms with knowledge work. For many young people, however, schooling provides the only accessible entry point into a knowledge society. For them, teachers are indispensable agents of enculturation. This raises the question of how teachers can be expected to initiate students into a culture that they have not grown up in themselves. Add to this the built-in bias of teaching toward viewing knowledge as a property of students' minds, and we have the makings of a classic 'you can't get there from here' situation. Pre-service teacher education seems to be our best hope for introducing the needed cultural change.

3. PROJECT DESIGN AND WORKPLAN

The first step in successful implementation of any innovation is commitment on the part of student teachers, the subjects of the case study who are going to be trained to use information technology to enhance instruction during their teaching practice. For purposes of this effort, technology not only included computers but also computer networks and telecommunications, multimedia and hypermedia, camcorders and VCRs, instructional television and interactive video, CD-ROM and videodisc players, graphing calculators and video microscopes, telephone and voice mail technologies. The goals of the effort were:

1. To enhance basic and advanced information technology knowledge and productivity of students related to computer operating systems, word processing, spreadsheet programming, data base management, page layout and design, internet resources and use, presentation software, statistics and data processing, and instructional design courseware.
2. To develop instructional modules to help student teachers infuse information technology content into the teaching and learning processes that are the foundation of all professional education coursework.
3. To evaluate improvements in student teachers' competence and productivity that result from these efforts to enhance technology use in instruction. Responsibility for designing, implementing, and co-ordinating this response was assigned to a team of three people, myself (the researcher), a computer specialist, and one of the school teachers. Five overall goals were taken into consideration to:

a) clarify and refine technology,

Co-operative parent-child learning:
In computerised technological environments

Uzi Armon
Department of Mathematics and Computer Science, Bar-Ilan University, The Jordan-Valley College, Israel

Abstract: The paper describes parent-child interactions within two computerised and technological environments - the internet Forum and LEGO-Logo. Courses in LEGO-Logo were held over four years for sixth-grade gifted children, with the willing participation of their parents. LEGO-Logo lends itself to and allows for a rich choice of activities in various fields, by project-oriented teaching. During the last two years an internet Forum, in which they could present questions, suggestions, and ideas, was introduced. The findings show unequivocally that these courses help to foster and cultivate thinking and creativeness of the participants, as well as establish close familial relations and bring about better understanding between parents and their children. Applying the internet in order to help learning was a little disappointing, and there is a need to study more about how to improve it. Nevertheless, the idea that parents and children could learn together co-operatively has become a reality.

Key words: co-operative learning, team learning, parent-child relationship, learning environment, computerised-technological environment, project-oriented teaching, gifted children

1. INTRODUCTION

A child's world is reserved and restricted, kept at a distance from the adults' world. Many parents are too busy to be in contact with their children. Thus, it is often observed that children who grow up alone are under the influence of their peers. Consequently, we hear about crimes committed by frustrated youngsters who may be motivated merely by schooling failures.

Studies show that strengthened connections between children and their parents improve children's academic achievements (Bass, 1994; Poirot and

Robinson, 1994). A very wide and comprehensive study in the United States found that such strong and supportive ties help children to prevent risky behaviour, such as suicide, violence, and substance abuse (Schroeder, 1997). Thus, during previous years some interesting projects have been conducted to support the significance of parent-children relations. One of the above was undertaken through workshops organised for whole families of one school (Goodman, Sutton and Harkavy, 1995), while another provided computers to the students' homes with printed materials for use by parents and their children (Fullerton, 1995).

Now, let us think for a moment about teams of children and their parents learning together. Is it possible? After all, most children do not see their parents go to school, or sit in front of a teacher. Nevertheless, will such collaborative learning be worthwhile for children and their parents? How is it possible to use the internet to improve learning and understanding?

There are very few learning environments where team working is so intrinsic as it is in LEGO-Logo, which almost does not depend on any teaching method. Does it affect parent-children interactions as well? The following paper will give partial answers to these questions and will deal with six subjects:

1. A description of the LEGO-Logo system;
2. The educational approach;
3. The co-operative parent-child learning process;
4. Records of the follow-up activities at home;
5. The influence of shared learning on family relationships;
6. Using the internet Forum to foster learning processes.

2. LEGO-LOGO SYSTEM DESCRIPTION

LEGO-Logo, as its name indicates, is a combination of Technical-LEGO (the technological aspect) and of Logo (the computerised aspect). The combination of these two has a much greater effect than each one by itself. Recent findings (Jarvinen, 1998; Krumholtz, 1998) show that it is a suitable learning environment for designing technological systems and control programming. It encourages diversity in several ways: in project themes, working styles, entry paths, and with many different types of design: software design, mechanical design, and structural design (Resnick and Ocko, 1991; Carlsen, 1998). Thus, LEGO-Logo offers an abundance of activities within a well-defined framework, where everyone can find something personal and interesting to do, and thus can learn.

Inclusion of sensors in LEGO-Logo allows the transfer of information to-and-fro between LEGO and Logo through an interface-box. As a result, one can build LEGO-machines, operated and controlled by Logo programs.

3. THE EDUCATIONAL APPROACH

Any learning environment that allows activities in team projects can perform an astonishing positive change in the learning process (Denton, 1994). LEGO-Logo, like other active co-operative learning environments or methods, fosters respect for learning (Graves, 1993).

Learning processes are reinforced by feedback from computer programs, LEGO models, other teams, and the teacher. During study in class, students organise themselves in teams. Each team chooses an authentic project, plans, builds, and carries it out accordingly. Teaching, in this environment, is performed by project-oriented learning. Thus, rather than frontal-teaching, the teacher assists with problem-solving, by guiding questions and directing hints. The teacher may also be a catalyst or may introduce new ideas (in technology, programming, mathematics, etc.) such as the inverse ratio between motor speed and its strength, or how to structure a program. Teaching is performed by conversations with each team separately and by whole class discussions about general ideas, which may be common to all.

In LEGO-Logo students have to share, talk, debate and relate one to another. They learn how to work with others and how to help each other. Hence, this system has a positive effect on classroom social interactions. The students learn to work co-operatively in groups as well as use computers better and plan shared authentic projects (Barak, Waks and Doppelt, 2000). Does it affect parent-children interactions as well?

4. CO-OPERATIVE PARENT-CHILD LEARNING PROCESS

The LEGO-Logo course described here has been used for four years in the spirit of Papert's book 'The connected family' (Papert, 1996). The course was designed for sixth-grade gifted children with their parents. The sixth-grade students used to study once a week in a school for gifted children located in a central college, and during the rest of the week they attended regular schools in their regions. The whole year course was organised and supported financially by that school. The course teacher during the first two