

# **Multimedia Scenario in a Primary School**

## **Abstract**

Multimedia as an educational technology is used throughout the educational system. In this paper we present a research project where multimedia scenario was used to initiate a discussion about Internet use among students and teachers at a primary school. Multimedia scenario is the use of large screen multimedia to initiate and facilitate discussion in a group of learners. Multimedia scenario is part of a teaching methodology called PIER (Problem based learning, Interactive multimedia, Experiential learning and Role playing). We describe how two groups of students and teachers facilitated by a multimedia scenario discussed Internet ethics and Internet information filtering in a school context. The groups were observed during the use and the paper concludes that multimedia scenario and the PIER methodology has potential as learning activity in the primary school context.

## **1. Introduction**

PIER is an educational methodology based on the following: Problem based learning (PBL), Interactive multimedia (IMM), Experiential learning and Role-playing. The learning activity is divided into four phases where the first phase is accomplished by using an interactive multimedia scenario to present a problem by making the participants experience the problem or a problematic situation relevant to the group.

The objective of the research presented in this paper was to evaluate the first phase of PIER in a school setting. To achieve this an understanding of the current situation in school concerning the use of IT was needed in order to intervene in a real situation.

Previously, we have successfully conducted evaluations with interactive multimedia scenarios and PIER in higher education [REF], and in corporate competence development [REF]. The use of PIER in a primary school setting has not been conducted and it is relevant to investigate if the PIER approach can be used to initiate learning with children. Therefore the research question raised in this paper is the following:

Is the PIER approach useful in primary school, in supporting the interaction between the students and the teacher?

The remainder of the paper is divided in the following sections: First we discuss the research approach taken in this paper. Second we give a theoretical background before we present the PIER approach in the following section. In the next section we present the result from the

field study and from the evaluation of the multimedia scenario in a primary school. This is followed by a discussion and we end the paper with conclusions and further research.

## **2. Research approach**

The research approach in this project is "the New Informatics," which is "...a theory and design-oriented study of information technology use, an artificial science with the intertwined complex of people and information technology as its subject matter" (Dahlbom, 1996). We are interested in the use of technology because we are interested in changing and improving that use." The aim is to improve the educational practice concerning IT-use.

Educational research is a thorough and systematic attempt to bring about a better understanding of the educational process, with the purpose of improving the efficiency. The aim for the researcher is to describe how *learning* occurs and to design different educational activities that can influence the quality of the learning (Entwistle, 1986).

In this paper, the term design is used to describe the activity of analyzing the needs, or the possibilities, for the implementation of form and functionality (e.g., Dahlbom and Mathiassen 1993). Current research approaches applied to contribute to both the development of technology, such as educational technology, and the design of its use is guided by variations of the scientific methods: ethnography and action research. Ethnography aims at describing the culture of a specific domain by observing and participating in this culture (Van Maanen 1988). Often, but not necessarily, ethnographic studies involve longer periods of study to assure the researcher of a deep understanding of the culture. However, ethnographic research in short time periods is also viable, i.e., "quick and dirty ethnography" (Hughes et al., 1994).

The purpose of action research is to solve a problem here and now (Patton 1990). Action research has two aims: to contribute to solving practical problems, and some specific research goal, such as the development of an approach, a method or a conceptual framework. A key assumption in action research is that science can be used by people themselves, in collaboration with researchers, to solve their problems of practice. The combination, and focus, of the two are delicate, "Those involved [in action research] are either doing research with little action, or action with little research" (Foster 1972, p.529). The standard for judging action research is the evaluation made by research participants and researchers of the solution generated.

Doing informatics research in education the approaches above, ethnography and action research, are suggested as fruitful in reaching the aim of designing information technology use in education. The researchers' relation to the educational activity is determining the approach. There are basically two alternatives. Doing research as an observer and not participating as a teacher in the educational activity, an ethnographic research approach is suggested. This allows the researcher to observe and understand. A teacher conducting research in her own course is not able to be the outside observer in the same sense for obvious reasons. In researching your own practice an action research approach is suggested.

The overall research approach proposed is action oriented since the aim is to experiment with education through intervention and to evaluate and reflect on the effects of the intervention. Inspired by pedagogical ideas and the possibilities to enhance them with information technology, this paper is focusing on the design of prototype applications and the use of them in educational activities.

The importance of experimentation and providing examples of information technology use in education is advocated by for instance Leidner and Jarvenpaa. They say, "computer based teaching methods might be encouraged as a means of enhancing classroom learning, although it may require trial-and-error or experimentation to determine the most effective uses of the technology" (Leidner and Jarvenpaa 1993) p.51. The evaluation of the effects on different aspects of education is therefore less emphasized than it would be in other educational research. The reason for this is that there is a need for concrete examples of how information technology can be used in different educational activities. Of course, there is also a need for extensive evaluation of the effects, but it is probably more urgent to experiment with a variety of ideas to open up for a dialogue among teachers concerning the use of information technology.

The viability of action research in an education context is discussed by Gibbs (1995) who suggests that: "using research and research tools to intervene, often successfully, in their own courses [...] is the kind of research which gets results" (p.27). The idea of trying out ideas and solve problems in the teacher's own practice, and systematically evaluate and document the work and communicate it to other teachers through the standard channels, i.e., academic journals, conferences and seminars should get higher status. One problem is that a relatively low proportion of academics read the research journals on teaching in their discipline (Laurillard 1993, p.191). One other problem is that the most common type of paper in these journals concerns a discussion of curriculum content: what should be taught and why. The

optimum curriculum sequence is a popular topic for research papers, but very little research reports on how students find different learning activities.

The design and use of information technology in educational activities must be pedagogically well-grounded. Information technology as such will not solve the problems of education. From an informatics perspective, it is possible to take information technology as a point of departure. However, the design of educational information technology should always be validated by appropriate pedagogical models [REF].

### **3. Theoretical background**

People can find it difficult to learn from their experience through a messy struggle with real challenges. Thus, action learning is meant to be a relatively safe laboratory for learning and help people to learn from risk taking and errors (Marsick & O'Neil 1999). The focus of action learning is on individuals who play an enhanced role in directing their own learning and, as such, achieve more control of their own destinies. Action learning is: "an approach to the development of people in organizations which takes the task as the vehicle for learning. It is based on the premise that there is no learning without action and no sober and deliberate action without learning" (Pedler 1997).

Most practitioners of action learning draw eclectically from a variety of philosophies (Marsick & O'Neil 1999). In this research, our approach to action learning builds on problem based learning (PBL), interactive multimedia, experiential learning and role-playing as the theoretical and practical background to propose the PIER approach. Each of these four are described below.

#### **3.1 Problem based learning**

PBL builds on a fundamentally different understanding of learning than traditional teaching and is a significant challenge to orthodox beliefs about education and learning (Margretson 1991). PBL is: "...a way of constructing and teaching courses using problems as the stimulus and focus for student activity. It is not simply the addition of problem-solving activities to otherwise discipline centered curricula, but a way of conceiving of the curriculum which is centered around key problems in professional practice." [...] "... problem based learning start with problems rather than with the exposition of disciplinary knowledge" (Boud & Feletti 1992).

The starting point in PBL is a real world phenomenon or problem the student wishes to learn more about. The problem, or rather the problematic situation, is identified, designed and presented to the students, who themselves then define what the actual problem is. The responsibility of the educator is to present the problem in a stimulating way. In PBL, this is done through what we call a "vignette." A vignette can be anything between a single paragraph, some graphics, a comic strip or a twenty-page case study. It can also be a brief lecture where the problem is introduced to the students. The purpose of the vignette is to get the group started. The group then rather freely organizes their learning process to understand and discuss solutions to the problem.

### **3.2 Interactive multimedia**

A great deal of attention has been focused on interactive multimedia (IMM) in the educational domain. Commonly, IMM uses hypermedia to permit links among pieces of information such as text, sound and graphics, and enables the learner to "explore ideas and pursue thought in a free and non-linear fashion" (Bieber & Kimbrough 1992). IMM use has undergone a revolution during the last years, from simple drill-oriented programs to advanced simulations where students receive support for understanding complex matters.

IMM has been used to add dimensions, such as capturing the learners' imagination, to various learning activities. For instance, paper based case studies have been transformed into interactive case study simulations for individuals (Kendall et al. 1996; Farrimond 1997). IMM applications have been used to enable individual learners to practice in a safe environment, for instance a sales-person can practice how to deal with difficult customers (Shank 1997).

There are three trends with IMM currently. First, the main channel for distribution of IMM is becoming the WWW rather than the CD-ROM. Second, there is a shift from multimedia for individual learners towards multimedia application for teams or groups of learners. Third, the interactivity that is getting the most attention is the interaction among the participants in the group working with the IMM, not the limited individual-computer interactivity.

### **3.3 Experiential learning**

Experiential learning refers to an encounter that the learner experiences. From this encounter, learning is initiated. In experiential learning: "... the learner is directly in touch with the realities being studied ... [experiential learning] involves direct encounter with the

phenomenon being studied rather than merely thinking about the encounter or only considering the possibility of doing something with it" (Kolb 1984).

Experiential learning is participative, interactive, and applied. It means experiencing at first hand the environment and to be confronted with processes that are uncertain. Experiential learning involves the whole person and learning takes place on the cognitive, affective and behavioral dimension (Gentry 1990). The epistemology of experiential learning can be summarized as problem solving focus with the aim of raising awareness and develop capacity to change tacit practice (Marsick & O'Neil 1999). Simulations of different types is the most applied way to conduct learning activities focusing on experience. Different types of interactive multimedia have often been used to support these activities (Graf & Kellog 1990).

### **3.4 Role-playing**

Role-plays can be described as dramas in which a number of participants are asked to portray a particular character, but no lines are provided as for actors (Steinert 1993). An area where role-plays are frequently used is medical education where the objective is to simulate and practice different patient-doctor situations. Role-playing helps the students to view situations from alternative perspectives. In a higher education context, role-playing is used to prepare the students for their future profession. Besides medical education, other common areas are training in law, law enforcement, military service, and management.

The role-play can also be used as a technique to approach issues otherwise difficult to discuss. In a role-play where controversial issues are discussed, the participants can in their disguise of the role elaborate with their own true conception, but without exposing themselves. When acting in a role, individuals need to rethink their conceptions and understandings. Role-plays can in other situations be used to support the exchange of experience amongst the participants. The purpose and structure of a role-play can be to initiate discussions on issues directly related to for instance a group of a certain profession, e.g., project management.

## **4. The PIER approach**

The four points of departure briefly discussed in the previous section serve as the foundation for the PIER approach, which is described in this section.

PIER consists of four activities:

- \* Activity one - concrete experience through role-playing with a multimedia scenario
- \* Activity two - a period of individual reflection
- \* Activity three - seminar where the scenario is discussed
- \* Activity four - ongoing and organized learning processes

It should be emphasized that reflection is an important aspect of all activities in PIER. Three types of reflections are covered in PIER. First, there is reflection-in-action (Schön 1983), reflection that is made during the enacting of the scenario. Reflection on what happened during activity one, i.e. reflection-on-action, is done during activity two and is discussed at the seminar in action three. Reflection-for-action, i.e. thoughts about how to use the knowledge gained by the experience in a future situation are initiated during activity three (Cowan 1998).

Activity one should mainly be considered as a starting point for the other three activities in the PIER approach. Consequently, the PIER approach as a whole must be thought of as a start of an extensive learning process.

#### 4.1 Activity one

In activity one, a group of five to eight learners, called a base-group (adopted from PBL terminology) are engaged in a role-playing activity supported and guided by an interactive multimedia scenario and a facilitator (see figure 1 below). The activity lasts for two to three hours and during this time the learners experience a problematic situation, which is relevant and realistic, and discuss problematic issues.

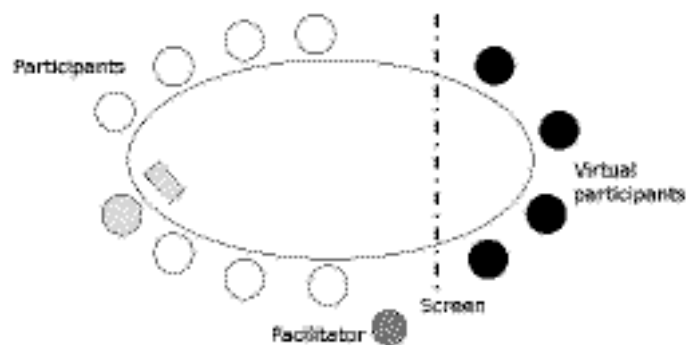


Figure 1: The setting for activity one.

Figure 1 illustrates an overview of the physical setting. The white circles represent the participants seated around the table. The light gray circle is the participant who controls the

navigation, according to the base-groups' wishes, through the scenario with a mouse and a keyboard. Navigation is intended to be simple and consists of clicking on hotspots and writing text into forms. At the end of the table an interactive multimedia scenario is displayed on a large screen. In the scenario there are virtual participants, represented by black circles (figure 1), who contribute to the role-play in various ways. They are part of the imagined reality and can be a video-clip, sound-clip or a piece of text. They could for instance be members of the group, managers or others interacting with the base-group. The facilitator has an opportunity to act as one of the virtual participants when it is necessary to intervene in the ongoing group-process. The dark gray circle represents the facilitator, who assumes a peripheral role. The facilitator intervenes in the group-process only when necessary, for instance when progress is too slow or the navigation alternatives are not obvious.

The scenario lets the learners become part of a fictitious but not improbable world. They are given brief role-descriptions and act according to the role but mainly rely on personal experiences and preferences when participating in discussions. The discussions are the essence of the learning activity and although the participants interact with the scenario, the main interaction is within the base-group. They face different situations where they are required to make decisions, and in order to make decisions they discuss, negotiate and exchange conceptions.

Some of the decisions lead to different paths through the scenario. There are a limited number of paths and there is no turning back. Multimedia scenario is not a realistic simulation that allows non-linear navigation. Instead the realism is embedded in how characteristic the confronted situations are of the real world, i.e. if the participants recognize similarities with their own situation and the alternatives are believable. By decreasing the complexity, regarding the available paths, the learners are steered into predetermined scenes and thus the scenario ensures that the intended problematic situations are experienced. However, it is difficult to keep the scenario alternatives limited and at the same time maintain the realism; it is a matter of creating a credible story.

We have used web technology to develop the scenes in the scenario. The scenario structure reflects the passing of time, i.e. as the group navigates through the scenario time passes and new events occur. The scenario structure is static in the sense that the narrative is presented as it is stored in the computer as opposed to being dynamically created by a human facilitator.

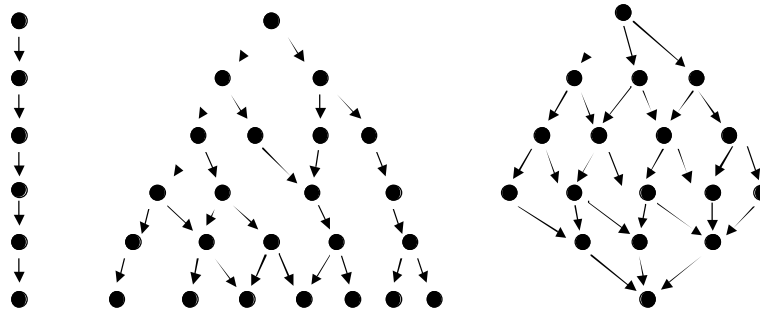


Figure 2: Interactive case (left) and two types of case-based simulation.

The scenario can have different overall structures as shown in figure 2. In the interactive case, navigation and presentation of information is in a linear fashion, while in the two types of case based simulations, the base-group relatively freely navigate their way through the case. The case based simulations differ in the way that one has an open ending of the scenario, and the other has a closed ending.

The terminology of scenarios in PIER is pragmatically adapted from film theory. Like a theatrical performance a scenario can be divided into acts. Each act consists of one or several scenes, and each scene consists of one or several web pages with embedded objects. Examples of objects are text, graphics, sound and video. Acts, but also scenes, are delimited from each other either by the focus, i.e., the issues presented, or by time, i.e., a series of events or different phases of a process.

The facilitator ensures that the base-group participants reach the end of the scenario and leave the session with the problematic situation on their mind. The ending scene of the scenario is meant to be a cliffhanger since our intention is to leave the base-group with unanswered questions and feelings to reflect upon during activity two. Instead of having an ending that provides closure, we want them to leave activity one asking themselves; "what happened?"

The scenario is self-instructive in the way that the participants can navigate the scenario with ease and the need for extensive computer skills is not needed. Furthermore, there is neither single correct interpretation nor answer in the scenario to be given to the facilitator. From the information, that are gathered through the scenario the students form their own ideas and thoughts, which they share with each other through discussions.

Another advantage is that the only software needed to be able to run the scenario, is a web browser and Quick Time to play the movies. To reuse this kind of learning activity is simple and according to this aspect, PIER has great potential in a school setting.

## **4.2 Activity two**

Activity two is individual reflection for about one week. During this period each of the participants will have a chance to individually reflect on what happened in the scenario and they will hopefully relate their experiences from the scenario to their daily work, whether it is professional practice or an educational program. It is tempting to support the reflection by handing out material such as relevant questions or pointers but this we believe would interfere with the participants' individual sense-making of the experience and instead to some extent turn the activity into a traditional teacher-oriented activity. To further avoid interference, activity one ends sharply without any following discussion and explanation.

## **4.3 Activity three**

After a week of reflection the facilitator meets the base-group during a seminar lasting for two to three hours. The purpose is to discuss the experiences the participants encountered during their work with the scenario in activity one and explicitly relate them to their experiences from daily work. An important part of discussing their experience in activity one is the intention to debrief the participants, i.e. make sure they understand that they are not to blame for mistakes and failures in the scenario. The purpose is also to discuss possible ways to approach the issues covered in the scenario. Some time should also be dedicated to a discussion of further activities to be carried out as a part of activity four, since this continuation should build on the participants' own ambitions and ideas.

## **4.4 Activity four**

The fourth activity is probably the most important since a central part of PIER is to prepare the participants for dealing with similar situations as covered in activity one. Whereas activity one through three should be understood as a starting point, activity four is meant to be an ongoing and organized learning process. Examples of learning activities could be a series of traditional seminars and lectures, new scenarios, or a net-based continuation.

## **4.5 Related research - previous evaluations of PIER**

The PIER approach has been applied in other learning contexts. In this section we will bring forward some findings in earlier research conducted with the PIER approach related to this research.

#### **4.5.1 System development education at universities in Sweden and South Africa**

PIER has been applied as a simulation in which failure and escalation in system development projects are introduced to higher education computer information system students. This research aimed at searching for models that allow genuine interaction in learning activities [REF]. There were 21 Informatics students participating at a university in South Africa and 10 at a university in Sweden. Feedback from the students was captured through a questionnaire that was handed out afterwards. They were positive to this kind of learning activity. It was also found that the combined use of a multimedia scenario and PIER was effective for learning about information system project failure and escalation.

#### **4.5.2 Copernicus- Experiencing a failing project as industrial competence development**

The setting for this research was corporate involving a large organization. The purpose was to facilitate experience-sharing, discussion, and reflections with the intention to increase communication among project workers and in a longer perspective improve project management practices [REF]. This research project lasted for about six months and involved four researchers. First they conducted interviews in order to create an understanding of the underlying organizational culture and to collect stories and anecdotes to be used in writing the stories. The actual design and implementation of the scenario was a joint effort between researchers and members of the organization.

There were 80 employees participating in the learning activity and the first phase of PIER was located at the research institute whereas the seminar (third phase of PIER) was held at the corporation. The conclusions drawn from this research is that multimedia scenario and PIER methodology add to existing competence development efforts.

### **5. Field study and design of multimedia scenario**

This section describes firstly, the field study conducted to get an understanding of the current situation in a school in Sweden concerning the use of IT. Furthermore, it aimed at identifying a problem or a need for enhancement in their use of IT. Secondly, the section describes the design of a multimedia scenario, which was designed to deal with the identified problem from the field study.

## 5.1 The Field Study

The school where the field study was conducted is a one to sixth- grade school with approximately 140 pupils and 10 teachers. The two first grades (1-2) are integrated and they are divided into two classes with first- and second-graders in the same class. The same accounts for third and fourth grade. But the fifth and sixth grades are not integrated. The computers at the school range from new to very old ones. The older computers are mainly used for fill-in exercises in math and in Swedish. The applications available for those computers are text-based and are more a substitute for using paper and pencil. The school has four new computers with a printer each and two of the computers also have access to the Internet. A wish of having more computers with access to the Internet was expressed by one of the teachers, but the cost for every additional modem is too high. According to the assistant principle "we don't have this kind of money". Consequently, they have one new computer each in the grades three to. Only the new computers have the capacity to run programs that are more advanced. An example of an advanced program that is used is "Matador". This program aims to make the students use different methods for solving various math-problems. It uses graphics to visualize the problems. "The program gives the student the opportunity to learn the classroom material in a more meaningful way" one teacher said. Other subjects where the computers are used are in science and in Swedish class. The applications used in those classes are also specialized for that particular subject. For example, in Swedish class they have "Svestav," which is used to enhance train spelling skills. In math they also have "Urkul" which is a software for learning the clock.

Since eighteen months, the school has adopted a concept of IT-agents. This concept was a central decision from the district to enhance the IT-use in the Schools by using students as IT-agents. At this school, two students in each class are appointed IT-agents. These are agents throughout the years they attend this school. These students were not appointed IT-agents due to their previous computer literacy. These students are not necessarily "the best" at computers in their classes. The IT-agents have received a basic course, conducted by the person responsible for the IT at the school and who is also a teacher. This course included how to use Windows and the different applications mentioned above. IT-agents serve as extra resources in the classroom to help and to support their classmates. This concept has during eighteen months showed to be a successful approach, taking a burden off from the teachers and making the pupils more aware of the possibilities and difficulties concerned with computers and their use in the classrooms.

We asked the students if they use the Internet in their schoolwork, they answered that they very seldom do, but they wanted to do this more. They told us, that they mostly use Matador. This seemed to be a very popular program among the students. However, one fifth-grader frowned when Matador came up as a topic when we were talking. "I have a lot more exiting programs at home", he said. He was not impressed, but when asked if he was to choose between doing math using his exercise book (which he at the moment actually was doing) or using Matador on the computer, he answered without hesitation, "Matador, of course". During this class only the new computer was used. The old computers, which were placed within the classroom, were not used, but we were assured that they sometimes do.

Soon after the bell rang and we all left the classroom and the teacher locked the door to the classroom. The main reason for this is to get the students out in the fresh air, but there seems to be another reason too. Some students have visited X-rated sites on the Internet. Once two students were caught in action. The computers log file had been analyzed, and they could see that this was done at several occasions. Because of this, the students are not allowed to use the computers with access to the Internet without an adult nearby. We were told: "There are programs available that work like filters, but they can be very consequent when filtering. Using them can result in every page with for example the word sex is blocked out". In Swedish the word "sex" is also the word for the number "six", which complicates the matter. Therefore, this solution seemed not to be an option. Instead, several teachers wished the students to be more aware of the criticism of the sources and ethics on the Internet.

## **5.2 Analyzing the field study**

Summing up the field study, it was not too hard to see what was functioning well and what was not. Due to the constrained resources there was not much to do about the fact that they need more computers, software, and network access. The school is understaffed but this is a national problem in Sweden. In spite of these scarce resources, the attitude towards using educational IT is positive and they make the most of what they have. This is much thanks to the IT-responsible at this school and the assistant principle.

The problem the teachers felt was most urgent was to get the students to be more critical about sources and to be more aware of the ethical issues concerning the Internet. The pupils, on their side, wished to be able to use the Internet more in their schoolwork. Therefore a multimedia scenario that illustrates the problems of these issues was designed.

### **5.3 Designing the multimedia scenario**

There are software to delimit access and distribution of improper information on the Internet. But this is not a solution to the problem. On the contrary, they will take responsibility away from the students and it might even work as a stimulant for trespassing. The responsibility lies in the hand of the user and the judgment should be integrated in the personality instead of the computer. The use of Internet in education can actually reinforce or in other words be used as a tool to enhance the students, and of course the teachers as well, ability to be more critical towards the sources of information in general. The aim in designing the multimedia scenario was to visualize the problems in a manner that would make the participants experience some of the problems attached to the issue in focus. In addition, make them discuss different aspects and reflect upon the experiences. The level of the scenario was to suit both children and adults. We also had an idea of exchanging the roles between teachers and students, i.e. teachers play roles as students and vice versa, this in order to make the participants view the aspects from each other's perspective.

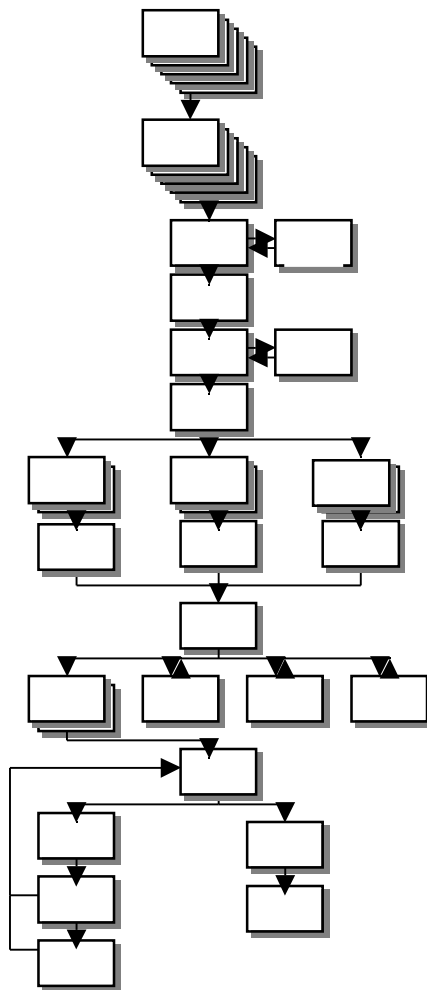
Below is a short summary of the story implemented in the multimedia scenario.

In the initial scenes the participants are introduced to the fictive school they attend or work at in order to give them a background to act from. They get some information about the school, e.g. where and at what time of year the story takes place. After that, the role-characters are to be handed out on a paper to each participant. There is a different character for each person and the group are given time to prepare for their roles.

Next scene is in the classroom. The principle knocks on the door and has a message to the representatives of the student council and some of the teachers (These characters are the ones that just were handed out to the participators). The message is that they are to meet in the conference room right after the lesson. Figure 3 below is the scenario structure to give an overview of how the scenes are linked together.

Figure 3 The overall structure of the scenario

When they all are gathered in the conference room, they first have to introduce themselves to each other. There is also a virtual student present who also introduces herself. The principal then continues to tell them that a problem has arisen at the school. Some students have



misused the computers and visited improper sites on the Internet, and they have to do something. The virtual participant also talks about how she by mistake ended up on an X-rated site. The principal has already decided that Internet software filters will be purchased in order to prevent improper use of the Internet. The principal therefore leaves it to the group to choose from three alternatives. There are different kinds of software available and they work in different ways. One filter excludes pictures and movies that contain too many pixels that agree with the color of naked skin. Another software excludes sites that contain words that are improper. The third alternative blocks out specific Internet servers that are, in some way, publishing improper information.

After the participants have made a choice they are dismissed and they return to their classrooms. Times passes and the software is installed. According to what kind of software the participants chose, different problems arise soon after and the principal calls for another meeting.

This time the principal wants the participators to fill in a questionnaire, watch some movies and discuss the issue of ethics and criticism of sources of information. First, they have to fill in the questionnaire individually (the questionnaire is actually handed out by the facilitator on a paper for the participators to fill in). When they are ready, they are to reach consensus on the questions by filling out the same questionnaire in the scenario.

This time the participators have to unite on the questions posed. After that they choose whether they want to watch movies or move on to the discussion. The first movie describes the enormous amount of information available on the Internet and ways to get the "good parts" out of it. The other movie is about the importance of knowing who is behind a site and the purpose of that site. The next scenes show a number of statements the principal wants the participators to discuss. When the discussion has come to an end the principal tells the participators that they are to meet next week to discuss this matter further. Then the multimedia scenario ends.

## **6. Running multimedia scenario in primary education**

In this section we summarize the results from using the multimedia scenario in a primary school. The focus is on the participants' interaction with each other and with the multimedia scenario and to what extent the scenario supported and encouraged discussion and reflection about ethics and criticism of sources of information. Again, only the first phase of the PIER methodology was evaluated in this research

The activity took place in a small class room where a table was set up in front of a white wall (see figure 1). This wall was used to project the multimedia scenario on. The participants were seated round the table and one of the students was given the responsibility to navigate through the scenario with a keyboard and a mouse attached to a portable computer used to project the multimedia scenario.

The participants were divided into two groups of five people. In each group, there were four students and one teacher. It was the same teacher that (the IT-responsible) participated both times. The students were the appointed IT-agents from third to the sixth grade. This activity

was carried out during daytime and the students were excused from their regular classes. The time planned for multimedia scenario session was about one hour. The participants did not exactly know what they were going to do in advance. They only knew that this was an activity exclusive for the IT-agents and had something to do with IT.

### **6.1 First group**

The students in this group were two boys and two girls. Their ages ranged from eleven to twelve years.

One of the authors acted as facilitator and explained to the group what to expect from the scenario. What they were expected to do the next hour as for how to navigate by pressing the "next" button and that there were pictures that worked like links and that there were decisions to be made by them. It was emphasized that this is a way to talk about the subject at issue. Role-playing was introduced and that the role-descriptions were going to be handed out to them shortly after the start of the multimedia scenario.

In the initial part of the scenario, the participants all turned to the facilitator when they felt they were ready with each scene. Although carefully explained to the participants before we started how the scenario worked, what they were to expect and what they were supposed to do, they still were eager to get the facilitators approval in every move they made to make sure they did it right. Further on they were all silent until the roles were distributed. The teacher and one student got the roles of students and the other three students were given roles as adults. They started to read and after a couple of minutes, one girl exclaimed. "Do I have to memorize all this?" She was frustrated with the information given to her and she was told that they did not have to memorize the role-character and that they were free to use the information given to them if they wanted, that there was no obligation of playing a role. The other students did not say much but it was obvious that they felt lost with this part.

When they reached the site where they all were to choose one of three different filters they, very quickly, chose the first alternative which was the one that excluded pictures and movies with "to much naked skin". They all agreed that would be the best solution to the schools problem with students visiting improper sites on the Internet.

The next major event in the multimedia scenario was the next meeting and the participants were first given a questionnaire on paper each to fill in individually. This was done without anyone asking questions. When they were ready, they continued to the next scene where they

were to reach consensus fill in the same questionnaire on the screen. In order to do this they first had to come to an agreement on each question. At first, the students were very quiet and for a time it looked that this would never work. Fortunately, this was wrong, slowly they began to talk, but very quietly, it was sometimes hard to hear what they were saying. Their opinions varied a great deal and they had difficulty in agreeing on the posed questions. Some of the students did not want to compromise when the opinions varied too much. The teacher was very active in this discussion, as she wanted the students that did not want to compromise to convince the others why their point of view was better. Eventually they came to an agreement on all of the questions. During this scene, some of the student expressed that they had some difficulties in understanding some of the questions in the questionnaire.

The next discussion was largely colored by the earlier experiences of the participants. When discussing sites truthfulness on the Internet, one girl said, "If a home-page on the Internet says that Brad Pitt is a queer then it is not true!" Another boy used the example of company that was selling trucks when talking about the purposes of different sites. He had himself visited such a site. Another example of topic that reflected their prior experience with the Internet was the risk of giving phone-numbers away at chat-sites. During this discussion one participating boy left, he was needed for music-practice. During this learning activity, there were a couple of interruptions by both students and teachers that fetched books or other things from the room.

When afterwards asking the students if they had played their roles, they answered that they had not. The participating teacher had played her role as a student, but from time to time, she was herself. The school-bell rang just as the first group was ready. The discussion in phase three of the PIER methodology afterwards ended up very thin. The participating students were in their minds already out in the schoolyard. The duration of this seminar was about one hour and fifteen minutes

Afterwards the teacher who had participated was interviewed about the role-playing part of the multimedia scenario. As the students did not seem to understand the intention with role-playing and it only made them confused. Therefore we decided to not hand out the role-descriptions to the second group.

## **6.2 Second group**

The second group consisted of one teacher and two girls and two boys. The ages of the students ranged from nine to ten years. The multimedia scenario and the setting were identical except for the exclusion of the role-playing dimension as discussed above.

This group started out navigating the scenario without paying any attention to the facilitator, in contrast to the first group. When they reached the scene where they were to choose a certain filter for the Internet the choice fell on the third alternative after a minor discussion. The participants continued to click themselves through and when they reached the scene with the questionnaire, they started to read the questions on the piece of paper we had handed out. Almost immediately, they remarked that they had problem understanding two of the questions in the questionnaire. Not surprisingly, it was the same questions the first group had problem understanding. But, one of the students instantly explained the question in a most convincing and easy way. After a short while they continued to fill in the questionnaire on the computer screen. This group did not have the same problem agreeing on the questions as the first group had. The participants continued to click through the next scenes and watched the two movies without making any comments on the content. When they reached the scene where they were to comment on a set of statements they started to discuss immediately.

Afterwards one girl asked about a scene she did not understand in the scenario. It was the scene where the role-characters were supposed to be handed out. It became apparent that all of the students were very curious and wanted to know more about this part. Therefore, we told them about role-playing, as it was meant to be used in this scenario. We also handed out the sheets of paper with the written role-characters on. After a couple of minutes one boy read out loud, "You are married and have four children", he laughed and we all joined him. He obvious thought this was funny. We got the impression that this was very difficult for him to imagine, being a ten year old kid.

The discussion continued to focus on what kind of roles they would like to play and the students all agreed on that the character had to be a smart and groovy person and as one boy said " ...and have a nice car". When we asked if there was something they wanted to say about the scenario a third-grade boy answered, "I thought it was good to know all this!" It took this group approximately one hour to go through the scenario.

## **7. Discussion**

In this section the two groups and their use of the multimedia scenario described above are discussed. We will discuss the usefulness of the first phase in the PIER approach as it is was performed in this thesis. The focus is on the participants' interaction with each other and with the multimedia scenario and to what extent the scenario supported and encouraged discussion and reflection about ethics and criticism of sources of information in the aspects of collaborative learning. The discussion is structured around the aspects of PBL; experiential learning, and role-playing which are the central pedagogical concepts of PIER.

### **7.1 Problem based learning**

In this research, problem based learning is a collaborative learning activity. The participants' previous experiences and knowledge colored the discussions and they were eager to share this with each other. For example, one student said he had problem understanding a question when another student instantly explained the question in a most convincing and easy way. They all contributed in the discussions; these contributions showed they had different understanding of the issues discussed. The purpose of letting the participators unite on the questions posed in the questionnaire was to get the students defend and reason about their standpoints in different issues concerning the problem.

One boy who said he had very little experience with Internet was in fact able to contribute to the discussions as much as the others. In this case, the issues of criticism of sources and ethics are applicable in our daily lives, as we are confronted with information in various situations and not only on the Internet. He continues to say that Internet can even be a useful tool for the students to learn about ethics and criticism of sources.

In the aspect of PBL, the role of the facilitator was important. The first group sought for guidance and help throughout the scenario. They assumed that the facilitator was the teacher and was there to teach them. The students were not used to the kind of pedagogical approach.

### **7.2 Experiential learning**

In the aspect of experiential learning the scenario was not as strong as expected. The activity was carried out in a room next to the fifth- and sixth-grade classrooms. The lack of other rooms to be in made it unavoidable. Both teachers and other students that needed something from the room constantly interrupted the scenario. One participating boy in the first group was needed for music-practice, so he left in the last part of the scenario. All this interruption

made the participating students unable to fully concentrate on what was happening in the scenario, and therefore much of the story telling part of the scenario was fragmented and lost its purpose. The purpose was to get the students involved in the action and a feeling of an experience. The importance of having a calm and quiet environment must be emphasized in a learning situation of this kind.

One can also question the scenario itself. It might be argued that it was not "good enough" in getting the participants a feeling of experience. The design of a scenario demands a great deal of creativity rather than routine, as it is suitable for controversial subjects. The same accounts for the duration of the scenario. It might not be sufficient with only one hour. On the other hand we strongly believe that a three-hour long session could be too long for the students in primary education in the regard of keeping their interest and engagement throughout the whole scenario. The reason for a shorter scenario was the amount of time available, for both teacher and students. Summing up the impressions from the two groups in the learning activity, the participators had time to get a good enough understanding of the problem to get them involved in active discussions.

### **7.3 Role-playing**

The aim of role-playing was to make the participants view situations in new angles. However, it was obviously too difficult for them to relate to the concept with changed roles, teacher being a student and vice versa. If role-playing is to be used and serve its purpose, the students must be more closely related to the characters in order to "live the part" more easily. As in the first group, who participated in the learning activity, the role-playing interfered too. Earlier research results, focused on the role-playing and how it affected group interaction show that it made the participants more open-minded and the discussions less prestigious [REF]. To bear in mind those participants were exclusively adults.

### **7.4 Limitations, reflections and lessons learned**

The time was very limited due to organizational constraints within the school and what refer to as "quick and dirty ethnography" (Hughes et al., 1994). The teachers and students' time is scarce, and therefore we did not want to, or more accurate, could not interfere too much in their work. In spite of the limited time spent at this school, we do believe that this was enough time to gain an overall satisfying understanding in order to give a picture of how

educational IT is used and of some of the problems this school encountered with educational IT.

In this project several lessons were learned. Firstly we would have interviewed more students in the field study and interviewed the students individually after their participation in the use of the multimedia scenario in order to get a richer picture of their view. We got the impression that they were not likely to speak as freely in a group, as they would have individually. Secondly, as only one of the authors acted as facilitator it was obvious that observing and act as a facilitator at the same time was difficult. It was difficult to keep full attention on both things at the same time. Therefore, a video camera instead of a sound recorder should have been used during the multimedia scenario. Some of the relevant interaction between the participants could have been missed out when only the sound was recorded. Furthermore, two of the questions in questionnaire were difficult for some of the students to understand. We should have been more careful with the formulation of the questions, in a manner that a nine-year old would understand.

A limitation is also that only one teacher participated. A more careful planning might have avoided this, however the emphasize is on might. The teacher was in participating during her free time and the other teachers were all busy teaching.

The design of a multimedia scenario is very time consuming as it consists of different types of multimedia as e.g. movies, sounds and pictures that has to be produced. Moreover, creating a plot that is interesting and rewarding in the sense of illustrating the relevant and important aspects of the problem in focus, is very important. The aim is to engage and attract the participators in order to get the feeling of a mutual experience of the problem in focus. To achieve this takes considerable time, as in this case the need for an overall understanding of the issues of ethics and criticism of sources was just the beginning of the design.

## **8. Conclusions and further research**

In this paper we have described the design, implementation and evaluation of a multimedia scenario to enhance the experience that initiates learning. The multimedia scenario was used to initiate and facilitate discussion among students and teachers about Internet use in primary schools. The research question elaborated in this paper was:

Is the PIER approach useful in primary school, in supporting the interaction between the students and the teacher?

The evaluation suggests that this type of learning activity can work in a primary school setting. This particular scenario was designed to make the participants discuss and reflect on the issues of ethics and being critical of sources of information on the Internet from their prior knowledge and experiences. PIER showed potential in supporting collaborative learning. This kind of learning activity, we believe, can very well serve as a source of inspiration for teachers. Beside the need for teachers to know how to integrate educational IT into the curriculum there is also a need for them to know a variety of techniques for implementing that integration effectively. We also believe that PIER can be a source of inspiration for teachers to use collaborative learning, PBL or experiential learning as a pedagogical approach in a learning environment and not using information technology to do so. So in that sense IT as in this case the PIER approach, can enhance education if that is the same as using the new pedagogical approaches.

PIER and more specifically multimedia scenario have potential to visualize the issues so the students can more easily relate to them. To engage the students in discussions is after all the most critical part of the scenario.

Further research includes the following: Only the first phase of the PIER methodology was used in this research, and the whole cycle of PIER is to be applied to fully evaluate the approach in a primary school setting.

## **9. References**

[REF] - own references blinded for review purposes.

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