

# OECD/CERI ICT PROGRAMME

## A Case Study of ICT and School Improvement

Summary

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### **Executive summary**

This survey attempts to answer whether ICT plays a significant role in the change of pedagogic practice, how abilities in the use of ICT tools are spreading through the organisation, and what kind of the effect of this has on the learning community. The survey has been carried out at Røyse Elementary School in Hole municipality and at Bokn Elementary and Lower Secondary School in Rogaland and Ringstabekk Lower Secondary School in Bærum municipality. The survey tries to answer four central issues given in the summary below.

## Can ICT be as a catalyst for educational reform?

The three case reports are all linked to schools which have made a change in the pedagogical practice: From subject oriented teaching to bigger elements of project and problem-based work within the frame of the teaching plan. These innovations have been carried out at different paces and with different strengths in the three schools. The ICT arguments have come into the process at different times and apply to the whole or parts of the organisation. When it comes to Ringstabekk, ICT was introduced after a long period of open teaching practices. At Røyse and Bokn, a change of the teaching instruction happened simultaneously with the introduction of ICT. The reforms have been initiated centrally and lead to consequences for all participants.

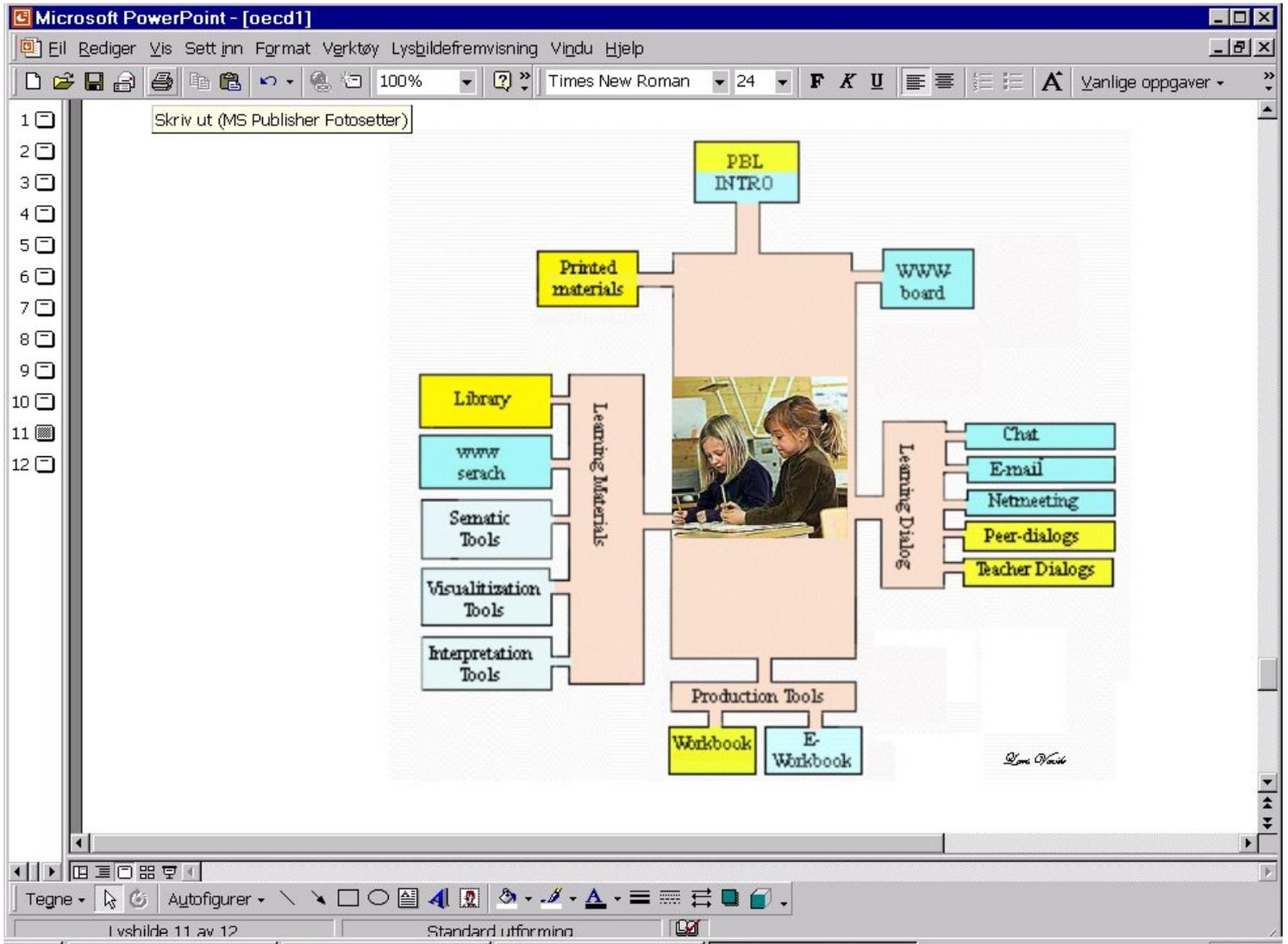
The issue of whether ICT acts as a catalyst for the changes of the pedagogical practice, is therefore difficult to give a general and unambiguous answer to. As regards Røyse Elementary School, the introduction of ICT have been used as an important argument for the reform, while in the case of Ringstabekk, ICT can be seen as a supplement to a project and problem-based work form which was already established prior to the project. This indicates that ICT contributes with additional resources and is no necessary condition for the reform work in itself. Also, the driving force behind the reform is what determines how ICT is to be used; not the other way around.

Further, we can state that ICT can support a traditional academic didactics as well as a project and problem-based perspective. ICT does not have any structural properties that makes sequence-orientated academic teaching not suited for this media the fact is quite on the contrary. With lectures on a Web page, control questions, automated correction forms and frequent ask lists, ICT comes across as an excellent tool for maintaining a well-known, lecture-based teaching tradition. This is mainly the structure which is offered at online courses today, and that some of the teachers at the selected schools have received their ICT education through.

When the introduction of ICT in the three schools is used as an argument in favour of a change of the pedagogical practice, ICT is added as a facility to problem- and project-based learning. This means breaking with the established lecture-based practice. Due to this fact, a special set of ICT applications are emphasised. Few detail about the various applications has been provided in the planning phase at the different schools, as ICT is used as a collective concept. However, it looks as if this will be embellished on during the process.

Few teachers say that their teaching is dependent on ICT. However, the absence of this facility will naturally cause many practical problems. This is likely to be increased as new ICT tools open up to possibilities which cannot be covered by other media. This tendency is also visible in the new plan documents for the schools, where ICT acts as something more than a production tool.

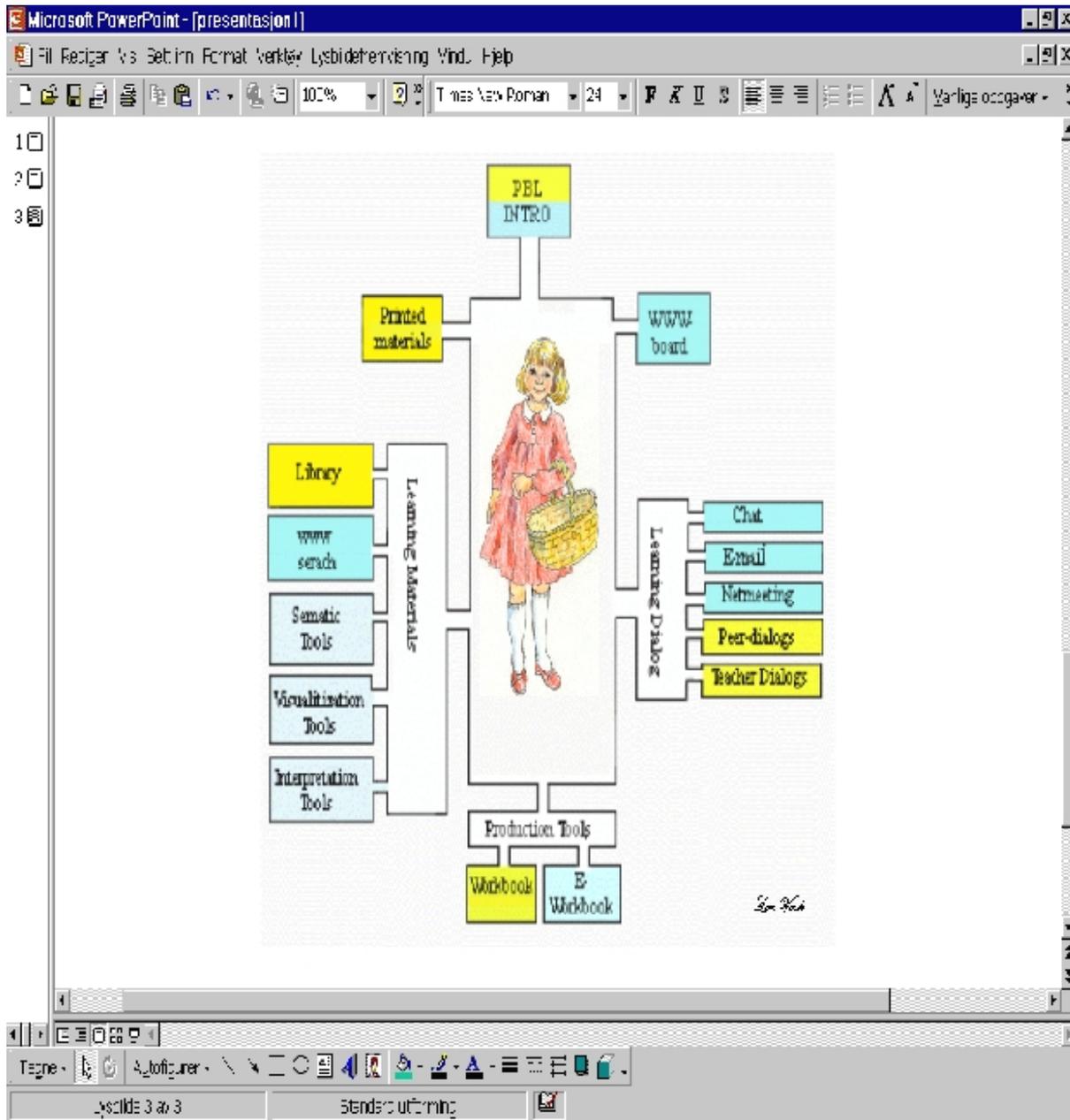
## Will implementation of ICT lead to the same or higher academic standards?



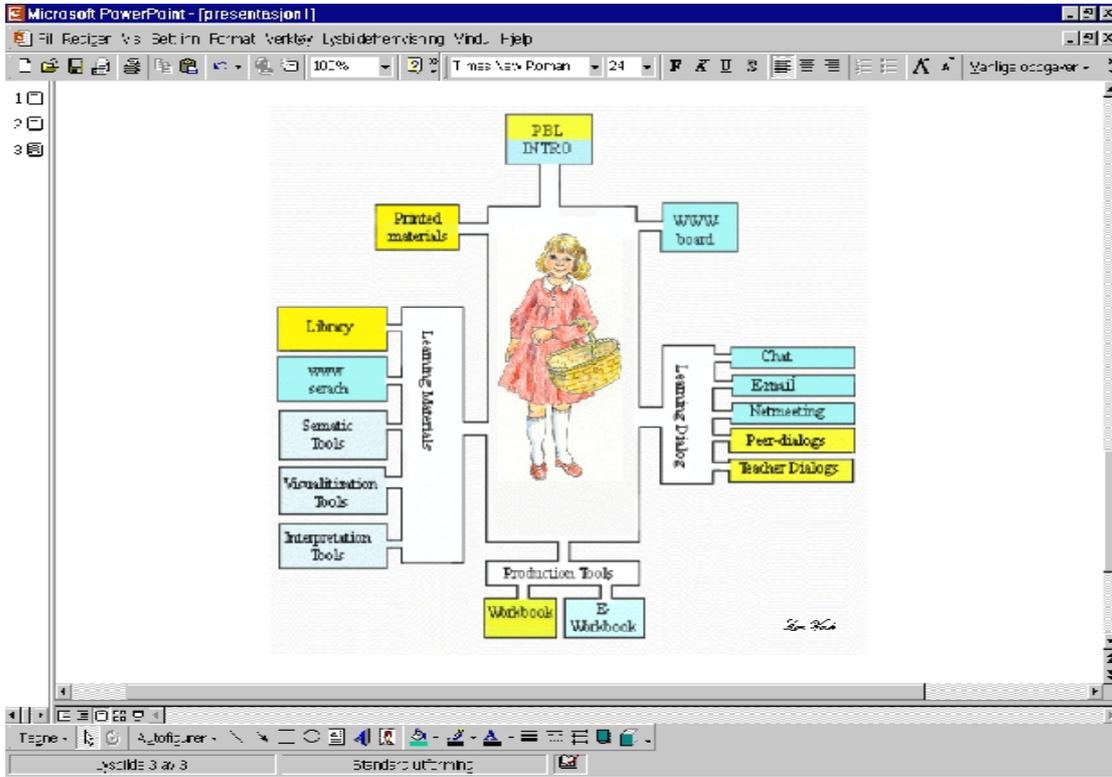
The reform work in the schools is problem- and project-based, and partly supported by ICT-facilities. This raises a more complex issue about academic standard, as the same question applies to problem and project-based work forms where ICT is not involved

ICT has opened up for new possibilities for the schools. Simplified, we can say that the structural aspects of the learning community can be pictured as a room diagram, which includes the work forms present in all three schools. The metaphor is a conventional, open landscape – a marketplace, with freedom to use and collect the resources regarded necessary to finish a project or solve a problem.

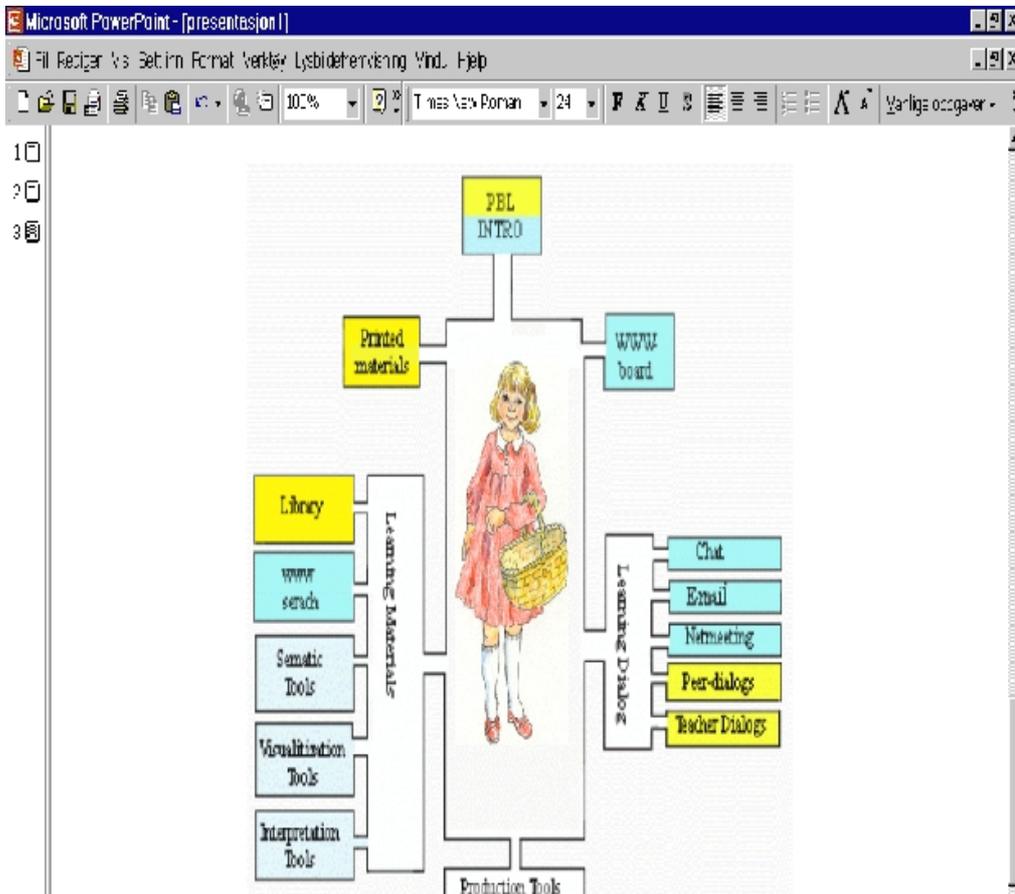
The diagram shows that new arenas have been established alongside (marked in blue) the old and familiar rooms for library, laboratories, guidance, group work, class and plenary settings. ICT has extended the repertory of meeting places with virtual arenas for synchronous and asynchronous communication. In the same way, the learning material is supplemented with new tools for visualisation, interpretation, construction and collecting and storing information. The students have also been given access to production tools to produce, print and publish their own material.

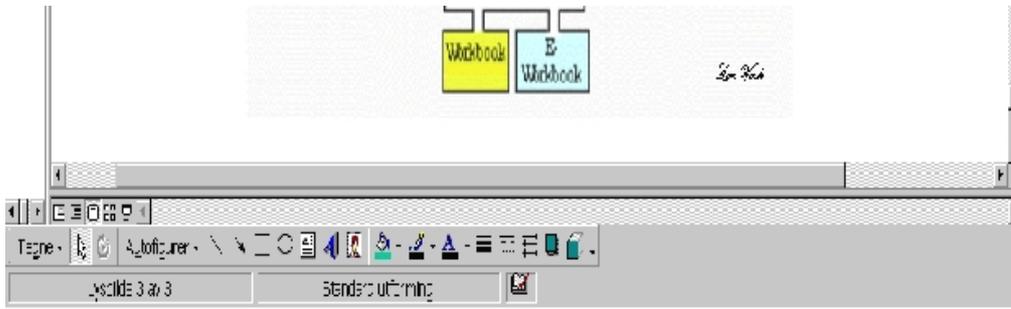


Surprisingly many of the activities observed in the three schools are linked to production tools like Word, PowerPoint and Publisher. We also observe cases, especially where ICT is easily accessible, where the students' design fantasies are given the chance to grow and develop. Copied pictures and gif-animations are rampant in the students' e-folders, without relation to the rest of the content. We can also see the effect of how easy it is to acquire material from the Internet: Some texts are clearly marked by the fact that they have been copied and not understood by the students.

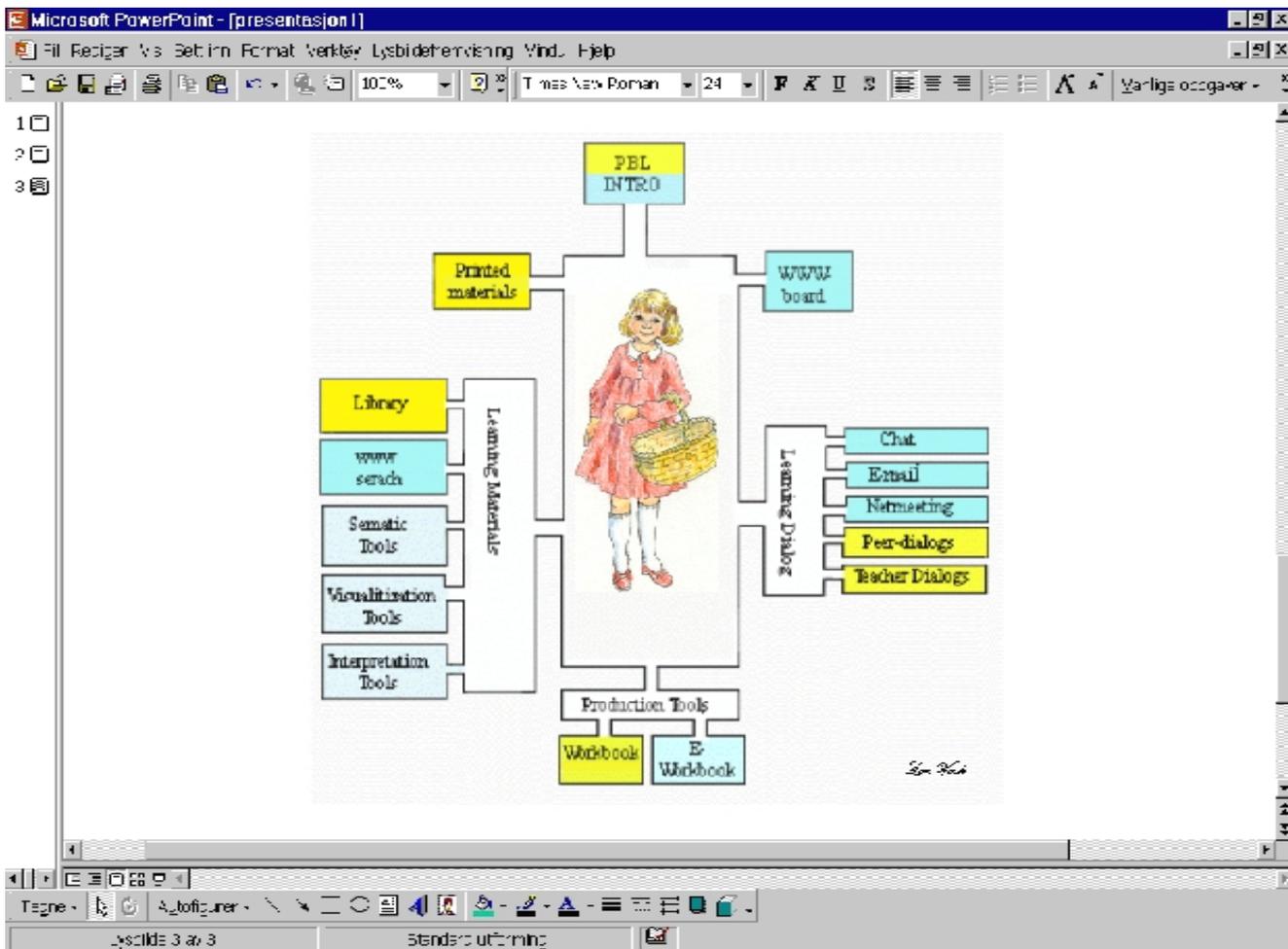


ICT is also used beyond the production of neat reports and presentations. Here, we refer to students who use a source critical analysis to negotiate understanding, choose a perspective and present their results for discussion. We are talking about an intentional information search on the Internet, a reflected selection and a construction process for making a hypermedia document for presentation. With respect to the work phase in problem-based learning, ICT is used both in the collection phase, the analytic phase and the presentation phase.





ICT has opened up to an extended learning community. This fact makes it possible to carry out distributed problem-based projects within a contact network that extends beyond the individual school and the local community. We also see that the internal communication form in the school between students and teachers is extended through the use of netbased communication.



It is difficult to identify what the students have gained regarding knowledge and qualifications. On the one hand, the schools put the emphasis of their work on problem- and project-based methods. Expectations and goals are central elements in such a method. The ICT work is meaningful as long as it contributes to fulfilling these goals.

On the other hand, we also see a tendency of ICT resulting in new activities, where focus is on the technical possibilities. Design and technique are subject matters which are not included in the curriculum in Norwegian school. In this context, G. Salamon's statement proves an interesting contribution to our reflection: *Different media, if they are powerful, serve different rather than the same ends. The greater the difference between the media -- the greater the diversity of outcomes that can be attained.*

## Which pattern of diffusion will occur in the organisation related to the reforms and application of ICT?

Because there was close to a 100 % agreement among the staff to participate, they could all be labeled innovators or early adopters of this reform. This number is far beyond the predicted rate of participation. We attribute this high rate of participation to the fact that the major changes of the project-based learning approach could not be implemented gradually. This is especially the case in Røyse Elementary School.

As regards the ICT part of the reform and the ICT implementation in general, we find more evolutionary diffusion. Personal initiative and willingness to participate have been decisive for the diffusion. This fact becomes more evident when we differentiate between different ICT tools. There is no discussion at all about using Word or about using e-mail.

Another diffusion pattern also emerges as ICT tools become generally available. We observe a trivialization process where the new and sensational aspects of ICT become well known, and thus gradually more common and invisible. The trivialization probably implies a more realistic attitude towards ICT among the users, as well as a more sensible use.

## What are the main factors for a successful implementation of ICT in schools?

Observations from the three schools give us yet again a basis for differentiating between different ICT tools and range of uses. Nearly all students from our sample have access to ICT in their homes. The group of different production tools is spread through many channels, and, naturally, their utility value will to a large degree depend on whether they are being utilised by available equipment at the individual school. Røyse Elementary School serves as the best example in this case with 2:1 student/computer ratio and a wireless network that gives the students and teacher almost unlimited access to ICT power.

Typically, the guidance, where there is a need for it, takes place through colleague-based training. Using an application, like Word or PowerPoint, is controlled by demand and supported through the practice of teaching the person sitting next to you. The following statement serves as a typical example for the opinion of many teachers in the three schools:

*The most important thing that helps me to use ICT in my teaching is the informal support I receive in collaboration with my colleagues, i.e. someone who I can ask to help me with the ICT. Sometimes I also find training sessions on new ICT applications helpful, but this only the case if I have to use it directly in the classroom or in my daily professional practice - and again, with the informal support network around me. (Teacher at Ringstabekk)*

We see the beginning of a range of uses which demands a different type of knowledge of pedagogy, ICT and subject matters. This goes far beyond the operational ability needed for using an ICT application. The following serves as examples:

- being an adviser for intentional search for information on the Internet
- understanding the teaching/learning during hypermedia production
- helping students to use subject orientated visualisation tools to gain insight into relations that are not otherwise easily accessible
- being an adviser in modelling work
- helping the student to catalogue, save and retrieve information
- providing guidance in the construction of semantic networks
- understanding the problems related to teamwork on the net with distributed problem-based learning

These examples are related to a professional competence which reflects a profound insight, experience, thorough consideration and

understanding. The survey provides fragmentary knowledge of how this didactic knowledge can be introduced . However, we feel that we can focus on the principle of teaching in a contextual situation. This coincides with a situated perspective of learning and learning, which may be illustrated in a quotation from Wittgenstein (1958)<sup>[2]</sup>:

*Is there such a thing as expert judgment?*

There are those whose judgment is better and those whose judgment is worse.

*Can one learn this knowledge?*

Yes, some can. Not, however, by taking a course in it, but through experience.

*Can someone else be a man s teacher in this?*

Certainly. From time to time he gives him the right tip. This is what learning and teachings are like here. (p. 227)

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<sup>[1]</sup> [http://www.itu.uio.no/konf/so\\_what/Prentasjoner/Salomon/Oslo\\_point-filer/slide0046.htm](http://www.itu.uio.no/konf/so_what/Prentasjoner/Salomon/Oslo_point-filer/slide0046.htm)

<sup>[2]</sup> Wittgenstein, L. (1958). (G.E.M. Anscombe, Trans.). *Philosophical Investigations*. Oxford: Basil Blackwell.