

Digital Teaching Aids and Learning Design Sequences in Swedish schools – a user’s perspective: Interaction

Abstract

The purpose is to present pupils interaction when working with digital teaching aids in class. The aim is to show how and where interaction takes form in a Learning Design Sequence. The research project is based at the Stockholm Institute of Education. It is financed via the Knowledge Foundation’s research program LearnIT. The material used in this paper, which mainly consists of videotapes, is collected from four schools in the Stockholm area. The analysis is made according to the LDS model and it is related to traditions within socio cultural theories with a focus on didactic design and multimodal analysis. The result shows that pupils interact more when using digital teaching aids and that they focus slightly more on the digital artefact than on the content.

Keywords

ICT

Learning, interaction, multimodal, socio cultural, digital teaching aids, Learning Design Sequence

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Introduction

Purpose and background

The purpose of this article is to present how pupils can interact when they work with digital teaching aids in class. The aim is to show how interaction takes form in a Learning Design Sequence - LDS - which is explained under the headline Learning Design Sequence. Our understanding of interaction springs from a multimodal perspective on learning and is understood within socio cultural frames. The conference theme we are focusing is connected to the theme of *ICT and learning*.

Questions at issue

We approach the question on how digital teaching aids can support the learning process and how it is used in school. The questions at issue are;

- What types of interaction is found in the LDS?
- In what phase do the different types of interaction occur in the LDS?
- What do pupils interact about; the digital artefact, the subject (content) or something else?

Project presentation

The research project, *Digital Teaching Aids and Learning Design Sequence in Swedish Schools – Users' Perspective*, is based at the Stockholm Institute of Education. It is financed via the Knowledge Foundation's research program *LearnIT*. The project's purpose is to deepen the understanding of how digital media are used as a resource for learning in education. The project runs for three years, from the year of 2004 to 2007.

In 2004, at the beginning of the project, 19 schools which are ahead in their ICT-development were contacted via interviews with head teachers and teacher questionnaires. Ten schools were selected because they use ICT in, their own opinion, and advanced ways. Pupils are from 6 to 19 years old and they are observed in different subjects such as Maths, Science and Foreign languages. At present the research group is busy analysing and transcribing the vast video material.

The project studies ICT and interaction in its socio-cultural context which means that our material is gathered in classrooms – often with pupils we are familiar with which means the study is of ethnographic character. Our interest is the interaction between pupils and between pupils and digital artefacts. We are also interested in the interaction between pupils and teachers. To mention an example, we want to see who is in charge, who takes the initiative and who restrain the schoolwork. The main part of our material consists of more than a hundred hours of videotaped film from classroom interaction and field notes attached to each film.

The material also consists of interviews of both pupils and teachers, often with the help of an Mp-3-player.

The project collects all pupils' representation such as written material and PowerPoint presentations as well as their own films made within the frames of the LDS. In a few cases pupils have written log books which are gathered and copied.

The project is now in the phase of transcription. All material is not transcribed; instead we transcribe critical incidents that we choose according to our questions at issue. Each research member transcribes and analyse sequences according to his or her individual research questions. The analysis is made according to the LDS model and pupils' interaction is analyzed in relation to the content of the task. The material is analysed in relation to four aspects;

- Design - how the digital teaching aid is built and how different modes are interacting.
- Usage - how pupils interact and use the digital artefact, what actions that occurs and with what objectives.
- Understanding representations – how pupils represent their learning
- Meta narratives and reflections – how the users understand the usage of the digital artefact in comparison to their own learning

The result of the project is so far a few papers and articles and three essays. The whole result will be presented in different forms in June 2007 when the project is finished.

Learning Design Sequence

Within our research group we have constructed a model which we refer to as an LDS – Learning Design Sequence (Engström, Hössjer, Selander & Åkerfeldt, 2006). Our LDS is defined in two aspects; “action and time” as well as “representation and signs of learning”. An LDS is a sequence of learning which we follow from start to end. This means that we document a sequence from introduction to evaluation. An LDS can consist of a few hours or several weeks. We have documented these sequences with a digital video camera. After each LDS we have interviewed both teachers and pupils and we have also gathered pupils' representations. Since we have a multimodal perspective we are interested in documentation of all modes such as speech, gestures, pictures and sound. The members of the research group look into different areas within an LDS with help of their own individual research questions. This paper is concentrated on interaction in all phases since that is what Eva's and Susanne's research questions concerns.

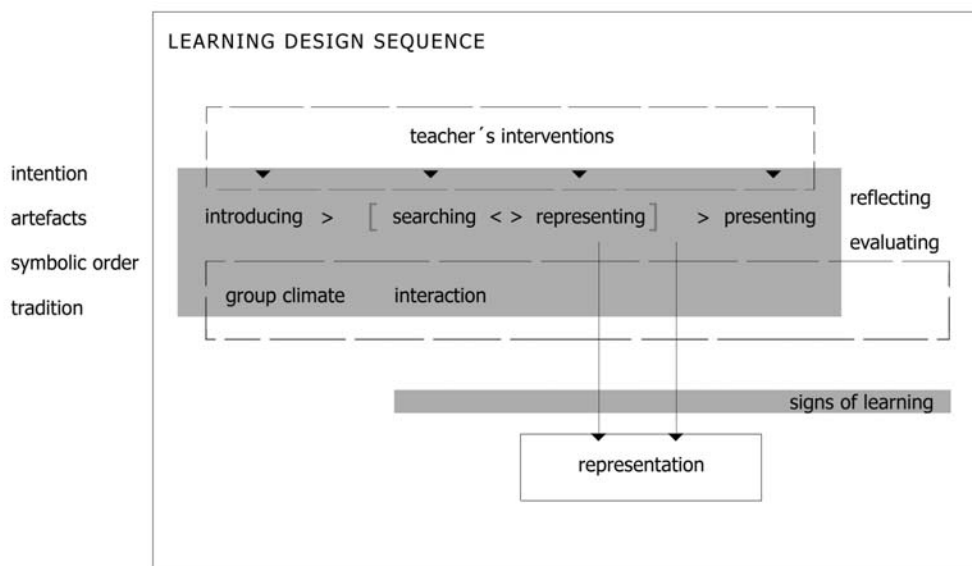


Figure 1

Theoretical framework

Our research about interaction is related to traditions within socio cultural theories with a focus on didactic design and multimodal analysis.

In the socio cultural perspective the artefact is central. Pupils thinking is thought to be intimate connected to the artefacts they are using (Säljö, 2005). This is shown in the interaction between pupil and artefact where the pupil for example often can manage complicated actions without being able to verbalise them, which is a common scenario in our material. Säljö means that it is useless trying to understand what goes on in one pupils head – instead we try to understand learning in the interaction between pupils.

Interaction can be described as fundamental social actions which have meaning for other participants (Lindblad & Sahlström, 2001), and it can be seen as a reciprocal action between how teachers, pupils and artefacts influence each others actions through different communicative expressions. The notion of interaction can in the physical world be described as the individuals' mutual influence on each others actions and on their way to function when they are in their direct presence physically (Goffman, 1959). Today this definition can be relevant without the physical presence. It can for example exist in a chat-conversation or in a game on-line.

In socio cultural literature communication and interaction are not divided. Often the notion is used synonymously. Neither will we sort out the differences between communication and interaction in this paper. In our material we can see different kinds of communication such as mimetic, symbolic and verbal communication. We look upon interaction as a situation which consists of interplay of actions between teacher-pupil, pupil-pupil and pupil-artefact. In a socio-cultural perspective, learning and development exists through communication. It is through communication and interaction people's thoughts connect to other people (Säljö 2000). People and their direct social and physical surrounding have a mutual relation. An action can't be seen as an isolated activity, to act is to inter-act. Interaction is the connected flow of actions (Linderoth, 2004). Through interaction we create understanding and knowledge (Säljö, 2000) – therefore we prefer to observe pupils working together.

When interaction is looked upon from a multimodal perspective mode is a central term. Modes give us the opportunity to divide activities into sections to understand them better. If we are interested in the interaction when pupils are opening a file on their computer it can help us understand it better if we see it as different modes such as; gestures, speech, mouse activities and actions on the screen. Kress et al (2001) writes how language often is seen as the central and dominant mode in education whereas pictures, gestures and artefacts often are seen as illustrative supports to language. With a multimodal approach we look upon classroom interaction with its full repertoire of modes; visual, action concentrated and lingual modes. The notion multimode underline that we in our communication with other people use a great variety of different mediating recourses to formulate meaning. It can for example be spoken language, gestures, mimic and sighs (Lindstrand, 2006). With this approach it is obvious to videotape pupils' interaction since it is crucial to document everything the pupils say and do in the LDS.

Kress et al (2001) writes the artefact's built-in recourses give the pupils affordances which make them work and think in special ways. Therefore the interaction between pupils and digital artefact is important to document in order to understand learning and interaction in an LDS.

You can understand a mode as a mediating recourse. Different modes contain different forms of communication where certain forms are more important than others. All modes create meaning in different ways but it isn't sure that the meaning is accessible or visible for everybody. (Kress, Jewitt, Ogborn & Tsatsarelis, 2001). This is shown in our material where the digital artefact or the teachers' didactic plan can be designed in one way but used by the pupils in another way. Learning can still occur even if it is not the learning that it was meant to be.

A characteristic for many digital educational media is that they are multimodal. The interaction with the artefact as well as with other people in the classroom can be seen as multimodal. It includes modes as spoken and written language, intonation, sound, images, animations and film. In our study the material constitute principally of modes as spoken and written language, gestures and images.

Result and analysis

The method we have employed in the study refers to qualitative method. We have used different methods for data collection – as field observation, field notes, video recordings, informal and formal interviews. Methods of analysis are oriented towards artefacts, interaction and narratives.

The result and analysis of this paper consist of the material from three classes from compulsory school year 2, 7, 8 and one class from upper secondary school, year 1. The collection of the material took place during the autumn of 2005 and the spring of 2006 at 4 to 5 times during 2 months of time. The pupils were mostly working with their own portable computer in the classroom or with a stationary computer in a computer-lab. Both individual work as teamwork occurred. The subjects were Swedish Language (year 2 and 1), an integrated teamwork in Social Science, Music and Media (year 7) and Social Science (year 8). The LDS' were called "My own history" (year 2), "Fear" (year 7), "The travel through Europe" (year 8) and "History of literature" (year 1).

The result of the first question at issue: "What types of interaction is found in the LDS?" is that the types of interactions are pupil-pupil, pupil-pupil-pupil, pupil-artefact, artefact-pupil, teacher-pupil, pupil-teacher and pupil-parent.

According the second question; "In what phase do the different types of interaction occur in the LDS?" we have found that all types of interaction are found in all kinds of phases in the LDS except pupil-parent which only were found in the phase of searching and presenting.

Due to the third question at issue "What do they interact about; the digital artefact, the subject (content) or something else?" We have differed the interaction about artefact and the subject in the following; if a pupil in the searching phase has asked the teacher or another pupil about which word to search on in Google we have analysed it as an interaction about the subject. If a pupil in searching phase has asked the teacher or another pupil how to search to get fewer results we have analysed it as an interaction about the artefact. If pupils in the searching phase discuss the ethics about using a certain picture they found on Google or if they discuss their weekend plans we have analysed it as an interaction about something else.

The result is that the most usual type of interaction at the present time of the data collection were pupil-pupil. Among the younger ages (year 2 especially) the interaction about the digital artefact dominated. Among the older ages (year 1) the interaction about the subject dominated totally. In year 8 the result was even between the content and the digital artefact. In year 7 pupils interact on both form and content, but with a majority on the form.

Final remarks

The project is in the phase of transcription. So far we have found all different types of interaction in all phases of the LDS. Something else we have seen is that pupils interact with each other via the artefact - there is little face to face interaction. The older pupils even chat with each other even when sitting next to each other.

What we have found so far is that pupils interact mostly about the artefact and slightly less about the actual content. This material shows that the younger the pupils are, the more they interact about the artefact. We can see that this scenario follows through the LDS from introduction to evaluation and it applies to the teachers as well. The older students are more focused on the content and they use the artefact as a resource for their learning. We have seen that pupils who get stuck with the content begin working on the form instead. This leads us to the questions if pupils need more or different kinds of support from the teacher or the digital artefact? Do/can teachers put the right demands for learning on the digital teaching aids the pupils are using?

The interviews tell us that pupils interact more with each other when they are working with digital artefacts than when they work with traditional media. What we do not know is what happens when pupils interact more?

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