The Digital Workbook Students Constructing their Curriculum

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INTRODUCTION

The purpose of this paper is to demonstrate a constructivist strategy of organizing Internet-based learning. The goal has been to design a learning environment that is open, student centred and problem based, in which the student is given control of the situation instead of being controlled, and which provides the student with sufficient structure and support to solve the problems and to reflect on the experiences (Dewey 1915).

The pedagogical tool discussed in this paper is called the digital workbook. It is not an advanced piece of technology. It is more a strategy for organizing and structuring Internet-based learning, where one takes advantage of the Internet as a constructivist and democratic tool.

The experiences of using the digital workbook come from a course in computer science given at Ostfold University College in Norway. The subject matter was "local area network and intranet", and there were 115 students attending the course, among them 17 distant students. Further there was only one teacher assigned to the course, sitting off-campus in Denmark, and two student assistants on campus. Consequently there were several challenges to overcome when designing a problem based learning environment for this course. The advantage was that the students were skilled in using computers.

THE DIGITAL WORKBOOK

The digital workbook is inspired by the portfolio pedagogy. It is a framework for structuring and collecting the work of the student. The aims of the workbook are: to effectuate knowledge building, to support communication and the sharing of experiences, and to provide assessment based on samples demonstrating authentic student work and focusing on the student as a problem solver. The course was carried out without ordinary lectures. It was organized around the framework provided by the workbook. Each student was supposed to construct his/her own workbook and publish it on the WWW.

In order to give direction in the learning process (Dewey 1915), the workbook was divided into four chapters, covering different aspects of the subject matter. In the first chapter the student was asked to describe his/her learning goals and motives for attending the course. The learning goals were expected to be reflected in the workbook. The next three chapters covered different main aspects or disciplines of the subject matter. Further there were organized several activities to each chapter. The main activities were related to producing content for the chapter. These activities raised different problems spanning from the concrete and general to the experimental, and they were meant to cover the different stages of an experiential learning cycle (Kolb 1983).

The problems the students were expected to work on were the following: giving an overview of the current technology; describing a "real" case to which they should prescribe solutions; choosing a technological problem to discuss and elaborate; carrying out a practical implementation and reflecting upon the experiences. The structure of these activities was deliberately kept relatively open. The learner was allowed to shape the problem according to his/her own experiences and interests. The student was expected to make the problem his/her own and identify with it (Dewey 1915).

Other activities had supporting functions. They were means to aid the student in elaborating on the problems and writing the chapters. Extensive study resources had been prepared for each problem to support the students in constructing their workbook, such as well-structured Web pages covering the basics of the subject matter. The students were also encouraged to look up external sources on the Internet and in the library. Additionally they received individual tutoring as well as written feedback to each chapter, and there were online discussion facilities (web-conferences) where they could raise and discuss problems and solutions.

The students were free to work on the activities whenever they preferred to. This meant that there were a variety of ways of traversing the terrain in order to meet the problem-solving approach and to answer the learner's enquiry. Learning is a dynamic process and the student could return to the different problems and elaborate further on them after obtaining more insight and knowledge. They were allowed to work with the problems of the workbook during the whole semester, which meant they had the possibility to engage in a process of learning at their own convenience. Additionally, the students were encouraged to visit each other's workbooks, discuss them and exchange experiences.

THE INQUIRY

The students' experiences of the digital workbook were researched using different methodologies: observation, questionnaires and interviews. The analysis of this empirical material indicates that different learning patterns were

developing as a consequence of using the digital workbook, and it raises some interesting questions that will be briefly discussed below.

EXPERIENCES

An experiential learning style. The learning stories told by the students indicated that the students were indeed working in an experiential manner. They returned to the problem repeatedly after reflecting on it and doing more research, and after gaining more insight and practical experience. They emphasized that it was the problem-oriented tasks in the workbook that they really felt they learned from, when they were required to describe their own case for implementing a network and when they had to research a self-defined problem within the subject. These were the tasks they claimed that they returned to repeatedly. They also acknowledged the digital workbook as a learning tool. They characterized the workbook as being the motivating factor, and emphasized that they could form the workbook after their own interests and experiences.

- "The workbook makes you remember more of the theory. Students who attended this course last year without the workbook, don't remember anything at all" (male student).

Copying, or constructing knowledge? Copying was observed in the workbooks, but not as a general phenomenon. The students only copied when they solved general and shallower problems. For example when they were asked to give an overview of the technology, they copied from each other and from the study resources on the Web. These parts of the workbook are therefore remarkably similar for all of the students.

However, in the problem-oriented activities where the students were asked to define problems themselves and where they could present their own experiences, there is no noticeable copying. As one student remarked in an interview, "It is not possible to copy when you work with these topics". As a result all workbooks are different and with an individual profile.

- **Loneliness and distress at the price of flexibility.** The digital workbook provides a very flexible working style, and many students appreciated that (30% in the questionnaire). The problem is that just as many found the workbook overwhelming. A typical comment is that the workbook requires considerable discipline and that there is little pace provided by the design. The students also found it difficult to know where to begin and what was expected of them. They also complained that they got little feedback from the teacher.

As an observable consequence about half of the students postponed the work with the workbook until the last weeks before assessment. Some did this deliberately because it suited their work and life situation, but many did it because they were not motivated to start earlier.

Collaboration or comparison? We had expected that the students would collaborate. What we found was that the students were showing their workbooks to each other (except three students), and they explained that they were using the workbooks as a ground for discussions and for getting feedback. Additionally, the students were browsing each other's workbooks regularly and were interested in comparing their own work with that of their peers to get inspiration. Still there was no genuine collaboration (Salomon 1995). The workbook is an individual project and publishing on the WWW alone is not sufficient to stimulate collaboration.

CONCLUSION

The digital workbook appears to function as a design concept for a constructivist-learning environment. The workbook creates an environment where knowledge is constructed and where learning is experienced through activity and reflection, and most students adapted to the new learning model.

The negative result is that some 30% of the students felt lonely and distressed and were not motivated to work with the workbook. This can be expressed as the dilemma between designing for maximum flexibility and putting more effort in controlling the learner, and between designing for individual contra social learning.

One solution to the problem could be to allow the students to work in project groups and to make the digital workbook a shared resource of the group, visualizing shared experiences.

The experiences with the digital workbook and the results from the research are not conclusive. There is thus a need for more research on these types of arrangements in order to develop a coherent and stimulating digital learning environment that will benefit both students and teachers.

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