Author(s): Makkonen, Pekka

Title: Is a seminar based on student-created screen capture videos a meaningful way of learning?

Year: 2008

Version:

Please cite the original version:

Makkonen, P. (2008). Is a seminar based on student-created screen capture videos a meaningful way of learning?. Journal of Education, Informatics and Cybernetics, 1(1), 34-37.

Is a seminar based on student-created screen capture videos a meaningful way of learning?

Pekka Makkonen
Department of Computer Science and Information Systems, University of Jyväskylä
Jyväskylä, 40350, Finland

ABSTRACT

We ran a problem-based seminar with screen capture videos. The students worked in small groups of two or three students or they completed the coursework individually. In this seminar the students had a workspace in the Optima environment for publishing their coursework videos. At the final phase of the course the students were expected to familiarize themselves with the presentations of other groups. In this paper we analyze the benefit of our problem-based coursework on the web by comparing the different phases of it. After each phase the students were expected to analyze the benefit of it for their learning.

Keywords: Learning of information systems, screen capture videos, web-based learning environment, constructivist learning, problem-based learning.

1. INTRODUCTION

In the constructivist approach learning is comprehended as the development of mental models. Brandt [1] emphasizes that constructivism is an essential basis when applying the web for teaching and learning. It provides the teacher with a structure for teaching. By focusing on concepts and connecting them to mental models, teachers can gain both confidence and control over the amount of material they cover in the small blocks of time usually allotted to teaching and training. Integrated with experiences that learners use to alter and strengthen mental models, the constructivist approach to teaching information retrieval also gives users the structure needed to get the most out of the Internet.

The era of the web 2.0 has brought new ways to publish works on the web [11]. The web can be seen an active tool supporting collaboration. One of these new ways for publishing is videos. YouTube video service has promoted this significantly. In the spirit of the YouTube student can compose videos by themselves and publish them on the web. In this way they can use video making tools in the spirit of constructivism allowing active learning experiences. One tool for video-making is Windows Media Encoder (WME) which enables capturing screen and voice narration at the same time. These videos are playable in most media players including, for example, Windows Media Player.

Based on the aforementioned we use a problem-based coursework focusing on the problematic concepts of the learning area. First in this coursework, students need to report what these difficult concepts are by familiarizing themselves with a lecture handout. Second, the students need to search area-related information on the web and give some examples of learning. In this way the students can focus on the main concepts and enrich their learning in a constructivist way and the web can help them learn difficult concepts in particular. Based on this acquisition of information students can compose WME videos in which they teach other students to understand these problematic concepts better.

The social constructivist learning theory emphasizes the meaning of interaction in successful learning. For realizing these benefits in our web-supported coursework we suggest the use of a virtual learning environment (Optima) and its shared workspace feature. This occurs by publishing videos; by commenting on seminar works created by other students (or groups) and by reading comments expressed by other students. By using a virtual learning environment the students can use their own language to teach each other to understand problematic concepts.

This paper introduces our approach to carry out a web-based coursework and seminar. Additionally, it provides the analysis of it focusing on the successfulness of our coursework and seminar. Our analysis has many goals. We want to know

- how the students experienced the coursework,
- how the students experienced making a coursework video, and
- how the students experienced watching other's coursework videos.

Before discussing the study itself, we first provide an overview of constructivism and the WWW in learning from the perspective of our study.

2. CONSTRUCTIVISM

Jonassen [4] summarizes what he refers to as "the implications of constructivism for instructional design". The following principles illustrate how knowledge construction can be facilitated by:

- providing multiple representations of reality,
- representing the natural complexity of the real world,
- focusing on knowledge construction, not reproduction,
- presenting authentic tasks (contextualizing rather than abstracting instruction),
- providing real-world, case-based learning environments, rather than pre-determined instructional sequences,

- fostering reflective practice,
- enabling context-and content dependent knowledge construction, and
- supporting collaborative construction of knowledge through social negotiation.

According to Brandt [1], constructivism asserts that learners construct knowledge by making sense of experiences in terms of what is already known. In constructivist learning the concept of a mental model is essential. Learning is comprehended as the development of a learner's mental models (or a student's knowledge structures). Brandt [1] emphasizes that constructivism is an essential basis when applying the WWW for teaching and learning. While the goal of constructivism is to recognize and help to facilitate a learner's ability to construct knowledge when applied to teaching information retrieval on the Internet, it also provides the teacher with a structure for teaching. By focusing on concepts and connecting them to mental models, instructors and teachers can gain both confidence and control over the amount of material they cover in the small blocks of time usually allotted to teaching and training. Integrated with experiences that learners use to alter and strengthen mental models, the constructivist approach to teaching information retrieval also gives users the structure needed to get the most out of the Internet.

The WWW and its hypermedia nature enable learning by constructing knowledge in the sprit of the cognitive school of constructivism. Cognitive constructivism emphasizes that learning occurs through many channels: reading, listening, exploring and experiencing his or her environment [7]. Furthermore, the WWW and web-based learning environments support learning based on social constructivism by providing different ways of communication. The social constructivist theory emphasizes the influences of cultural and social contexts and interaction in learning [10].

Problem-based learning is one implementation of the constructivist model of learning and the practical implementations of it can vary [6]. By applying problem-based learning to constructivist learning students can concentrate on what is really difficult. According to Ellis et al. [2], in a problem-based learning environment, students work in groups on real-life problems and have the opportunity to determine for themselves what they need to learn in the relevant subject area(s). Based on the aforementioned one approach to problem-based learning can be familiarizing with an area to learn first. This phase can be followed by determining difficult concepts to learn and this could be the basis for an assignment. The assignment can occur on the web using different resources, such as search engines and directories. In this way students can bring fresh and clarifying views for themselves and fellow students in their own language.

3. THE WWW IN LEARNING IN OUR CONTEXT

In the case of coursework one approach may be by seeing Internet tools as cognitive tools, in other words, tools for knowledge construction. A cognitive tool is a term introduced by Jonassen in his discussion of hypermedia tools [3]. He claims that cognitive tools actively engage learners in the creation of knowledge that reflects their comprehension and conception of the information rather than focusing on the presentation of objective knowledge.

In the same way, web-based tools, like Optima, can be seen in an active context. The students can use Optima and its presentation feature for introducing their ideas, receiving feedback, and managing coursework. This leads to learning by constructing knowledge based on both a student's own ideas and other students' ideas. Additionally, by publishing video clips students can learn a subject area under the rules of cognitive constructivism.

4. METHODS

We pursued the study, including a problem-based coursework, and using Windows Media Encoder as well as the Optima environment. In this section we describe our experiment, sample, and results.

Experiment

At the University of Jyväskylä, the themes of the course Information management and information systems development are (1) administrative view to information resources management, (2) technological view to information resources management, (3) building information systems, and (4) organizational applications. The course was inspired by a textbook, Information Technology for Management: Transforming Business in the Digital Economy [9]. The course usually lasts for seven weeks including lectures (36 hours), coursework (feasibility study) as well as the final exam. The course given in fall 2006 also lasted for this length of time and included the above-mentioned activities and in addition material and activities on the WWW to support the lectures in the constructivist fashion combining both cognitive and social constructivism as well as problem-based learning.

To realize the benefit of problem-based learning and constructivism we organized a coursework in which students were expected to learn difficult course themes based on self-defined problems. The students were expected to familiarize themselves with the lecture handout of the course (128 pages) and try to find 5 difficult matters which should be better clarified. Based on these problems they searched for more information from the web to understand the possible difficult matters in our material. The students needed to report what useful links they found by using search engines and directories. They were expected make Powerpoint slides that included examples of what they have learned. The Powerpoint slides were the basis for videos. Videos were composed by using Windows Media Encoder and they contained Powerpoint slides and narration. The students were expected to clarify to other students what they can learn by seeing examples on the web. This part of the coursework was designed by combining problem-based learning and cognitive constructivist learning theory focusing on the concepts of the content area.

To promote the students' participation in the optional coursework, the students got credits for the final examination by completing the coursework. Although the coursework is a constructivist part of the course, the teacher's office hours were available as an additional resource to promote their work as well as scaffolding support. The students had six and a half weeks for the coursework before the final examination. The work was expected to be conducted as an individual task or in groups of two or three students.

The groups placed the videos on a web server. In the web-based workspace on Optima learning environment (see more details on the product at http://www.discendum.com/english/index.html) students created links to the videos on different servers and in this way the Optima enabled the single-point access to all the video material created by the students. Other groups were expected to familiarize themselves with these presentations. Additionally, it was possible to attach comments regarding any work of other groups on this workspace. For making the videos, the groups had six weeks. After these six weeks the groups were expected to comment on three other coursework presentations. These comments were placed in the Optima workspace. The students had one week for this. In the comments the students were expected to clarify what they learned by watching other students' videos. This part of the coursework was designed in the spirit of the social constructivist learning theory.

Figure 1 shows the first view of students' workspace on Optima. With the help of this outlook the students had a possibility to create links to videos on other servers and see and comment on the presentations created by other groups. By clicking a yellow button after the name of a presentation the students were able to comment on the videos of other groups. The commenting could occur either by typing plain text or using attachment.

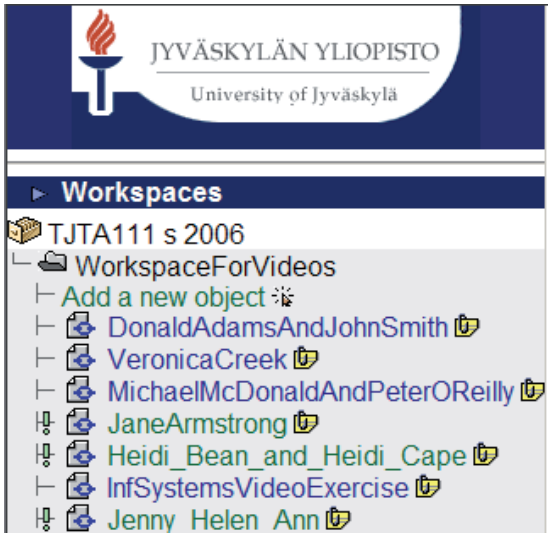

Figure 1. Single-point access to videos of coursework.

Sample

Forty-three students, 12 females and 31 males, whose mean age was 23 years (range 18-39 years), participated in the experimental group including the problem-based seminar on the web. 7 students studied informatics as a minor and 36 students as a major. 10 of them completed the coursework individually, 21 in groups of two students, and 12 in groups of three students. We call this group the WWW group in this paper.

Thirty-five additional students, 13 females and 22 males, whose mean age was 25 years (range 19-52 years), were involved in the control group. 13 students studied informatics as a minor and 32 students as a major. We call this group the non-WWW group in this paper.

Both the students of the WWW group and non-WWW group were expected to use the Optima learning environment for retrieving the course material. The pre-questionnaire conducted at the beginning of the course showed that the students both in the experimental group and the control group were at the same knowledge level concerning the main topics of the course: (1) administrative view to information resources management, (2) technological view to information resources management, (3) building information systems, and (4) organizational applications.

Results

As a part of the coursework the students evaluated two main phases of the coursework. This included the ratings of how beneficial they experienced (a) video making and (b) commenting on the videos of other students (where 1=very insignificant in learning and 5=very significant in learning). In this subsection we show the results based on this information. Additionally, we compare the effect of these two ways on learning and analyze the effect of our e-learning platform on learning.

How students experienced coursework in general: Table 1 shows the students of the WWW-group ratings on the coursework and seminar in general. The students were expected to rate how they experienced the coursework generally at the end of the course. The result shows that their attitude is mainly positive in both groups concerning the coursework generally.

n	43
Mean	3.88
Very insignificant	0
Insignificant	3
Moderately significant	7
Significant	25
Very significant	8

Table 1: Coursework generally.

Making videos: Table 2 shows the students' ratings concerning the benefit of video making. The students rated the benefit when they had created a link to the video from the Optima workspace. The result shows that this phase was beneficial for most students.

n	40
Mean	3.75
Very insignificant	0
Insignificant	1
Moderate significant	11
Significant	25
Very significant	3

Table 2: Benefit of video making.

Commenting on videos: Table 3 (see next page) shows the students' ratings concerning commenting and its effect on learning. The students were expected to rate how they experienced this phase at the end of the course. This phase was the most beneficial for the students.

n	37
Mean	3.94
Very insignificant	1
Insignificant	0
Moderate significant	4
Significant	27
Very significant	5

Table 3: Benefit of commenting on videos.

Comparing main features: We compared the means of the students' ratings concerning two basic features of the coursework. Since the data did not agree with the normal distribution, the Wilcoxon Signed -Rank test was appropriate for comparing two phases of the course. The test did not find significant difference between the ratings of video making and commenting on the videos (p=.225). The both phases are equally beneficial for learning.

How the students evaluated their competence level of e-learning platform use: We compared the means of the students' ratings concerning the competence level of e-learning platform use. Since the data did not agree with the normal distribution, the Mann-Whitney test was appropriate for analyzing data. The test did not find significant differences between the experimental group and the control group (p was .359 at the beginning of the course and .596 at the end of the course). Thus, the use of an e-learning tool is not the only critical matter while creating learning activities on the web. Pedagogical design is needed as well.

5. DISCUSSION

In this paper we analyzed a web-supported coursework focusing on the effect on the topics to learn. The results show that our screen capture video -based coursework including a seminar is a potential way to organize a coursework if we have a crowded course. Our comparison shows that the video making is the most fruitful part of our web-based coursework. In our coursework the video making phase represented cognitive constructivism and the commenting phase is connected to the social constructivist learning theory. We can claim that the approach presented in this paper supports the previously mentioned type of constructivism in the best way.

However, these phases together brought more value for learners and this result supports [4] general discussion on constructivist learning. A course with e-learning activities should include different engaging activities.

In the fall of 2005 we ran the same coursework without video [5]. In this assignment the students were expected to create HTML documents instead of videos. The results of this coursework showed that the authoring phase of the coursework is more important in learning than the commenting phase. Based on this we can claim that video has improved the usefulness of the commenting phase. The students of the year 2006 experienced the coursework more effective for their learning concerning both phases. Thus, video making improves the usefulness of both phases.

6. REFERENCES

[1] D. A. Brandt, "Constructivism: Teaching for Understanding of the Internet", **Communications of ACM**, Vol. 40, No. 10, pp. 112-117, 1997.

[2] A. Ellis, L. Carswell, A. Bernat, D. Deveaux, P. Frison, V. Meisalo, J. Maayer, U. Nulden, J. Rugelj, and J. Tarhio, "Resouces, Tools, and Techniques for Problem Based Learning in Computing", **ACM SIGCSE Bulletin inroads**, Vol. 30, No. 4, pp. 45-60, 1998.

[3] D. H. Jonassen, "What are Cognitive Tools?" in P. A. M. Kommers, D. H. Jonassen., J. T. Mayes (eds.). **Cognitive Tools for Learning**, Springer-Verlag (NATO ASI Series), Berlin, 1992.

[4] D. H. Jonassen, "Thinking technology", **Educational Technology**, Vol. 34, No. 4, pp. 34-37, 1994.

[5] P. Makkonen, "Benefit of an optional problem-based seminar on the web: Comparing ways of learning on the web", **Proceedings of the AMCIS Conference**, 2006.

[6] U. Nuldén, "PIE- Problem based learning, Interactive multimedia and Experiential learning", **Proceedings of WebNet 99**, 1999.

[7] J. Piaget, **The Development of Thought: Equilibration of Cognitive Structures,** New York: Viking, 1977.

[8] J. Rosenthal, "Active Learning Strategies in Advanced Mathematics Classes", **Studies in Higher Education**, Vol. 19, No. 2, pp. 223-228, 1995.

[9] E. Turban, E. McLean, J. Wetherbe, **Information technology for management: transforming business in the digital economy**, New York: John Wiley & sons, 2002.

[10] L. S. Vygotsky, **Mind and Society**. Cambridge, MA: Harvard University Press, 1978.

[11] Wikipedia, "Web 2.0", http://en.wikipedia.org/wiki/Web_2.0 (accessed on February 20, 2007), 2007.