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Videowikis for Improved Problem-based Collaborative Learning: Engaging Information Systems Science Students

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***Abstract*— The contemporary era of social media and web 2.0 has enabled a bottom-up on-line collaborative approach with easy content creation and subsequent knowledge sharing. The technically literate students of today and the changes in pedagogy towards a user-centred approach, where learners engage in the learning process by constructing new ideas and concepts based on their current or past knowledge facilitate the use of social media in learning environments.**

This paper describes the combination of a wiki and screen capture videos as a complementary addition to conventional lectures in an information management and information systems development course. The basis for our approach was collaborative problem-based learning with concrete problems defined by students. In order to activate students they were asked to identify unclear concepts or issues from four not well-defined or clarified lecture themes. The students worked in small groups. After the groups selected the theme which was most unclear to them they created presentations associated with these issues. Our intention was to facilitate collaborative learning by using the principles of the Jigsaw method. The results from the experiment showed that videowiki-based coursework affects both external and internal motivation equally in most cases. This reflects that from the perspective of constructivism the videowiki-based assignment is equally effective compared to learning without this setting. However, the development of knowledge concerning different course themes was positive in groups of students who completed this videowiki assignment.

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 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 constructivist learning theory presented in this paper is not an ideal theoretical framework for the era of the web 2.0. In this era learning is more targeted and includes various sources and processes. Connectivism has been suggested as an alternative for current theories (behaviorism, cognitivism, and constructivism) [2]. However, since connectivism has not been acknowledged as a theoretical framework by the research community (see e.g. [3]), we apply constructivism as the basis of theoretical reasoning in the current study. Another motivation factor for this is that in constructivism a user-centred approach is encouraged in contrast to course-driven design. Learners engage in the learning process by constructing new ideas and concepts based on their current or past knowledge [4]. In this study the students were asked to construct concepts and new knowledge according to their understanding of problems.

The era of the web 2.0 has brought new ways for publishing works on the web. The web can be seen as a tool supporting active collaboration. One of these new ways is publishing videos. YouTube video service has promoted this significantly. In the spirit of the YouTube students 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.

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Based on the aforementioned we use a problem-based coursework focusing on the problematic concepts of the learning area that engages students in solving authentic and contextualized problems. First in this coursework, students report what difficult concepts they identify by familiarizing themselves with a lecture handout. Second, the students search content-related information on the web and give examples of the content in a way they consider that they better understand and thus better facilitate their 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 to learn particular difficult concepts and share this knowledge with other students. Based on this acquisition of information students compose WME videos in which they teach other students to understand these problematic concepts better. The students can utilize this video material at their own pace, any time and place. In this way WME videos can be considered more useful in education compared to traditional live presentations.

The social constructivist learning theory emphasizes the meaning of interaction in successful learning. For realizing these benefits in our video-supported coursework we suggest the use of a wiki environment (Wetpaint in our case) and its power to share knowledge through single-point access. This occurs by publishing seminar videos, by commenting on seminar videos created by other students (or groups) and by reading comments expressed by other students. By using a wiki environment the students can use their own language to teach each other to understand problematic concepts.

The shortage of the existing studies of web-video use in education is that these are based on web-based distance learning paradigm, apparently applying behaviorist strategies. Such methods include blogs, simulations, pod casting, and video games (see for example [5-7]). The problem of these experiments seems to be that they forget the connectivist nature of the web use.

This paper introduces a constructivist approach to carry out a videowiki-supported coursework and seminar. This paper has two purposes. First, it introduces our videowiki-based coursework as a way to apply the WWW in the learning of basic concepts and issues in information systems science. Second, it includes an evaluation of how dedicated the students who completed the optional WWW-based coursework were learning different areas of information system science. Additionally, the paper contains an evaluation of how the knowledge of four different main areas was developed during the course. We made all the evaluations by comparing the students who completed the coursework to the students who did not participate in the coursework.

The paper is organized as follows: section two describes constructivism as an alternative view of learning. In section three we discuss the opportunities of the WWW in learning. In section four we describe the meaning of engagement and motivation in learning. The fifth section presents our research objectives based on the theoretical discussion conducted earlier in this paper. The sixth section presents the evaluation of our assignment from the perspective of engagement and motivation as well as from the perspective of knowledge development. In section seven we summarize the results of the study and draw conclusions and in section eight we reflect on the application of learning theories. Finally in section nine we provide thoughts about potential future work.

2. Constructivism

Widely known and discussed views associated with computer-supported learning include behaviorism and constructivism. Behaviorism is as a learning paradigm derived from positivistic paradigm of science. It discards mental issues as scientific topics, and relies purely on observable phenomena. In the behavioristic view learning is conceptualized as student's reactions to teaching based on the activation of subjective knowledge construction (stimulus). Whether learning has taken place or not is evaluated solely on the basis of observable behavior of the student. Constructivism, in contrary, is derived from cognitivist views of human cognition, thus focusing on mental events rather than outer behavior as learning outcome. In constructivism learning is fundamentally seen as subjective, active knowledge construction. As teaching strategy, it is interested in the mental processes which affect the behavior of a student [8]. Most forms of learning and instruction can be implemented according to any learning paradigm, i.e., a traditional lecture as well as courseware and projects may be carried out according to behavioristic strategies or by intentionally supporting the construction of knowledge in the cognition of the learner. However, most existing web-based instructions are based on behaviorism [9].

Jonassen [10] 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;
- 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 web 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 web and its hypermedia nature enable learning by constructing knowledge in the spirit of the cognitive school of constructivism. Cognitive constructivism emphasizes that learning occurs through many channels: reading, listening, exploring and experiencing the environment of the learner and the learning content [11]. Furthermore, the web, web-based learning environments, and wikis 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 [12].

Problem-based learning is one implementation of the constructivist model of learning and the practical implementations of it can vary [13]. By applying problem-based learning to constructivist learning students can concentrate on what they consider the most difficult issues. According to Ellis et al. [14], 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 approach to problem-based learning familiarizing with an area can be the first step of learning. This phase can be followed by determining difficult concepts to understand and this could be the basis for an assignment. The assignment can include the use of different resources on the web, such as search engines and directories. In this way students engage in complex, challenging problems and collaboratively work toward their resolution and bring fresh and clarifying views, which they can discuss in their group and use for preparing their assignment to be used for knowledge sharing between themselves and fellow students in their own language. The motivation to solve a problem becomes the motivation to learn. Simultaneously problem solving skills are developed and learning becomes an active, integrated and constructive process influenced by social and contextual factors.

3. The Use of theWeb for Learning in our Context

Vast information resources are available to teachers and students via the web. However, the problems inherent in any information system include disorientation, navigation inefficiency and cognitive overload. On the Internet these problems are multiplied [1]. In educational settings these problems can be decreased or even overcome by using suitable pedagogical approaches and/or appropriate tools.

One potential approach in educational settings and coursework may be considering 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 [15]. 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. These tools are learner driven and controlled, opposed to teacher or technology driven. The use of a cognitive tool changes the role of the student into an active learner. Figure 1 shows cognitive tools in the general three-dimensional framework for computer-based learning [15]. These dimensions are generativity, control, and engagement.

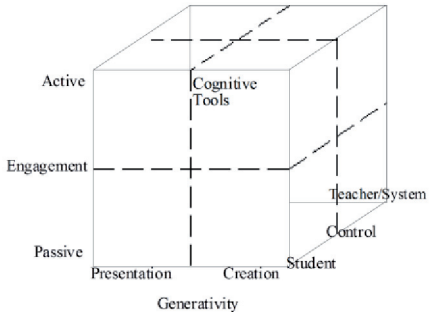

Fig. 1 Cognitive tools in computer-based learning

In the same way, web-based tools, such as wikis, can be seen in an active context. The students can use wikis for introducing their ideas, receiving feedback, and managing coursework. This facilitates learning by learners constructing new knowledge based on interaction among themselves.

In the case of a web-based seminar it is useful to discuss the use of the web from the perspective of media research. Haythornthwaite [16] stresses the interpersonal ties that affect the character of web-based communication. According to her, strong ties between students/learners improve web-based communication. In virtual environment team cohesion and group identity is difficult to achieve, if there are no earlier ties between team members. The reason is that virtual team members seldom meet face-to-face and thus informal communication is reduced. A successful leader of a virtual team (the teacher as facilitator) must excel in applying the right choice of communication means along with a profound knowledge of the effect of applying it. One of the strengths of team work is the exploitation of knowledge sharing and the dynamics of the team. If communication and trust are limited only partial knowledge sharing will take place and the potential added value (learning in our case) will not be achieved. The main differences between collated teams (team-members working in the same office/location) and distributed teams (team-members working on the same project/assignment in different locations) are within communications and trust [17]. Taking this into consideration and our own

experiences from higher educational environments in different cultural contexts we strongly believe that physical face-to-face interaction is needed as a part of a course, in particular in the beginning. Face-to-face interaction develops ties between students/learners/team members in a way that is not possible in a totally virtual training setting [18]. By meeting the students/learning face-to-face in the early stages of assignments contexts can be created in which effective web-based learning is facilitated.

Based on the above, it is important to appreciate these views of learning and to understand the use of the web in learning while outlining courses. Three issues, important to take into consideration are:

1. Discussion/reflection regarding the right amount of face-to-face based learning is necessary [19].
2. Analyzes of an accurate way to use the web. Active learning must be promoted and situations conducive for successful web-based learning must be created.
3. Scaffolding support is needed to support constructivist learning based on the web. We claim that most information systems science courses can be built on the constructivist approach of learning. Practically, this occurs e.g. by organizing a comprehensive coursework that works as the core of a course. This coursework should cover as many course topics as possible.
4. As an outcome of the underlying abstraction we decided to apply the Jigsaw collaborative learning method for our assignment [20]. The Jigsaw method divides the area the students are expected to learn into smaller pieces. In our case these pieces were four main themes of the course. The students were expected to create a presentation regarding one selected theme. In the next stage the students were expected to watch videos that the other student groups had created from three other themes. In this way students both create own knowledge and learn from other students. This was considered to be an effective way of problem-based learning in order to comprehend the whole course content.

4. Engagement and Motivation

Jonassen [15] claims that by using cognitive tools in learning, a student's engagement in learning is better. Thus, it is important to evaluate motivation in order to show the depth of engagement in this way.

Most commonly in learning from text, motivation and learning style is understood both internally and externally [21-24]. Internal motivation (or intrinsic motivation) reflects the own personal interest of the student/learner in regard to espousing new knowledge. It is associated with a human's high-level needs such as self-actualization. External motivation (or extrinsic motivation) reflects the need to reach goals set by others. This is connected to a human's low-level needs such as security and survival. Motivation in learning from text can be evaluated as shown in figure 2. Pre-motivation is the sum of pre-interest and pre-benefit. Post-motivation is the sum of post-interest and post-benefit. Internal motivation is the sum of pre-interest and post-interest. External motivation is the sum of pre-benefit and post-benefit.

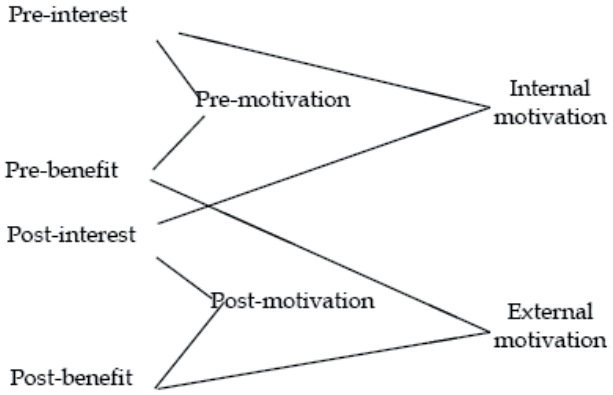

Fig. 2 Motivation of learning from text.

Biggs [21-22] created a Study Process Questionnaire (SPQ) to measure learning style. He found three qualitatively different learning approaches to studying, namely:

Surface learning: A student with the aim of achieving the minimum requirements learns in a superficial manner and uses a predominantly surface approach. The student is goal-oriented rather than focused on deriving any intrinsic meaning from the task.

Deep learning: The student is interested in reaching a meaningful understanding through extensive reading and research.

Achieving learning: The student is highly committed to gaining good grades and is likely to take a systematic approach to studying.

Every approach consists of a congruent motivational pressure and a corresponding study strategy. Biggs [21-22] articulates that students use predominantly one of these approaches to learning, and that these approaches are correlated to different performance outcomes. He claims that the identification of learning profiles is useful for identifying the compatibility of the student with a particular learning environment. In our case we did not take this into consideration, but future work will concentrate on identifying the learning style of students before creating the groups and measuring the outcome depending on the learning style preferences of the groups.

5. Teaching/Learning Methods

Taking the constructivist learning theory as the base for our pedagogical approach and combining contemporary trends in learning, we pursued the current study, including a problem-based coursework by using Windows Media Encoder as well as the Wetpaint wiki platform (see wetpaint.com). In this section we describe our experiment, sample, and results.

A. Experiment

At the University of Jyväskylä in Finland, 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*' [25]. The course usually lasts seven weeks including lectures (36 hours), coursework (feasibility study) as well as the final exam. The course given in the academic year 2008-2009 also lasted of the planned time and included the above-mentioned activities. In addition material and activities on the web was used to support the lectures in the constructivist fashion combining both cognitive and social constructivism as well as problem-based learning. Shorter versions of the course have been taught within the Erasmus Teaching Exchange programme to students at Johannes Kepler University in Linz, Vienna University of Technology and Alexander Technological Educational Institution of Thessaloniki, Greece in 2010 and 2011. Experiences have been reported at [26].

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 in order to find material supporting the comprehension of the student defined difficult matters in our material. The students needed to report what useful links they found by using search engines and directories. They were expected to create PowerPoint slides that included examples of content in a comprehensive way in order to demonstrate what they had learned and to be used by the other students to facilitate learning of the whole course material in an easy, fashionably and effective way. The PowerPoint slides were the basis for videos that students composed by using Windows Media Encoder. The videos contained PowerPoint slides and narration. The students were expected to clarify to other students what they can learn by using examples identified from 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 participation of the students in the optional coursework, the students achieved credits for the final examination by completing the coursework. Although the coursework is a constructivist part of the course, the office hours of the teacher were available as an additional resource to support the work of the students. 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 Wetpaint wiki website. On this workspace, students created links to the videos on different servers, and in this way Wetpaint enabled 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 in the discussion forums of Wetpaint regarding any work of other groups on this workspace. For making the videos, the groups had to finish within six weeks. After these six weeks the groups were expected to comment on three other coursework presentations. These comments were placed in the discussion forum of Wetpaint. The students had to finalize their comments on work of other groups within one week. In the comments the students were expected to clarify what they learned by watching videos of other students. This part of the coursework was designed in the spirit of the social constructivist learning theory.

Figure 3 demonstrates our single-point access to the videos and comments in our assignment. By utilizing the EasyEdit feature students were able to update wiki and create links to video material.

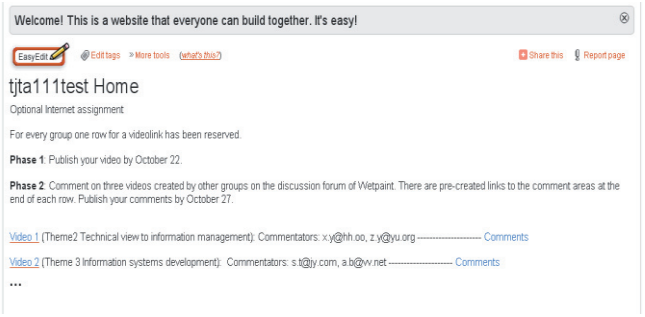

Fig. 3 Single-point access in our wiki-based coursework.

B. Sample

Sixty students, 22 females and 38 males, whose mean age was 22 years (range 18-39 years), participated in the experimental group including the problem-based seminar on the web. In total 9 students studied information systems science as a minor and 51 students as a major subject. Totally 8 students completed the coursework individually, and 52 in groups of two to five students. We call this group the video group in this paper.

Twenty additional students, 0 females and 20 males, whose mean age was 26 years (range 20-40 years), were involved in the control group. They all studied information systems science as a major. We call this group the non-video group in this paper. The students in the control group completed the course without the assignment including video making and the use of a wiki.

All the students had been initiated into the use of a PC and a web browser, and all of them were familiar with university lecturing. The pre-questionnaire conducted at the beginning of the course showed that the students both in the experimental group and the control group were approximately 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.

C. Collecting data

The data for this study was collected by administering a questionnaire both at the beginning and end of the course to both types of groups. The respondents rated each theme of the course with regard to (a) how interesting they considered the themes of the course (where 1=very uninteresting and 5=very interesting), and (b) how beneficial they considered the themes of the course (where 1=very useless and 5=very useful). The knowledge of the students/learners before taking the course and after having taken the course was measured through a subjective evaluation/ranking of their own skills or knowledge on a 5 point Likert scale (where 1=very poor and 5=very good) by the students themselves in the pre-questionnaire and the meta-questionnaire regarding the four learning objectives of the course, namely the creation and improvement of administrative views to information resources management, the technological views to information resources management, the skills of building information systems and the competences to comprehend organizational applications.

6. Results

A. Motivation

The Kolmogorov test showed that the data based on the responses of the students concerning the themes of the course agreed with the normal distribution. Thus, the one-way ANOVA test was appropriate for statistical analysis of the data.

We calculated the scores for pre-motivation, post-motivation, internal and external motivation of each theme. This was based on the framework presented in section two. The one-way ANOVA test did not show significant differences in pre-motivation between the Non-video group and the video group in regard to any theme of our course (p varying between .392 and .875).

Additionally, the one-way ANOVA test did not show significant differences in post-motivation between the Non-video group and the video group in regard to any theme of our course (p varying between .394 and .991). The one-way test did not either show significant differences between the genders in the video group (p varying between .150 and .999).

B. How students' knowledge was improved

Since the data based on the responses of the students concerning the goals of the course did not agree with the normal distribution, the Mann-Whitney test was appropriate for the analysis of the data. Additionally, because of our small sample size we selected this non-parametric test for analyzing the data. Concerning learning of different themes the study found that the problem-based coursework on the web was equally useful in the learning in of theme 3 (Building information systems) and theme 4 (Organizational applications). However, in the learning of theme 1 (Administrative view to information resources management) and theme 2 (Technological view to information resources management) the students of the video group showed more progress in learning compared to the non-video group. The details of the analysis concerning knowledge are shown in table 1.

TABLE 1.
ANALYZING THE STUDENTS' KNOWLEDGE OF DIFFERENT THEMES

	Mean at the beginning of the course			**Mean at the end of the course**		
	Non-video group	***video group***	***p***	***Non-video group***	***video group***	***p***
Administrative view to information resources management	2.60	1.96	.002	3.30	3.06	.165
Technological view to information resources management	2.50	1.78	.002	3.30	3.15	.379
Building information systems	2.50	2.04	.014	3.55	3.33	.238
Organizational applications	2.25	1.84	.041	2.85	2.73	.610

If we compare knowledge at the video group at the beginning of the course to the end of the course, the statistical analysis shows that differences were highly significant ($p<.001$) in the learning of all the themes). However, in the non-video group these differences were varying from .001 to .021.

7. Discussion

In this paper we analyzed the effect of our wiki-based coursework from the perspective of students' motivation and knowledge development. The results show that a wiki-based coursework including a seminar is a potential way to organize a web-based coursework if we have a crowded course. The results are promising because most teachers appreciate the cost-effectiveness of web-based education [9]. Our comparisons show that in the wiki-based coursework the most significant effect is the improvement of students' knowledge concerning the course themes. From this perspective our assignment is more suitable for the females. However, from the perspective of motivation students were equally motivated in both groups. This reflects that the main effect of this coursework is better learning without additional convenience.

We also claim that this wiki-based course setting works in the teaching of the knowledge management area of information systems [26-28]. Knowledge management comprises sharing of both explicit and tacit knowledge.

The limitation of the study is that we did not compare traditional live presentations to these web videos. However,

our approach can reveal many benefits compared to live presentations. The students can access videos as many times as they want. In traditional live presentations the students behave differently. According to Walter et al. [12], they can turn visual attention elsewhere (i.e., to static slide or to their notepaper) while maintaining auditory attention on the speaker. Based on these facts we can claim that videos on the web may be the effective way of learning compared to traditional live presentations.

Nevertheless, this paper demonstrates that a successful seminar for a crowded course is possible using Windows Media Encoder and a wiki environment. Windows Media Encoder and related tools bring videos in the active way into the education. Wetpaint or other related tools enable web-based communities. In this way the web brings new possibilities for education, and web-based communities are at least as effective as traditional learning settings.

8. Remark about the Application of Learning Theories

Learning and teaching are peculiar concepts. What we mean by them largely depends on the context of use. The confusing fact is that we use the same word in everyday language and theoretical reasoning, even if the contents of the concepts in everyday context and theoretical context do not necessarily have much in common. These peculiarities are reflected in the current study. As a post-analysis, we now analyze the concepts of learning and teaching from the point-of-view of this research report.

In the theoretical context, the precise definition of concepts has traditionally been found as a virtue in science. Therefore, even if learning and teaching sound extremely familiar and we assume that there exists a mutual understanding about their content, we argue that they deserve a closer look. According to Kuhn [24], the adopted paradigm is a fundamental issue in communication, but also in perception. In other words, if we are talking about learning in e.g. behavioristic vs. in constructivist framework, we mean different things and pay attention to completely different issues. This fundamental role of chosen paradigm is often disdained. Different learning paradigms are merely handled as different strategies for e.g. instructional design.

The reason for the confusion is the poor resolution in our concepts. In the behavioristic era, conditioning was proposed to form a basis for an exhaustive theory of learning. I.e., it was proposed that all kinds of learning could be ultimately explained in the conditioning framework. The same happened in the emerge of constructivist learning theories – we were told that learning used to mean one thing but from now on it means something else. In other words, even constructivists declared their view to cover all human learning. In the meantime, the content of the concept of learning among the men-in-the-street had not changed. On the other hand, researchers and practitioners of education, who have their background outside the core of learning theories, use the names of popular theories to justify their instructional design. The reference to the theories is sometimes quite superficial. Over-simplifications, about the relationship between the type of educational design and underlying conception of learning, are usual. For instance, if there is a teacher in front of a classroom and students are sitting in their desks listening to the oral presentation of the teacher, can we claim that the teacher applies certain learning paradigm? Certainly we cannot. The classroom setting described above can quite as well be intentionally used for the activation of subjective knowledge construction (constructivism) or to use the means available to make the students behave in a desired way in given context (behaviorism).

It is quite common sense that learning multiplication table by heart is a completely different task than learning the role of information systems in manufacturing industry. Is it even possible to refer to these two tasks with the same word ("learning")? Or should we enrich our vocabulary concerning learning to make a distinction to qualitatively different kinds of learning tasks? In that case, we would discard the idea of behaviorism, cognitivism and constructivism as learning paradigms and handle them merely as different views of learning or learning/teaching strategies. This has actually already been done by Merriam and Caffarella [9], but even they did not name this meta-view to contribute to the endless debate about what learning and teaching are fundamentally all about.

9. Conclusion and Future Work

The pedagogical trends today focus mainly on learning (opposed to teaching) and calls for flexibility in teaching methods. To this respect, the nature of the new information and communication technologies, including social media, helps considerably. In order to embrace the contemporary teaching and learning trends emphasis need to be placed on specific learning context and how real-world outcomes, both in short-term and long-term, are influenced by non-cognitive factors, such as rational and emotional components, personal background including interest, motivation, experience and competence.

The contemporary approach described in this paper demonstrated our experiences of problem based learning from a constructivist viewpoint. Wiki and screen capture videos, as cognitive tools for facilitating knowledge creation and sharing, were used to facilitate knowledge creation, knowledge sharing and learning.

The experiments will continue with emphasis on three new approaches, namely (a) in-depth comparison of traditional live presentations to web videos, (b) assessment of individual differences in learning profiles, such as learning styles and learning preferences, for identifying the compatibility of the student with a particular learning environment and (c) comparison of the outcomes of similar problem based approaches in different cultural contexts. The motivation for the third approach is that the authors from own experiences are convinced that different cultural contexts bring about differences in assumptions about learning, the expectations that students/learners have

regarding learning and teaching, the teaching model itself, the relationships between educator and learner, the way the technology itself is experienced, the pedagogical aspect, the design of online courses and the way in which individuals and groups communicate and respond to their environment.

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