DIVERSIFYING HIGHER EDUCATION: INNOVATIVE TOOLS TO FACILITATE DIFFERENT WAYS OF LEARNING

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Abstract

The objective is to demonstrate how higher education can benefit from using unconventional methods such as Web 2.0 technologies. We will illuminate how the various types of learners (auditory, visual, kinetic) benefit from using new methods and tools for learning (traditional teaching settings). We assess the strengths nd weaknesses of these alternative teaching methods and tools. The paper is bsed on a case study and a pilot project where different methods and tools were used and tested in a teaching setting in a university.

Introduction

Universities represent stability and tradition in many cases, for example in teaching. This may be when it comes to teaching methods and innovations therein somewhat exaggeratedly interpreted as stagnation and stubbornness (Tynjälä, Välimaa, & Sarja, 2003; Conway, Fletcher, Russell, & Wilson, 2012) thus leaving room and giving reason for improvement (Bates & Poole, 2003). The faculty members do not always follow the newest technology and its possibilities to also be used in the classroom. The students of the day seem to be more accustomed in dealing with and on newer technologies.

The age-old form of lecturing dates back to times when there were no books for the students to read and study from because books were expensive and scarce. Even the term "lecture" itself derives[1] from reading and chosen text. Lectures are still being held in today's universities, but their form and indeed the media may be somewhat altered. However, this varies quite a bit according to the individual capabilities of the lecturer. It may well be that the worst case scenario resembles remarkably the "good old days." Lectures in their modified form have their place in today's universities too, but it is safe to say that in general those days are over when the reasons behind the lectures were non-existing alternative means to lecture.

It seems that our students have grown with web technologies. The majority of the students carries their laptops to the lectures and uses them for taking down notes among other things. They simultaneously chat, browse the web and check details. They have already learned that the information and knowledge are there in abundance; the problem is to find the relevant sources. They use various methods in and for their work and assignments according to their personal capabilities as before. The difference is that they tend to learn quite quickly how to adapt the newer technologies and tools in their work. Also the

fact that these tools in their various forms are readily at students' disposal for no or little cost and the implementation thereof is reasonably easy.

In our curriculum there is a course that suited our interest of testing and finding new ways of realizing our tuition; *Methods and Tools for Business intelligence.*[2] The course is targeted at students in their third and fourth year at the university. The course covers the theme of business intelligence (cf. Vitt, Luckevich, & Misner, 2002; Vuori, 2007; Gilad & Gilad, 1985), with themes such as knowledge needs, discovery, use and assessment. The repertoire by which the tuition was to be given was decided to be expanded based on feedback gathered from the graduates. A presentation technology and tool named Prezi was used. The use of this tool was twofold: the personnel of the course prepared the tuition in Prezi, and the students were required to present their learning and progress with the assignment by using this tool. The way Prezi was utilized enabled novel interaction between participants. There were for example weekly discussions about the assignments that catered to knowledge dissemination and distribution more efficiently. The students used also Twitter and live Twitter feed during the course to present comments and questions to the teachers that were simultaneously delivering the tuition. Also the Socratic method was used to deepen parts of the teaching by conversing over a matter that was centric for the theme of the course.

The goal of this paper is to report the experiences collected during the course. Through this paper the use of more activity-based learning, and teaching, is justified also among academia. The encouraging experiences gained give reasonable grounds for recommending this kind of teaching and learning approach where and when the subject to be taught is seen to fit.

The structure of this paper is as follows. The second section presents the theories and contents related to the realization of the course; of teaching (actually of learning); and of the used tools and methods (Prezi, Twitter, Socratic method). The third section describes the actual process and how the course and the "teaching experiment" were executed. In the fourth section experiences of the course are reported: experiences of the students from whom feedback was collected, of the experts who assisted in technical issues and of the teachers who delivered the course. The fifth section forms a synthesis and discusses the suitability of such methods for university tuition as well as the overall success of the course.

Theoretical Backgrounds

From the students' point of view, this kind of teaching approach offered a way to study in a new and refreshing manner – one that is not so common in academic education, but that is highly recommended (e.g., by scholars representing the cognitive theory of learning, such as Fiske & Taylor, 1984; Niiniluoto, 1984; Sarvimäki, 1988; Rauste-von Wright & von Wright 2000; and Tynjälä et al., 2003). The cognitive approach to learning favors practical experience as a vital part of the whole process. According to the cognitive approach three types of learners exist – auditory (or aural), visual, and kinesthetic – and all these types of learners should be considered when

planning lectures. An auditory learner learns best at, for example, a lecture. In order to internalise the teaching, an auditory learner must hear the tuition. For a visual learner pictures and figures play a significant role in learning process, that is s/he must see what's going on. Kinesthetic learners learn by doing. An academic activity discussing or actually performing some kind of assignment (e.g., Prashnig, 2000) may be considered as such. Although scientific contribution and accuracy of the actual framework of various learning types may be debatable (see e.g., Coffield, Moseley, Hall, & Ecclestone, 2004; Hargreaves et al., 2005; Evans, Cools, & Charlesworth, 2010), it may be claimed that people like to study in different ways. Also based on the experiences it may be stated that changes in ways of delivering the tuition bring encouraging results.

A course exploiting multimedia[3] is able to answer the needs of various learners to study. The proportions of the three categories in the general population are: 25% auditory, 40% kinesthetic, and 35% visual (Ahola, 2004). This division is not exclusive. The suggestive numbers show the preferred and a primary method for learning, but it is argued that the other categories still remain and support the learning. This approach requires more openness towards novel ways of doing things from the faculty's side, as there are new tools to be learned for them as well.

The more pragmatic approach fits nicely to the university tuition (Virtanen & Helander, 2005). Jedeskog and Nissen (2004) have studied the use of ICT in teaching from the standpoint of teacher/student influence and control. They used two dimensions in their analysis: the nature of the study task and the nature of the education method used. These dimensions form two continua, between teacher-directed task and learner-centered task, and that of teacher-directed methods versus learner-centered methods (see Figure 1). Jedeskog and Nissen (2004) argue that, through these continua, different teaching methods and situations can be classified.

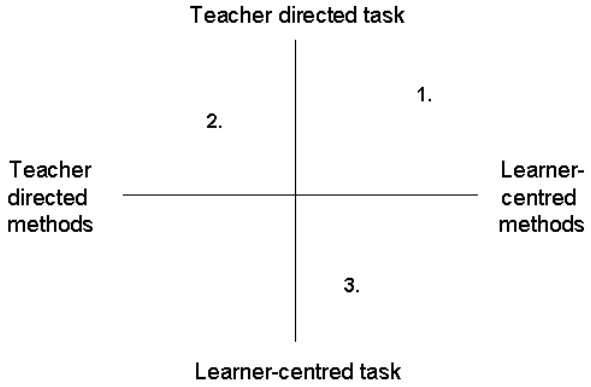

Figure 1. Teacher/learner influence (modified from Jedeskog & Nissen, 2004).

Traditionally, university tuition has been highly teacher-centered (Zupancic & Horz, 2002); the lecturer has set instructions for the student to perform a task by using a method chosen by the teacher. Figure 1 identifies in which zones the hands-on-tuition course fits and what kinds of possibilities it offers in the

pedagogical sense. First, and most importantly, the course offers the possibility for the students to be given a specified task but without any formal procedure. In other words, the students have to complete a given task, but the way they find the information from the existing knowledge base is not restricted by the teacher (nr. 1 in Figure 1). On the other hand, sometimes it is also important that the students learn a certain way, a path or a method of using the system, and then it is important that the students carry out the specified task in a/the way the teacher wants it to be done (nr. 2 in Figure 1). The third option offered by the course is that the students are provided with the possibility to use whatever knowledge they may think of and have access to independently and freely (nr. 3 in Figure 1). An argument backing this kind of university tuition is the fact that it may give additional abilities for students in their later activities to apply for positions (Ross, Staples, & Udall, 2011). It has also been stated that when the learners engage in the teaching and elaborate real problems, the results are also better (Blumenfeld et al., 1991).

The Execution

This paper is based on a case study where three learning methods were tested as parts of teaching and learning. The learning approaches were tested on a *Methods and Tools For Business Intelligence* course, with 23 third or fourth year students from the Information and Knowledge Management degree program. The teaching team consisted of two teachers and one advisor. Before the development work begun, the expectations and possible outcomes of the new teaching methods were coined to an overall goal of receiving better learning outcomes. Three new methods were selected to be tested during this course: Prezi presentation software, Twitter, and Socratic method. Selection of the methods was based on an analysis of possibilities and needs for the course.

Prezi presentation software was selected because of two advantages. First, it is a cloud-based solution enabling real-time collaboration for the students to work together and interact. Second, Prezi enables a new mindset for its users: it opens up novel possibilities to use that lie somewhere between whiteboards and traditional slides (Conway et al., 2012; Prezi, 2012). The zoomable background makes it possible to create an extra dimension to one's presentation. It also helps to rather freely explore ideas and form connections between them. The visual outcome is at its best very different from what it is in other existing presentation media.

Twitter is a real-time information network, which is about short communications called Tweets (Twitter, 2012). Twitter was used in the class together with Twitvisio, a Twitter extension allowing real time group video chatting around a topic. Twitter and Twitvisio were selected for the purpose of creating more channels for interaction in the classroom. Most of the students, if not all, have a laptop computer, which they use during the lectures to check facts, search for information and to communicate. Their ability for multitasking was utilized to serve and cater for the course. During the teaching the students were able to post their comments and questions via Twitvisio. The online discussion was projected to a screen in the class so that teachers and students without computers could also see comments. There was

also a facilitator asking questions in Twitvisio and raising the most relevant topics to be discussed in the classroom.

Twitter was selected because some of the students already had a Twitter account and the students were familiar with how it works. Twitvisio was selected for privacy reasons: it makes tweets visible in Twitvisio, not in one's personal Twitter account. Twitvisio also enables someone not being able to attend the class physically to take part in the teaching.

The Socratic method promotes learning by asking questions and conversing on the theme. Thus this method may be said to be exploiting the knowledge of the many. Originally in the dialogues Socrates pretended to have no knowledge of even the most fundamental principles of the matter at hand. He demanded short answers that address very specific points and do not move on to more complicated questions until an adequate understanding of basic principles is achieved (Maxwell, 2012). The Socratic method was used in the course when addressing the ethical aspects relevant to the course topic. The method was chosen so that the students would be forced to think and argue about the topic themselves, as no ready answers are available.

Out of the selected three methods, two had a direct purpose of enhancing classroom interaction although with very different approaches. Students were given a short training in both Prezi and Twitter/Twitvisio about their purpose and practicalities. Twitter provided a possibility to participate online, while the Socratic Method facilitated classroom discussion with continuous questioning and forcing students to think and argue for themselves. The feedback was collected directly after the class. The students used Prezi to create their learning diaries. Prezi allowed for collaboration online, but also more importantly forced students to practice to visualise their learning to a Prezi canvas. Visualisation enhances learning (Piburn et al., 2005). Feedback for Prezi was collected at the end of the course. At the end of the course, the participants evaluated the outcome. Table 1 describes the number of students who answered the feedback questionnaires.

Table 1

Number of Students Responding to the Feedback Questionnaires

Twitter Survey	Socratic Survey	Prezi Survey	Total Number of Students
19	19	23	23

Results and Experiences

This section describes the results of the feedback from the students and the teacher's experiences. The results are divided to four parts: background, and the three methods – Prezi, Twitter and Socratic method.

Background information

The aim was to illuminate how various types of learners benefit from taking new methods to the tuition. First, however, the students' overall mindset and attitudes towards classroom settings were studied with two questions:

1. How necessary it is for you to participate to the lecture by asking questions and comments?

2. How important is it that lectures offer diverse ways of participating to teaching?

The students were given a scale from 0 (not important at all) to 5 (remarkably important) where they selected the most appropriate answer.

The results from these two questions are presented in Figure 2. Over 80% of the respondents answered four or five to question number one about the importance of asking questions during lecture. This means that the students feel that it is very important to offer a possibility to participate by asking questions during the class. When considering different ways of organising a class, this result clearly indicates that for these students online lectures would not be the best option.

The second question about importance of different ways of participating showed less strict answers. The most popular answer was a three, while still more than half of the students had selected four or five, meaning very/extremely important.

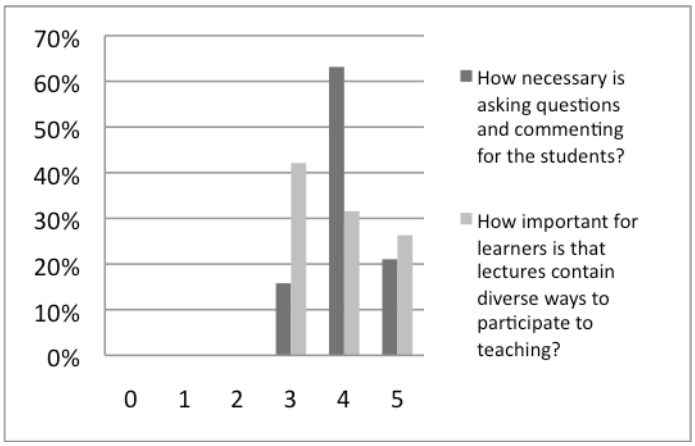

Figure 2. How necessary is asking questions and commenting for the students?

The students' answers to question number two can be partly explained by the students' past experiences where diverse teaching methods have taken place. Based on this study, the students feel that it is important that there are different ways of participating to the class. This study encourages moving forward with testing different methods in the class.

Experience From Using Prezi

Students did their assignments and learning diaries by Prezi and teachers used Prezi as a presentation tool. Before the class, an expert for using Prezi offered students training. Tips were given also along the way when the students had started with Prezi. The average answer for the question: "Do you feel that you got enough training for using Prezi in the course?" was 4.15. All of the students answered with the rating of 3 or more.

The utilization of Prezi was seen to be beneficial. More than 90 % of the students answered that Prezi suited the course very well (Figure 3). The average answer was 4.45. Figure 3 illustrates that Prezi helped the students to organise the substance of the course very well. Students were encouraged to use Prezi for their lecture diary during lectures. Prezi enabled zooming in or out and at the same time informal brainstorming and structured presentation.

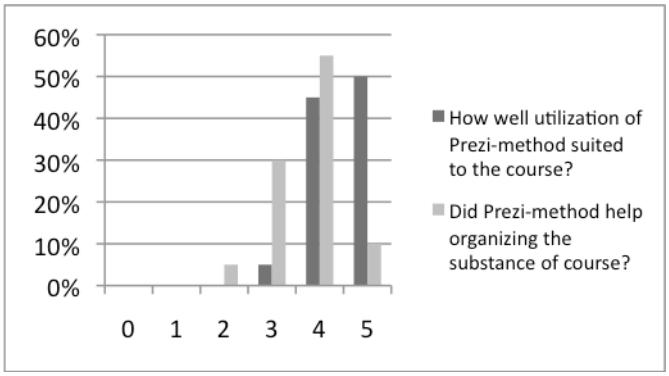

Figure 3. Utilization of Prezi in the course.

Students were also asked which technique (MS Word, MS PowerPoint, Prezi or some other) they would prefer in the future when doing similar assignments. According to answers, most of the students would use Prezi as a primary tool for this. Some said that a combination of Prezi and some text processing software would be the best alternative. This is also backed up in literature (cf. Conway et al., 2012). One student commented on the overall benefit noting, "It [Prezi] should be used more with course exercises because it helps to clarify the general view better."

The utilization of Prezi was not, however, trouble-free. Prezi had some bugs; it occasionally crashed and processing large amounts of information was sometimes a bit slow. Despite technical problems, there were surprisingly few answers from students criticizing Prezi as a tool. When asked how to improve the utilization of Prezi during the course, the respondents commented: "There is nothing much to improve; it's all up to user," and, "Application of Prezi should be encouraged more."

These answers supported the numerical data from the questionnaire that students found Prezi a useful tool for learning. The students were also asked whether they would utilize Prezi in the future. Almost everyone answered they will most likely be using it (Figure 4).

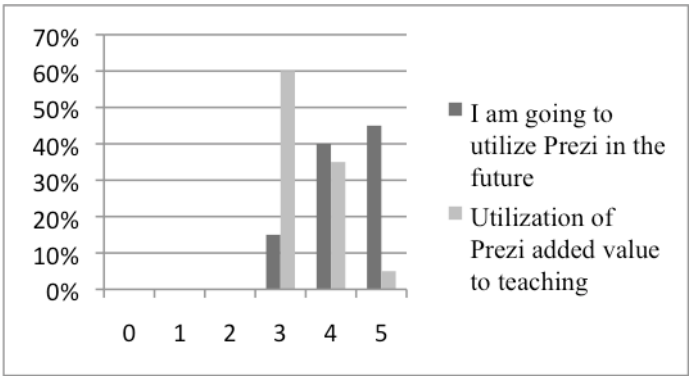

Figure 4. Prezi as a valuable teaching method.

From a teaching point of view the utilization of Prezi was not as successful as it was from the learning point of view. Students thought that Prezi was a valuable tool used in teaching, but the average value in the Figure 4 was not as high as it was in other questions concerning Prezi. Nevertheless, all the answers were three or higher.

Experience From Using Twitter

Twitter was utilized on the course together with Twitvisio. These enabled continuous commenting and information sharing. Nearly all of the students logged on to Twitvisio with Twitter while about 60% of the students tweeted quite actively. All the students were able to see all the tweets as they were projected on a screen in the classroom. Tweeting was facilitated and moderated by an expert who also assisted in technical issues.

The discussion in the tweets was mostly comments to the lectured topic. This proved beneficial when there was one discussion going on and the students wanted to raise another to the discussion queue. The students also shared links and additional information. The teachers utilized the comments and info actively during lecturing.

According to the questionnaire results, tweeting improved interaction during the lecture (Figure 5). The average value was exactly three out of five. The students were asked how they suggest Twitter to be used in future. They recommended Twitter as a method for mass lectures (>50 students) where the interaction is more difficult than in a smaller group.

The presence and the role of the moderator and facilitator were found crucial. This was stressed in open questions with development proposals. For example, students remarked:

- " Lecturer should pick more tweets into the discussion."
- "Needs a facilitator that can also summarize the discussion for the lecturer."

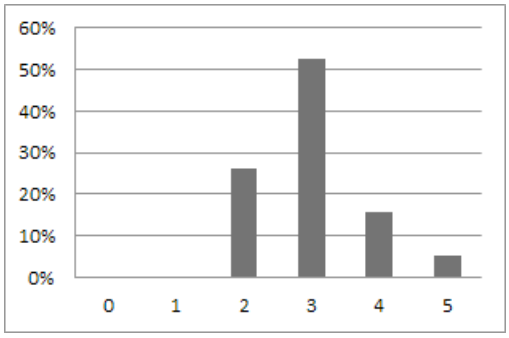

Figure 5. How well did utilization of Twitter improve interaction in lectures?

From the teachers' point of view utilization of Twitter created a comfortable environment for the lecture. This was also due to active students who were interested in sharing extra information. Twitter lowers the barrier for students to comment and answer questions in the class. It offers easy participation for more silent and shy students. Students were asked how they would overall develop the interaction in teaching. Their prevailing comment was that comfortable, open and dialogic atmosphere would help. Examples of other comments were: "Twitter brought an extra channel for discussion," and, "Students need courage to participate."

For the development suggestions of students, Twitter offers one solution. It enables discussion in lectures and encourages students to participate.

Experience From Using Socratic Method

At the beginning the method was explained to the students. Socratic method was utilized when the lectured topic was ethics. As ethics is about moral values and applying ethical norms, the lecture was easily formed into dialogue.

When asked how the Socratic method supported the understanding, the results were almost unanimous (Figure 6). Over 70 % thought the method supports understanding well. The students shared ideas and challenged each other's opinions. Students also thought the method was useful from learning point of view (Figure 6).

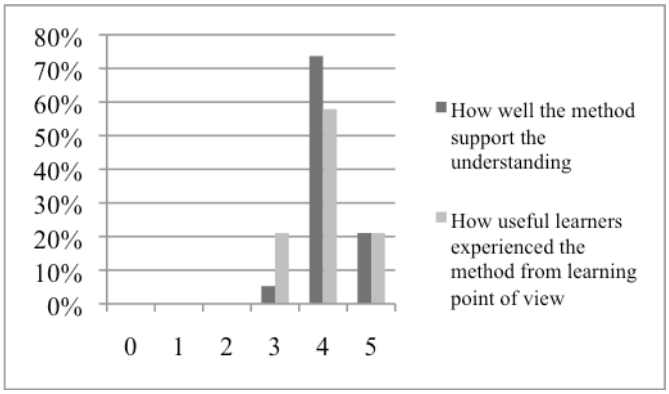

Figure 6. Benefits of Socratic method.

From teachers' point of view the use of the Socratic method was a success. The students discussed, shared ideas, and learned. However, the planning before using the method could have been better. The students missed a synthesis. Main points for criticism were pointed in these comments:

- "Too much hang on own notes and own understanding."
- "Main results need to be summarized."
- "Questions should be more specific."

The students were willing and able to discuss and argue, but they still needed a lecturer to sum up what was achieved in the class. The lecturer should be well advised to clarify his/her own standpoint to the matter beforehand in order to be able to facilitate the dialogue. However, it is important to remember to leave room for the thoughts of the students and their own idea creation.

Conclusion and Discussion

The paper elaborates experiences from utilizing unconventional methods in higher education. We studied how the students, and various types of learners among them, benefit from applying new methods and tools to the tuition. The paper combines conceptual analysis and empirical findings of utilization experiences of Prezi, Twitter and the Socratic method. The methods are not widely used in our tuition so the results have novelty value for larger audience.

According to the literature there is more than one type of learners. Thus variance in teaching methods serves the multiplicity of various types of learners: auditory, visual and kinesthetic. The traditional higher education tends to focus more on lecturing. The novel way of teaching and the utilization of tools and methods therein, such as Prezi and Twitter, enable learning that supports the three learning types.

As a conclusion it may be stated that such variety of methods suits rather well also university tuition, even if the opinion in general may favor the more traditional way of approaching teaching in the academia. The more motivational ways of doing things may be well grounded if it gets the results, and better motivated students. The learning results and feedback are encouraging. The students seemed to learn better and like the teaching better when alternative methods were exploited. With a little extra effort invested in learning the new tools we received good feedback from the students and the actual teaching was more motivating and rewarding for the staff as well.

Though the experiences were mostly positive and encouraged to utilize these methods in the future, there are issues to be considered. Utilization of the methods needs influence from both students and teachers. For example, learners needed teachers' participation with Twitter as well as a synthesis of benefits achieved by utilizing the Socratic method. It was also learned that combination of different methods, like Prezi and some text processing programs, would be more useful and beneficial than the methods used solely which is also supported in the literature. Also, the teaching situation must be

planned more accurately beforehand. The planning includes the choice of tools: for example, Twitter is a means to an end when there are a large number of students involved; the Socratic method requires adequately motivated students in a relatively small number and from the teachers' side it requires skill to maintain the discourse.

In general, according to the results it is recommended for any teacher to consider the use of variety of methods in one's tuition. The variation increases the motivation of both students and teachers and improves the results. The study was conducted among senior students, as future research it would be beneficial to learn whether the results are comparable among junior students or in different sized learning groups. A broader study with various group-sizes and demographics would deepen the understanding of effects of the utilization of new methods in university tuition.

Notes

1. Medieval Latin*, lectura*, reading, from *legere*; to read (MOT, 2012).
2. Business intelligence is a term that refers to the processes, techniques or tools that support faster and better decision-making (Hannula & Pirttimäki, 2005).
3. Multimedia is merely an integration of multiple forms of media (TechTerms.com, 2012).

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