Development of an Online Learning Platform for University Pedagogical Studies-Case Study

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Abstract: Due to a high demand of university pedagogical staff development courses in our university, we were faced with the problem of not being able to offer university pedagogy courses for everyone who wanted to study them. Additionally, we wanted to seek ways to improve our already existing teaching. As a solution, we created a web based learning platform called UTUPS (University pedagogical support). The platform allows us to reach a wider audience and offer courses more conveniently to our teaching staff. Since the platform was released in Autumn 2015, offered modules have been completed cumulatively over 300 times. We propose a learning environment like UTUPS can significantly increase the flexibility and scale of studies that a university can offer. We will provide a thorough explanation on why and how the environment was made, a technical description of the current UTUPS platform, compared it to already existing solutions and analyse its strengths and weaknesses. In order to evaluate the platform, we will utilize primarily student feedback and refer to literature and existing solutions when relevant.

1 INTRODUCTION

In recent years, the demand for greater amount and more flexible staff development courses, called the university pedagogy courses in our university, has increased. The University of Turku offers 10, 15 and 35, together 60 credits (ECTS) courses for those staff members, who can show that they have teaching at the university. Thus, we have not been able to accept those researchers and doctoral students, who do not teach at the university at the time they apply. Also, in many years, we have not been able to take in all teachers (who currently have teaching) willing to participate in pedagogical courses due to high amount of applicants. Therefore, we have been searching for a solution to offer more courses for a wider student group, including researchers and doctoral students, with a relatively small funding. The situation is quite similar in other smaller Finnish universities, so we have been searching for cooperation possibilities with the other universities.

In 2015, the University of Turku made a decision to fund a development project named UTUPS to create a learning platform for university pedagogical courses that would be open to all university staff and doctoral students for self-study and also offer some courses to earn credit points. During 2015-2017 the University of Turku Pedagogical Support, UTUPS, was created, tested and consolidated in use. In the beginning of 2017, the Finnish Ministry of Education and Culture assigned a funding to a project called University Pedagogical Support, UNIPS, to create a platform in cooperation with 8 Finnish universities, based on the previous UTUPS platform.

The UTUPS platform was built and designed specifically for the purpose of distributing university pedagogical material and knowledge, and it was never intended to be a platform for, for example, providing solely SPOC or MOOC courses. The aim of this paper is to introduce the reader to the UTUPS learning solution by analysing the basic principles of the pedagogical and technical solutions, and presenting results from the testing of the environment. We will also set some visions for the future, especially concerning our new UNIPS developmental project.

2 PEDAGOGICAL SOLUTIONS FOR UTUPS

When designing the UTUPS system, our focus was on producing high quality online material on higher education and providing an easy access for our staff

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members to that material, so they can obtain information through self-study on any university pedagogical topic of their choosing that is available on the platform, in order to support their teaching. Our secondary focus was to incorporate guided study with credit points in our system, which in addition to using the self-study materials, would utilize online teamwork for collaborative improvement on pedagogical skill. Additional goals we wanted to address with our solution included the possibility to offer university pedagogy courses to our doctoral students, to create an environment for flexible studying, to create smaller sets of university pedagogy studies than previously and to enable the option of developing disciplinary specific courses.

The university pedagogical material on the website was designed with a focus on making the material engaging and entertaining, as well as being informative. In practise this meant that the videos on the website were purposefully short, and that quizzes and other interactive elements were added when relevant. The purpose of these interactive elements is to activate the learner, as well as mediate information. The more specific content of the university pedagogical material on the website is out of the scope of this paper, but we will refer to 3 pilot modules "Becoming a teacher", "Lecturing and expertise" and "How to plan my teaching" in this paper, in order to demonstrate some design decisions we have made, and when we evaluate our platform.

The 3 pilot modules are a way to categorise the material on the platform. This makes it easier for our staff members to find information on the specific topic they desire. The division of the pilot material into 3 modules not only helps in finding information, but also acts as a division into 1 credit (ECTS) courses, referred to as guided study. The guided study modules are all divided into two parts: an individual task period and a small group working period. The individual task period consists of going through the study materials on a specific module, and writing an essay based on those materials.

The small group working phase supports the pedagogical principle of creating knowledge and developing pedagogical expertise in collaboration (Hakkarainen, 2015). By selecting groups that have participants on different skill level, e.g. experienced teachers and more novice doctoral students, we can enhance the collaborative benefits of the group working.

In small group working, the students will set questions to each other and comment each other's texts, which will give them a possibility to reflect their own thinking and help each other to develop more elaborated conceptions. The more experienced members of the group can share their teaching experiences with the more novice ones and the novices can ask advice from the more experience ones. The members can also share feelings and solve problems together. The goal is to enhance conceptual development and change (Vosniadou 2013; Chi, 2017; Vosniadou, 2008; Vosniadou 2014; Chi, 2014; Chi, 2009) , i.e. to help students to build their teaching expertise through getting familiar to educational concepts and discussing about those.

3 OUR TECHNICAL SOLUTION AND WAYS TO STUDY IN UNIPS

In the implementation of a new learning platform, the design decisions previously made are constantly evaluated, or alternatively evaluated in iterative cycles. According to Hevner design science methodology, both the knowledge base and the environment effect design decisions. The feedback from our students provided suggestions to improve the platform from the environment side, and existing similar solutions like Moodle or Coursera gave us an example from the knowledge base side on how to deal with certain problems. The UNIPS environment was mostly based on the pedagogical goals discussed in chapter 2 of this paper. The technical implementation began in March 2015 and was ready in autumn 2015 for preliminary testing. Only minor revisions have since been made to the core system, as the feedback has been positive. However, we seek to constantly evaluate and improve our platform. In this chapter we will go through the current technical implementation and design of the UTUPS environment. (Hevner, 2007).

3.1 UTUPS Compared to SPOCs and MOOCs

When looking at already existing solutions that would suit our needs, SPOCSs (Small Private Online Courses) and MOOCs (Massive Open Online Courses) need to be discussed. The University of Phoenix launched an online campus with courses covering entire bachelors and master's degrees already in 1989. Since then, online courses have become increasingly popular over the recent years with the introduction of (SPOCs) and (MOOCs). The first time the term MOOC was used, was by Dave Cormier in 2008, and is now a common term used to

describe perhaps the most popular form of online teaching, and SPOC's emerged roughly around the same time as MOOC's. The difference between the two is, that MOOC's are, as the name states, offered for a wide audience through platforms like Coursera, [4] where as SPOC's are private and usually offered only inside Universities. From now on we will set our focus on SPOCs, as they share more characteristics with our UTUPS solution than MOOC's, since the UTUPS modules can be completed in SPOC -style with a guided study. (Kaplan 2016).

Even if SPOC's are sometimes easily transferable to MOOC courses, they have various different characteristics. Kaplan et al (2016) list two types of SPOCS: asynchronous and synchronous. An asynchronous SPOC can be completed by students on their own schedule, without the need to be present at any specific times. However, also an asynchronous SPOC can set deadlines for the students. On the other hand a synchronous SPOC requires real time participation from the students.

The UTUPS solution uses both the asynchronous and synchronous solutions. One guiding principle in developing the UTUPS solution was the idea that the platform is always open for our staff and doctoral students for self-study. The materials are always available and there are instructions how to study the materials. This can be done whenever the students want to. However, our university also wants to offer pedagogical studies where students can earn credit points, so we offer the courses also in synchronous way. It includes the same tasks as the self-study mode, but adds a collaborative small group working phase in the digital environment.

Stracke (2017) argues that high dropout rates are essential in MOOCs and online courses, because the costs of accepting extra students to these courses for the course organiser are very low, or even close to non-existent, and on the other hand some students might only come to the courses to take a peek of what the course actually contains. The UTUPS environment embraces this idea, by offering the course materials to all staff members at all times without even the need to enrol to the modules for a guided study. As the UTUPS material is constantly available for all staff members to view and study, the dropout rates for the actual guided studies can be decreased. (Stracke 2017).

3.2 Technical Decisions in the Development of Our Platform

Firstly, the decision between hosting an intranet solution and an internet solution had to be made. The main problem regarding having the solution built on our universities intranet was the scalability. In case we wanted to share the course materials at some point with people outside our university, we would have needed to expand to an internet website in any case. Therefore we decided to create a new password protected webpage for UTUPS, and reserved the domain utupedasupport.utu.net for the purpose.

UTUPS environment was built on top of WordPress CMS, which was chosen because it is a widely used open source system that offers powerful tools for quick standard website development. In our WordPress site we could add video material, links to course articles, simple tasks that had automated checking, as well as various other interactive and non-interactive elements. We used the Tesseract -theme, and a collection of freely available plugins, our own pictures and videos to come up with our websites visual appearance.

A great emphasis was put on the usability of the website. We wanted the modules containing the actual study materials to be right on the front page, one click away when entering the website. Also the study material of one module was all put on their own separate pages, so that all the information related to a specific topic would be in one place. The only exception being the scientific papers that were linked on the module page and part of the material are located elsewhere due to legal reasons. Figure 1 shows the front page of our website. Below the site logo, menus and banner picture there are links to the modules and some motivational videos for the students.

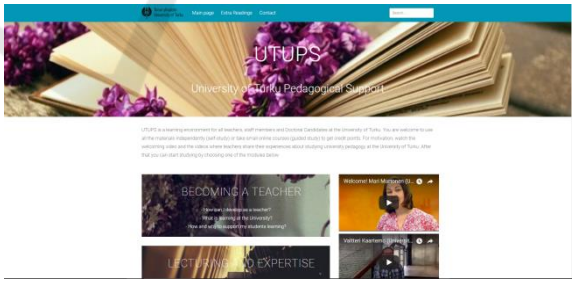

Figure 1: The main page of the UTUPS website.

Following the principle of good usability and modern stimulating design, we tried to make the place the materials on the website in a creative, but clear way. Figure 2 demonstrates how instead of simply listing video materials on the website, we decided to superimpose them on top of a picture. This kind of design has resulted in a positive feedback from our users. More detailed analysis of student feedback is presented in chapter 4.

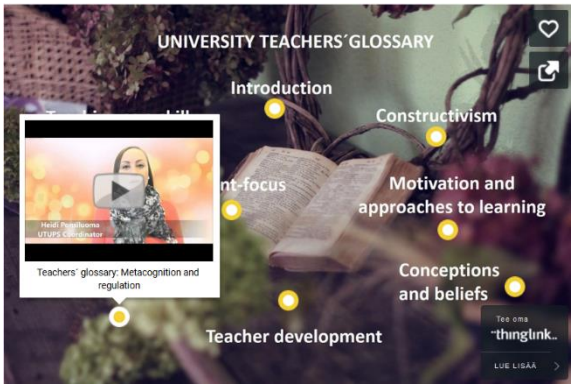

Figure 2: Video materials placed on top of a picture in the module "Becoming the teacher".

The website is currently hidden from non-authorized visitors with Ben Husons "Password Protected" Wordpress plugin, which asks for a password from any user who enters the website. However, we are looking to add the SAML based Shibboleth -login of our University federation to the website. This way we would be able to obtain more accurate data for research by identifying the students visiting the website. Additionally this would allow us to monitor and control better who has access to the website and its materials.

3.3 How UTUPS Works in Practise

In order to test the platform in a form of offering courses where students can earn credit points, one pilot module was created. The pilot module was named as "How to plan my teaching" and it was tested in late 2015. The module was divided in two parts: a self-study period, when students individually read given materials and watched the videos in the environments, as well as did other interactive tests or task in the environment, and to the second period of small group working.

When the first module was evaluated and good results were obtained, two more modules were created. All 3 pilot modules were divided into two parts: a self-study period and a teamwork period. The two other modules were "Becoming a teacher" and "Lecturing and expertise".

In the self-study period, which is the same to all students whether they will pursue for credits or not, we wanted to be able to offer our students videos, selected scientific articles and possibly additional simple tasks and interactive exercises. An example of an additional interactive exercise would be a quiz, where the student would automatically receive the result of the test, telling him or her what kind of a teacher he or she most likely is. This quiz is based on the ATI, Approaches to Teaching Inventory by Trigwell and Prosser (2004), but used as a self-testing questionnaire it should be used with caution. Thus, the students are informed that this is a playful quiz that should not be taken too seriously and the theoretical basis of the inventory is dealt in the literature of that module.

In addition, students may participate in creating word clouds and other interactive materials together. The words clouds have been concentrating on some specific topics or videos, where student have been able to comment how they understand the topic or what is related to it. The idea of these interactive elements is to enrich the learning environment with activating tasks, which help the student focus on learning. Additionally the interactive exercises can be used to, for example, demonstrate pedagogical concepts and raise the student's awareness of his or her own teaching.

For the technical implementation of the teamwork period, which is for those who seek to obtain credit points by completing guided study modules, we required a platform that enabled the students to communicate with each other in a sensible way, and collaboratively edit each other's texts in order to engage in collaborative information forming. After exploring the possibilities of integrating this to our website, we decided not to reinvent the wheel, and chose Moodle (Dougiamas, 2003) as an additional technology to support our system. However, some exercises planned in the pilot modules required collaborative editing, which at the time was not available in Moodle. Therefore, for the purpose of allowing collaborative editing and discussions as part of our study modules, we adopted the use of google docs (Spaeth, 2012) in our course platform.

In the teamwork period, the students are divided to groups of four. Their task is to read each other's essays which they wrote in the individual study phase, and then comment on each other's works. By this way, discussion is encouraged and the students can both reflect their ideas together as well as built their knowledge and pedagogical expertise in collaboration with their colleagues.

There is a tutor on the course whose task is not to guide discussions or participate in those, but to look that every group is active and that the discussions and comments are in line with the course goals, i.e. that there are no discussions that concern some irrelevant topics for the course or that are somehow harmful. In case that more funding would be available, a tutor who would guide the discussions would also be beneficial for the group discussions.

4 EVALUATION AND ANALYSIS OF THE UTUPS ENVIRONMENT

The three pilot modules: *becoming a teacher*, *lecturing and expertise* and *how to plan my teaching* have been completed 112, 120 and 112 times respectively. The first modules were organised in autumn 2015, and the last ones counted in this number were completed in spring 2017. A successful completion is counted, if the student completed all required individual and group tasks in the module. 14,9% of all who completed the modules were university staff members, 64,3% doctoral students without teaching responsibilities, and 20,8% were doctoral students who currently had teaching duties at the university. All together 154 individuals have completed at least one module through the UTUPS environment. Most students studied more than one module.

4.1 Student Feedback

In order to evaluate how well the UTUPS platform works, we asked students to send feedback and answer questions regarding the platform after completing UTUPS guided study modules. Student feedback data was collected over three instances. The first data is from spring 2016, where we received replies from 27 students. The next feedback collection is from autumn 2016, where only 9 students participated by sending feedback. Another feedback collection form was sent in autumn 2016, where we received additional 21 replies. All together we have obtained feedback from 57 students, which is roughly 30% from all individuals who have completed one or several modules in the UTUPS environment. We will analyse the first feedback session in greater detail, and provide shorter descriptions of the two following feedback collections.

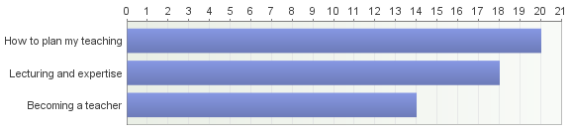

Figure 3: Distribution of which modules students studied in the feedback collected in spring 2016.

In spring 2016 we asked the students 5 questions after they had completed one or more UTUPS modules. Overall 27 students replied. From Figure 3 we notice that the module "How to plan my teaching" was the most popular of the 3 offered modules with 20 students completing the module, while the "Becoming a Teacher" module was the least popular, and was completed by 14 students. From other instances where the modules have been organized, the numbers have varied.

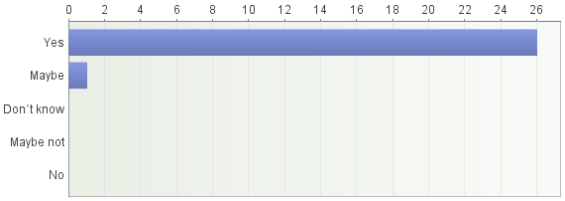

Figure 4: Did the individual task period support your learning?

We asked the students 5 questions, which were:

1. Did the individual task support your learning?
2. What do you generally think about the individual tasks, would you change them somehow?
3. Did the teamwork period support your learning?
4. What do you generally think about the teamwork tasks, would you change them somehow?
5. General feedback, comments or suggestions? Let us know how we can improve UTUPS environment and the modules. We are thankful for all kind of feedback.

In figure 4 we see that an overwhelming majority of 26 students out of 27 replied that they felt the individual task period supported their learning. We also asked the students verbal feedback of how they would improve the individual task period. To analyse the replies, we singled out all improvement suggestions, and came up with how many students suggested them. 3 students wished the video materials in the course Lecturing and Expertise were shorter. They found it difficult to search for specific information in 15min long educational videos, and said it would have been easier to have the same material in text form. 4 students said the modules contained too much work in relation to the amount of student credits received from completing them.

Similarly to the feedback from the individual task period, we analysed the replies we got concerning the teamwork period by identifying improvement suggestions received from the students. Figure 5 shows that generally the students also enjoyed the teamwork periods of the modules, like they enjoyed the individual tasks. 3 students said the teamwork

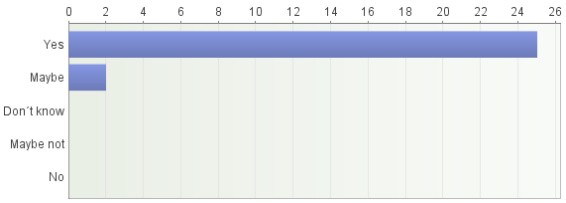

Figure 5: Did the teamwork period support your learning?

period needed more time than 2 weeks. Only 3 students said the conversations emerging between the students were not helpful for their learning, but that otherwise they enjoyed the teamwork period. Additionally, only2 students stated that having to jump between the UTUPS website, our universities Moodle page and Google Docs document was annoying, and that if possible, all tasks should be integrated under one single environment. Thus we can conclude that the environment worked well, the working load was reasonable and the teamwork period supported students' learning.

Finally we received 20 replies in our final question asking general feedback of our solution. Here the students gave very positive feedback, but there was criticism by 2 students towards the video material being hard to follow compared to traditional lectures, and additionally the tight schedule of the courses, and too big of a workload compared to the student credits received, was also addressed.

4.2 UTUPS Website Activity

One way to analyse the UTUPS materials is to look at website statistics from our platforms webpage. We used *WP statistics* -WordPress plugin and *Google Analytics* -WordPress plugin to obtain information on how many unique visitors entered the website and when, what materials did they use and so on. Figure 6 shows the evolution of website traffic during the second pilot module phase in early 2016. This data is cumulatively collected from the three password protected modules, in order to clear the data from random visitors. As expected, there was a peak on the website traffic on the final week of the self-study period, when the individual task deadlines approached. Which was interesting however was, that even in the teamwork period where students did not necessarily need to refer to the course materials to pass the exercises, there was still notable traffic on the site.

In addition to following the website traffic during guided studies, we wanted to know if students still use the materials when they are not completing a guided study. To do this, we observed data from our website

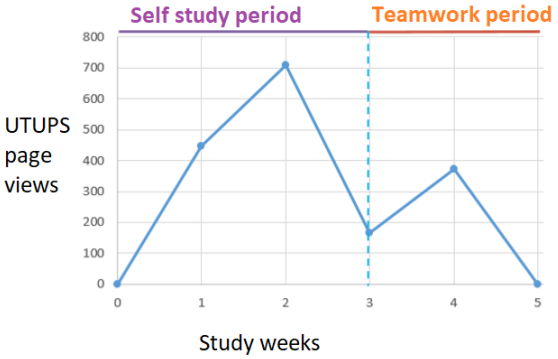

Figure 6: UTUPS platform traffic during the second pilot module.

during the last 60 days. Figure 7 shows this data plotted. The y axis presents the amount of visitors and the x-axis is the time of 60 days. The two biggest peaks in the graph are the moments when the guided study period began, and the last two days before individual task essay due date. From the data we can observe that indeed the website is regularly utilized by a few students, but primarily it is used during the guided study periods. Additional researched is required to identify whether the teaching staff in our university has purposefully looked up knowledge from the website to support their teaching, or if they have come to the webpage only out of curiosity or other reasons.

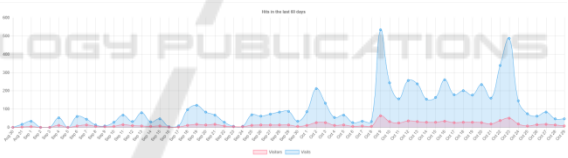

Figure 7: UTUPS platform traffic before and during a guided study period.

5 CONCLUSIONS AND FUTURE WORK

The guided study modules have been completed cumulatively over 300 times in our environment and the student feedback of the system has been positive. Therefore we can conclude that the UTUPS platform is a welcome addition in our University ecosystem, as a medium for offering university pedagogical courses. Additionally, the UTUPS materials that are now available for all teaching staff at all times, is a resource that has been previously unavailable for teachers in our university, at such convenience. Naturally in addition to the UTUPS environment, our university still offers traditional pedagogical courses

that include contact teaching, as well as the possibility to borrow literature to support the teachers' pedagogical understanding.

With the success of the UTUPS environment, funding was applied for its continued development and extension to other Finnish universities. In early 2017, the Finnish Ministry of Education and Culture gave funding to build a new system (titled UNIPS) for 8 Finnish partner Universities, based on the UTUPS solution. The project is funded until 2020 and it covers the costs of the technical development of the platform and the creation of several new modules and materials, and research of the solution.

The new UNIPS environment will share the same pedagogical principles as UTUPS. It will be hosted online, and the webpage will have password authentication for those partner University staff members who want to study the materials. What separates it from SPOCs and MOOCs is that the main priority in the website is to have categorised high quality university pedagogical materials available, and only the secondary goal is to offer guided studies for those who want to get credits or certificates for studying the materials.

In the becoming UNIPS solution of 8 universities, each university will provide other universities with materials for at least one module. The modules are, however, developed in cooperation, i.e., in addition to the university that is responsible for the module, there will be at least two other universities participating in the planning and developing of the module. The individual partner universities will be locally responsible for offering the guided studies with credit points for their own students, but all content creators will offer example guidelines to other universities on how to organise them. These instructions will include, for example, tips how to organise groups, what kind of ideas can be evolved in the group discussions and what would be the pitfalls to avoid in each module.

The choice not to include automatic evaluation was made, because the created modules include teamwork sessions and essays as ways to study, and with current technology it is not possible to evaluate an essay or group processes automatically with sufficient quality. Yet, the platform allows the use of interactive tasks which give immediate feedback to the user. Additionally, some modules might be constructed in the future so that all tasks are automatically assessed. This is another thing we will look into as we develop the UNIPS platform.

Another goal for the environment, which we will keep in mind in the future, is the development and offering of disciplinary specific courses. This has not yet been realised, but the platform provides an opportunity for that and we hope that in the future it will be utilised in a way that gives teachers possibilities to develop and organise courses on specific disciplines or topics. Further work is also needed in organising and assessing the disciplinary specific courses on our website.

The UTUPS and the upcoming UNIPS solutions have thus far been proven to be effective, well-liked and cost-efficient in offering university pedagogical staff development courses for university teacher, other staff and doctoral students. The platforms will be further developed on the principles described above and new solutions will also be searched for.

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