TEAM PROJECTS IN DISTANCE LEARNING COURSES - AN EXPERIENCE REPORT

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Abstract

Since 2007 there is a distance learning course established at the University of Applied Sciences Darmstadt. Part of this course is a team project that will be done in the 4th of six semesters. Students choose a project out of a list of offered subjects. They work very autonomous and organize themselves. Team projects in distance learning courses have specific requirements and challenges. But the results show that it is a good method for encouraging students.

Keywords: Team project, part-time studying, distance learning, experience.

1 INTRODUCTION

Since 2007 there is a distance learning course in Electrical Engineering (M.Sc.) at the University of Applied Sciences Darmstadt. The course is for people who work as an engineer and want to expand their knowledge. Students will study in part-time and reach the Master degree after 6 semesters. Currently there are 204 students enrolled and up to now 250 students were granted their degree.

At the beginning students can choose between two major subjects “Automation” or “ Electronics”. In 2012 the study course was expanded by the major subject “Energy Systems”. Due to the Bologna process it is completely modular so students can do the whole study course or just a few modules for further education. The whole course is based on a blended learning concept. Most of the learning is independent from the university’s lecture times. At a few targeted dates there are block lectures and exercises located at the university. At this lectures students use the laboratories and discuss specific problems.

Part of the course is a technical project in the 4th semester with a work-load of 7.5 ECTS (European Credit Transfer System) – Credit-Points. In order to prepare the project work, a lecture in project management takes place beforehand. Each project has to be done in groups of 3 to 5 students under the supervision of a lecturer. Students form teams by themselves and select the topic from a list published beforehand.

2 IDEA

During the development of the study course we had the intention that the students should be more involved in research and get more practice in project management. Learning by research is one method to motivate students. Yet it needs a lot of requirements like an autonomous definition of the subject of research and time for failures. This requirements are difficult to realize in a distance learning course where particularly time is a very rare resource.

They should get used to working with members who are located at widely spread places, which is quite common in international companies. And they should get the theoretical knowledge how project management will be done. We planned to offer subjects in the major branches of the study course.

In the team project the students will also develop some relevant key qualifications. They have to communicate with the other members and the teacher. They need a time management for the whole project and have to organize the work between all members of the project group. All this qualifications are important for a good result and are demanded for career.

We expected that students are used to working in projects in their jobs. So this module has a great overlap to their daily work, so it will be easily done part-time. We also expected, that therefore this module isn’t so interesting for the students. In spite of this the theoretical knowledge of project management is often neglected due to the needs of their daily work.

Before starting the team project the students get lectures in project management. In this part the students get lecture notes with exercises send to them by mail. The lecture notes also can be downloaded from the e-learning platform. They also have the opportunity to attend a block lecture at the University of Applied Sciences Darmstadt.

The projects has to be limited by time. They have to be done in merely 13 weeks and during one semester. The offered projects have to be complete but with an open result. Ideally it is a project with can be continued so that several groups can work on it continually.

There will be a list of projects offered by the teachers of the study course. So the students can choose a project they are interested in. Aim is to have more projects than needed for the submitted number of students divided in groups of three.

Because the project is part of the study course and is granted with credit points students have to get a mark for their achievement. To provide proof of their work the students have to write a report and present their project results. Students have to get individual marks so their part in the project has to be labelled.

3 REALIZATION AND EVALUATION

In the beginning it was difficult to find projects. The subjects were strictly separated in the different specializations (Automation, Electronics and Energy Systems). One problem is the requirement of splitting the project in tasks which are largely independent. Hereby the students are challenged to organize the tasks so that the workload is divided equally among the members of the team. Another problem is the need of resources. As the students are not situated at the university they have no access to measurement equipment. We also had no budget provided for devices or components.

Due to this problems the list of projects was very short so the students had no choice but to accept the offered projects. The presentation of the results is often without an audience except the teacher.

3.1 Evolution

During the last years and while more than 50 projects are realized there is a continual development of this module. The most important change for the number of offered projects is allocating an amount for devices and components which can be used in the projects. We also bought some test boards which will be lent to the students during their project. This leads to an increasing pool of subjects. Currently we can offer more projects than needed for the study groups although the number of submitted students has extremely increased.

As another result of the great amount of realized projects they trigger follow-up projects which leads to continuity and development in the projects. This helps to use the team projects as part of researches.

More and more students make their own suggestion for a project and look for some co-workers. Projects than are near to practice in business or to leisure activities of the students. We support this by searching for a teacher who attends this student project. We organize rooms for additional appointments of the groups and often teachers enable access to laboratories for their project groups on weekends.

Over the last ten years an application of patent and several publications results from the projects. And at last we got an external offered proposal for a project which was expanded to a masterthesis. In table 1 you find a selection of interesting projects which were realized. As you can see the subjects are spread very widely and have interdisciplinary aspects.

Table 1. Selection of projects done in the distance learning course.

	Project Title	Year of adaption	notes
1	Study of the Power Supply of the “Hanauer Hütte”	2017	External proposal espanded to a masterthesis
2	Geoinformation System for Mobile	2014-2015	Continued project

	Project Title	Year of adaption	notes
	Robotics		
3	Mains Operating in Smart Grids	2016	Results are used in study courses
4	Connection of a Diesel Generator for Auxiliary Power of a HVDC Transmission Station	2016-2017	Student's proposal
5	Conceptual Study for a Power Supply of a Camping Site with Renewable Energy	2011	
6	Virtual Guitar – Karplus-Strong Sound Synthesis	2014	
7	Development of an Energy-Efficient Smart Meter for the Customer Mass Market	2013	publication
8	Design, Modelling and Engineering of a Predictive Controller by the Antisystem-Approach	2009-2010	application of patent

In the beginning the marks for the team project often were based on the technical competences. The using of the project management tools wasn't considered. And mostly there is just one mark given for the whole group without respect to different achievements. To include this elements we informed the teachers again about the requirements of the team project. And for reminding them we designed a sheet for protocolling the presentation. We informed the students to send the report not only to the teacher who coached the project but also to the secretary of the study course for documentation.

We decided, that the report can be written by one member of the team, but has to show which part each member contributed to the whole project. And each member of the team has to present a part of the results, so the teacher can assess the individual achievement.

3.2 Evaluation

At regular intervals we asked our students about their impression of the study course. Points of interest are especially their satisfaction with the coaching and the offered subjects. In winter 2016-2017 there was the latest evaluation of the team project.

We also asked our teacher who has coached a project in the last few years of their impression about the student's achievement in that specific matter.

3.2.1 Opinions of the Students

Students are very satisfied with the offered project. They liked to work on a subject just for their own interest and without any business reasons. The students commended their teachers on being responsive to the specific situation of students who study while being employed in full-time jobs. They also are pleased by the opportunity to make own proposals for projects.

This is not only a result of the questionnaire but also of collecting the comments in an informal way.

3.2.2 Opinions of the Teachers

Teachers are used to students who are physically present during their education. They compare their experience with this on-campus students to the distance learners. They find them higher motivated, largely committed and with more discipline. Working in team projects supports discussions and creates different ideas for solving problems.

4 CONCLUSIONS

Team projects in distance learning courses are successful. In spite of being present the whole time students achieve good results. Team projects in technical study courses support key qualifications as well as expert knowledge. For realizing team projects in distance learning courses the universities have to supply the right environment. Access to laboratories and measurement equipment at unusual times is important for projects in distance learning courses.

In summary a research and development project is a positive contribution to the quality of learning and helps students to keep up their motivation. This is very important since a part-time degree course competes with private obligations and the challenges of engineering work in industry.