RESULTS OF A STUDENT SURVEY OFFER BLUEPRINT FOR PART-TIME MASTER PROGRAMME

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Abstract

In this paper, we present the overall positive results of a survey on students’ experience with a part-time master programme electrical engineering. The reception of the didactical concept of a distant learning study programme in electrical engineering, the workload and the compatibility of work, study and family from the student side was investigated in, using an online questionnaire. The findings are applied to develop another distant learning study programme in Electrical Engineering by identifying a blueprint for a part-time master programme.

Keywords: master course, blended learning, distance learning, education, electrical engineering, non-traditional, survey, questionnaire, students, study program.

1 INTRODUCTION

In autumn semester 2017 Darmstadt University of Applied Sciences introduces a new M.Eng.-Course “System Reliability, Quality and Security”, abbreviated in the following with Q&R (Quality and Reliability). This new master course is driven by the strong demand from industry and society for well-trained Q&R-Engineers and is part of the project “Open e-University”, funded the BMBF initiative “Upward Mobility through Academic Training: Open Universities” [1] which fosters the academization of non-traditional students.

Its concept is based on our established M. Sc. In Electrical Engineering (M.Sc. in EE), which started in 2007 with about 200 students currently enrolled. Organizing (self-study) learning and teaching methods developed for this course are well investigated, thoroughly evaluated and continuously improved according to cater for the needs of our distant learners and are a sound basis of generic procedures for technical further education programs.

![Figure 1. Didactical Concept.](image-url)
Figure 2. Didactical Concept, curriculum of M.Sc. Electrical Engineering.

The course is a correspondence course to be completed in periodic attendance sessions combined with distant learning elements in a blended learning approach. The course comprises 120 credits, split across 90 credits worth of taught modules during autumn and spring semesters, and a 30-credit dissertation on an individually chosen topic completed over the last semester period. This will be our students’ opportunity to undertake a major piece of independent research, using the knowledge and experience gained during the course. We focus on three important parts in launching a study program. The reception of (a), the didactical concept of the part-time master program by the students, (b), the aspect of workload as well as (c), compatibility of work, study and family from student’s side was investigated in.

The survey was conducted in the study programme M. Sc. Electrical Engineering. The main objective was to identify best practice components, who are in good working order, and to pin down aspects which need to be improved. In a next step, these components are analysed and the findings used to create a blueprint for a distant learning study programme in Electrical Engineering.

Research questions are threefold. First, in the didactical concept of the part-time master program by the students, there were great discrepancies between the plans of the lecturers and the implementation of these plans. This concerns topics like e-learning material and the kind and amount of actually implemented e-learning material [2]. The same holds true for the course of the term, instruction design or emphasis of the curriculum. The objective is to find out, how lecturers can be supported to carry out most of their plans in subsequent study programs. Second, the feedback on the aspect of workload during the course of years led to the impression, that extensive support was essential for students to achieve the targets of certain courses. Yet precise information on what type of support was needed mostly remained vague. The aim is to detect the type and amount of support as well as rank the results according to the importance assigned to them by the students. Third and last, the compatibility of work, study and family from student's side seemed to be a topic of rising or at least varying complexity, yet it had not been thoroughly investigated in. The objective is to find out where students experience an interplay of their overlapping areas of life and to integrate their feedback most efficient. In the long term the findings can be used to subsequently improve the blended learning concept by improving the interplay of presence study, lecture notes and e-learning material.

The Target group of the study programme comprises of employed and self-employed Engineers who want to upgrade their expertise in System Reliability, Quality and Security. Initially, only applicants with a bachelor’s grade or equivalent will be accepted for the study programme.

2 METHODOLOGY

To carry out the survey, we developed a questionnaire with closed and open questions as well as rating questions. Qualitative Elements in the survey were brought to effect in several open questions. The instrument comprised of 43 questions in total covering the topics: efficacy of the organisation of study, efficacy of the didactical concept, workload, compatibility of study, work and family, E-Learning material and applicability of the content of the study programme in working life of the students. Certain questions were only posed to specific groups, for example questions on the compatibility of family and study to students with children under 15 years of age.
There was a pretest of the survey which was carried out online: all four cases of specific groups were simulated: employed, temporarily unemployed, children under 15 years of age, special professional qualification. The students were able to pause and finish the survey at another time. There were 199 students invited via e-mail to take part in the survey. To improve the participation two email reminders were sent, which again held all the information, purpose and material of the survey. The main unit of all distant learning students in summer 2016 was 197 students. The sample equals the main unit, the aim was to have the survey completed by all students enrolled for M. Sc. Electrical Engineering. With a response rate of about 41 % (81 forms) the survey can be classified as not fully manifested census of M. Sc. Electrical Engineering in summer 2016. Because of drop-outs, non-plausible answers or too many missing answers four forms had to be taken out, leaving 77 forms to analyse. Altogether this leads to a net response rate of roughly 40%.

In respective literature return rates for online panels between 65% and 70% are rated as sound [3] whereas experiences in seminar evaluation of faculty the led to much lower return rates. As there were no census surveys in the distant learning study programme M. Sc. Electrical Engineering so far, a reliable judgment of the return rate is not feasible.
Students with a university degree as well as employed electrical engineering experts with additional qualification can enrol for the distant learning study programme M. Sc. Electrical Engineering. The sample comprises of 70% bachelor’s degree students and 30% experts with additional qualification. Students with a university degree can be divided in four groups, the biggest group being students with a bachelor’s degree. Students with a diploma make up 20%.

3 RESULTS

On first sight overall positive results of the survey on students’ experience with the part-time master programme electrical engineering give valuable hints to improve the didactical concept. To improve the blended learning concept, certain aspects of the interplay of presence study, lecture notes and e-learning material will be promoted in introducing the distant learning study programme Q&R. There were calculations on the workload which founded the curriculum. Now there are definite results on students’ impression of the workload which give a bigger picture to compatibility aspects of working life and family when students take up a distant learning study programme in electrical engineering at Darmstadt University of Applied Sciences. This gives fruitful input to offer support structures concerning all three overlapping parts of life.

3.1 Didactical Concept

We wanted to find out about the overall satisfaction with the study programme. To get a good picture, we formed clusters of five items for each of the organisational topics (1) Suitability and Range of Material and Dates, (2) Attainability of Lecturers and (3) Learnability of Attendance.

![Overall Satisfaction with Didactical Concept](image)

The results show an overall satisfaction with the didactical concept. The attainability of Lecturers is rated best in comparison, items covered for example attainability at attendance sessions, office hours or supervision. Suitability of the learning material was linked to one of the core points of the self learning material: lecture notes respective textbooks. There is room for improvement there, while there is little room for change in varying deadlines and fixed dates.

This being a distant learning study programme we considered a focus on e-learning material. Yet the students more frequently use textbooks resp. lecture notes and hold them high in esteem.
We consider the result of a rather low average of hours used for self-study with e-learning material caused by the fact that the e-learning concept was under development.

There were no best practice or worst case material identified in the survey. The lecturers as well as the students show individual preferences in making and using e-learning material which result in a varied mixture.

### 3.2 Workload

To estimate the workload besides guidelines for Credit Points, we asked our students about their motivation and discipline, the time they devoted for their studies each week and what they most frequently did to prepare attendance sessions.
An expected picture of motivation and discipline – people with a fulltime job and probably a family to provide for do need a (rather) high motivation and a good discipline. The leading amount of time was an estimated average of 10 hours per week for self-study. This may equal one working day.

In this distant learning study programme the students stick to the book to prepare attendance sessions. The possibility to discuss questions with fellow students is not very common, which is feasible on the one hand because students come from all over Germany; yet on the other hand far from the possibilities of social media.
3.3 Compatibility of Work, Study and Family

All students are employed professionals. Almost half of them (45.5%) rates the compatibility of work, study and family as positive, they evaluate it as “very good” or “good”. Almost a third (29.9%) is satisfied and evaluates compatibility as “decent”. Less than a quarter claims that compatibility is poor. No student rates compatibility as dissatisfying. About a quarter (20%) of the students have a child or children under 15 years of age.
4 CONCLUSIONS

To launch a successful distant learning study programme it is vital to know its target group and also to have a good understanding of the didactical concept. In the presented survey we learned about the requirements of fulltime working electrical engineers who take up a distant learning study master programme at Darmstadt University of Applied Sciences. The aim was to get information about a running study programme and create a new one out of its blueprint. The idea is simple yet smart: create the perfect fit of learning content in a feasible didactical structure for a well-defined target group.

How do we translate this idea into action: we look at the results and decide what to keep, what to adapt or introduce and what to omit.

Regarding the didactical concept this means for example: we keep the structure of modules with lecture notes and singular attendance sessions on weekends, yet we take care that lecturers and students are well informed about the didactical concept before they start teaching. We adapt the offer on assistance and support especially for e-learning but also for writing lecture notes for example by use of an advance organizer [3]. We adjust workshops for lecturers to facilitate transfer of didactical ideas into teaching for lectures and for e-learning. We omit the idea that a professional who gives lectures in a study programme does not need extensive explanation about the didactical concept of a distant learning study programme.

Concerning workload there is a close connection to the didactical concept: Lecture notes or textbooks are part of it. They are established and are in high esteem of the students; we keep them. We adapt the workload linked to reading them by improving their readability of this most frequently used learning material and shift the newly available part of it to the attendance sessions. We offer the same quantity of exercises and take care to standardise their quality. We pay special attention that requirements are clearly stated and omit the notion that the high motivation and discipline of distant learning students leads to an inexhaustible amount of time which students invest in their studies.

As regards compatibility of work, study and family: there are already a lot of offers to ease the burden of managing overlapping areas of life, yet they seem to go unnoticed or distant learning students are not aware, that they are entitled to employ these services. We bridge the gap and inform students about these offers and connect them with the provider, for example we actively promote offers of student services to our target group.
Top 10 of personal and vocational reasons to start distant learning
"I have.."
Survey Master of Electrical Engineering SS16 (n=77)

Figure 13. Top 10 of personal and vocational reasons to start distant learning in Percent.

REFERENCES


