Anytime, Anywhere – The development of an online course in Research Methodologies

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INTRODUCTION

At the Faculty of Aerospace Engineering at Delft University of Technology in the Netherlands over 200 students start their 2-year MSc programme in Aerospace Engineering each year. As part of this 2-year programme students complete a thesis worth 42 ECTS (equivalent to a workload of 1176 hours) and a preparatory literature study of 12 ECTS (workload of 336 hours). Sometimes they even combine this process with their internship in Industry. Accompanying their preparatory literature study is a course in Research Methodologies, which is mandatory for all MSc students in Aerospace Engineering with a workload of 56 hours.

As the Dutch university system is very flexible, allowing students a considerable amount of freedom in planning, this means that students are starting their thesis at any time during the year from and that they are not necessarily present on campus. This has resulted in increasing demand from students for increased flexibility in being able to take the research methodologies course at any time, in any place during the year. It was therefore decided in 2013 to redevelop the course in an online course allowing students to complete the course at time and a place of their own choosing.

This paper details the development of the online course, the context in which online courses are developed within Delft University of Technology and also shares the lecturer's experience and the outcomes of the student evaluations.

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1 ONLINE TEACHING ENVIRONMENT AT TU DELFT

Online education at TU Delft dates back to 2007 when it started a comprehensive programme to publish its courses as OpenCourseWare (http://ocw.tudelft.nl) and in 2012 it took its first steps in offering online Master courses [1], [2] and became part of the worldwide MOOC initiatives by being the first European partner to join the edX consortium founded by MIT and Harvard. This soon evolved further and has resulted in the founding of the TU Delft Extension School, a comprehensive support unit within the university housing experts in e-learning, didactics but also on technology, business and marketing. This school promotes and supports the development of online education within TU Delft; be it MOOCs, online Bachelor and Master courses, ProfEd courses, Blended courses or Virtual labs, enabling lecturers to continuously improve their education and firmly prepare students with the skills for the 21st century. In April 2015 it launched its own learning mall through which all online TU Delft activities for off-campus students can be accessed (http://online-learning.tudelft.nl).

To support the development of online learning TU Delft developed its own pedagogical model for the development of online courses [3]. This TU Delft's Online Learning Experience (OLE, see figure 1) consists of 8 interrelated principles that together form the basis of each online TU Delft course.

Fig. 1. The TU Delft OLE model [3]

2 SET UP OF ONLINE COURSE IN RESEARCH METHODOLOGIES

2.1 Set up of the original face-to-face course

The traditional face-to-face course consisted of 7 lectures of courses taught weekly for 7 weeks. The deliverables of the course are a project plan and a short literature review allowing the student to kick-start their thesis research [4]. The course already allowed for interaction through in-class brainstorm activities surrounding the formulation of research objectives and research questions as well as in-class quizzes. Students were also given the opportunity to give each other intermediate peer feedback on their draft project plans before handing in the final version.

2.2 Design of the online course

The course was designed in the existing Electronic Learning Environment of the TU Delft, Blackboard™. In order to stimulate students to work regularly on the course, the course was split in to 8 sections divided over 10 weeks. Figure 2 shows a screenshot of the course. Each weekly section was then further split up in order to create small *activities* created in such a way that the student felt *supported* through

their learning process. The activities are designed to be *diverse* (i.e. watch, read, solve, create) and to stimulate the students' thinking towards their thesis. Short videos were created to replace to face-to-face lectures. *Interactivity* and support are facilitated through encouraging students to share their opinions by taking part in discussions and peer reviewing each other's work thereby *including* all students in the process. *Flexibility* was created by allowing students to study in their own time within a framework of 10 weeks meaning students have 5 opportunities per year to complete the course with freedom of completion within each 10-week period. By linking the course directly to the thesis research the work the students are doing is *authentic* to them. They feel the coursework for this course assists them in their thesis process. As the students are active online, it is easier for lecturers to monitor their activities and continue to *innovate* the course. For instance as of Spring 2015 the existing anti-plagiarism software used to assist students in correctly referencing has been replaced with TurnItIn™, allowing the e-moderators and the graders in the course to provide students with direct feedback on their work rather than just communicating a grade.

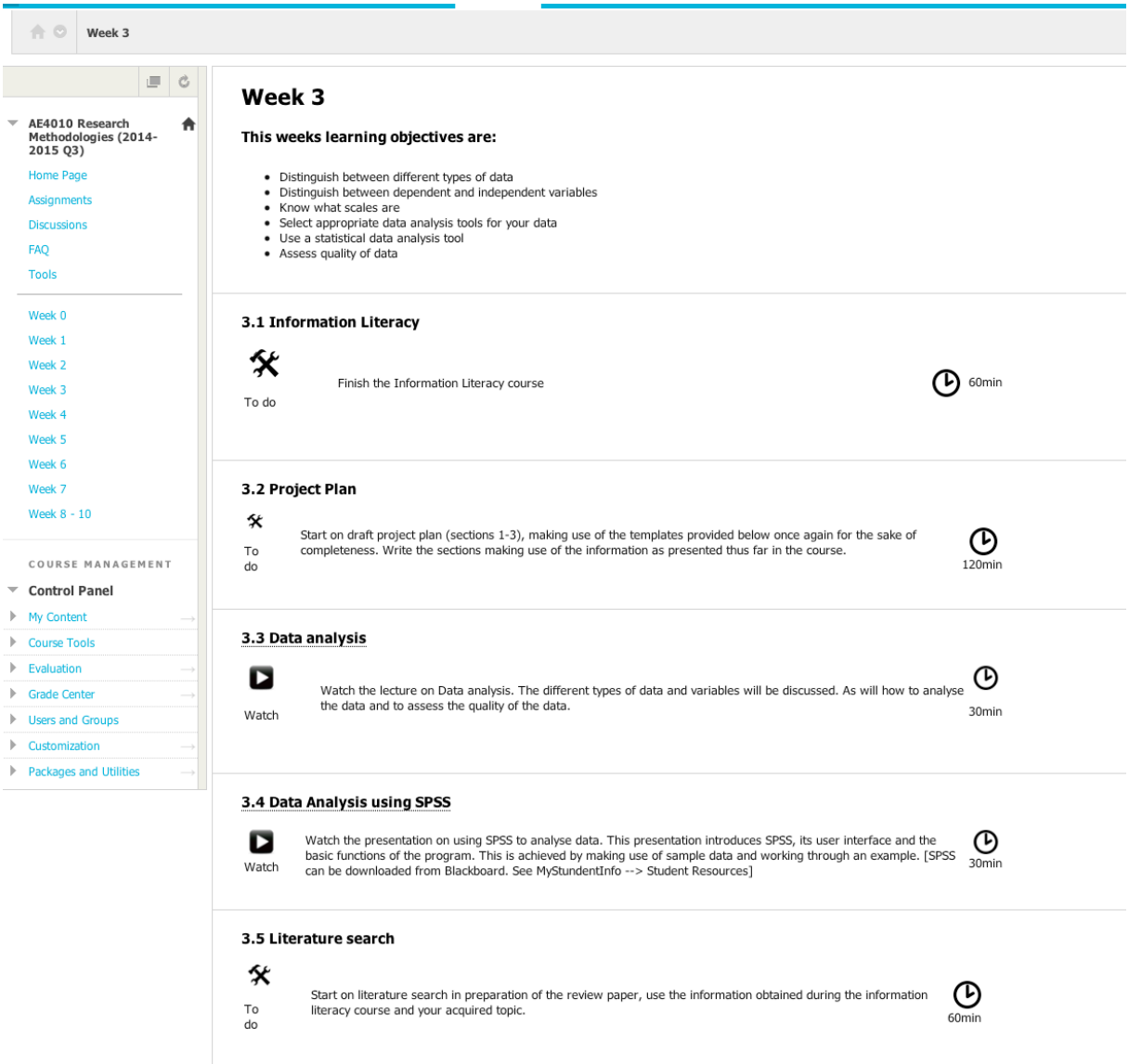

Fig. 2. Screenshot of online course environment

3 EXPERIENCES AND RESULTS

The course has now been running for its 7th consecutive run and overall the experiences are positive. Although the initial creation of the online course required a large amount of discipline and attention to detail from the lecturer when creating the course and the recording the videos, maintenance has since been a low effort case. By designing the course in this way the course can be run to a large extent by the e-moderator, usually a post-graduate student, with the lecturer only having to oversee, making the workload of over 200 students a year a lot more manageable.

Table 1. Outcomes of course evaluations

Criterion	Average Score (1-5) (very poor – very good)
Coherence	4.02
Lecturers	4.47
Course Contents	4.34
Methods of Education	4.03
Assessment	4.22
Organisation	4.33

Student evaluations show a great satisfaction on their part when it comes to flexibility offered and the quality of the content. In table 1 the results of the 2013-2014 course evaluation as carried out by the Faculty's quality assurance officer are shown. This indicates that online learning has become a very acceptable and appreciated form of teaching. The method of education and coherence were considered good and the organisation of the course even better. The course was given an overall grade of 7.9 out of 10. In the words of a student in the evaluation: "It is a key course given in a way that allows students to customize it to their own graduation schedules. This course feels somewhat undervalued but is actually very useful and cements and clearly structures the foundation of doing good research."

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