

# PREPARING FOR MASTERS´ STUDIES: A WEB BASED TOOL FOR SELF-ASSESSMENT AND KNOWLEDGE GAP MITIGATION

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## Abstract

This paper presents a project, conducted by three European universities and a software company, funded by Erasmus +, Strategic Partnership. The project addresses the problem that sometime masters´ students do not get their degree within the allocated time, if at all. Apparently some students with the formal prerequisites to register for a master's programme still lacked the actual abilities to manage their studies.

The solution was to design an online HTML5 platform to house self-assessment and learning resource modules for four different master's programmes in Europe. The modules were intended to illustrate the level and abilities that potential applicants were supposed to bring into their studies by a self-assessment test. In case lacking abilities were revealed, the modules offer learning resources to mitigate those gaps.

The access modules provides potential students with a visualization of twelve different skills and knowledge as compared to those identified by lecturers as necessary for study on the master's course. If there are weak spots identified, the students are presented with a series of learning interventions designed to remedy their ability flaws.

The authors suggest that providing potential students with this kind of material can raise their awareness of what the programme really takes. In this way students with false expectations can be avoided and the ones who applies come better prepared, which the use of access modules potentially can leads to improved enrolment, completion rate, time-to-degree and retention in a wide range of academic programmes.

Keywords: enrolment; e-learning; masters' education; higher education; educational technology;

## 1 INTRODUCTION

The idea behind this project was that potential students should have an opportunity to find out if their previous knowledge and skills are suited and/or sufficient for a particular programme before they apply, but the anonymous self-assessment test was decoupled from the admission processes. In case they lack some desired ability, they should have an opportunity to mitigate knowledge gap before starting their courses.

Such a resource could help educational institutions recruiting the desired talent to programmes, but also help students that are struggling to hang in and complete their education by providing learning resources to mitigate gaps in their previous knowledge. The design of the access modules developed in this project can readily be used to develop similar modules for other levels of education (e.g. bachelor's programmes or vocational training).

## 2 BACKGROUND

All over the world several higher educations are organized in a similar way, students start with a few years of grad courses and then apply for the next level, i.e. masters´ programme.

Europe is unifying and standardizing the structure of their masters' level education through the Bologna initiatives with support of the European Union. The Bologna process for standardization of European higher education specified an undergraduate degree of at least three years called the "license" or bachelor's degree, followed by a two-year diploma called the master's degree, then a

doctorate, meant to be obtained in three years. However, the process is not yet fully accomplished and the situation varies between countries.

When students apply to a master's degree programme, they must show that they have the necessary background, or prerequisites, to be successful in the programme. Most of the time, they must hold a bachelor's degree in the field in order to be admitted to a master's degree programme. Some graduate-level programmes don't require you to have a degree in a particular subject, while others require a degree in a related discipline. Some programmes will also require that you meet certain course prerequisites, for example certain healthcare programmes will require that you have a predetermined amount of clinical or laboratory experience.

When this project was initiated it was considered a problem that many students had the formal prerequisites to register for a master's programme, but still lacked skills or competences that are important to be successful in the master's courses. As a result, many students did not get their degree within the allocated time and several dropped out without a degree. Of all students that enter a master's programme in Europe about two thirds will get their degree [1-4].

Before sending the application for funding of this project a little survey was conducted by sending an E-mail to 90 European and 10 Latin American universities, presenting the idea of the access modules and asking "Do you think that such a module is of interest and relevance to your Master's program?" The responses indicated that most universities experience similar problems with recruitment and retention of students.

### **3 THE PROJECT**

The primary objective of this strategic partnership was to design an online platform to house free (on- and off-line) access modules to four master's programmes in Europe. The modules are intended to help universities attract suitable students and prepare them by evaluating and improving knowledge and skills that are pertinent in order to successfully study on the master's programme in questions.

Each access module provides potential students with a visualization of their existing skills and knowledge as compared to those identified by lecturers as necessary for study on the master's course. If there are any weak spots identified the student are presented with a series of learning interventions designed to develop the required abilities. Users are also presented with an option to enjoy all learning resources. The study material developed in this project had to be licensed as Open Educational Resources (OER) [5, 6], i.e. free to redistribute and use for public education in accordance with the Paris Declaration [7].

After completing the learning interventions the students can reassess their skills and knowledge.

### **4 THE PARTNERS AND THE PROGRAMMES**

There were four partners in the project; three universities; University of Borås (UB), University of the Highlands and Islands (UHI), University of Alcalá (UAH) and a soft-ware developer; Digital Connexions Ltd, (DC).

UB is responsible for project coordination and for developing the subject-specific content for the access module for Textile Engineering. UHI worked with Digital Connexions on the development of the HTML5 System and is responsible for the subject-specific content of the access module for their Masters in Education and the module for Master in Leadership and Management.

University of Alcalá is responsible for evaluation of the project implementation and development of subject-specific content of the access module for the Masters in Telecommunication Engineering. Digital Connexions Ltd is responsible for the development of the HTML5 System and development of the source code for the on-line diagnostic tool.

Instructional video on how to use the platform, as well as information about the project for students and teachers, was developed and published by UHI.

## 5 AN EXAMPLE; THE DEVELOPMENT OF THE MODULE FOR TEXTILE ENGINEERING

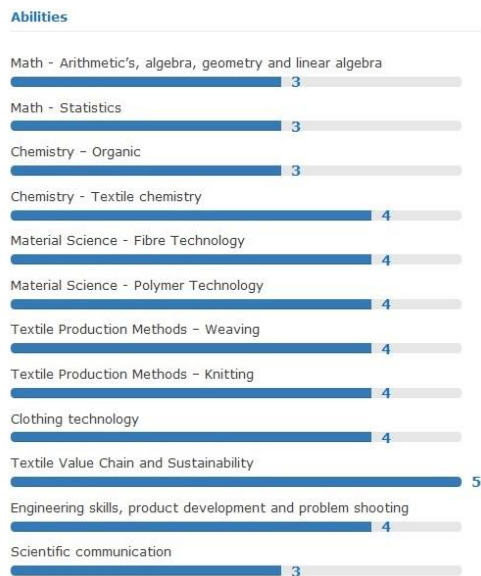
The University of Borås (UB) was responsible for the access module for MSc in Textile Engineering. For the self-assessment feature teachers identified twelve different areas, based on their BSc learning outcomes and MSc admission criteria where new students should have particular qualification levels. For each area the users were supported by level guides to judge what level statement that best fit their current status. The module offered six predefined levels of increasing learning outcome fulfilment. Recently graduated domestic BSc were consulted for their perception of the self-assessment test and one sample learning resource. They were asked to conduct the self-assessment test and provide feedback to the following questions:

1. Was it easy to understand what/how to do the self- assessment test?
2. Does it feel that the module platform gives a true and fair view of what a BSc Textile Engineer has for some abilities?
3. Do you find the level guide descriptions relevant?
4. What do you think about the training package?
5. Other comments?

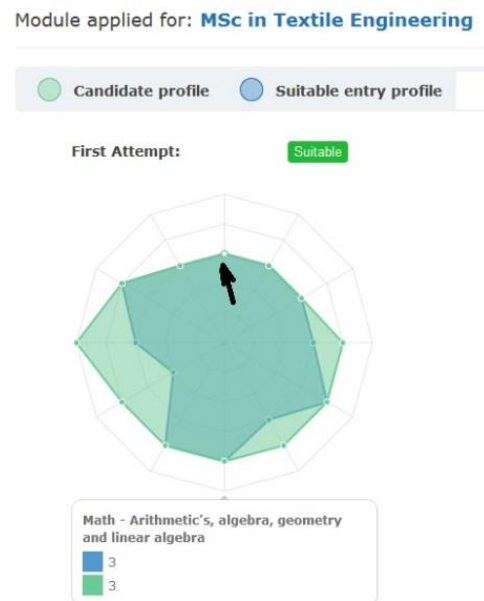
From their answers, it was obvious that the students were fully satisfied with module platform, contents and level guides. Some students were fully and some largely satisfied with the sample training package. The module contents for a few abilities were revised based on their comments.

Each of the 12 areas or abilities listed below corresponds with a node in the diagram (fig.2)

Figure 1: A prospective student's assessment of his/her abilities



Figur 2: Diagram illustrating the comparison between assessment and the desirable entry profile



Before the module was made available online a survey was conducted to find out how students at the (two year) Master's Programme in textile engineering at UB responded to the idea. Present students in their 1st and 2nd year together with recently graduated students were invited to respond, out of 15 objects 11 or 74% replied.

## 6 RESPONSES TO THE SURVEY

When you were contemplating to apply for the program	Yes	No
1. Would you have taken the module test?	64%	36%

2. Would it have made you more interested in the program?	82%	18%
3. Would it have made you more interested in University of Borås?	82%	18%
4. Would you have told your peers about the module?	82%	18%
5. Do you think it would have improved your awareness about entrance requirements?	90%	10%
6. Would you have considered taking part in a virtual student community to get and give feed-back regarding the test results?	91%	9%

**Comment:** The students appear to be positive to the module. The results confirmed that many prospective students would appreciate a possibility to test their pre-knowledge and prepare for courses with self-studies.

If the module identified gaps in your learning	Yes	No
1. Would it have made you more reluctant to apply?	55%	45%
2. Would you have followed the recommended training packages?	82%	18%
3. Would you have considered taking part in a virtual student community to get and give feed-back regarding your results from the training packages?	82%	18%
In retrospect	Yes	No
1. Can you appreciate the value offered by this module?	73%	27%

**Comment:** Here one can see a potential problem with the module. 55% of the respondents say they may have been more reluctant to apply for the programme if they had had gaps in their knowledge identified. So, while it may be necessary to create awareness among some potential applicants that are not suited for the programme, there is also a risk that suitable potential students are unnecessarily discouraged by the test.

## 7 APPLICANTS TO THE MSc IN TEXTILE ENGINEERING

The access module for textile engineering was publicly available for the first time from October 2017, in connection with the opening of the application portal for the international August 2018 admission to the MSc in textile engineering. The application portal was closed by January 15 2018. There were then 157 applicants to 10 places on the programme, in 2017 it was 164. 90 applicants in 2018 had this programme as their first choice; in 2017 that number was 99.

When the online application for the programme was closed by January 15, 39 people had registered to use the access module on the AToM platform. Of the 157 applicants eight e-mail addresses coincided with those that registered for the module. It remains to be seen in coming years if more of the potential students use the module and if those who do are successful in their studies.

## 8 DISCUSSION

For a university there are many ways to evaluate and improve their results, as measured by government and society. OECD's annual Education at a Glance [3] looks at who participates in education, how much money is spent on education in different countries and results. Results include indicators on the impact of education on earnings and on adults' chances of employment. Below are four statistical indicators of productivity; i.e. to what extent a university or a programme is successful at making their students get a degree. For educational institutions these indicators may be used to evaluate the work of adapting education to the demands from society and students.

Enrolment; i.e. to recruit the most suited prospective students. Completion rate; make students successfully complete their studies with a degree. Time-to-degree; make students complete their studies within a specified time period. Retention; encourage the less successful students to re-enrol in a study programme and get a degree rather than drop out [8, 9].

These four points are strongly connected, the first three reflect different results of students starting on programmes that they are not suitable for, or at least, are not prepared for. The fourth point is different. People representing government and industry tend to look at studies as an investment of time and resources that should increase future productivity and generate more tax income while many academics would argue that enrolment in higher education may be beneficial for society and personal development even if it does not result in a grade or financial gains [10].

While we, the authors, adhere to the latter view, we prefer that potential students make informed choices about their future. The access modules described in this paper should give interested students much of the information needed to avoid the frustration and possible cost of a failed attempt to earn a degree, and provide suitable material for those who want to prepare for their selected programme.

One important aspect of a masters' programme is how well it meets the demands from industry and society. Employment rate and salaries of graduates are important both for students that are considering a career in a certain field and for government allocating resources to education [11, 12]. Accurate information should be available to potential students before they decide to apply for a programme.

The modules described above provide three things for the visitor; information about the programme, evaluation of their suitability and links to study material for those who want to remedy weak points in their knowledge, or further augment their abilities to come even better prepared for their studies. Today almost all universities have a webpage which is the natural starting point for potential students looking for information about academic programmes. Existing Learning Management Systems (LMS) provide all features that are required to utilize these modules (i.e. self-test(s), repository for multimedia and text, tools for communication and interaction), hence the platform developed in this project is not necessary for this to work.

Much study material that may be suitable for this purpose can be found as Open Educational Resources (OER) that is already available online [5, 6]. Even if it was not demanded by the funding agency it would be necessary to use only free instructional material, text or video because it is impossible to prevent copying and redistribution of the material. In this case the funding agency requested that the study material developed in this project had to be licensed as OER, i.e. free to redistribute and use for public education in accordance with the Paris Declaration [7].

## **9 RECOMMENDATIONS**

To many people it would probably be interesting if the self-assessment test in the modules was completed with an actual test of previous knowledge and study aptitude.

We recommend all universities to market their programmes online, present general information about higher education and careers, provide potential students with the opportunity to evaluate their suitability for different programmes and offer some study materials or learning resources for those who want to remedy weak points in their knowledge or just want to prepare for studies.

In order to make higher education accessible to growing numbers of students, we strongly advocate a wider use and production of OER. This way computer-assisted education at low cost can be accessible world-wide, and in particular help developing countries to provide education as stated in article 26 of the Universal Declaration of Human Rights: "Technical and professional education shall be made generally available and higher education shall be equally accessible to all on the basis of merit" [13, 14]

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