Title: Interactive Assignments in Electro Courses at MDA

Keywords: Technology Enhanced Learning (TEL), Möbius Courseware, blended learning, e-learning, Learning Analytics, Community of Inquiry (CoI)

Presentation format: Presentation

Stage of the project: Early

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Background and purpose

Abstract

Education at the Mechatronics Division is traditionally based on collaborative-constructivist theory of learning and attempts to integrate theoretical studies with practical exercises (Grimheden, 2006). Most of our courses are characterized by Dewey's catchphrase "learning by doing", developed further in Community of Inquiry (Garrison, 2015) and reviewed by Stenbom (2018). In this digitalized era when technology is changing rapidly, especially electronics and computational technology, it is not far-fetched to expect of our teaching methods to follow this development. Thus, we aim to develop technology enhanced learning in our electro courses in accordance to current pedagogical and technological trends (Ismil, 2020). The main aim of this ongoing research is to examine how teaching presence designed with interactive assignments enhances our students' learning.

Background and Purpose

The first step in this project was to develop intranet rooms in Learning Management System (LMS) Canvas in our electro courses in accordance to the structure of a course and with clear connection to course goals. An important aspect of the intranet room in LMS is the enabling of social interactions through Discussion Forum, where students and teachers can interact with each other (Vaughan, 2013).

Examinations assignments used in previous academic years and carefully sorted in AFS-database by previous teachers are used as teaching material and Möbius Courseware is used as a digitalizing tool.

The great advantage of using Möbius is the possibility to obtain statistically processed data of students' results. This data describe our assignments by measurable information necessary to learning analytics showing us how much our students are developed in solving the examination assignment and even how "hard" some assignment are. Figure 1 shows the statistical data of assignment nr 24000720 used in online examination in course KH1251 January, 7, 2020.

Count	Correct	Partial	Incorrect	Success Rate	p-Value	d-Value	p-Biserial	r-Biserial
71	45	9	17	0.687	0.634	0.75	0.83	1.062

Figure 1. Statistics of task 24000720

Finished work/ongoing work

The next step in the development of our courses is the ongoing work on developing interactive assignments with embedded pop-up comments. Developing this function in the mandatory assignments reduced the need for teachers to respond to students' questions in the Discussion Forum. Besides, in our experience, students answer other students' questions in the Discussion Forum, which furthermore decreases the need for teachers to be available.

Results/observations/lessons learned

Efficient education obtained through the use of interactive assignments requires a standardized and an error-free database of the assignments created in accordance to the goals of the course. The road to an error-free database of interactive assignments is long and requires time-consuming work of specialists in both education and programing.
So far, using only a few interactive assignments in each stage of the course KH1251, we have completed our first attempt at this and the results are presented in fig. 2 showing the course grade in KH1251 in the last four course rounds. Interactive assignments have been used mostly in the last course round, and the first online examination, based on the assignments from the same database but without comments in Möbius, was conducted at KTH computer rooms in the presence of exam guards on January 7th, 2020. Although, we are well aware that one course round is not enough for us to draw any valid conclusions, and thus our research continues.

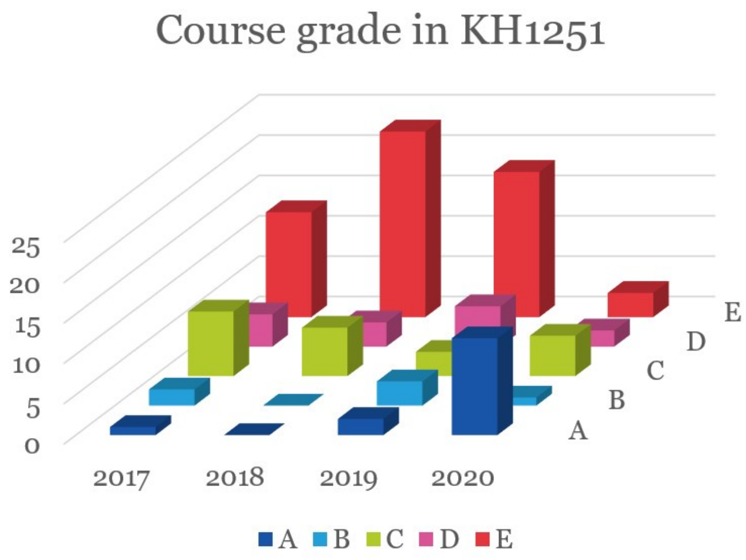

Figure 2. Results until now

Take-home message

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