

Title: C-MODE– Constructing knowledge based on modular on-demand digital education

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Timeframe: 18 months

Background

Digital education provides a unique opportunity to reshape our educational practices in order to optimally use our limited resource in terms of human capital and continue to provide excellent education to our students. However, education at most universities is still organized around monographic stand-alone topic courses, offered in a predetermined sequence and taught in plenary lectures. At the same time it is well-known that the ingredients needed for (deep) learning are: boundaries (context), resources and a question that triggers our imagination. The goal of this project is to develop a course design strategy based on these three pillars that can be extended to learning line design.

Objectives

The general objective of this project is to develop the C-MODE blueprint for modular on-demand digital education and implement it on a course as a pilot example.

Additionally, the following sub-objectives are defined:

- Explore the possibilities of on-demand modular education within the current curriculum structure.
- Optimize face-to-face lecturer-student contact to maximize the ratio value/time.
- Develop an intelligent digital learning environment including digital assessment tools.
- Establish best practices, do's and don'ts and a roadmap towards broader implementation of the C-MODE concept.

The goals of the C-MODE concept itself are:

- Encourage intrinsic motivation of students.
- Optimize use of our limited resources to make lecturer time count.
- Maximize the added value of TU/e education with respect to online programs.

Approach

- Develop C-MODE blueprint based on existing literature and best practices and TUE expertise.
- Students construct knowledge by solving a case provided by the lecturer (for example, controlled motion of a robot-arm).
- Design digital learning environment making use of existing online material supplemented with new material if needed and implement in CANVAS.
- Implement on an existing 5 EC course, 4DB00 Dynamics and Control of Mechanical Systems, that can be coupled to a 5 EC DBL course, 4GB20 Robot-arm, in a second phase.
- Pilot will be run with a subset of the total population of students on voluntary basis.

Expected outcomes

- Modular educational concept that can be implemented within the constraints of the current curriculum.
- Improved performance and satisfaction of students and lecturers.
- Reduce pressure on lecturing space and lecturer time.
- Roadmap towards a broader implementation of the C-MODE concept.

Project organization

The project is organized in five workpackages:

WP1: Literature review and course design

Task 1.1 Literature review: Gather information on similar initiatives elsewhere, study literature on the relevant topics for the project and collect best practices.

Task 1.2 Preliminary course design: decide on course structure, desired contact time, assessment methods, etc.

WP2: Test case development

Task 2.1 Selection and definition of test case: Select test case and decide on how to present the case to the students: for example, show certain behaviour of a system and ask them to build a model that can explain this behaviour.

Task 2.2 Establish and define most suitable solution strategy: Decide on the preferred solution strategy and split the solution process in steps that can be coupled to a module.

Task 2.3 Build digital environment for test case: Make images and animations of system, create interactive map that links system to modules, create a virtual companion.

WP3: Module development

Task 3.1 Organize course content in modules

Task 3.2 Generate library of digital content for each module: This includes online content that can be found elsewhere.

Task 3.3 Peer-instruction system: Explore on-line and face-to-face peer-instruction possibilities and define peer-instruction system.

Task 3.4 Build digital environment with modules: This includes the peer-instruction and formative assessment tools..

WP4: Formative and summative digital assessment

Task 4.1 Evaluate outcomes eFable pilot: The outcomes of eFable will be available in January-February 2019. These results will provide the input for the development of eFable 2.0

Task 4.2 Develop eFable 2.0: Develop second generation of online formative assessment tool

Task 4.3 Summative assessment of module content: Explore the possibilities of online summative assessment, how to deal with fraud etc.

Task 4.4 Summative assessment of test case: Develop summative assessment tool for test case.

WP5: Prepare, run and assess C-MODE pilot

Task 4.1 Pilot preparation: Get approvals to run pilot with a selection of students, invite selected students and control group students, prepare dedicated student surveys, ...

Task 4.2 Run C-Mode pilot: Weekly meetings with pilot participants, Online activity monitoring, Mid-term and final survey, ...

Task 4.3 Assess pilot outcomes: Assess pilot outcomes, lessons learned, develop plans for phase 2.

WP6: Dissemination

Task 6.1 Presentations: Prepare presentations/posters on preliminary and final project results and present at relevant symposia and meetings

Task 6.2 Reports: Compact mid-term report and complete final report.

Task 6.3 Write paper for peer reviewed journal

