

Interactive Learning for On-campus Courses

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Project Description

Chalmers students belong to a generation that grows up when there was Internet available in almost every household. They have a natural acceptance of digital media and technology in every aspect of learning. Moreover, they seek to learn in new ways outside the classroom. Together with this generation of students, we want to push the boundaries of Chalmers' on-campus education: We plan to use available, interactive education technology for enhancing the students' learning environment as well as to encourage teachers to adopt these advances in their courses.

Our experience with interactive learning methods includes the use on interactive screencasts. Students watch them when mostly before, but also after classes. The plan is to break down every lecture to several short video clips; each with a key issue from the lecture that the student must learn. Each video clip will then have an online questionnaire. It provides students with immediate feedback and allows teachers to monitor their learning and to identify knowledge gaps. We present the students with their individual scores as well as how they perform compared to their classmates. Presenting aggregated scores to the students in the classroom enhances their learning experience. It allows them to discuss with their peers and in class whenever they are lacking knowledge. Such peer feedback and class discussions will immediately close knowledge gaps at their early stages. We want to investigate new ways to use interactive learning technology together with peer group experience for advancing Chalmers education.

Pedagogical Benefits and Impact

The main objectives of this project focus on improving the learning environment for Chalmers students by incubating aforementioned ideas in our courses. We believe that when studying during the course, preparing for labs, lectures and the written exam, the proposed course materials will help students to understand the course content deeper. This is especially beneficial, because the videos will cover the most complex elements of each lecture.

We believe all students will benefit from the proposed teaching course materials. The experience with (the less attentive) students shows that they often lack key learning skills and the motivation to fill knowledge gaps from existing course material, e.g., reading the course's textbooks. By encouraging students to close their learning gap as soon as they appear, we can achieve better quality and completion levels as well as the student approval during the course evaluation.

Additional Benefits

Sharing such videos (in part) via online platforms, such as YouTube, we hope to increase the visibility of Chalmers education programs and courses. Our experience shows that course videos are highly visible on the Internet and students often refer to our media when asked by prospective students about our courses and programs. Thus, we expect this project to promote Chalmers, its programs and courses.

We plan to start a forum for Chalmers teachers that are working in the area of interactive learning. Starting from the second year, we plan to have annual meetings in which we will present the project developments and lessons learned. To these meetings we plan to invite all interested teachers as well as a guest European/Swedish lecture. We will also welcome all interested pedagogues to attend.

Estimated Costs

The plan includes the following five to six courses from the following list of courses.

- During the first two year: DAT105 - Computer Architecture (Per Stenström) and TDA596 - Distributed Systems (Olaf Landsiedel)
- On the second year, we will select three to four courses. The following course examiners have already shown interest: EDA222 – Real-Time Systems (Jan Jonsson), EDA263 - Computer Security (Magnus Almgren), EDA122 - Fault-Tolerant Computer Systems (Johan Karlsson), and EDA387 - Computer Networks (Elad Schiller). We plan to also to look into similar advanced courses.

We estimate that at least 550 students will be able to enjoy this project and that they will come from at least two master programs. However, we expect that an even greater number of students will enjoy the fruits of this project since we believe that more teachers will start including such teaching materials in their courses.

We estimate the each course will take about two iterations before the work completes. We calculate that in the first iteration, each course will include 12 two-hour lectures and that it will take a ratio of 8:1 between the media preparation time and the time spent in class. The second iteration we expect an average ratio of 2:1. We also request 10 K SEK for each of the annual meetings (traveling of European/Swedish guest lecture, leaflets, room and refreshments).

Project Schedule

- 2014 (*120 hours*): DAT105: second iteration (first iteration was done in 2013) *24 hours*. TDA596: first iteration *96 hours*. COURSE#3: Planning the activity for 2015.
- 2015 (*120 hours*): TDA596: second iteration *24 hours*. COURSE#3: first iteration *96 hours*. COURSE#4and COURSE#5: Planning the activity for 2015. First annual meeting of Chalmers Forum on Interactive Learning, *10 K SEK*.
- 2016 (*216 hours*): COURSE#3: second iteration *24 hours*. COURSE#4and COURSE#5: first iteration *192 hours*. COURSE#6: Planning the activity for 2016. Second annual meeting of Chalmers Forum on Interactive Learning, *10 K SEK*.
- 2017 (*144 hours*): COURSE#4and COURSE#5: second iteration *48 hours*. COURSE#6: first iteration *96 hours*. (Second iteration in 2018 will be in-kind). Third annual meeting of Chalmers Forum on Interactive Learning, *10 K SEK*.

The total cost 600 hours plus 30 K SEK for the annual meetings, which is about 672 K SEK. (Half of the teachers are professors and thus we use an average 60 K SEK monthly salary.)

2014	2015	2016	2017	Total
128 KSEK	139 KSEK	241 KSEK	164 KSEK	672 KSEK