

χ - Collective. Individual.

Annual report 2019

Organizational

Magnus Lilledahl is the project manager for the project. Magnus Strøm Kahrs has been coordinator for the project in a 100% position until mid-2019. At this time Kahrs took the position as vice-dean of education at the NV-faculty in a 40% position and corresponding reduction in the project (perhaps in a reality also a higher reduction). 6 students have been employed in the project during 2019 (as regular student assistants and summer jobs).

It has been difficult to fill the position after the loss of a large part of the coordinator position. This is partially due to no available resources at the department, restrictions on temporary hiring, and difficult to find qualified applicants. We also announced nine open student assistant positions this spring and only got one applicant.

This lack of resources into the project has made it challenging to conduct some of the plans of the project but the overall aims are going well.

WP1 Framework for optimal course design

The goal of this work package has been to identify elements that will contribute the better courses, both elements that work on the individual level and the collective level. The focus has been on elements that can be implemented as policy at the department level.

Individual pedagogical development

The key figure in designing courses, including the didactical design, is the lecturer. To improve student learning in courses it is essential that the lecturer has the necessary knowledge about learning, is knowledgeable and well trained in didactical techniques and, has the appropriate attitude and priorities. Although knowledge about pedagogical theories and models, as those offered in the NTNU PedUp course, is important, it is not a straightforward matter to develop specific practices from these principles. One can also question whether pedagogical theoretical knowledge in itself affects attitudes and practices among teachers. Perhaps a more effective approach for developing attitudes and practices could be to focus on specific ideas, and how they are relevant for specific courses

We have identified certain elements we believe are essential for a training program to develop the lecturer's skills. The underlying premises are that university teachers are generally highly overworked and have very little time to engage in their own didactical development.

- The program must be very efficient in terms of developed skills per time spent.
- New pedagogical ideas should be framed as specifically as possible (i.e. using physics and the teacher's own course as an example)
- It is necessary that implementation of new pedagogical concepts is accompanied by experienced guidance and resources for implementation.

We have used these key elements to design one course module for a specific didactical topic (Student response systems, see below). Five lecturers have followed the training and are using the elements (with success as far as we can access) in their classes. Our plan is to develop more of these

modules and establish this as an integral component of the departments educational quality development.

We are now in the process of establishing additional modules on other topics (feedback, being a primary candidate).

SRS module

Our first module has been a module on how to use student response systems (SRS) in a pedagogical effective way. It is our impression that the widespread use of Kahoot has contributed to an ineffective approach to SRS, from a pedagogical perspective.

The training program consists of the following elements

- A brief text which describes what research indicates is an optimal way (in terms of learning) of using SRS.
- A technical description of optimal use the available system (Mentimeter).
- A training session, with active participation.
- Resources to help in developing good questions.
- A departmental repository for questions.
- Follow up and feedback on actual implementation in courses.

Together we believe this is a highly efficient way of disseminating efficient use of SRS at the departmental level.

Collective pedagogical development

It is also a central premise of this project that a more collegial approach is essential for enhanced educational quality. To promote a collegial approach, we have at the department established *emnegrupper* (course groups) which are forums for teachers in related courses. The teachers in these courses meet once or twice a year to discuss pedagogical ideas, course connections, and work as a communication point with the department to communicate the need for resources.

Our experience so far is that this has been received well by the faculty. It seems like these groups meet an unexpressed need among faculty. There have been good discussions on overlap between courses, content, and didactical techniques. We also feel that having a moderated discussion is more fruitful than the average discussion over lunch which tends to emphasize the negative aspects rather than promoting solutions.

WP2 Elite sports

During the spring 2019 a set of learning activities inspired by elite sports were conducted in the course TFY4240 Electromagnetic theory. The learning activities were a set of exercise sessions, 2h per week for 13 weeks. Each session consisted of a combination of activities related to physics and activities aimed at improving the students learning skills. Both the activities as well as the learning skills were inspired by inputs from training in elite sports as well as cognitive psychology.

The sessions were evaluated throughout by several observers as well as students and we also conducted interviews with a few students after the sessions. We also planned to evaluate the performance of the participating students but the number of students that attended were too few that such an investigation would provide meaningful results.

A major theme throughout the exercises was to maintain good quality in the training.

Examples of themes primarily from elite sport that were discussed were goal setting, goal orientation (mastery/performance), motivation, planning, and logging.

Themes primarily from didactics were, time-on-task, concentration, deep learning, reading techniques, self-directed learning, study habits and procrastination, reviewing and remembering.

Throughout the exercises a strong emphasis was placed on group activities as this has shown improved results both in academia (belonging) as well as in elite sports (team spirit).

We also performed testing throughout the semester to assess development and areas in need of improvement (important both in academia and elite sports).

The sessions themselves went well and a lot of experience was gained. Many of the activities clearly gave the students new perspectives on their own knowledge. Several of the pedagogical techniques that were presented were well received by the students.

However, the number of students that participated quickly dropped from around 10-15 to below 5. During the interviews one feedback from the students were that the students in their third year (when this course is typically taken) are too fixed in their habits to be open for new ways of studying. Also, an emphasis on higher order learning topics, like motivation and goal setting might seem difficult to prioritize in a hectic study program, from the students' perspective.

A revised program is being conducted for the spring 2020.

WP3 Students as partners

(this package has been renamed from contest webs. See previous year's report)

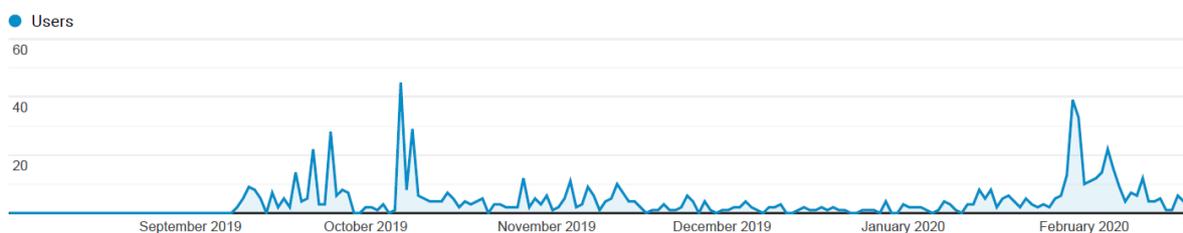
During 2019 we established an initiative for student projects (Students as partners). The aims of this project are to 1) contribute to closer connections between students and faculty, and 2) promote more entrepreneurship and creativity among students.

The idea is that teachers (and possibly industry) can announce projects that can be completed by students in collaboration with faculty. There are 4 project categories 1) research assistant, 2) research project, 3) course developer and 4) student driven projects.

A webpage has been established to announce projects

(<http://home.phys.ntnu.no/brukdef/undervisning/studentprosjekt/index.php>)

So far, the page shows decent activity (typically in the beginning of the semester (results google analytics))



The initiative has been well received both by faculty and students. Six projects were conducted during the fall of 2019 and several new projects have been announced during 2020.

So far, the project is financed by the Chi project (the students are reimbursed 10kNOK to participate in research projects and as course developer) and two student assistants administer the project, however the department has agreed to continue the project after the completion of Chi.