EXPERIENCES FROM IMPLEMENTING A SCHOLARSHIP OF TEACHING AND LEARNING PROGRAM FOR TEACHERS

Hanne Løje

Technical University of Denmark, Department for Engineering Technology and Didactic
Email: halo@dtu.dk

ABSTRACT

Teaching quality is essential for having a high standard of educational quality. To achieve this, teachers need to be supported in their professional development.

Scholarship of Teaching and Learning (SoTL) is a way to support teachers in the development of their teaching practice as SoTL is the systematic study of teaching practices and learning experiences with the goal of improving students learning. In SoTL, the focus is on a scholarly approach to teaching and learning, where teachers act like researchers to investigate and develop their own teaching practice. The teachers work systematically with continuous improvement of their teaching and investigate the teaching impact and how it supports the students learning. SoTL also involves reflection on their own teaching practice. Furthermore, it adds a possibility to contribute the accumulated knowledge to the ongoing discussion about the development of engineering education by participating in conferences within Engineering Education Research and to publish scientific articles in relevant journals as well as networking with other teachers and educational consultants around the world within Engineering Education Research.

Since 2018, we have been running a SoTL program for teachers at our institute. Each year a number between 10 and 20 teachers have participated in the program. The SoTL program is scheduled to take a year, and consists of seminars with external and internal presentations, workshops and work with own projects. Furthermore, the program consists of feedback sessions with the program leader and peer-to-peer feedback sessions.

The participants must come up with a question, "a teaching problem", which is something they are curious about in their teaching and want to investigate. During the SoTL program, each participant makes a research design, collects, and analyzes data and at the end of the program makes a presentation of the results from the project. Furthermore, the participant is encouraged to participate in educational conferences.

In this presentation, we will present our findings from three times running a SoTL program for teachers. Furthermore, we will present and discuss the challenges of implementing a SoTL program for teachers.

INTRODUCTION

Teaching quality is important for achieving and retaining a high standard of educational quality. Thus, the teachers need to be supported in their professional development. Therefore, it is important to create opportunities for teachers to collaborate, to share knowledge and to do practice-based research to promote educational development. In addition, it is important to provide the teachers with tools to continually develop their teaching practice and to enhance their understanding of student's learning.

The Scholarship of Teaching and Learning (SoTL) is a framework for university teachers to develop their teaching as well as ensure the quality of the teaching. Furthermore, it is a training for the teachers to become scholarly teachers.

The concept of SoTL was developed by Boyer (1990) and his concern was to address the disproportionate status reward accorded to research in universities, and the consequential disregard for the importance of teaching. Boyer (1990) proposed a reconceptualization of the activity of the university, arguing that it was best seen as embracing four distinct but interdependent and interrelated forms of scholarship: discovery, integration, application, and teaching. In this paper, we will focus on the form Scholarship of Teaching. Since Boyer first proposed his idea a variety of SoTL models have been launched (Trigwell & Shale, 2004) and the SoTL framework today is used by practitioners around the world (Mårtensson et al. 2011).

The SoTL framework offers a way to approach teaching and learning scientifically with focus on identifying and defining a problem, systematically gathering evidence of student learning, and drawing conclusion from the evidence and making results public for peer-review purposes (Dewar et al., 2018; Mårtensson et al 2011).

The SoTL framework can be a way to focus on educational development and be a support for academics to set up and maintain a high standard of teaching and learning. This can lead to enhancement of faculty teaching competence (CDIO standard 10) as participating in SoTL include actions with enhance faculty teaching competence as SoTL is a development program, a forum for sharing ideas and best practice among the participants. In addition, the assessment of students learning (CDIO standard 11) is relevant as many SoTL projects have focused on the extent to which each student achieves specified learning outcomes.

The SoTL framework can be a way to support teaching as a subject for research where the teacher has a scholarly approach of teaching and learning, which include making research about own teaching and go public at conferences with results to share and thus receive feedback (Graham. 2018). In addition, SoTL framework can help the university to build a community with focus on engineering education at the university and can be used as the development of the university's ability to support student learning (Mårtensson et al., 2011). At Twente University in Holland, they have developed a scholarly approach regarding the senior University Teaching Qualification where the participants work as researchers to investigate their own teaching (Poortman et al., 2020).

The benefits of participation in a SoTL program, are that it promotes a more reflective teaching and improve the teaching effectiveness (Dewar et al., 2018). SoTL is described as having three main benefits. First, engaging in SoTL improves the student learning because it affects how the teachers think about teaching and the learning opportunities for their students. Second, contributions to the field of teaching are improved and enhanced. Third, engaging in SoTL enriches one's experience as a teacher (Bishop-Clark & Dietz-Uhler,2012).

According to Bishop-Clark & Dietz-Uhler (2012), the SoTL framework consists of five steps, 1) Identify the research question, 2) Design the study, 3) Collect the data, 4) Analyze the data and draw the conclusion and 5) Present and publish the SoTL project. This is illustrated in figure 1.
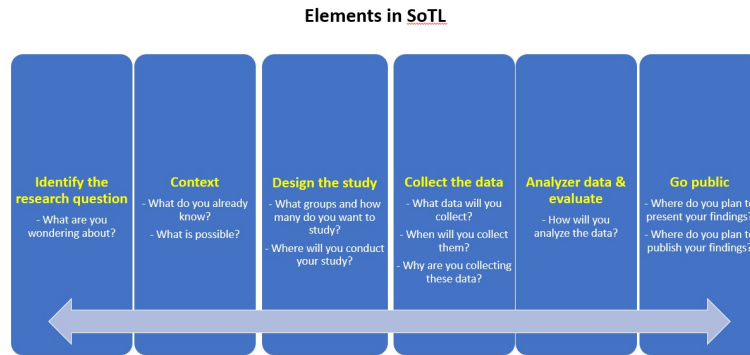
Elements in SoTL

Identify the research question
- What are you wondering about?

Context
- What do you already know?
- What is possible?

Design the study
- What groups and how many do you want to study?
- Where will you conduct your study?

Collect the data
- What data will you collect?
- When will you collect them?
- Why are you collecting these data?

Analyzer data & evaluate
- How will you analyze the data?

Go public
- Where do you plan to present your findings?
- Where do you plan to publish your findings?

Figure 1: Elements in SoTL program at DTU

Felten (2013) has described the principles for good practice in SoTL:
1) Inquiry focused on student learning
2) Grounded in context
3) Methodologically sound
4) Conducted in partnership with students
5) Appropriately public

Normally, inquiry into learning has focused on the students, but it can also include explorations of how teaching and a teacher influence affects the students learning (Biggs, 1999). To be scholarly, builds on what is known and using relevant theory. Good practice in SoTL requires application of research tools that connect the research question to student learning and is conducted in partnership with students (Felten, 2013). Good practice in SoTL requires that both the process and the product of the research are public so colleagues can give feedback and use the SoTL work (Felten, 2013).

The SoTL program at DTU focus on the scholarly approach of teaching and learning, where the teachers are researcher and design their own research plan to be able to investigate their own educational practice with the aim of improving teaching and support the students learning. The SoTL program consists of two parts. One part consists of presentations and workshops held by internal and external experts. The purpose of the first part is to give the participant knowledge and inspiration on how to investigate elements in their teaching and which methods they can use. In the other part, the SoTL participants plan and execute their own project either alone or in smaller groups. During the project they are supported by internal and external supervisors and peer feedback from colleagues. In Figure 2 the plan for the SoTL program at DTU is shown.
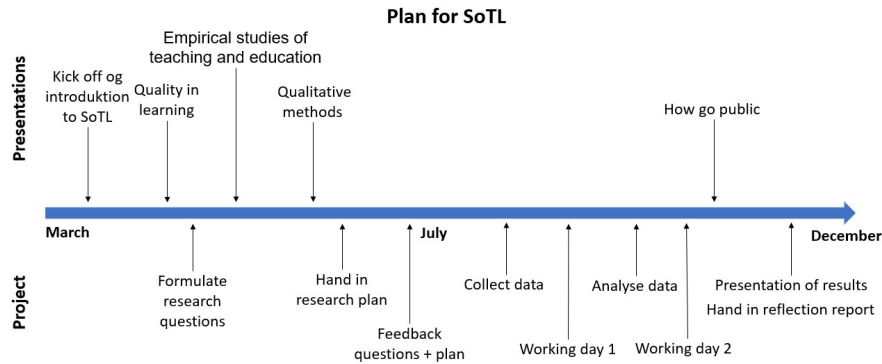
Plan for SoTL

Presentations:
- Kick off og introduktion to SoTL
- Quality in learning
- Empirical studies of teaching and education
- Qualitative methods
- How go public

Timeline: March — July — December

Project:
- Formulate research questions
- Hand in research plan
- Feedback questions + plan
- Collect data
- Working day 1
- Analyse data
- Working day 2
- Presentation of results
- Hand in reflection report

Figure 2: Overview SoTL program DTU

After running the SoTL program three times, this paper describes the benefits and the challenges of running a SoTL program. Furthermore, improvements for the future SoTL programs will be introduced.

The research question is how to develop a program on a scholarly approach of teaching and learning. Furthermore, to present and discuss the challenges of implementing a SoTL program for the teachers.

FRAMEWORK AND DESIGN

The Scholarship of Teaching and Learning program at DTU

At the Technical University of Denmark (DTU), in the Department for Engineering Technology and Didactic (DTU Eng Tech) we have been running an internal program based on the SoTL framework three times (2018, 2021 and 2022).

Participants in the SoTL program at DTU Eng Tech are all experienced teachers at the institute and when participating in the SoTL program, they are expected to:
- Be motivated to and have a focus on how to improve their teaching.
- Be critical and proactive with regards to their own role as teacher.
- Be actively involved in the activities in the program and to collaborate with other participants in the SoTL program.

Each participant received 70 hours from the institute (internal hours) to use for the SoTL program. Further hours for their individual project might be needed and extra hours are therefore expected to be provided by their research group.

The experiences from running the SoTL program will be presented and discussed.

SoTL 2018 program

The first SoTL program in 2018 was a pilot study. Ten teachers from one department at the Institute participated in the pilot program. The participants were mainly associate professors with several years of experience as university teachers.

The aim of the pilot program was to find a structure for a SoTL program. External presenters gave motivating talks concerning different aspects of SoTL to motivate the participants to work with their own teachings. In the pilot program there was only a little focus on the participants'

own project, but some of the participants did small studies into their teaching, which they presented at the end of the program.

SoTL 2021 program
In February 2021, we started the next SoTL program. To attend the program in 2021, the teachers were asked to write a small application with a description of which course to work on and what they wanted to investigate in their individual project - what was she/he interested in and wanted to explore during the course.

Totally ten teachers participated and all of them were associate professors with many years of experience as university teacher.

The first meeting – the kick-off meeting was held in February and was an introduction to the SoTL framework, but there was also time for the participants to get to know each other. Furthermore, the participants pitched their topics of interest, and they received feedback from the other participants.

In the first half year (until summer) there were meetings every month with presentations and workshops. The meetings were focused on explaining the processes of educational design, how to get data, how to analyze data etc. Most of the talks were held by external speakers within the field. All meetings were scheduled to be a three-hour meeting and were held every month.

Three months after the start, the participants started to work on their own projects. The participants could work alone or in groups of two-three teachers. The participants started to formulate their project and describe which problem they want to investigate in. They could use their initial idea, but they could also choose another subject. Each participant/group made a research plan which they handed in and then got several feedbacks from the peers and the facilitator.

When the new semester started in September, the research plan was ready, and the participants started to collect data for their own projects. During the autumn semester data was collected and then analyzed.

During the last period of the project, the participants additionally met at lunch meetings to discuss their project and possible challenges etc. Furthermore, each participant could ask for an individual feedback meeting with the facilitator.

At the end of the SoTL project 2021, there was a poster session, where the participants presented their results to their colleagues at the institute. At the poster session they received feedback from colleagues and the management team at the institute. Furthermore, the participants were encouraged to write an abstract and/or a paper for a conference within the field of Engineering Education Research or for a journal.

SoTL 2022 program
In the SoTL 2022 program, 13 participants were enrolled. This time the participants consisted of PhD students, assistant professors, and associate professors. Some of the associate professors had many years of experience as university teachers while other associate professors had many years of experience as researchers. The structure from the SoTL program in 2021 was followed with a few adjustments.

OUTCOME

After running the SoTL program three times, the SoTL program has now been implemented as a competence development program for all teachers at the institute. The implementation of SoTL is supported by management and each participant receives 70 hours (internal hours) for participation in the SoTL program. The teachers can follow the SoTL program several times.

The participants worked on a large variety of themes like "formation of groups – self-selected or decided by the teacher", "choice of case for case work - should it be decided by teacher or students?", "how to strengthen student motivation" and "how to facilitate different groups of students". All themes are related to the participants own teaching.

SoTL 2018 outcome

The aim of the pilot project in 2018 was to develop a structure for a SoTL program. External presenters gave motivating talks concerning different aspects of SoTL to motivate and inspire the participants to work with their own teaching. Five presentations were held during 2018 with one meeting every month (not during the summer period). In the pilot project, there was only little focus on the participants' own project, i.e. some of the participants did small studies into their own teaching which they presented at the end of program. The results from the pilot program were evaluated based on the organizers' perceptions and comments from the participants. It showed that the teachers were highly motivated to participate in a program like SoTL and they were also interested in working with their own teaching. Besides the input from the teachers, we also got knowledge about what could be relevant for future teaching materials and which subjects at present were relevant to participate in. In addition, it was clear that more time should be assigned to the participants if they should work with their individual projects.

Based on the results from the pilot program, a program with internal and external presenters and a plan for how the participant should work with their own project was developed. Unfortunately, due to the covid-19 situation, the next SoTL project was not launched before 2021.

SoTL 2021 and SoTL 2022 outcomes

In the SoTL program in 2021, we had a program with seminars and workshop planned for the entire year based on the input and observations from the pilot program in 2018. Furthermore, teachers from the whole institute were invited to participate and the teachers had to write an application before enrollment into the SoTL program.

Based on the comments and observations from the SoTL 2021 the program for SoTL 2022 was made. Only small changes were made like it was mandatory to hand in the research plan for feedback.

The reflections from running the SoTL program in 2021 and 2022 were that the application before enrollment worked well as it started the reflections about what to investigate and why it could be relevant to do so. All the applicants were accepted to the SoTL programs in 2021 and in 2022, these participants were more prepared and focused than the participants were in the 2018 program. The participants were motivated to work with their teaching, and they appreciated networking with the other participants. Networking was mentioned as an important output. Poortman et al (2020) mentioned in their paper that recognizing and rewarding teaching is essential to support effective professional development and a practice for this should be considered for the future program. Today the participants received a diploma after their poster presentation.

The participants learned how to present their improvements in posters, abstracts and papers. All participants had to do a poster presentation held at the end of the program. Furthermore, some participants have written a journal paper and/or participated in conferences with engineering education research. One participant from the program in 2021 presented his work

at the SEFI Conference in 2022 (Schultz & Blaszczyk, 2022) and another participant from the program in 2022 is expected to submit a paper later in 2023.

A challenge was to have enough time for doing the collection of data and then to analyze them. Even though each participant received 70 hours, it was not enough for all participants. In the study by Poortman et al. (2020), it was also mentioned that the participants had difficulties in finding time for the activities.

Furthermore, for several of the participants it was their first time conducting social science (doing interviews with students etc.) and they had to learn to conduct interviews, observations etc. Furthermore, it also took some time to recognize what kind of data was available and what data needed to be collected.

One of the aims of the SoTL program was also to build a community about teaching and learning where the participants could meet after the SoTL program was finished. The community should help to create a culture for continuous improvement of teaching, and where teachers can share knowledge and inspire each other. This community still needs to be developed.

Based on the experiences of running the three SoTL programs the following improvements will be made.

In future SoTL programs, each participant is expected to deliver the following products: 1) a poster presentation, 2) a reflection report (main learnings from participation in the SoTL program). As an additional delivery it will be possible to hand in an abstract for a poster or a paper for an educational conference. The report will be reviewed by the project leader and the participants director.

In the 2022 program, it was not mandatory to hand in the research plan. Most of the participants did it, but in the future, we will make it mandatory to hand in the research plan after two months' time. The research plan will be reviewed by one of the facilitators to ensure that all its participants have a complete and a well-structured research plan before data collection starts.

To support the participants in their work on their project we will have several open sessions where the time is booked to work on the research plan, analyzing data or writing the report. It will be possible to get just-in-time feedback from the facilitator but otherwise the time is allocated for the work with the SoTL project.

CONCLUSION

After running the SoTL program three times the content and the structure of the program seems to be on the right track, and the SoTL program is now implemented as a competence development activity for the teachers at the institute. In the next program (2023), the expectations of the participants will be made clearer, and they are also supposed to submit at the end of the SoTL program. There will also be more focus on the creation of a community (for new and old participants) and having more scheduled work meetings to help the participants to better allocate time to their projects.

The participants are very positive towards SoTL, and they have expressed that participation in a SoTL program has had a positive impact on their thinking, teaching approach and their students learning.

REFERENCES

Bishop-Clark, C. & Dietz-Uhler, B. (2012). Engaging in the scholarship of Teaching and Learning – a guide to the process and how to develop a project from start to finish. Stylus Publishing

Boyer, E. L. (1900). Scholarship reconsidered: priorities of the professoriate. (Princeton, NJ: Carnegie Foundation for Advancement of Teaching

Dewar, J. M., Bennett, C. D. & Fisher, M. A. (2018). The Scholarship of Teaching and Learning – a guide for scientists, engineers and mathematicians, Oxford

Felten, P. (2013). Principles of good practice in SoTL. Teaching & Learning Inquiry, 1(1), 121-125

Graham, R. (2018) The Career Framework for university teaching: Background and overview. Royal Academic of Engineering, London

Mårtensson, M., Roxå, T. & Olsson, T. (2011) Developing a quality culture through the Scholarship of Teaching and Learning, Higher Education Research & Development, 30:1, 51-62, DOI: 10.1080/07294360.2011.536972

Poortman, C. L., Rouwenhorst, C., Ter Braack, M ten Voorde & van der Veen, J. T. (2020). The senior university teaching qualification: engaging in research, design and building community in engineering education. Proceedings of the 48th SEFI Annual Conference 2020

Schultz, O, & Blaszczyk, T. (2022) Introduction of process in embedded programming supporting students' self-efficacy – case study. Proceedings of the 50th SEFI Annual Conference 2022, pages: 2034-2040. Presented at 50th Annual Conference, Barcelona, Spain 19 – 22 September 2022

Trigwell, K. & Shale, S. (2007). Student learning and the scholarship of university teaching, Studies in Higher Education; 29:4, 523-536

BIOGRAPHICAL INFORMATION

The authors must grant a Creative Commons version 4.0 license to reproduce the work and include the marking shown below.

Hanne Løje holds an MSc degree in Food Science from Copenhagen University and a PhD degree in Food Technology from the Technical University of Denmark. She is Head of the Research Group Engineering Education Research at DTU Engineering Technology and Didactics, Associate Professor and Head of Studies for the Bachelor of Engineering program in Global Business Engineering at the Technical University of Denmark (DTU).

Hanne Løje has for several years worked with didactics and pedagogy and has presented results at national and international conferences within Engineering Education Research and been project leader for several projects within this field. Hanne Løje has been teaching university students for more than 15 years and is responsible for development and running a number of new courses at DTU. Through her academic career, she has worked systematically with development of teaching, teaching materials and teaching environment to improve the students learning and she has published several papers in this context and presented her research at several international conferences.

Corresponding author

Hanne Løje
DTU Technical University of Denmark
DTU Engineering Technology – Department
of Engineering Technology and Didactics
Lautrupvang 15, DK-2750 Ballerup,
Denmark
Halo@dtu.dk