

Collaborative Course Evaluation and Development at KTH – Progress, Lessons Learned and Way Forward

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Abstract—This paper presents a very brief overview of an ongoing effort to develop and establish a process for collaborative and learning-oriented course evaluation and development at the Royal Institute of Technology (KTH) in Stockholm, Sweden. First, a departmental case study is summarized, in which the essential objectives, tools and processes have been developed, tested and evaluated – in particular the so-called Learning Experience Questionnaire (LEQ) process. Empirical data from the case study suggest that the developed process, if realized in practice, does indeed lead to the desirable change. Next, some work in progress is accounted for, with focus on the university as a whole. Finally, we share some lessons learned and provide tentative directions for the future.

Keywords—Course evaluation and development, Student learning and participation, Communities of practice for teachers.

I. INTRODUCTION

Course evaluations is the dominating method in Sweden when evaluating quality of teaching and learning from a student perspective. According to Swedish law course evaluations is to be conducted on every course and the students are to be informed regarding the results and the measures taken due to these results.

Course evaluations are from a teacher’s perspective often viewed upon as a mandatory necessity, and the way that they often are constructed gives little information of use for a

teacher that is interested in course development [1], [2]. Engaged teachers therefore often add open-ended questions in order to capture student views that are more helpful when striving for course development.

Students often perceive course evaluations as something that teachers do because they are supposed to, but that has little effect on the quality of the actual teaching and learning [1]. Students seldom experience that their efforts in giving feedback is of use, partly because the course already has finished and it is only of use for future students, partly because teachers does not take the opportunity to tell new students why and in what ways former students feedback has influenced current course design.

Course evaluations have many purposes, but are commonly used to provide feedback to teachers that contributes to enhanced quality of teaching and learning, and to enable student participation and influence [3], [4]. Another purpose may be to investigate whether or not teaching creates good conditions for student learning, which is a central theme in the present work. In spite of this, course evaluations are often constructed without considering present knowledge regarding what makes for a good and efficient learning environment [3].

Another inhibiting factor when it comes to typical course evaluation formats is that teaching tend to be a very personal matter for many teachers – it may be a sensitive matter to open up and discuss your course with a colleague. Course evaluation that rates teachers, rather than focus on how the course could be improved, does not encourage teachers to seek support and help from others. Our experience is that a common perceived problem among university teachers is a lack of collegiality and that they experience a need for course development, but that time constraints and the feeling of “I do not know where to start” makes it hard to get going.

The purpose of the present work is to address both these problem areas concerning course evaluations: i.e. the lack of useful information for course development in course evaluations and the lack of fruitful and safe collegial foras for course development for university teachers. The core development, testing and evaluation has taken place within the framework of a departmental case study at KTH, which will serve as a point of departure in what follows.

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II. METHOD I: CASE STUDY

The first blueprint of the developed process took shape during 2013, when two of the authors (Borglund and Henriksson) got opportunity to work with a group of about 30 teachers at an engineering department at KTH. In short, the department had recently been through some difficulties and expressed a concordant willingness to explore possibilities to increase the sense of community in the group. A more collegial approach to the development of teaching and learning (as opposed to e.g. research) was seen as a promising path for this purpose, as this involved all participants and was considered a worthwhile challenge with many potential benefits for the participants as well as the department. This was also the main outcome of an initial SWAT exercise with the group.

Although participation was voluntary, most teachers participated actively in the initial development, albeit to different degrees and on different occasions. This was an agreed way of working and a key factor in bringing the work forward in spite of limited resources. From the authors' point of view, a case study in this format was considered a very suitable method for the development, testing and evaluation of a practically useful process for collaborative educational development at university.

A. Method II: Survey and Focus Group Interview

The initial stage of the project involved an in-depth examination of the current situation at the department. First, a survey was conducted among the teachers, with two main areas of interest: their current practice regarding course evaluation and development, and any existing structures for collaboration and exchange of experience. Based on this, a semi-structured interview with a focus group consisting of 9 teachers was carried through. The main findings of the combined effort can be summarized as:

- Overall, there was a lack of exchange of experience among the teachers, mainly due to
 - lack of time and resources,
 - organizational factors,
 - differences in teaching approach, and
 - that teaching was considered a personal matter,
- The existing procedures for course evaluation were judged as being inadequate, mainly because they were perceived as a formal requirement with limited bearing on meaningful course development,
- Apart from responding to a survey after completion of a course, students were, typically, neither involved in course development nor informed about previous measures taken as a result of student feedback, and
- The teachers also found it difficult to identify their own needs for professional development, as well as more concrete measures to tackle perceived problems in their teaching.

Thus, the results obtained tend to reflect the general trends described in the introduction to this paper, and we also argue that the current context can be considered quite typical of a (Swedish) university.

B. Objectives

Based on these results, as well as known difficulties with course evaluation [1], [3], [4], we set out to develop and establish a process with the objectives to:

- facilitate collaboration and exchange of experience among the teachers,
- help them find new ways to improve their students' learning,
- help them identify own needs for professional development,
- increase the meaningfulness of their work with course evaluation, and
- facilitate student participation in their work with course development.

In this stage of the project the communities of practice approach seemed to be the way to go forward. It is a socio-cultural approach to learning where learning is something that takes place within, and in interaction with, a community of practitioners. Basically, communities of practice are groups of people who share a concern or a passion for something they do and learn to do it better as they interact regularly [5], [6]. The community of practice theory is based on the assumptions that

- 1) learning is a social phenomenon, real knowledge is integral to “doing” and is a part of social relationships and the specific knowledge of the community,
- 2) the learning process and the community of practice are inseparable, which means that learning has an effect on group status, changing both the identity of the learner and his or her relationship to the community, and, finally,
- 3) engaging in real activities that have significance for both individuals and for the community, a powerful learning experience is created.

With this type of approach it is vital to exploit the potential of problem-based learning methods and case study methodologies, and we therefore aimed at creating a course evaluation that could form the basis for a problem-based approach to learning by doing course development work together with peers. Could we design a course evaluation that was informative, based on research on effective learning environments, non-threatening and that stimulated curiosity to develop the course further and share experiences with others?

C. Method III: The Learning Experience Questionnaire

The next step was thus to design a course evaluation that could support the establishment of a community of practice as well as course development with improved student learning as a guiding star. Here, our strategy was to introduce a more holistic perspective on teaching and learning that all teachers, regardless of previous experience and practice, could relate to and develop from.

Rather than evaluating the teacher's performance or the specific form of teaching (like students' opinions on lectures) we decided to shift focus toward the students' experience of the *learning environment* in the course – the physical, social, and cultural context in which the students' learning takes place [7]. Moreover, we wanted to evaluate this experience with

respect to a number of *learning factors* which, according to research and proven experience, have proved to promote learning in higher education [7]-[11]. This is the basic principle of what we now refer to as a *learning experience questionnaire*, or LEQ. The shift from evaluating students' opinions on teaching to their experience of learning is essentially what distinguishes a LEQ from, for example, a course experience questionnaire, or CEQ [12].

An example of one such learning factor is that we tend to learn most effectively (in ways that have a sustained, substantial, and positive influence on the way we think, reflect, act or feel) if we are able to collaborate with other learners struggling with the same problems as we do (which, as mentioned earlier, is also central to learning in communities of practice). Inspired by the format of the CEQ by Ramsden [12], our ambition was to develop a number of statements that could be used to evaluate the students' learning experience in the light of such factors. For example, the statement "I was able to learn by collaborating and discussing with others" is a way to evaluate the learning factor on collaboration. In this manner, the structure and contents of a LEQ was developed with the help of the following procedures:

- 1) Compilation of a number of evidence-based learning factors from higher education pedagogy literature,
- 2) Thematic analysis of prioritized learning factors in order to identify core aspects of an effective learning environment,
- 3) Formulation of statements that investigate these aspects of the learning environment,
- 4) Student interviews to ensure that the statements are correctly interpreted as far as possible. If necessary, return to Step 3,
- 5) Quantitative investigations of the response rate to the questionnaire statements in order to identify remaining problems. If necessary, return to Step 3.

The application of these procedures, including 3 structured interviews with different groups of students, eventually converged to a LEQ which examines 14 different learning factors using 22 statements [13]. A 7-grade Likert scale is used for the students' response to the statements, ranging from "No, I strongly disagree with the statement" to "Yes, I strongly agree with the statement". A few open questions are also included, like "What was the best aspect of the course?" or "How would you suggest to improve the course?", as well as a couple of questions about the respondent's personal profile. A detailed description of the LEQ can be found in a KTH user guide [13].

Based on the average response to each statement, the teacher can both identify stronger and weaker aspects of the learning environment, and carry on a dialogue with other teachers about how various aspects of the learning environment could be developed in order to support the students' learning. If the other teachers bring their own LEQ response data to the table, it will open up ample opportunities for curiosity-driven comparison and exchange of experience. This also entails an opportunity to identify individual or general needs for competency development, which can be satisfied through different types of courses, seminars, or workshops. At the same time, the fact that the LEQ is based on learning factors

makes it easier for the student to give feedback that can be converted into course development that promotes learning. In view of the objectives stated in the previous section, we therefore consider the LEQ to have the characteristics we were aiming for.

D. The LEQ-process

The overall process for collaborative and learning-oriented development using the LEQ, as developed and implemented in the project, is depicted in Fig. 1. In addition to the elements mentioned above (course evaluation, collaboration with peers, optional professional development and course development), there is also a possibility to involve the students in the course development. This is accomplished by providing a group of students with the LEQ response data (keep in mind that the LEQ does not rate the teacher), and using their analysis as an additional source of information in the subsequent development.

Obviously, the described process can be implemented in many different ways depending on the context (the specific

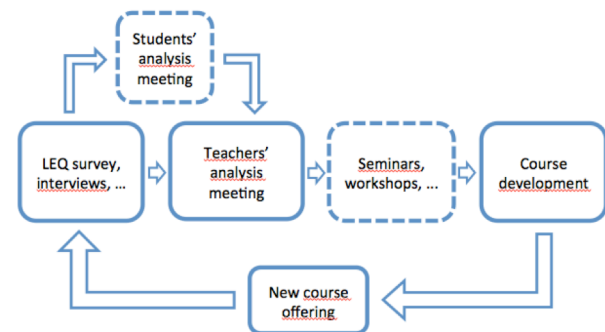


Fig. 1. Process for collaborative course evaluation and development that also allows student participation and professional development.

group of teachers, different subjects and educational levels, periodicity of course offerings, the willingness of students to participate, available resources, external support, etc.). We will not get into detail about the practical aspects here, but the interested reader can find some recommendations in a KTH user guide [13]. Regardless of contextual variations, even of the LEQ, the collaboration and exchange of experience among the teachers is the core element of the process. Still, it is important to note that it is the individual teacher who decides which aspects of the learning environment should be given priority in a development effort, and how the development is to be implemented. Since a given aspect of a learning environment (such as formative feedback) can be developed in many different ways, each teacher should feel free to develop in his/her own way and at his/her own pace.

Different ways of developing a given aspect of the learning environment will have different significance for the students' learning, and the "best" way to improve learning always depends on the specific context. *It is therefore the students' examination results that determine whether a change is favorable to learning or not, and to what extent.* Nevertheless, the LEQ-process makes it easier for the teacher to pursue course development that promotes student learning, which students' examination results typically do not do.

E. Outcome

The developed process was fully operational (albeit voluntary) at the department about a year after the project was initiated (except for the student participation, which was developed at a later stage) and has now been running for more than three years. One of the authors (Carlsson) has coordinated the process as part of his role as part-time educational developer at the department, which has included organization of course analysis meetings as well as occasional follow-up workshops on different themes that have emerged from the process (e.g. formative feedback for learning). As in the initial phase, most of the teachers have participated actively, but to different degrees and on different occasions.

A follow-up survey has been carried out every second year from the start of the project. While 21 teachers responded to the start-up survey in 2013, only 16 and then 9 did so for the follow-up surveys in 2015 and 2017, respectively (the follow-up surveys were only sent to those who responded to the start-up survey). The decrease in response rate is partially explained by the fact that some teachers have left the department since the start of the project (post-docs, retirements, etc.). It is also believed, but not confirmed, that the enthusiasm for the project was higher in the beginning. Nevertheless, we consider the data to be relevant and will share the most essential results with regard to the objectives of the LEQ-process.

Regarding the necessity of a community of practice, one teacher wrote the following in the start-up survey (2013, translated from Swedish):

“It is important to keep the pedagogical language alive, and to actualize the pedagogical challenge we are constantly facing, so that the entire work environment has it in fresh mind and strives in the same direction. If you want to change an environment, you can not do that by occasional efforts. An ongoing dialogue is required. Unless the entire environment is penetrated by it, we easily fall back into old patterns as soon as we get home from our courses in teaching and learning.”

In Table 1 and 2, the response to the following questions in the follow-up surveys are presented:

- A. Have you used LEQ for course evaluation?
- B. Have you participated in any course analysis meetings with other teachers?
- C. Have you participated in any follow-up workshops?
- D. Has the process resulted in any course development?

Due to the different response rates it is difficult to draw firm conclusions from the data. But it is nevertheless possible to draw an important conclusion: *active participation in the process leads to increased levels of course development.* Whether this development leads to improved student learning or not remains to be investigated, but the following comment indicates that LEQ helps the teachers to focus on aspects more relevant to student learning:

TABLE 1

RESPONSE TO QUESTIONS IN THE 2015 FOLLOW-UP SURVEY (16 RESPONDENTS)

Question	Yes [% (no.)]	No [% (no.)]	Don't know [% (no.)]
A	87(14)	13(2)	0(0)
B	69(11)	31(5)	0(0)
C	81(13)	13(2)	6(1)
D	50(8)	37(6)	13(2)

TABLE 2

RESPONSE TO QUESTIONS IN THE 2017 FOLLOW-UP SURVEY (9 RESPONDENTS)

Question	Yes [% (no.)]	No [% (no.)]	Don't know [% (no.)]
A	100(9)	0(0)	0(0)
B	89(8)	11(1)	0(0)
C	67(6)	11(1)	22(2)
D	78(7)	11(1)	11(1)

“In my opinion, LEQ has contributed with a more relevant focus compared to previous course evaluations (the learning environment rather than student satisfaction or the teacher's performance).”
(from 2017 survey)

As we have pointed out, it is the collaborative element that forms the essence of the process. This is also confirmed in numerous comments about the process:

“The course analysis meetings made me aware of how other teachers were doing. That way, I got tips. It also led to further discussions with some teachers.”
(from 2017 survey)

“In particular, course analysis meetings, and discussions that arose there, gave me several good ideas that I have implemented in courses.”
(from 2015 survey)

“Development has mainly occurred through discussions with other teachers at the course analysis meetings. Not so much because of the LEQ evaluation in itself.”
(from 2017 survey)

These comments also point to the relevance of the theory of communities of practice that underpins this project.

In Table 3 and 4, the longitudinal response to two questions regarding spontaneous interaction and social community among the teachers is presented: “How often do you spontaneously discuss teaching and learning with peers?” and “How often do you feel that you belong to a social community”, respectively. Keeping the different response rates in mind, it still seems that the process has increased the level of spontaneous discussion as well as the social community among the teachers. In summary, the results from the case study are encouraging and suggest that the developed

process leads to the desirable change, both with regard to making course evaluation more meaningful and establishing a community of practice for teachers.

TABLE 3
LONGITUDINAL RESPONSE TO THE QUESTION “HOW OFTEN DO YOU SPONTANEOUSLY DISCUSS TEACHING AND LEARNING WITH PEERS?”

Year	Always [% (no.)]	Often [% (no.)]	Rarely [% (no.)]	Never [% (no.)]
2013	0(0)	43(9)	57(12)	0(0)
2015	6(1)	63(10)	31(5)	0(0)
2017	0(0)	89(8)	11(1)	0(0)

TABLE 4
LONGITUDINAL RESPONSE TO THE QUESTION “HOW OFTEN DO YOU FEEL THAT YOU BELONG TO A SOCIAL COMMUNITY?”

Year	Always [% (no.)]	Often [% (no.)]	Rarely [% (no.)]	Never [% (no.)]
2013	5(1)	50(11)	41(9)	6(1)
2015	19(3)	75(12)	6(1)	0(0)
2017	37(3)	63(5)	0(0)	0(0)

III. WORK IN PROGRESS

Other initiatives at the university have also played a key role in the development of the LEQ-process. For example, the university administration has recently funded the development and maintenance of a state-of-the-art system for semi-automated course evaluation (in which Borglund and Naimi-Akbar have been involved). The system was officially launched in 2015, making it possible for all teachers at KTH to use the LEQ. As a result, teachers at KTH can easily create and distribute an electronic LEQ to their students, obtain their results in a customized report, and create a formally approved course analysis in which the required course data is included automatically [13]. At present, accumulated feedback from an increasing number of users gives rise to further development of the system as well as the LEQ. For example, the LEQ will soon be offered in multiple versions, with different number of statements depending on the teacher’s needs and preferences. As concluded in the case study, the most important thing is that teachers start working collegially with course evaluation and development.

In 2014 KTH launched a unique and bold pedagogical project, both in terms of financial investment and in terms of exploring new ways to support pedagogical development at university [14]. About 20 part-time educational developers were recruited from the faculty (most of them associate professors or professors), and the teaching and learning unit was commissioned to support them in their mission to, in turn, support their fellow researchers and teachers. The common objectives were to 1) work hands-on with a group of teachers, 2) help them focus on the improvement of student learning and 3) document the results. Some of the developers (among them Carlsson, Colarieti Tosti, Havtun and Hjelm) decided to implement the LEQ-process for this purpose, and thus contributed to a first wave of dissemination of the process to other parts of the university.

A working group with a particular focus on the LEQ-process was formed as well, including most of the authors of

this paper. Among other important advances, this work has for example contributed with the way in which students can be incorporated in the LEQ-process (see Fig. 1). The proposed approach has been applied in a couple of feasibility studies by Carlsson and Colarieti Tosti, with promising results in terms of relevant contributions to course development. However, the effort that is required to organize the students’ effort is a potential obstacle, both from the teachers and the students’ point of view. This issue has also emerged in discussions with representatives from the student union at KTH (among them Edström), with which we have established a fruitful exchange about the LEQ initiative. Overall, the students are very positive about this development.

A joint initiative among the larger group of pedagogical developers has been to develop a number of workshops for teachers. Central themes, derived from identified needs, include: designing courses for motivation, formative feedback for learning, intended learning outcomes and the course syllabus, assessment methods, and flipped classroom. For educational developers working with the LEQ-process, it is thus possible to offer suitable workshops as part of the process or as stand-alone events (see Fig. 1). In addition, some workshops are offered on a regular basis to all teachers at KTH, including participants in courses on teaching and learning (which creates added value).

IV. LESSONS LEARNED AND WAY FORWARD

No doubt, the case study as well as the university’s initiative with educational developers [14] have contributed substantially to our present knowledge about the challenges that are associated with the establishment of learning-oriented communities of practice for teachers (in our case, using the LEQ-process). Some of the lessons learned are:

- The desirable change will only happen if the process itself is happening – provide a responsible (and suitable) person with sufficient resources to coordinate the process. The same applies to the participation of the students.
- Do not underestimate the importance of including the teachers and the students in the specific implementation of the process – use an inclusive and co-creative approach in order to increase the incentives for active participation.
- Teachers are very busy people – develop tools and procedures that facilitate and revitalize the work that teachers must do in their duties (like effective tools for course evaluation and reporting, including the participation of the students).
- For the same reason, teachers tend to reject activities beyond their zone of proximity – tailor professional development (like workshops) to specific needs and interests in the community of practice. If possible, allow the teachers to include it in their records of pedagogical qualification.
- Making teachers collaborate and exchange experience in a meaningful way is THE key to success – progress may, at least initially, require that pedagogical aspects (like the format of a course evaluation) come second.

Regarding the way forward, one of the most important aspects is that which Edström [1] refers to as *system alignment*. Of particular importance is the alignment of the university's regulations regarding course evaluation and the main outcome of this work (which can be repeated): it is the collaboration among teachers that matters most for the overall improvement of quality in teaching and learning. Indeed, such an instruction was recently decided at KTH, laying the ground for a desirable long-term development. Even though the university advocates a collaborative culture among its teachers, it is unlikely to develop unless sufficient resources are invested to support the establishment of self-sustained communities of practice. Considering the progress that has been accounted for in this paper, we believe that KTH has good opportunities to succeed with this effort.

V. CONCLUSIONS

The results from this work are encouraging and suggest that the developed process leads to the desirable change, both with regard to making course evaluation more meaningful and establishing a community of practice for teachers. Even though it was found that the collaborative element was the main cause of this change, it is important to keep in mind that the LEQ has been specifically designed to facilitate the exchange of experience among teachers, being more informative, less threatening and based on research on effective learning environments. From this point of view, the LEQ is an advancement compared to previous course evaluation formats. However, it is important to stress that it is ultimately the *process* that makes the difference. The real challenge is to realize a process like this in practice, and to simultaneously promote learning for the students and professional development for the teachers. The design of the LEQ makes it an appropriate candidate for this purpose, which we have tried to demonstrate in this work.

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REFERENCES

- [1] K. Edström, "Doing course evaluation as if learning matters most," *Higher Education Research & Development*, vol. 27, no. 2, pp. 95–106, 2008.
- [2] C. Chan, L. Luk, and M. Zeng, "Teachers' perceptions of student evaluations of teaching," *Educational Research and Evaluation*, vol. 20, no. 4, pp. 275–289, 2014.
- [3] P. Spoorren, B. Brockx, and D. Mortelmans, "On the validity of student evaluation of teaching: the state of the art," *Review of Educational Research*, vol. 83, no. 4, pp. 598–642, 2013.

- [4] L. Alderman, S. Towers, and S. Bannah, "Student feedback systems in higher education: a focused literature review and environmental scan," *Quality in Higher Education*, vol. 18, no. 3, pp. 261–280, 2012.
- [5] J. Lave and E. Wenger, *Situated learning: Legitimate peripheral participation*. Cambridge: Cambridge University Press, 1991.
- [6] E. Wenger, *Communities of practice: Learning, meaning and identity*. Cambridge: Cambridge University Press, 1998.
- [7] K. Bain, *What the Best College Teachers Do*. Cambridge: Harvard University Press, 2004.
- [8] J. Biggs and C. Tang, *Teaching for Quality Learning at University*. Maidenhead: McGraw Hill, 2011.
- [9] M. Elmgren and A.-S. Henriksson, *Academic Teaching*. Lund: Studentlitteratur, 2014.
- [10] K. Kember and C. McNaught, *Enhancing University Teaching: Lessons from Research into Award-Winning Teachers*. Abingdon: Routledge, 2007.
- [11] P. Ramsden, *Learning to Teach in Higher Education*. New York: RoutledgeFalmer, 2003.
- [12] P. Ramsden, "A performance indicator of teaching quality in higher education: the course experience questionnaire," *Studies in Higher Education*, vol. 16, no. 2, pp. 129–150, 1991.
- [13] D. Borglund, U. Carlsson, M. Colarieti Tosti, H. Havtun, N. Hjelm, and I. Naimi-Akbar, *Learning Experience Questionnaire: Course Analysis for Development*, 2nd ed., Royal Institute of Technology, Stockholm, 2016. Available: <https://intra.kth.se/en/utbildning/lararstodswebben/evaluation-of-t-l/course-evaluation-an/learning-experience-questionnaire-leq>
- [14] Pedagogiska utvecklare vid KTH:s skolor 2014-2016. Final report to the KTH management, June 2016, KTH (in Swedish).