THE PEDAGOGICAL DEVELOPERS INITIATIVE – DEVELOPMENT, IMPLEMENTATION AND LESSONS LEARNED FROM A SYSTEMATIC APPROACH TO FACULTY DEVELOPMENT

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ABSTRACT

This paper presents a systematic, university--wide approach to creating an encompassing movement towards faculty development. In 2014, KTH Royal Institute of Technology launched the pedagogical developers initiative, appointing part--time pedagogical developers among teachers from all schools of KTH, to implement and strengthen good teaching and learning practices among faculty and students. They are teachers active in different educational programmes, with experience of, and interest in, pedagogical issues. In line with CDIO standard 10, the purpose of the pedagogical developers' initiative is to facilitate cooperation and knowledge exchange between faculty members, and to establish communities of practice. The paper presents the activities, processes for developing these activities and preliminary results from the initiative's second year, which focused much on supporting faculty development by putting into place a series of workshops, a format chosen for its combination of active community-building learning and time efficiency. The topics of the workshops emerged to meet faculty needs identified by the pedagogical developers during the first year. The workshops were created by smaller teams of pedagogical developers from different schools of KTH. This enabled a wide array of experiences and perspectives to be incorporated into the workshops. Main focuses of the workshops have been on creating internal discussions in dynamic communities of practice on specific subjects of interest, and on creating forums for exchange of ideas, open to the whole faculty. During Autumn 2015, the workshops have been offered as voluntary add-on parts of the basic course in teaching and learning offered to faculty at KTH. This first round of workshops generated a positive interest from teachers, and participant feedback indicates that they particularly appreciated the opportunity to work directly with their own courses and the opportunity to discuss pedagogical aspects with peers.

KEYWORDS

Pedagogical developers, educational developers, change agents, workshops, faculty development, CDIO standards: 10

INTRODUCTION

Faculty competence in teaching, learning and assessment methods needs to be continuously and systematically developed as described in CDIO standard 10. This has been argued for e.g. by Crawley et al. (2007). Many universities expect faculty members to learn more about new and alternative teaching methods that support student learning. Teachers are expected to successfully implement integrated learning experiences (standard 7), include active learning (standard 8) and use novel learning assessment methods in their courses (standard 11).

However, it is difficult to implement such changes in practice. In fact, many efforts witness of struggling attempts while providing little evidence of long-term success. In contrast, real and long-lasting educational improvements seem to have been achieved when either quality management has been closely related to the day-to-day work performed by individual teachers (Kleijnen et al. 2014), or when changes have been associated with a combination of top-down and bottom-up strategies (Elton, 2003, Graham, 2012). There exist also a few examples showing that systematic academic efforts through internal institutional programmes can lead to overall changes in teaching and learning at large research universities (Wieman et al., 2010). As the management of universities faces these educational challenges, as well as external quality concerns from governments and society at large, there is much pressure to evaluate teaching and learning, and to encourage and support continuous development of the teaching faculty.

To face these challenges, KTH dedicated internal funding to launch what would be known as the pedagogical developers' initiative (Berglund et al., 2015). This initiative started in 2014 and was organised as a development project, consisting originally of 24 pedagogical developers (PDs). KTH is organised in ten schools and the project finances about 40% time for 1-4 PDs per school, the number being based on how much education each school has. One important dissemination factor in this initiative is to document and share efforts made. The dissemination of new knowledge to faculty were designed to be consistent with Bloom's taxonomic reasoning (Airasian et al., 2001), and in support of engineering education guidelines found in the CDIO syllabus (Crawley et al., 2007).

Implementing change in large educational organisations is as a rule difficult. Changes often remain limited in scope and effect (Kotter, 2012). To go beyond such limitations, the pedagogical developers at KTH act as change agents, working both locally to create "communities of practice" (Wenger, 2015), and at university level to achieve coordinated efforts, and building bridges and contacts, across departmental and school borders.

During the start-up phase in 2014, each PD had their own sub-projects, which were organised by the PDs in a very informal way (Berglund et al., 2015). This means that each PD could initiate all the different pedagogical development activities in the best way suited for each school, at the same time as they could get feedback from their colleagues about things to be improved. Furthermore, the PDs met every third week and discussed common problems. These discussions resulted in that the PDs jointly identified a number of themes, where there was a need for further faculty development. The PDs decided to have a common focus on developing workshops, based on what the teachers at the schools wanted and had pointed out as relevant for them. A reason for this strategy was that the PDs as a group could not serve the development of the whole faculty on an individual peer-to-peer basis.

In this paper, we first describe how the teacher workshops have been developed to match specific problematic issues, related to teaching and learning, identified from course analyses and faculty needs. Secondly, we present the feedback and results on how the workshops have been perceived by the participating teachers so far. Last but not least, we discuss the

next steps to develop faculty competence in the view of the bottom-up approach taken in the PDs initiative.

DEVELOPMENT OF WORKSHOPS

The work with the development of the workshops started in January 2015, although most of the themes had already been identified. As a first step, a small steering group with a strategic responsibility for the workshop development project was formed. All PDs were then allowed to voluntarily choose which workshop themes they wanted to develop. As a result, there were 3-7 PDs engaged in the development of each workshop, and by sharing the responsibilities, each PD was only involved in the development of 1-3 workshops. The Department of Teaching and Learning supported this development by shortly educating the PDs about how to arrange pedagogical workshops and suggesting some background material.

The development of all the workshops was managed in an agile and flexible manner, since PDs are faculty members with many other duties and, hence, their availability could not be steered. The development of the workshops was self-organised, so each group had the freedom to identify the workshop objectives and pedagogical design, as well as how the group internally should communicate and make decisions throughout the development work. Each group had a designated group leader, who was responsible for arranging meetings within the group and for reporting group progress at monthly pulse meetings where most of the PDs were present. Through this procedure, potential problems within a development group could be detected at an early stage and proper measures could be taken to support that group.

The common and accepted goals among the PDs were that all workshops should be ready by Fall 2015 and that they should be given internally for the group of PDs before they were given for other teachers. Most groups met 3-6 times before draft versions of the workshops were ready to be tested on the rest of the PD group. The PD group was informed before the start of the test-runs about their double role as teachers (test of the workshop contents) and PDs (help to improve the workshop) and when to switch roles. During the test offerings, the participating PDs were divided into groups, to systematically look at a number of aspects: structure and time management, intended learning outcomes and constructive alignment, meaningfulness, credibility, and persuasiveness, as well as other specific aspects asked for by the offering team. Meta-discussions were allowed only after the workshops, to allow for as much realism in the situation as possible (prevalence of teacher role). The designs of the workshops were then revised in the light of peer feedback before being offered to other faculty members. Thus, the internal quality process served two purposes – it gave the workshop developers a feeling of how it felt to give the workshop in reality and they also got an opportunity to receive constructive feedback from their fellow PDs on how to improve their workshop. On a meta-level, this procedure also helped the PDs to get deeper insights into the workshop format.

To promote further testing of the workshops, the Department of Teaching and Learning at KTH decided to include seven of the workshops as elective parts in their basic pedagogic course for new teachers at KTH during Fall 2015. In total, more than 100 participants (about 30 different teachers) participated. A few of the workshops have so far been given on other occasions too (locally at the schools), with an additional 70 participants. Furthermore, workshops will be offered at a pedagogic day in March 2016, and again as part of the basic course in teaching and learning for KTH teachers during Srping 2016. The marketing of the workshops to teachers continues to be a prioritised issue.

DESCRIPTION OF THE WORKSHOPS

The following themes were developed into nine workshops. Their connections to the CDIO standards are also shown.

- Assessment methods (CDIO standards 10 and 11)
- Designing courses for motivation (CDIO standards 8 and 10)
- Educational development with LEQ (CDIO standards 10 and 11)
- Formative feedback for learning (CDIO standards 8 and 10)
- Flipped classroom (CDIO standards 8 and 10)
- Get started with E-learning (CDIO standards 9 and 10)
- Help your students to study in your course (CDIO standards 7 and 10)
- Independent students (CDIO standards 7 and 10)
- Intended learning outcomes and the course syllabus (CDIO standards 2 and 10)

These workshops are described in more detail below.

Assessment Methods

The purpose of the workshop is to make the participants more aware of what role assessment plays in students' learning and how to choose assessment methods that will promote active learning. The participant works hands-on with a course of his/her interest. Each participant is expected to prepare for the workshop by reflecting on the learning outcomes and the assessment methods used in the course of interest.

Intended learning outcomes: after the workshop participants should be able to describe the purpose of, and criteria for, high quality assessment. The participant should be able to identify pros and cons of different assessment methods, and also be able to choose assessment methods that support learning and that are constructively aligned with the learning outcomes and the course activities. Finally, the participant should be able to design or suggest good assessment for a specific course.

Designing courses for motivation

Motivation is a core concept in theories of learning. Motivation is what makes a student invest time and energy to master a subject or to learn a new skill. This workshop lets teachers explore ways of designing learning activities that increase the level of motivation among their students. Designing for motivation is a comprehensive way of making teaching and learning much more rewarding and meaningful to students and teachers alike.

Intended learning outcomes: after the workshop participants should be able to use findings from research on motivation to enhance their teaching; analyse learning activities from a motivational standpoint; design learning activities that stimulate and motivate students; discuss different approaches to motivation based on contextual factors; and deal constructively with less than perfectly motivated classes.

Educational Development with LEQ

The workshop gives the participant an opportunity to gain hands-on experience of working collaboratively with course analysis and development based on the KTH Learning Experience Questionnaire (LEQ), described in Berglund et al. (2015). Each participant is expected to prepare for the workshop by viewing a video about the LEQ process, reviewing the LEQ questionnaire, and reviewing the course design of the course that the participants are to analyse using LEQ.

Intended learning outcomes: after the workshop participants should be able to explain the theoretical framework that LEQ is based on, set up an LEQ survey on the KTH course web, analyse a learning environment based on LEQ response data, and discuss different ways to improve a specific learning environment.

Flipped Classroom

The focus of this workshop is the design of a flipped-classroom learning activity. Participants design preparatory, in-class and post-class activities and discuss their designs with other participants. In preparation for this workshop, each participant should either participate in the Flipped Classroom seminar, reflect on their own experiences of flipped classroom techniques, or read suggested scientific articles on the subject.

Intended learning outcomes: after the workshop participants should be able to describe the difference in the design principles of a preparatory activity, an in-class-activity and a post-class activity, design learning activities appropriate to a flipped classroom scenario and to design preparatory, in-class and post-class activities that are constructively aligned.

Formative Feedback for Learning

This workshop gives participants knowledge and ideas on how to give feedback that support learning. Each participant is expected to reflect upon and assess a course of their own, in order to focus the workshop discussion and to work on how the constructive alignment between ‘examination-activity-objective’ are matched with course feedback provided.

Intended learning outcomes: after the workshop participants should be able to motivate why formative feedback is of crucial importance for learning and to put up arguments about the characteristics of efficient learning through formative feedback, create a situation analysis based on the level of formative feedback provided in your current course, design an action plan to enhance formative feedback in your course(s) and reflect how formative feedback functions as a catalyst in the constructive alignment of your course(s).

Get Started with E-learning

The workshop is designed to allow teachers to discuss and reflect about how the new possibilities given by information technology can be used for student learning. Before the workshop, they should have identified one issue in one of their courses which they want to improve using IT. During the workshop, they can either make a short video or create suitable questions to be used in interactive environments such a peer instructions during lectures or automatically corrected problems in a learning management system (LMS).

Intended learning outcomes: after the workshop participants should be able to either make their own video or to create well-designed questions for interactive environments.

Help Your Students to Study in Your Course

The purpose of this workshop is to make the participants aware of prevailing study skills and to enable the participant to achieve better alignment between study skills and course design. Each participant is expected to prepare for the workshop by viewing the same videos on study skills as most students see in their introductory courses, briefly review a number of articles, and reflecting on a set of questions concerning study skills.

Intended learning outcomes: after the workshop participants should be able to describe some common study techniques and in which situations they are useful, to propose suitable study

techniques to the students of their course, and to adapt their course design to study techniques.

Independent Students

Students are supposed to be independent when they leave the university. In this workshop, the participants reflect on what this means and how to incorporate learning activities that promotes the progression in skills related to independence during the engineering studies.

Intended learning outcomes: after the workshop participants should be able to concretise what independent students means at different stages in their education and to implement learning activities that help students to become independent.

Intended Learning Outcomes and the Course Syllabus

This purpose of this workshop is to enable the participant to start working on constructively aligned activities and assessment, and create official course syllabuses with suitable level of detail and that fulfill the legal requirements. During the workshop, the participants work individually and in small groups with the contents of their respective course syllabi, in particular with the intended learning outcomes of your course. Each participant is expected to prepare for the workshop by bringing their current course syllabus, reviewing the concept of constructive alignment, e.g., through an introductory course in teaching and learning, the introductory seminar (*Constructive alignment - a way to improve course design*), or similar, and reviewing the document describing the course syllabus and the course PM.

Intended learning outcomes: after the workshop participants should be able to explain constructive alignment, develop intended learning outcomes that are result oriented, possible to assess, placed at a suitable and realistic level, understandable and serve as a base for constructive alignment, and be familiar with the different parts of the course syllabus and explain its function.

SUMMARY OF THE INTENDED LEARNING OUTCOMES

In order to analyse the type of faculty development intended with the workshops we have analysed how the different workshops have been described by the workshop development teams in terms of intended learning outcomes. Pretesting were made by adopting a priori coding of the intended learning outcomes using the cognitive goals of Bloom's taxonomy (Airasian et al., 2001). The resulting matrix is shown in table 1. The figures indicate the number of intended learning outcomes that belongs to each level in Bloom's taxonomy, for each workshop.
After discussing the results we agreed on combining two of the categories (applying and creating) to one category since in these intended learning outcomes involved changing actual courses which will involve both applying and creating.
As seen in table 1, the workshops have a clear emphasis on actually changing courses rather than more passive knowledge. Thus, the goals of the workshops go beyond the goal of CDIO standard 10 to enhance faculty teaching competence, to actually applying this competence by implementing change in courses. The evaluating step is met in neither of the workshops. It is also not aiming to do so either. A reason to this is because such step would only be efficient if a change has been put in action for a certain amount of time that would allow for valuable interpretation.

Table 1: Matrix mapping of intended learning outcomes of the WS according to Bloom's taxonomy

	Remembering	Understanding	Applying /creating	Analyzing	Evaluating
Assessment methods	1		2		
Designing courses for motivation			3	2	
Educational Development with LEQ		1	2	1	
Flipped Classroom		1	2		
Formative Feedback for Learning		1	1	2	
Get started with E-learning			2		
Help Your Students to Study in Your Course	1		2		
Independent Students		1	1		
Intended Learning Outcomes and the Course Syllabus		2	2		
TOTAL	2	6	17	5	

PARTICIPATING TEACHERS' FEEDBACK ON THE WORKSHOPS

To implement a built-in process supporting continuous enhancement of the quality of the workshops, a short questionnaire was handed out to all workshop participants towards the end of each workshop. This questionnaire had primarily a development focus, helping us improve the workshops and make them as useful as possible for the participating teachers. It included four open-answer questions:

- The three most helpful things that I learned at the workshop
- What I liked best about the workshop
- What I would have liked to be different/recommendations for future workshops
- Any other comments on the workshop?

Although not originally designed for research purposes, we have used the answers from these questionnaires for a contextual text analysis of the teachers' responses given so far. This included answers from 6 workshops (of which 4 were voluntary parts of the basic course in teaching and learning at KTH and 2 were given at pedagogic meetings at specific schools at KTH) and comprised in total 170 separate comments. The context analysis was made from a bottom-up approach without any a priori determined themes. Themes were constructed when trying to group the individual comments. The following themes were possible to identify among the answers to the questionnaire (the percentage of comments coded to a specific theme is shown in parenthesis):

Learning pedagogic concepts and ideas (26%)

When teachers answer the question about the most helpful things they have learnt during the workshop, many of them mention things related to basic concepts in teaching and learning. A few examples from the given answers are; 'clickers - peer discussions', 'different ways of giving feedback', 'summative versus formative feedback', 'importance of peer review' and 'a large understanding for the method of flipped classroom'. These answers clearly indicate that the workshops help teachers to become aware of basic pedagogic concepts.

Discussing and learning from peers (26%)

The possibility to discuss educational issues and learn new knowledge from other teachers by concrete examples is also very appreciated, which is one of the actions described for increasing faculty competence in CDIO standard 10 ('forums for sharing ideas and best practices'). Many teachers just mention 'group discussions' as the best thing about the workshop. Others are more concrete and concentrate on the learning effects, like e.g. 'the interactive nature of it and hearing experience and practice from other colleagues' and 'learning from my group mates experiences and get their perspectives and suggestions'. It also seems that it is the discussion of something teachers conceive as directly related to their own courses that really motivates them. This can be seen in the comments 'nice to be able to discuss own course syllabus' and 'it can provide learning in my courses'. Other teachers refer to learning from examples as e.g. seen in the comments 'example of how to include feedback in a course', and 'different approaches to solve similar problems'. Some teachers also asked for more examples like e.g. 'suggestions on how to give formative feedback' or 'more concrete examples, not just from project courses but also from more traditional/theoretical lecture-exercise lab-exam courses'. Hence, learning from concrete examples seems to be an important part of the teachers' workshop experiences.

Ideas for developing own courses (6%)

The ultimate proof of faculty development would be teachers changing their own courses based on pedagogical principles. We do not see any strong evidence for this in the answers to the questionnaires, but a few teachers mention the importance of peer discussions for getting new ideas and feedback about their own teaching. This is in line with the role of the workshops to create a forum for spreading good ideas within the faculty, which later on can lead to actual changes. However, to show such long-term changes, one would need to use other research instruments than a short questionnaire at the end of the workshops.

In addition to these themes, 18% of the comments consisted of practical feedback to the workshop leaders about how to improve the workshop and their time management between presentation and discussions. Other themes with a few percent of the comments each were coded as: finding information, work with own course, reflections about teacher/student relation, interest in subject and other comments. However, there are too few comments in these themes at the moment to allow for an analysis.

DISCUSSION

What have we learnt from the development process?

By establishing a process involving an internal review where each workshop was tested in the PD group, we had an appreciated way of progressing, not only within each workshop team, but also on generic aspects that were vital for all workshops. The themes developed were based on experiences and needs identified from course analyses. Still it should be remembered that each theme provides a mere fraction of what could be brought forward. The emphasis has been on providing best practices based on scholarly examples and relevant research. The opportunity to freely choose what workshop to develop strengthened each participating PD's motivation to contribute and also provided the emergence of the self-organised teams. Past educational change examples describe similar effects in how change agents can support implementation (e.g. Berglund et al., 2015; Graham, 2012). Crucial mechanisms for successful implementation are to sustain high motivation and engagement throughout and beyond the delivery occasions.

What have we learnt from the participants' feedback on our workshops?

The most prominent feedback from the participants is that they are very satisfied with the opportunity to discuss educational issues with colleagues. It seems that they appreciate the possibility to learn new knowledge usable for their own teaching, i.e. it is the direct connection to their own teaching practice that is important. The different themes in the teacher's feedback can at least loosely be related to steps in Bloom's taxonomy (Airasian et al., 2001) applied to teachers learning about pedagogics. During the workshops, the participants learn about pedagogic concepts and ideas. Then they discuss with other faculty members and get deeper understanding of the concepts. Last but not least, they discuss how to apply and implement these concepts and ideas to make changes in their courses. The ultimate goal is of course to encourage the participants to change their actual teaching in a direction that enhances student learning. This is a long-term process and it is still too early to analyse the outcomes of the workshops from this perspective since most courses are only given once a year.

What are the implications of these results for faculty development?

Feedback from the workshops indicates that we need to work continuously with repeated workshops, and that participants ask for further possibilities to have pedagogical discussions on their own courses with colleagues. However, our methodology has not ensured that all relevant themes have been identified since only a limited part of the faculty was involved in the initial work. This could indicate that some themes have been missed and that there is still a need for further development. Hence, these workshops should not be considered as a final product of the development work. Rather, they are meant to provide an inspiring first move towards continuous change among faculty. Whether the workshops in the end actually result in changes remains to be evaluated in a future study. In a further step, the participants also need to be able to analyse the effects of these changes, reflect about the results and make proper modifications in their teaching, corresponding to the highest level in Bloom's taxonomy (evaluation). In order to accomplish impact over time, workshops with discussions between participants is not sufficient. These efforts must be aligned with an overall university strategy that includes a pedagogical policy and a system for documentation and recognition of pedagogical merits.

CONCLUSIONS

The second year of the Pedagogical developers Initiative has focused on faculty development by producing and offering a number of workshops. The themes of the workshops were identified from course analyses and faculty needs which reassure implications for change. The workshops were developed by teams of pedagogical developers that were self-organised and driven by their own intrinsic motivation to participate. Testing and validation of workshops were done internally within the pedagogical developers group. This method gave vital feedback to the workshop developers group and ensured deliverance of high quality workshops.

The workshops allowed an appreciated opportunity to discuss participants own courses. By allowing guided discussions among peer faculty the workshops functioned as a catalyst to establish a cognitive awareness of new thematic areas essential for efficient teaching and learning practices. As participants actively worked with their own courses during the workshops, a first step to actually implementing change got established. The legitimacy of workshops in a larger scope is an issue of organisational and communicational concern. In retrospect, the workshops could be looked upon as the tip of an iceberg where the large majority of work remains obscured and as part of the participants' ambitions to actually go through with their intentions to change.

FUTURE DEVELOPMENT

The pedagogical developers' initiative is a three year project that in 2016 enters its final year. During 2016, the emphasis of the project will be on ensuring that the development work will be implemented and established at the university. Since the workshops are an outcome of a bottom-up approach based on faculty demands, they need to find their place in a larger quality framework at the university level. This concerns both how to follow-up pedagogic development at course level and how to reassure quality in educational programmes. The quality concern will become of vital importance when aligning with the 'Standards and Guidelines for Quality Assurance in the European Higher Education Area', ESG (2015). To be successful in implementing change, universities still need to communicate the urgency, formulate clear messages to the faculty, and build up a change strategy (Kotter 2012). These issues still constitute a challenge and will most probably determine whether or not the PD project will be able to create a sustainable change at the university level in the future.

In terms of PD action to proceed with faculty development, a proposed next step is to implement a course in *'Course development'*, encompassing all the steps in the LEQ process (see Berglund et al., 2015). This course concerns the course development process that allows participants to progress and track their changes made in their course by: evaluating the students' perception of their learning environment, analysing and pin-pointing actions for change, implementing suggested changes in the next course offering, conducting a new course analysis and evaluate the results from the two course offerings and reflect on how differences between the course offerings and actions taken, actually supported strengthened learning by the students. Such a course is intended to cover the evaluation part of Bloom's taxonomy and most importantly to stimulate and support a continuous pedagogic development process.

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