Creative ways of developing teaching competencies at the university level

Michael Christie and Tom Adawi
mich@chalmers.se; adawi@chalmers.se

Abstract In 2003, a change was made in the Swedish Higher Education Ordinance, stating that those who want to be employed as a senior lecturer or as a subject teacher must be able to show evidence of pedagogical training. Today, most universities in Sweden have pedagogical development units that offer a ten week course in pedagogy for university teachers. The dilemma we face as academic developers is that the teachers are not always convinced that it is necessary to take such a course and they do not always have the time. In this paper, we describe some creative ways in which we have reformed and improved the pedagogy course we run at Chalmers University of Technology in Gothenburg, Sweden, in order to meet this challenge. The reform was undertaken as an action research project and we have tracked the progress of one hundred full and part time teachers who have completed the course. At the end of the course the teachers were asked to write about what they had learned and how they had applied it in their own practice. Based on the written data, we draw a number of conclusions that can help others increase the competence of university teachers and assist them to teach and supervise in a more creative way. We discuss some of the reasons why many university teachers are locked into traditional teaching methods, starting with the architecture of teaching and learning, and we describe a four-stage ‘conceptual change’ model we have used to help teachers improve their practice. By expanding their repertoire as teachers they will make the learning process for their students more effective and their own job more enjoyable.

Introduction

In his classic work on understanding the media, Marshall McLuhan claimed that ‘the medium is the message’ [1]. McLuhan defined medium in a very broad sense and argued that we needed to study the form and nature of the medium and not only the content it might happen to mediate. The message television sent, in addition to its programs, was to sit back passively and enjoy. Theatre in the round, with its proximity to the audience and its potential for actor/audience exchange sent a different message. When we look at the architecture of teaching and learning in most European universities the spaces themselves send a message. The vast majority of universities are equipped with expensive lecture theatres furnished with semicircular rows of tiered seats that focus on the lecturer’s podium. The learners’ seats have fold up writing boards. The lecturer’s podium is often spotlighted. Behind the lecturer there is some means of projecting notes, a medium in itself that has changed from black board, to white board to PowerPoint screen. The room and its furniture send a clear message. The lecturer is the active source of knowledge; the learners are passive recipients of that knowledge.

There are very few universities where lecture theatres do not hold pride of place. Aalborg University in Denmark, which was founded as a problem based learning (PBL) university is one example. At Aalborg the teaching and learning space is, for the most part, made up of smaller discussion and syndicate rooms. The physical teaching and learning spaces of European universities mirror a pedagogical tradition that is alive, although not necessarily well, in undergraduate education today. Massed lectures, tutorials run by teaching assistants, laboratory work (often supervised by PhD students) and closed-book, end-of-course exams are standard pedagogical fare.

The degree to which traditional pedagogy predominates in the first few years of undergraduate education at Chalmers University of Technology was documented in earlier studies undertaken by the authors [2, 3]. As students come to the end of their undergraduate course and as they enroll in Masters and PhD courses the opportunity to learn in a variety of settings, using small group project or problem based pedagogy, work experience or individual research, increases.
For a variety of reasons, most of the teachers who enroll in the pedagogy course we run at Chalmers are both used to and use traditional pedagogical methods. Moreover, they are not always convinced that it is necessary to take a course in pedagogy. In this paper, we describe some creative ways in which we have reformed and improved the pedagogy course to meet this challenge. At the end of the paper, we return to some of the reasons why many lecturers use traditional teaching methods and we describe a four-stage ‘conceptual change’ model we have used to help teachers improve their practice. Our task as pedagogical developers is not to tell teachers that they are wrong in using traditional teaching methods because well designed, high quality traditional methods are very effective. Our job is rather to use creative ways to help them to both reflect on what they want their students to learn and to choose teaching methods that are most likely to fulfill those objectives. By expanding their repertoire as teachers they will make the learning process for their students more effective and their job more enjoyable.

Theory and method: Critical Theory and Action Research

Critical Theory as outlined in the work of Jürgen Habermas [4] and subsequent critical theorists such as Bourdieu [5] forms the theoretical basis for this article. In seeking to find creative ways to increase awareness and competency among university lecturers we first asked ourselves why it is that traditional teaching methods have such a hold in a university like Chalmers. Chalmers has committed itself to some expensive pedagogical reform projects. One, C-SELT, encouraged pedagogical innovation at the undergraduate level and another, IMPACT, at the Masters level. Over €10 million was pledged to support these reforms and yet the evaluations of both projects indicated that the effects were not as widespread as had been hoped for [6, 7]. One obvious gap in both projects is that there was little communication between lecturers keen to improve teaching and learning and those who decided how even larger amounts of money would be spent on designing and building learning spaces.

Critical Theory with its dual perspectives of System and Lifeworld have helped us in analyzing why it is that despite efforts to base important pedagogical reforms on a reciprocal understanding of a problem, final decisions are often influenced less by consensus than by power and money. The design and building of new teaching and learning spaces is a good example of this. During the C-SELT project a major renovation took place on campus and former hospital buildings were turned into office and teaching spaces. The centerpiece of this reconstruction was a two tiered lecture theatre. Despite a large body of educational science research and growing pressure from informed students and teachers, this new space was physically inflexible and hard to adapt to more interactive forms of lecturing. Our theoretical position assists us in understanding why it is that after considerable input from individual stakeholders final decisions in regard to both the physical and the pedagogical spaces for teaching and learning can be the result of instrumental or strategic action rather than communicative action. The way in which Habermas divides actions into three categories (instrumental, strategic and communicative) has also helped us in analyzing the responses of the teachers that we have interviewed or surveyed via end-of-course critical reflections.

Bourdieu’s work has also been helpful in analyzing the academic milieu in which teachers from different discipline based programs work. Although the written responses and critical incidents that we collected from individual teachers differed considerably there were discernible patterns that indicated that their particular disciplines had a strong influence on their pedagogical ideas and practice. An obvious difference was discernible between teachers from what could be classified as the hard, pure sciences (fundamental physics, for example) and the softer, applied sciences (architecture and business, for example). Since this study was conducted in an engineering university the contrasts tended to be greater.
We used Flannagan’s critical incident technique [8] in a number of the course modules and the data generated by both the written incidents and the small group and plenary discussion of the incidents strongly indicated that underlying the individual viewpoints and behaviors expressed in the incidents (habitus) were a number of assumptions derived from their particular field. As Bourdieu argues, the relationship between habitus and field can operate in two ways. Although individual habitus is often conditioned and structured by field habitus also ‘contributes to constituting the field as a meaningful world, a world endowed with sense and with value, in which it is worth investigating one’s practice’ [9]. When a sufficient number of powerful individuals, or groups of individuals, find the field no longer meaningful there is some chance that they will change it. As researchers we wanted to work openly with the teachers in the hope that by raising their awareness as individuals and as professional teachers we could enable them to change not only their practice but even the traditional way in which their discipline viewed pedagogy. In doing so there was a chance that they might begin to shift some of the embedded attitudes and assumptions they had imbibed from their particular fields. Given this ambition and the context of our study we felt comfortable with the use of action research as a primary research method.

It is appropriate, in the context of this paper, that the so called father of action research, Kurt Lewin (1890-1847) should have been an MIT professor. The paper that earned him that title was published in 1946 and is called ‘Action research and minority problems’. In that paper Lewin explained that action research consists of ‘a spiral of steps, each of which is composed of a circle of planning, action, and fact-finding about the result of the action’. He spoke about the difficulty of changing ideas and social behavior that had become fixed or normalized [10]. Most change begins with a disorientating dilemma and the need to do something about it. Lewin describes the process of realizing a dilemma or problem and wanting to do something about it as the ‘unfreezing’ of a mindset or situation. Given the raised consciousness that occurs once the problem is identified the action researcher sees the need to diagnose the situation and come up with new ways of dealing with it. Action is initiated and the results are collated and analyzed. The new behavior, in its turn, is likely to become frozen, hence the need for a feedback loop and the continuing spiral of reflection, action, analysis and further action.

Our dilemma: background and evidence

The dilemma that staff developers in Higher Education face is that university lecturers, who rarely have teacher training, are not always convinced that it is necessary. As a result lecturers tend to enroll in teacher training courses only when it becomes necessary to do so for job or promotional reasons. Following the recommendations in Fransson and Wahlen’s inquiry in 2001 it became clear that academics who sought jobs or promotion would come under increasing pressure to show evidence of pedagogical training and merits [11].

Today most universities in Sweden have pedagogical development units that offer a 15 point teacher training course for lecturers. The size and content of such courses are a response to a directive from the Association of Swedish Higher Education (SUHF). In November 2005, SUHF specified that the basic qualification for university teachers should be of ten weeks duration and should enable teachers to better plan, teach and evaluate student learning, critically reflect on their own teaching, explain their research to a more general public, carry out an independent pedagogical project in their own subject area and understand the rules and regulations that applied to them as teachers and researchers. The course should be grounded in sound pedagogical research and participants should be helped to access reliable and relevant pedagogical literature.

1 Available at http://www.suhf.se/web/Rekommendationer_och_uttalanden_2004-2006.aspx
Given that these aims are couched in broad terms it is not surprising that pedagogical development courses differ, to some extent, in terms of their philosophy, structure, teaching methods and content. Some, for example, include a module on supervision of research while others do not. At Chalmers, where supervision is seen as a teaching skill, it is included as a three point module in the 15 credit point Diploma of Higher Education (DHE).

A clear indication that staff are extrinsically motivated to take training courses can be deduced from the fact that up until 2005, when it was voluntary to take a supervisor’s training course, about fifteen people enrolled each year. However, when a new Chalmers rule (effective from 23 August 2005) stated that anyone wanting to apply for the title of Docent must take the module Supervision of Research, numbers began to climb (see Figure 1). The jump from 39 in 2006 to 59 in 2007 when word had spread about the ‘obligatorium’ provides graphic evidence for the effect of the new rule.

![Figure 1 Number who passed the module Supervision of Research in the years 2002-2009. The years are represented on the east-west axis as 2 (2002) up to 9 (2009).](image)

Further evidence that teachers are extrinsically motivated to attend modules in Chalmers 15 point Diploma in Higher Education can be found in the results of a survey of teachers taking the module Pedagogical Project. This module stretches over an academic year and in 2007-8 the thirty teachers taking this module were asked why they had enrolled in the course. Twenty eight said that they were mainly motivated by the fact that they were seeking promotion or a change in their employment status. Chalmers requires that anyone seeking a full time lecturer’s post should provide evidence that they have completed 15 points of pedagogical training and that those who wish to be promoted to Docent or Professor must on top of that show they have taken a course module in supervision. Those who responded to the question pointed out that if they were paid or had designated time set aside then they would be more ready to voluntarily take competency development courses but since this was not the case at Chalmers, career advancement was the main reason for taking the course.

In 2002 the first author took over as course coordinator for pedagogical training at Chalmers. Up until then a Swedish course and a smaller English version, called Teaching and Learning in Higher Education, had been given. An evaluation of the Swedish course published in 2001 indicated that many participants felt that the course could have been more ‘concrete’. The evaluation was based on semi-structured interviews and phenomenography was the methodology of the investigation. Six of those interviewed said that they

*missed more practical tips in the pedagogical basic course and above all an exemplification of the theoretical knowledge they were introduced to [12].*
One informant admitted that although the lack of practical applications was a source of irritation during the course, reflecting back on some of the theory was a rewarding experience. The course had been recently revised and ran over eighteen months. Although considerable numbers of teachers applied for the course there was a large drop out rate both before and during the course. One reason was dissatisfaction with the theoretical nature of the course while another was that some of the teachers’ circumstances changed from one academic year to another which made it hard for them to commit to an eighteen month course.

In 2002 the Swedish course was abandoned and the smaller English version re-designed. The name was changed to the Diploma of Higher Education (hereafter DHE) and creative ways were sought to overcome some of the shortcomings evident from the 2001 evaluation.

**Creative ways of solving the dilemma**

**A new pedagogical approach**

The principle design feature was that the course should practice what it preached. Or, as Thomas J. Shuell put it:

> If students are to learn desired outcomes in a reasonably effective manner, then the teacher’s fundamental task is to get students to engage in learning activities that are likely to result in their achieving those outcomes ... It is helpful to remember that what the student does is actually more important in determining what is learned than what the teacher does [quoted in 13].

The guiding philosophy for the course designer was Mezirow’s theory of ‘transformative learning’ [14, 15]. This is a process of:

> becoming critically aware of one’s own tacit assumptions and expectations and those of others and assessing their relevance for making an interpretation [16]

The course was designed to help participants become more aware of the fact that people see the world differently and that their viewpoints are based on a set of assumptions that may or may not be valid. To achieve such an aim required building an atmosphere of collegiality and trust. Well structured small group work was seen as the best and quickest way to achieve this. Via strategic small group discussions participants were encouraged to, in the first instance, recognize habits of mind, learn to question them by hunting the assumptions which underpinned them and if they found that some of those assumptions were invalid, work together to change them. An example of this critical, reflective practice was that in the supervision course participants chose from a file of critical incidents [17], discussed their choice of incident and its meaning for them and investigated the assumptions underpinning the incidents. In this way they actively learned about critical incident technique and prepared themselves for writing, discussing and analyzing their own incidents in small group and plenary sessions.

Active learning and problem based learning was modeled throughout the course. For example, Biggs’ theory of ‘constructive alignment’ [13] was taught by having participants review their own courses and rework them so that learning outcomes, teaching methods and assessment were aligned. Rather than talk about problem based learning the teachers were given problem based projects such as designing and implementing a digital teaching aid or object. Instead of preaching the virtues of active learning the participants engaged in active learning themselves and could draw their own conclusions as to its efficacy.
The standard format for most of the course modules was that participants were given written homework assignments that became the basis of small group discussions followed by a plenary in which the facilitator linked learning outcomes to current educational theory. In those modules where lectures were a feature (the Philosophies of Learning module for example) the lectures were always interactive.

**A new structure for the course**

Another problem with the former course was its structure. Participants had to engage with the course over eighteen months. The design for a new course sought creative solutions to the problem that the teachers’ duties made such a long term commitment difficult. The solution was to break up the single 15 point course into modules and include Supervision of Research among those modules.

![Figure 2. Modules in the Diploma of Higher Education (DHE).](image)

Four of the modules in the DHE are aimed at fulfilling the specified aims of SUHF: the pedagogical project module, the teaching, learning and evaluation module, and the two modules dealing with philosophies of learning and public understanding of science. The addition of a module on supervision of research is not so common in other Swedish tertiary teacher training courses but we argue that good supervision involves good pedagogical principles and practice.

Some of the electives were added for the benefit of PhD students who in addition to their research commonly have a 20% teaching commitment. Chalmers has made the teaching, learning and evaluation module and a research ethics module compulsory for all PhDs. In addition the Postgraduate Education Board pays for a module called Theory and Practice of Science. Given the importance of information communication technology we also added an elective that focused on the use of digital media in teaching and learning.

It was also decided that the language of instruction should be changed from Swedish to English to provide incidental competency building for Chalmers teachers who must teach in English at the Masters level. In modules with large numbers of participants from different countries (for example the Supervision of Research module) it is possible to divide groups into Swedish, English, Italian and Chinese speakers.

Teachers were now able to choose between eight modules all of which were worth 3 credit points, except for the Pedagogical Project course which stretched over the whole year and was worth 6 credit points. This meant that if a teacher could find the time they could complete four modules within an academic year. Most teachers tend to take the project, pedagogical and supervision modules plus an elective. A certificate is issued on completion of each module. The DHE is awarded once a participant has accumulated 15 credit points, and submitted a critical, analytical reflection on each of the modules explaining the changes that they had made to their own teaching or supervision
ideas and practice as a result of doing the modules. Teachers with less time might take a couple of modules per year.

Was the solution successful?

To what extent was the new course successful in solving the dilemma faced by staff developers who have to help improve the teaching and supervision skills of staff who do not always have the time or inclination to take teacher training courses?

The flexibility of the new structure and the new pedagogical approach has meant that the dropout rate from the modules is negligible. Sometimes teachers struggle to complete the year long Pedagogical Project module but since it is designed in stages strugglers can present the final version of their project in June or later on in November when a new batch of students give their progress reports.

At the conclusion of each module the facilitator asks participants to fill in an anonymous feedback sheet. These, together with the reflections submitted when applying for the DHE have been archived as electronic files. In 2008 an external evaluator was asked to look at all the evaluations from 2002 onwards, in the light of current literature on academic staff development. The evaluator interviewed participants from the 2008 pedagogical projects as well as sat in on the presentations for that module. In addition he had access to the critical, analytical reflections that were submitted when teachers applied to take out the DHE. In his report the evaluator concluded that:

The overwhelming message from evaluations, feedback and reflections is that the teachers feel they gain significant personal and professional advantage from doing the courses and see the importance and usefulness of improving their teaching and learning. There was a minority of teachers who objected to the new regulations requiring prospective Docents to complete a course in the supervision of research before they would be allowed to act as a supervisor but others were positive, pointing out that if the regulation did not exist it would be more difficult for them to convince their superiors to allow them the time off to do the course.

The evaluation cited opinions expressed by course participants in their feedback sheets and the retrospective analysis they submitted for the DHE. One student who had taken part of the Swedish course that was given before 2002 commented on the changes he had experienced between the two courses. Referring to the previous course he said:

The teaching of the course at that time was mainly standard lectures. I think it would be good too if the course also apply different types of teaching, so that we can try different teaching concepts. It is much easier to learn when you apply it on something. So I would have wanted to see, work in whole class, do small works in group, assignments at home, etc. In many of the pedagogic courses I have read since it has been discussions in small groups and that is actually one of my favorite parts. I think you learn so much from discussing teaching and also supervision with other teachers that are in the same situation. To talk about how they solved their difficulties when teaching and also what their tips are is a good experience.

The value of sharing experiences related to teaching and supervision was repeatedly mentioned by the participants; here, with the aid of a ‘skilful instructor’:

The very idea of the course is definitely healthy – get together teachers and researchers to discuss and share their pedagogical experiences and problems and let everybody work on a project directly concerning real-world pedagogical practice. Even for an experienced teacher it is useful to
be placed in such a challenging environment where key issues of modern pedagogy are stated sharply and discussed by a group of motivated participants led by a skilful instructor.

The ratings for the facilitators have been consistently high, further proof that the course has gained the respect of the participants. The authors of this paper take the majority of the modules given in the course and the responses to positive propositions regarding the enthusiasm, skill and knowledge of the facilitators and the suitability of the module’s design and material average 4.5 on a scale of 5 where 5 equals strong agreement and 1 strong disagreement to the propositions.

Perhaps one of the most telling proofs of the efficacy of the DHE is the content of the critical incidents that are written in a number of the modules. In the teaching, learning and evaluation module participants write about an incident where they felt they had a pedagogical breakthrough. Many nominate the ‘microteaching’ experience where they are filmed explaining a concept and then engage in a discussion on pedagogical issues that come up. One person commented:

When I saw myself on video, I saw with my own eyes how I could and should have increased the interactivity to make the lecture more fun and likely more fruitful for the listeners. I strongly felt, during the different video-taped lectures, that even the slightest interaction increased the level of the lectures.

There is a great wealth of evidence to indicate that the design of the DHE enables creative interchange between the participants themselves and that the philosophy to model active learning has not gone unnoticed. One participant said that:

The take home message of the whole course, correct me if I’m wrong, is that students learn by doing and I strongly agree...

Another student noted that:

The course has given me many insights and has helped me to put words on what I have felt during my entire time as a student at Chalmers – The education given to students at Chalmers does not bring out the full potential in students. Why? Because most teachers at Chalmers are not teachers but researchers and because they are not aware of how students learn.

Judging from many participants in the course the last statement is a generalisation that is not borne out by our experience. On the other hand the opening statement is borne out in the hundreds of feedback forms. Judging from them and the independent evaluation from 2008 the DHE course has encouraged participants to become reflective practitioners, capable of building their own theories as well as critiquing established pedagogical theories.

Discussion: How to make change happen

Is it fair to describe the changes as creative? A lot depends on how one defines creativity. We have used the word in a more general rather than specialist sense. The type of course we have created is by no means unique and the philosophy and practices embodied in it are used in other such courses. However, if we go back to the introduction to this paper, we believe that we have used creative ways of solving university staff resistance to undertaking and benefiting from competency development courses.

In the introduction to this paper we said that most of the lecturers who start the pedagogical course use traditional teaching methods. In our experience there are four main reasons for this situation: teachers are not aware of alternative methods, they do not believe in them, they do not know how
to use them, or they use undeveloped theories of teaching. It is our belief that teachers must first be helped to realize that they have a theory of teaching if they are going to change their practice. This is, however, only the first step in a creative process to help them to improve their practice. Based on feedback from the teachers in our courses, we have concluded that it is necessary to include four distinct stages in a ‘conceptual change’ model for teaching:

1. A self-awareness stage in which the teachers reflect on and articulate their own theories of teaching and learning.
2. A confrontation stage in which the teachers might realize that there are shortcomings in their current theories of teaching and teaching methods.
3. An exploration stage in which teachers become aware of alternative theories of teaching and a range of alternative teaching methods, their effectiveness and limitations, and barriers to implementing them.
4. An implementation and evaluation stage in which the teachers try out alternative teaching methods, get feedback on how well they reached the objectives, and reflect on the feedback.

The activities involved in implementing each stage are open to variation and creativity. We have, for example, used case studies (from [19]); a film about constructive alignment [20]; Higher Education research papers comparing traditional and alternative teaching methods (e.g. [21]); video clips of classroom incidents (from [22]); and microteaching with a focused analysis [23].

Even if teachers become aware of more student-centered ways of teaching engineering subjects, and even if they are convinced of their merits, they still feel that there are barriers to implementing them in their own classrooms. Several such barriers and strategies for dealing with them are described in a useful paper by Kimberly Tanner [24]. In the introduction we drew attention to yet another barrier to change: the predominance of traditional learning spaces at the university. The learning space that we have at our disposal for the pedagogy course we run is also quite traditional: a classroom setting equipped with whiteboard and overhead projector. There are however many open spaces and informal, comfortable settings in the vicinity. These spaces are used for small group discussion work, and the interruption and physical movement that occurs regularly throughout the day are part of a creative strategy to open participants’ minds to the importance of physical activity and variation in the learning process. Once they have experienced regular changes in the way the classroom is set up as well as carefully organized transitions from idea writing, pair work, mini lectures and plenary discussions to break-out group discussions it is easier for them to imagine how they themselves might change the traditional patterns and spaces that they use. Or to put it differently: How they can modify the medium to mend the message.

References


2 This model is partly inspired by and somewhat similar to the conceptual change model described by Angela Ho [18], working with staff development at Hong Kong Polytechnic University.


