

# The effect of pedagogical training on teaching in higher education

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## Abstract

This article reports a study on the impact of university teachers' pedagogical training on approaches to teaching and self-efficacy beliefs (measured by Approaches to Teaching Inventory and an additional part measuring motivational strategies). The participants were 200 teachers of the University of Helsinki, who were divided into four groups depending on the amount of pedagogical training they had. The results indicated that pedagogical training had an effect on scales measuring conceptual change/student-focused approach and self-efficacy beliefs. Even when the effect of teaching experience was held constant, in order to find out the unique effect of pedagogical training, the results remained the same. In addition, twenty-three interview transcripts were analysed. The teachers mentioned only positive effects of pedagogical training on teaching. © 2006 Elsevier Ltd. All rights reserved.

*Keywords:* Approaches to teaching; Self-efficacy beliefs; Pedagogical training; Teaching experience

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## 1. Introduction

Traditionally, the expertise in one's own discipline has been the most respected feature of a university teacher. In recent years, however, there have been discussions about the need to improve university teachers' pedagogical thinking and skills as well. As a consequence, training of university teachers has recently become a widespread trend in many countries. The lack of research in this field is noticeable, leading to a lack of adequate evidence of the impact of training on teaching. As Gilbert and Gibbs have highlighted, there is a need to establish the effectiveness of higher education teachers'

training in improving university teaching. Evidence of impact is needed to guide educational development units to design their courses since earlier research in this field is rather descriptive than evaluative (Gilbert & Gibbs, 1999). An exception to this is a quantitative study conducted by Gibbs and Coffey (2004), in which they examined the impact of training of university teachers on approaches to teaching, teaching skills and approaches to learning of their students. A training group of teachers and their students were studied at the beginning of teachers' training, and 1 year later. The training group became less teacher-centred and more student-centred by the end of the 4–18 months training. In addition, their teaching skills improved significantly after the training as judged by students. They found that students took a surface approach to a significantly lesser extent after their teachers

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had been trained. They also took a deep approach to a greater extent, but this change was not statistically significant.

Many countries, such as Norway, UK and Sri Lanka have made decisions about the compulsory pedagogical training of university teachers (Gibbs & Coffey, 2004). In Finland, many universities arrange pedagogical training for their teachers, but training is not compulsory. However, for example, the strategy of the University of Helsinki (*Strategic plan for the years 2004–2006, University of Helsinki, 2003*) highlights, that every new teacher should have the possibility to participate in an introductory seminar on university teaching in order to improve teachers' pedagogical thinking and skills. However, the training is voluntary. An essential aim of the teacher training at the University of Helsinki is to enhance a shift from a teacher-centred approach towards a more student-centred approach to teaching.

The University of Helsinki consists of eleven faculties, such as Law, Medicine and Behavioural Sciences. It has 38,000 students and more than 7000 staff members. Most Finnish students study for a Master's degree. The number of degrees awarded each year is over 4000. Of these, nearly 10% are doctoral degrees. The University of Helsinki is a research-intensive university and it is a member of the League of European Research Universities. Every teacher of the University of Helsinki is expected to both do research and teach (Lindblom-Ylänne & Hämäläinen, 2004).

The present study aims at exploring whether teacher training at the University of Helsinki is effective in its aims; scales measuring approaches to teaching and, in addition to these, teachers' self-efficacy beliefs are examined by comparing four groups of teachers who differ from each other in terms of pedagogical training they have completed. Furthermore, the effect of teaching experience is examined in order to find out the unique effect of pedagogical training on each scale.

### *1.1. Approaches to teaching and learning*

Teaching and learning are not two distinct phenomena. Approaches to teaching are shown to be related to students' learning approaches and subsequently to their learning outcomes. If a teacher's focus is on what he or she does or on transmitting knowledge, students are more likely to adopt a surface approach to learning and focus on

the reproduction of knowledge. If a teacher adopts a more student-centred approach to teaching, the students more likely adopt a deep approach to learning and focus on deeper understandings of the phenomena they are studying (e.g., Entwistle, Skinner, Entwistle, & Orr, 2000; Trigwell, Prosser, & Waterhouse, 1999).

When examining the impact of training of university teachers on approaches to learning of their students, Gibbs and Coffey (2004) found that students took a surface approach to a significantly lesser extent after their teachers had been trained. They also took a deep approach to a greater extent, but this change was small and not significant. According to the authors, possible reasons for this relative lack of change in students deep approach include a ceiling effect (deep approach scores were already high at the start) and a delay before changes in teachers' approach to teaching can significantly affect their students approach to study. They imply that teacher training in higher education should be oriented towards changing teachers' approaches to teaching, to a more student-centred approach, because of its reasonable effect on improvement of learning processes and outcomes (Gibbs & Coffey, 2004). Although many articles report a positive effect of teachers' student-centred approach to teaching on their students' approach to learning, it still can not be regarded as self-evident. It is possible that in some cases a student-focused approach does not automatically enhance a deep approach to learning.

Teachers' approaches to teaching are influenced by their conceptions of teaching. Studies of university teachers' conceptions of teaching have showed a range of variation (e.g., Kember & Kwan, 2002; Prosser, Trigwell, & Taylor, 1994; Samuolowicz & Bain, 1992). These range from teaching as presenting or imparting structured knowledge, to teaching as facilitating understanding and bringing about conceptual change and intellectual development. Teachers who conceive teaching as transmitting knowledge are more likely to adopt a teacher-centred approach to teaching, while those who conceive teaching as facilitative, tend to use student-centred approaches. In teacher-centred teaching, transmitted knowledge is gained or constructed by the teacher. Students are considered more or less as passive recipients of that information, and the existing knowledge students have is not taken into account. Learning outcomes are expressed in quantitative rather than qualitative terms, without

concern of the students' understanding of knowledge. Teachers might try to make learning easier for students by organising their teaching thoroughly and structuring the knowledge in a way that is easier to remember. (Biggs, 1999; Kember & Kwan, 2002; Prosser & Trigwell, 1999; Prosser, Trigwell, & Taylor, 1994; Samuelowicz & Bain, 1992, 2001; Trigwell & Prosser, 1996b; Vermunt & Verloop, 1999). The following interview citation describes a teacher-centred approach to teaching (Lindblom-Ylänne & Nevgi, 2003):

I'm not a very experienced teacher. Therefore, it is difficult to evaluate myself as a teacher. I prefer giving mass lectures instead of small groups. I have clearly noticed that activating students to participate in discussions is difficult for me. I think I'm better in transmitting knowledge than activating a small group of students. I don't have tools to activate students. I don't like teaching very much either. It is a thing one must do if one wants to work at the university. You could say that I'm a reluctant teacher. Of course, I try not to show this to my students. (a 39-year-old female teacher, Faculty of Arts).

On the contrary, in *student-centred* teaching, transmission may be a component, but not an aim, as the focus is more on the students and their learning, rather than on teacher and his or her teaching. Teaching is interactive in a way that observes students' existing conceptions. Teaching is about facilitating students' learning: Students are encouraged to construct their own knowledge and understanding and to strive towards becoming an independent learner. A student-centred teacher tries to recognise students' differing needs and take these as the starting point, when planning the course (Biggs, 1999; Kember & Kwan, 2002; Prosser & Trigwell, 1999; Prosser, Trigwell, & Taylor, 1994; Samuelowicz & Bain, 1992, 2001; Trigwell & Prosser, 1996b; Vermunt & Verloop, 1999). Furthermore, student-centred teachers have been found to use a wider repertoire of teaching methods, than teachers who adopt a teacher-centred approach to teaching (Coffey & Gibbs, 2002). The following interview citation describes a student-centred approach to teaching (Lindblom-Ylänne & Nevgi, 2003):

I have realised that the students have to be in the centre of the learning process. My starting point is how the students experience and see the

learning situation. From this I start thinking how to best teach these students. I have given up the idea that the teacher stands in front of the students and delivers information. As teacher, my job is to facilitate learning. I support students to learn well. (a 38-year-old male teacher, Faculty of Law)

In order to promote students' deep approaches to learning appropriate assessment must take place. Traditionally assessment has focused on testing of memorised facts without deep understanding of the phenomenon. On the contrary, a student-centred approach to teaching focuses on assessing the acquisition of higher-order thinking processes and competencies. The emphasis is on aligning assessment with instruction and giving students opportunity to receive feedback from their learning. Furthermore, students should be taken along in the assessment process and they should be encouraged to reflect on their learning results and practices (Prosser & Trigwell, 1999; Biggs, 1999).

There are different views regarding whether student-centred and teacher-centred approaches are two ends of one continuum or whether they are two separate categories. The latter view emphasises that a student-centred teacher might sometimes use features being typical to teacher-centred teaching depending on the teaching context. However, a correspondent relationship to the opposite direction is not possible; teacher-centred conceptions of, or approaches to teaching, can not be combined with student-centred elements (e.g., Prosser & Trigwell, 1999; Åkerlind, 2003). Åkerlind (2003) suggests that the 'either/or' relationship between conceptions of teaching presented by some authors (e.g., Kember, 1997; Samuelowicz & Bain, 1992), should be reconceived as an 'and' relationship. Shifts from teaching-centred to learning-centred orientations are possible (Trigwell & Prosser, 1996b; Samuelowicz & Bain, 2001), although divergent views have also been expressed. For example, Kember (1997) argues that enormous efforts are needed to change or switch underlying beliefs.

### *1.2. Disciplinary differences in approaches to teaching*

Lueddeke (2003) showed that teachers from hard disciplines were more likely to adopt an information transmission/teacher-focused (ITTF) approach to teaching, while teachers who represented soft

disciplines took a more conceptual change/student-focused (CCSF) approach to teaching. Lindblom-Ylänne, Trigwell, Nevgi, and Ashwin (2004) made a similar finding in their recent study. More specifically, they found that teachers from pure hard sciences (such as chemistry) scored significantly lower on the CCSF scale than teachers who represented pure soft (such as history) and applied soft sciences (such as education). Furthermore, teachers from applied hard sciences (such as medicine), scored significantly higher on the ITTF scale than teachers from pure soft and applied soft sciences. Lindblom-Ylänne et al. (2004) also studied disciplinary differences in teachers' self-efficacy beliefs. However, they did not find significant differences between the four discipline groups.

### 1.3. Motivational aspects to teaching

Trigwell, Ashwin, Lindblom-Ylänne, and Nevgi (2004) have investigated relations between approaches to teaching and motivational aspects in teaching. They have reinterpreted ideas of motivation in a way that fits into this perspective. They see that the aspects of teachers' motivation and interest which are evoked will be related to their perception of the situation they are in. They see motivation as an integral part of teachers' awareness, which can change according to their perception of the situation. If approaches to teaching reflect what teachers understand teaching to be, motivational aspects of teaching, such as self-efficacy beliefs, do not seem to incorporate particular views on the purpose of teaching. Self-efficacy is about teachers' beliefs regarding their ability to perform their academic tasks (Lindblom-Ylänne & Nevgi, 2003; Trigwell et al., 2004). Gordon & Debus (2002) have shown that teachers with high self-efficacy beliefs are likely to engage in a wide range of more productive teaching practices than teachers with low self-efficacy. Bandura defines self-efficacy as "generative capability in which cognitive, social, emotional, and behavioural sub skills must be organised and effectively orchestrated to serve innumerable purposes". Perceived self-efficacy is a belief that one can perform using one's skills and abilities adequately in a certain circumstance (Bandura, 2000, pp. 36–37). The research on teachers' self-efficacy beliefs and on their conceptions of what constitutes qualitatively good learning are mainly done with school teachers, while similar research of self-efficacy beliefs of teachers' in higher education is

scarce. Bailey (1999) conducted a research focusing on academics' motivation and self-efficacy concerning research and teaching. He found that gaining higher qualifications increased academics' motivation and self-efficacy for doing research, but not with teaching. The low success in research was correlated with higher motivation in teaching. Females were more motivated in teaching than male teachers. However, he did not find any differences in female and male teachers' self-efficacy beliefs on teaching. Furthermore, he found no differences in self-efficacy beliefs for teaching according to academics' position, faculty, and level of appointment (Bailey, 1999).

### 1.4. Teacher training in higher education

An interesting question is if teacher training has an effect on self-efficacy beliefs and approaches to teaching. There have been discussions about academics' need to participate in training to support their teaching roles. However, there is an absence of evidence of the impact of training on teaching behaviour (Coffey & Gibbs 2000; Norton, Richardson, Hartley, Newstead, & Mayes, 2005). Coffey's and Gibbs's (2000) study revealed that teachers in universities in the UK, showed significant improvements in scores measuring learning, enthusiasm, organisation and rapport measured by the Student Evaluation of Educational Quality (SEEQ) questionnaire, after one semester of two- and three-semester long training programmes. Using the Approaches to Teaching Inventory (ATI; Prosser & Trigwell, 1999) in 22 universities in eight countries, Gibbs and Coffey (2004) studied the effectiveness of university teachers' training. A training group of teachers and their students were studied at the beginning of their training, and 1 year later. The training group became less teacher-centred and more student-centred by the end of the 4–18 months training. In addition, their teaching skills improved significantly after the training as judged by students (measured by SEEQ and the "Good Teaching" scale of the Module Experience Questionnaire MEQ). Their students took a deep approach to learning, to a greater extent, after their teachers had been trained, although this change was small. However, this study suffered from several drop-outs, and the authors point out that they are not in a position to demonstrate whether it was the training itself that resulted in the positive changes.

Despite these studies Norton et al. (2005) consider the effect of teachers' training in higher education questionable. They note that there is only little evidence to show that training would have an effect on teaching behaviour. They made a study of university teachers in the UK, using a questionnaire measuring different aspects of teachers' beliefs and intentions, concerning teaching in higher education. Fifty teachers had taken a programme on teaching and learning in higher education and the other group of 72 teachers had no training. They found that there were no significant differences between the two groups on scales measuring teaching beliefs and intentions. These results suggest that genuine development will come about only by addressing teachers' underlying conceptions of teaching and learning.

As can be noted, there is some debate on whether teacher training in higher education has an effect on teaching or not. This study is an attempt to bring more information to this discussion by examining whether the length of training of university teachers has an effect on approaches to teaching measured by the ATI and, furthermore, on self-efficacy beliefs. Teaching experience might have an effect on the results concerning the effect of pedagogical training. Due to this, the effect of teaching experience on each scale is examined, and finally the unique effect of pedagogical training on each scale is examined by holding constant the effect of teaching experience.

## 2. Materials and methods

### 2.1. Participants

The participants of the study were 201 teachers from different disciplines at the University of Helsinki and three teachers from the Helsinki School of Economics and Business Administration, the total number of teachers being 204. Ninety-eight of these teachers had participated in courses for university teachers. One hundred-and-two of the teachers did not have credits of pedagogical courses organised for university teachers, but 66 of them had just started on one of these courses. Thus, the number of teachers, who did not have any credits of pedagogical courses and who had not even begun their studies was 36. Four teachers did not report whether they had pedagogical training or not, and they were omitted. The total number of teachers in this study is 200. Some teachers had other kinds of

pedagogical courses, but in this study those courses are ignored because the intention is to concentrate on pedagogical training which is meant only for university teachers.

For the quantitative part of this study, teachers were divided into four groups, depending on how much pedagogical training for university teachers they had. As mentioned above, 36 teachers did not have any pedagogical training for university teachers and they had not even begun their studies (Group 1). Seventy-five teachers had short courses for less than 10 ECTS (European Credit Transfer System), or they had no credits yet, but they had just begun their studies in pedagogical courses (Group 2). Fifty-eight teachers had completed a short course of 10–12 ECTS (6 months) or had continued their studies even further, but had less than 30 ECTS (Group 3). Thirty-one teachers had completed 30 ECTS (1 year) or more (Group 4).

The contexts of teaching varied a lot. Class sizes varied from a few students to over a hundred. Most of the participants taught students who study for a Master's degree, and the level of students varied from the first to sixth year of study. Teaching methods varied from lecturing to discussions, demonstrations and giving personal instruction.

Fifty-two percent of the teachers represented hard sciences and 47% soft sciences. Four teachers did not report their discipline. The disciplines were divided into "hard" and "soft" sciences by applying "pure hard", "pure soft", "applied hard" and "applied soft" categories. Becher (1989) divided disciplines into these four categories by modifying Biglan's (1973) originally sixfold classification, which is made on the basis of disciplines' cultural and epistemological differences.

Disciplinary differences between the four training groups were not statistically significant. The teachers represented broadly all the eleven faculties at the university of Helsinki. The teachers' age varied from 25 to 62 years (mean age 41 years). Seven teachers did not report their age. Age differences between the four training groups were not statistically significant. Of all 200 teachers, 31% were male and 68% female. Four teachers did not report their gender. Again, no statistically significant differences were found between the four training groups. Gender did not vary by disciplines on a significant level when using the categories "pure hard", "pure soft", "applied hard" and "applied soft". The teachers' teaching experience varied from a few months to 35 years, and half of the teachers had less



than 6 (Md) years teaching experience. Seven teachers did not report how much experience of teaching they had.

To analyse the effect of teaching experience on approaches to teaching and on self-efficacy beliefs, the teachers were divided into four groups depending on the amount of teaching experience they had: Forty-one teachers had no more than 2 years of teaching experience (Group A), 65 teachers had teaching experience from 3 to 7 years (Group B), 35 teachers had from 8 to 12 years of teaching experience (Group C) and the rest, 52 teachers, had teaching experience 13 years or more (Group D).

## 2.2. *Courses for university teachers*

At the University of Helsinki, the four campuses have their own development units which organise their own basic teacher-training courses. The majority of courses is, however, organised by the Centre for Research and Development of Higher Education. The centre is also responsible for the design of all courses (Lindblom-Ylänne & Hämäläinen, 2004). In this study, teachers have participated in pedagogical courses organised by three development units.

The training is not compulsory. Thus, the teachers participate in the courses on the basis of their own interest. When teachers apply for positions at the university, pedagogical training usually enhances their chances to be selected. For these reasons, they are highly motivated and therefore there are hardly any drop-outs. The aim is to take all the teachers who are inclined to participate in pedagogical courses. Pedagogical training at the University of Helsinki is not a training program, but, instead, the courses are separate so that a teacher may select only the first shortest course and it is not compulsory to continue to the next course.

The short courses on learning and instruction in higher education (~10–12 ECTS) organised by three development units, may be considered as the basic teacher-training courses, which aim to give teachers the basic skills to plan, instruct and assess teaching and learning in their courses. These basic courses focus on general theoretical principles of learning and instruction. The aim is to help university teachers become aware of and capable of using student-centred ways of teaching. These courses last approximately from 4 to 6 months.

After taking the short course, the teacher can apply for the next course, which is the longer (30 ECTS) 1-year course organised by the Centre for Research and Development of Higher Education. It aims at deepening teachers' understanding of theoretical principles of learning and instruction in higher education. Furthermore, during the 1-year-long process, there are more possibilities to affect teachers' pedagogical thinking and conceptions of teaching and learning, than during the shorter courses. In these courses the teachers reflect on their learning during the course in their portfolios. Furthermore, a short practicum is also included in this course. The teachers are instructed to apply the teaching methods dealt with in the course to their own teaching and to investigate and develop their teaching practices. Finally, at the end of the course, they include in their portfolios a report, in which they reflect on their development process and on the results they achieved by developing their teaching practices. Learning portfolios and the development of own teaching practices are also applied in the short courses. Teachers apply for both 10–12 ECTS and 30 ECTS courses by sending an application in which they give reasons for participating in these courses and describe themselves as university teachers.

After having completed both the short course of 10–12 ECTS and the 30 ECTS course, teachers achieve a diploma of university teaching and the teacher can apply for a 70 ECTS course. In this course, which last for 2 years, the teachers participate in a practicum both in their own work and outside of their own work. They also conduct research concerning teaching in higher education. The participants are selected through teaching portfolios and interviews. However, only a few teachers had to be omitted from the 70 ECTS course. The selection was made on the basis of how motivated and committed they were to developing their teaching, not on the basis of their student-centredness. Most of the participants are lecturers but also a few professors have participated in the 70 ECTS course.

## 2.3. *Inventory*

The Inventory used in this study consists of two parts: The Approaches to Teaching Inventory (ATI), designed by Keith Trigwell and Michael Prosser (see, for example, Prosser & Trigwell, 1999; Trigwell & Prosser, 2004, 1996a), is developed as a

result of the identification of qualitatively different conceptions of teaching. It is composed of 16 items, of which eight items measure the CCSF approach and the other eight items are designed to measure ITTF approach to teaching. The second new part of the inventory is designed by Keith Trigwell, Paul Ashwin, and Sari Lindblom-Ylänne. The aim is to explore teachers' motivational aspects to teaching and regulation strategies they use. From the second part, a four-item scale measuring self-efficacy was analysed in this study. Self-efficacy scale is adapted for teaching from Pintrich and colleagues' (Pintrich, Smith, & McKeachie, 1989) motivation model for learning (see e.g., Trigwell et al., 2004). All scales are measured with a 5-point likert scale. When answering the questionnaire, the teachers were asked to select a course which is most typical or common course or other kind of teaching situation they teach.

For those, who participated in pedagogical training, the questionnaire was given during a course meeting or mailed after the course. For those, who had participated in the courses before spring 2003, the questionnaires were mailed during spring 2003. Teachers, who had not participated in these courses at all, received the questionnaire by mail at the end of year 2003.

#### 2.4. Interviews

After completing the University Teaching Inventory, 75 volunteer teachers were interviewed. For this study, 23 interviews are included in the analyses. A central focus of the semi-structured interviews was on teachers' experiences of the effect of pedagogical training on their teaching. The teachers were asked how they felt about the pedagogical training and what effect it had on their teaching. The interviews lasted from 30 to 80 min. The interviewers were the authors and one research assistant. The structure of the interviews as well as the strategy of interviewing was designed together to make sure that all interviews followed same principles and guidelines. The interviews were taped and transcribed. The interviews were conducted in Finnish and translated into English.

Comparisons between the teachers who volunteered to be interviewed and who only completed the inventory showed that the interviewed teachers did not differ from the teachers who had filled the questionnaire in any aspects.

#### 2.5. Statistical procedures

CCSF and ITTF sum scales were calculated. In addition to these, a sum scale of the items measuring self-efficacy beliefs was also calculated. In this study, these sum scales are taken in the statistical analyses.

Analyses of variance (ANOVAs) were used to explore the differences between the four different teacher groups' scores on CCSF and ITTF approaches to teaching, and furthermore on a self-efficacy scale. ANOVA was used to find out how the length of pedagogical training relates to the way teachers approach to their teaching and whether the training has an effect on the other scales mentioned above.

One might argue that teaching experience has an effect on the results found when examining pedagogical training. As an answer to this, the same statistical procedures were carried out in four different experience groups, as in four training groups.

To find out the unique effect of pedagogical training on each scale, the effect of teaching experience was held constant by conducting a two-way ANOVA with a main effect model. In order to describe graphically the connection between pedagogical training and scales measuring approaches to teaching and self-efficacy beliefs, standardised residual was used, when the part coming from teaching experience was removed.

The three figures presented in this article describe graphically the differences among groups. The plots are connected to each other with a line to make figures easier to interpret. Lines between plots are usually used in a longitudinal study, but in this study differences between different groups are examined and lines are used only as a clarifying element.

### 3. Results

#### 3.1. The effect of the length of pedagogical training

The one-way ANOVA design was applied to examine the effect of the length of pedagogical training (four groups), on teaching approaches and self-efficacy beliefs. The results revealed a significant main effect for the CCSF approach [ $F(3, 196) = 4.63, p = .004$ ] and self-efficacy beliefs [ $F(3, 196) = 2.90, p = .036$ ]. Table 1 shows that teachers who had most pedagogical training (Group 4),

Table 1  
Means and standard deviations for each variable in four training groups

Variable	Group 1 (n36): 0 ECTS	Group 2 (n75): under 10 ECTS	Group 3 (n58): under 30 ECTS	Group 4 (n31): 30 ECTS or more
CCSF				
<i>M</i>	3.96	3.70	3.9	4.1
<i>SD</i>	0.70	0.69	0.76	0.69
ITTF				
<i>M</i>	3.5	3.4	3.3	3.4
<i>SD</i>	0.67	0.70	0.70	0.77
Self-efficacy				
<i>M</i>	4.7	3.2	3.9	4.6
<i>SD</i>	0.54	0.61	0.73	0.37

scored highest on scales measuring the CCSF approach and self-efficacy beliefs. Correspondingly, they scored lowest on a scale measuring the ITTF approach to teaching.

To analyse the effect of pedagogical training on each scale in more detail, Tukey's post hoc test with its significant difference procedure ( $\alpha = .05$ ) was used for comparisons among the four groups in each scale. The effect of the amount of pedagogical training was not linear in any of the scales, except teacher-focused scale, as Fig. 1 shows.

In the CCSF approach scale, teachers who had 30 ECTS or more (Group 4), scored significantly higher than those who had just begun their studies or who had short courses for less than 10 ECTS (Group 2) and those who had 10 ECTS or more but less than 30 ECTS (Group 3). In addition, those who had no pedagogical training, scored also higher than these two groups, but the difference did not reach a significant level.

Self-efficacy scores were significantly higher among those who had pedagogical training for 30 ECTS or more (Group 4), than among teachers who had just begun their studies or who had short courses for less than 10 ECTS (Group 2). Compared to the CCSF approach scale, the same phenomena occurs again: Those who had no pedagogical training at all (Group 1), scored higher than those who had pedagogical training for less than 30 ECTS (Groups 2 and 3), but yet again, the difference was not significant.

### 3.2. The effect of the amount of experience

One factor, which might have an effect on the results presented above, is teachers' teaching experience. To analyse the effect of teaching experience in more detail, similar analyses were conducted using the amount of teaching experience as the independent. Using the one-way ANOVA design, a significant main effect was found for the CCSF approach [ $F(3, 189) = 3.191, p = .025$ ] and self-efficacy [ $F(3, 189) = 5.194, p = .002$ ]. Tables 2 and 3 shows, that teachers who had 13 years or more teaching experience (Group D), scored highest on the ITTF scale and on the self-efficacy scale. Teachers who had teaching experience from 8 to 12 years (Group C), scored highest on the CCSF scale. However, teachers who had experience no more than 2 years (Group A), scored lowest on the ITTF scale.

Tukey's post hoc test with its significant difference procedure ( $\alpha = .05$ ) was used for comparisons among the four experience groups in each scale. In the CCSF approach scale, teachers who had teaching experience from 8 to 12 years (Group C), scored significantly higher than those who had from 3 to 7 years of experience (Group B), as Fig. 2 shows. In addition, teachers who had experience of teaching 13 years or more (Group D), scored significantly higher in the self-efficacy scale than teachers who had from 3 to 7 years of teaching experience (Group B).

### 3.3. The unique effect of the length of pedagogical training

When Figs. 1 and 2 are compared, the same phenomenon can be seen in both figures in the CCSF and self-efficacy scales: those, who did not have pedagogical training (Group 1), or very little teaching experience (Group A), scored higher on these scales than those who had slightly more training (Group 2) or experience (Group B). An interesting question to propose could be, what the effect of the length of pedagogical training on each scale is, when the effect of teaching experience is statistically held constant, in other words, what is the unique effect of pedagogical training on each scale. To find this out, a two-way 4 (length of training)  $\times$  4 (amount of experience) ANOVA, was performed using a main effect model on the scores of teaching approaches and self-efficacy. When examining the unique effect of the length of



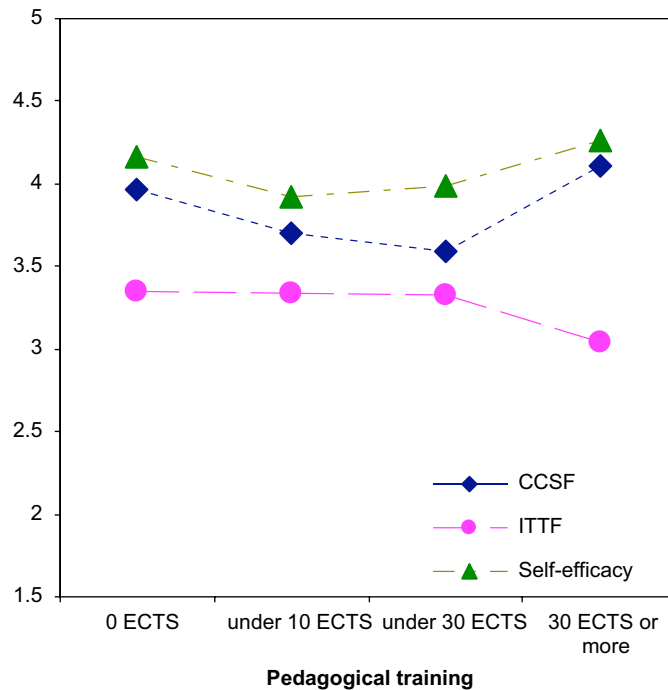


Fig. 1. Scores for CCSF approach, ITTF approach and self-efficacy of the four training groups (scale 1–5).

Table 2  
Means and standard deviations for each variable in four experience groups

Variable	Group A (n41): 0–2 years	Group B (n65): 3–7 years	Group C (n35): 8–12 years	Group D (n52): 13 years or more
CCSF				
<i>M</i>	3.85	3.56	3.9	3.9
SD	0.73	0.77	0.63	0.69
ITTF				
<i>M</i>	3.8	3.1	3.1	3.5
SD	0.68	0.71	0.58	0.77
Self-efficacy				
<i>M</i>	4.4	3.9	3.9	4.0
SD	0.64	0.59	0.58	0.47

Table 3  
Means and standard deviations for each variable in four training groups, when the effect of teaching experience is held constant

Variable	Group 1 (n36): 0 ECTS	Group 2 (n75): under 10 ECTS	Group 3 (n58): under 30 ECTS	Group 4 (n31): 30 ECTS or more
CCSF				
<i>M</i>	0.26	−0.09	−0.25	0.42
SD	0.93	0.97	1.0	0.96
ITTF				
<i>M</i>	0.05	0.06	0.05	−0.33
SD	0.96	0.97	0.99	1.08
Self-efficacy				
<i>M</i>	0.14	−0.14	−0.06	0.30
SD	0.93	0.95	1.21	0.63

pedagogical training, a significant main effect was found for a scale measuring student-focused approach [ $F(3, 185) = 4.166, p = .007$ ]. When the effect of pedagogical training was examined using a one-way ANOVA design, a significant main effect was found, in addition to this, for self-efficacy scale. This means, that teaching experience has an effect on these scales when measuring the effect of pedagogical training on each scale. After the effect of experience is eliminated, the differences between

the groups are not as strong, but similar differences between the groups can still be found.

However, when Tukey’s post hoc test with its significant difference procedure ( $\alpha = .05$ ) was used for comparisons among the four training groups, it showed, even though the main effect was not significant, that self-efficacy scores were significantly higher among teachers who had pedagogical training for 30 ECTS or more (Group 4), than among those who had just begun their studies or who had

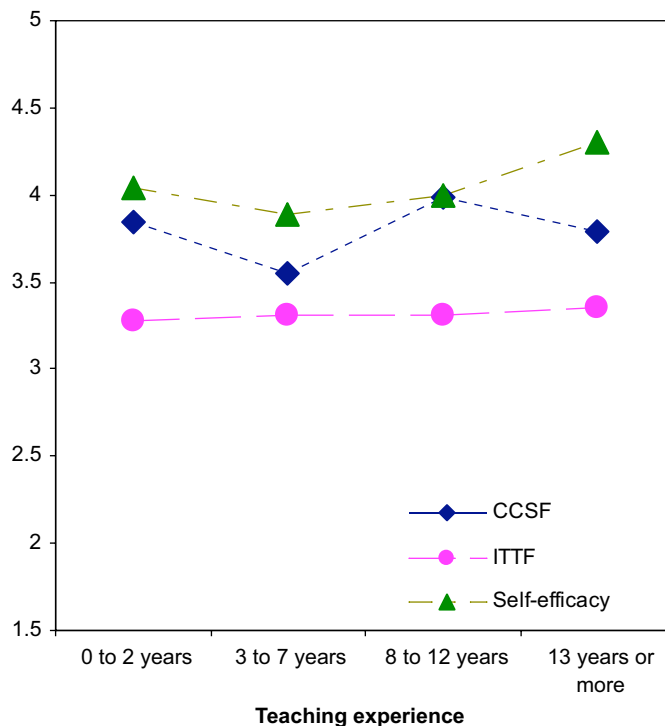


Fig. 2. Scores for CCSF approach, ITTF approach and self-efficacy of the four experience groups (scale 1–5).

short courses for less than 10 ECTS (Group 2). Even though the effect of pedagogical training on the self-efficacy scale is not so strong after the effect of experience is eliminated, the shapes of the figures remain the same, as can be seen when comparing Figs. 1 and 3; teachers who had the most pedagogical training, scored highest on this scale. However, teachers who did not have pedagogical training at all, scored second highest, and teachers between these groups scored lowest. Teachers who had just begun their studies or had only a few ECTS scored lowest of all teachers on this scale.

As in the self-efficacy scale, teachers in Group 4 scored significantly higher than teachers in Group 2, in the CCSF approach scale (see Fig. 3). In addition, teachers in Group 4 scored significantly higher on the CCSF scale than those who had 10 ECTS or more, but less than 30 ECTS (Group 3). When the effect of experience was not eliminated, the differences in the CCSF scores between the four groups were slightly more significant, but the shape of the figure is similar on both occasions, and very similar to the shape of the self-efficacy scale (see Figs. 1 and 3). Teachers who had the most pedagogical training scored highest also on the CCSF scale. Similarly, teachers who did not have

any pedagogical training at all, scored second highest, and teachers between these groups scored lowest. Teachers who had 10 ECTS or more, but less than 30 ECTS (Group 3) scored lowest of all.

The shapes in Figs. 1 and 3 are similar. Fig. 3 shows the connection between pedagogical training and scales measuring teaching approaches and motivational aspects to teaching, when standardised residual was used after removing the part coming from teaching experience.

#### 3.4. Interview results of the effect of pedagogical training on approaches to teaching

The teachers were asked in the interviews how they felt the pedagogical training has affected their approach to teaching. Twenty-three interviews were analysed for the present study. The teachers mentioned only positive effects of pedagogical training on teaching. However, two teachers felt that it was too early to evaluate the effect of the training because the course had just ended and they had not yet had a possibility to find out the implications of the course through their own teaching.

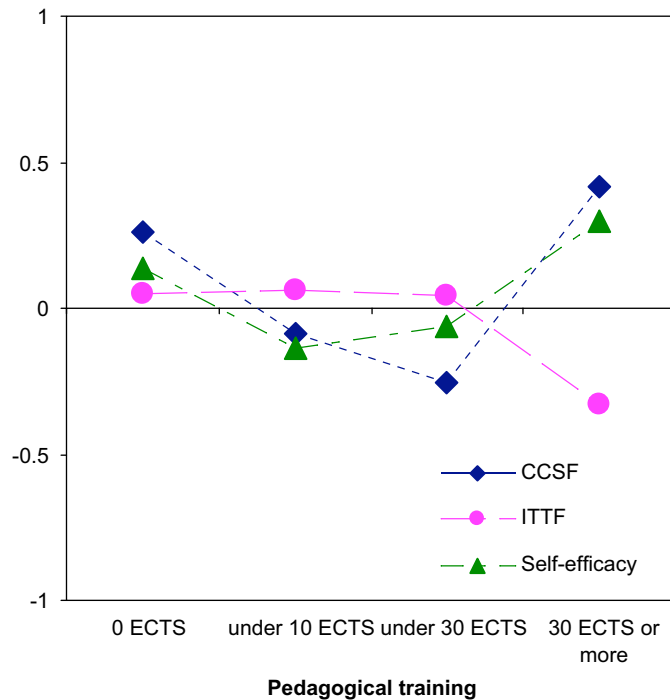


Fig. 3. Scores for CCSF approach, ITTF approach and self-efficacy of the four training groups when examining the unique effect of the length of pedagogical training.

More than half of the teachers felt that participation in the pedagogical training had made them more aware of their approach to teaching and of their teaching methods. These teachers further believed that their reflective skills had developed during the training.

Ten teachers considered that they received theoretical knowledge, new ideas, advice as well as new viewpoints from participation in the pedagogical training. Nine teachers evaluated that their willingness to develop as teachers and their motivation to apply new teaching methods increased. The following two extracts are examples of teachers who had noticed both above-mentioned effects.

It increased my level of consciousness. It also increased my willingness to apply different kinds of teaching methods. My teaching experiments are now more conscious. This is in my opinion the most important implication of the pedagogical training. (a 39-year-old female teacher, Faculty of Arts)

I must say that after participating in these courses I got some kind of a grasp of teaching. Previously I hadn't realised how important it is

that a teacher has formed a conception of personal instructional principles before he or she goes to the classroom. I'm aware how important it is to teach in a right way. I also follow what the experts of educational psychology say about the best way to learn. (a 38-year-old male teacher, Faculty of Law)

Five teachers enjoyed very much the possibility to meet teachers from other faculties and to discuss teaching and compare experiences with them. This kind of interaction was considered valuable, because teaching is a lonely job. The following two extracts show how discussions with other participants were helpful for the teachers:

I was able to discuss with different kinds of people during the course and to see that in other faculties things are done differently. I received different viewpoints to teaching. My way of seeing teaching is not so narrow anymore. (a 38-year-old female teacher, Faculty of Veterinary Medicine)

We had discussed a lot. I noticed that we all have similar kinds of problems and that the problems don't bring us down. We search solutions to

some problems and some remain unsolved. Everyone makes mistakes when teaching and that's not so serious. I think that it was important for me to realise that nobody is perfect. (a 28-year-old female teacher, Business School)

Four teachers thought that their self-confidence as a teacher had increased due to the course. In the following extract one teacher describes how the course had influenced her self-confidence:

One thing the course has had an influence upon is my self-confidence. It was somewhat surprising, because I thought before the course that it would develop my teaching and learning skills. Somehow I feel that after all it affected my self-confidence the most. I believe in me, in what I'm doing. I have noticed that I can read from pedagogical literature about the teaching methods I have spontaneously used. I didn't know that my teaching methods really existed. (a 28-year-old female teacher, Business School)

#### 4. Discussion

The aim of this study was to find out whether pedagogical training in higher education would enhance the shift from an ITTF approach, towards a more CCSF approach. This is also the aim of pedagogical courses at the University of Helsinki. Analyses of the effect of the length of pedagogical training on teaching approaches showed that the training enhances a shift from the ITTF approach, to the CCSF approach, but also that this is a slow process. Teachers who had just begun their studies in pedagogical courses scored even lower on the CCSF approach scale than teachers who did not have any pedagogical training. Only after a year long process of pedagogical training, teachers reported to be more student-centred than those who did not have training at all. In addition, only teachers who had pedagogical training for at least one year (30 ECTS or more), scored lower on the ITTF approach scale than the other groups who had less training or no training at all. The scale measuring self-efficacy beliefs was very similar to the CCSF approach scale; those who had just begun their studies in pedagogical courses or who had under 30 ECTS, scored even lower than teachers who did not have any pedagogical training at all. Only after 30 ECTS or more, self-efficacy beliefs reached a higher level. On the contrary, changes in

the ITTF approach scale were not so dramatic among the four groups. The ITTF approach to teaching seems to be more stable, more difficult to change than the CCSF approach to teaching. This result is consistent with the ATI questionnaire design; the CCSF approach and the ITTF approach to teaching are two separate variables and a linear relationship between these variables is not expected (Trigwell & Prosser, 2004). This result also supports the view of an 'and' relationship between the approaches; shifts from teaching-centred to learning-centred orientations are possible (e.g., Trigwell & Prosser, 1996b; Åkerlind, 2003). Gibbs and Coffey (2004) made a similar finding; training increased the extent to which teachers adopted the CCSF approach to teaching, but changes in the ITTF approach were not as strong.

The interviews implied that pedagogical training made teachers more aware of their approach to teaching and their teaching methods. This awareness probably explains why teachers who did not have any pedagogical training (Group 1) scored higher on self-efficacy and CCSF scales than those who had under 30 ECTS (Groups 2 and 3). In the interviews, the teachers mentioned only positive effects of pedagogical training on teaching. This study shows that awareness of one's own approach to teaching is essential in improving teaching practices.

The results of this study imply that approaches to teaching and self-efficacy beliefs change slowly. It takes at least a 1 year long training process until positive effects emerge. In fact, shorter training seems to make teachers more uncertain about themselves as teachers. Gibbs and Coffey (2004) argued that university teachers became less teacher-centred and more student-centred by the end of the 4–18 months training. The results of the present study support the view that after a long training process, a shift from a teacher-centred to student-centred approach is possible, but it also shows that the effect of pedagogical training is not that linear. Teachers who had less than 30 ECTS, that is, less than 1 year of pedagogical training, scored lowest on the student-focused approach scale and on the self-efficacy scale. The teacher-centred approach scale stays in the same level with those who did not have any training at all. In this study, results do not imply a change within a group of teachers, but differences between different groups.

Some other studies have found results that do not support the idea that teacher training in higher

education would have an effect on teaching (e.g., Norton et al., 2005). Anyhow, the results of this study are not necessarily inconsistent with these studies, since this study showed that shorter training courses do not have a positive effect on teaching, but the training needs to be more constant in order to be effective.

The negative effect pedagogical training seems to have in the beginning of pedagogical studies could be explained by the teachers' conceptions of themselves as teachers. Those teachers, who participate in the courses, have probably experienced problems in their teaching or wanted to improve their teaching. When they begin the pedagogical courses, they become aware of their limitations as teachers and they might feel themselves less student-centred than before. At the same time teachers' feel more uncertain about their ability to perform their academic tasks (self-efficacy). These changes probably do not actually take place, but training makes teachers more aware of the problems they have in their teaching, and after a longer training process they become more aware of an ideal way to teach. When teachers do not have any kind of pedagogical training organised for university teachers, they might not be aware of better teaching practices and they might feel that they are good and student-centred teachers. When they attend a pedagogical course, these images collapse. It is a long process to change conceptions of and approaches to teaching and actually become a better teacher. First, conceptions of teaching, and moreover, of education and other social issues attached, have to change, and after this a change in teaching practices and techniques is possible. The training probably does not make teachers less student-centred or make worse their self-efficacy beliefs but, rather, the change is in the teachers' beliefs about themselves as teachers.

Teachers face some pressure for research productivity because every teacher at the University of Helsinki is expected to do research. This might have an effect on how much to invest in developing teaching practices. The fact that participation in pedagogical courses is optional might have an effect on the results of this study. Teachers who are more motivated to improve their teaching practices may take more pedagogical courses. Teachers' desire to participate in pedagogical courses and their wish to become better teachers might lead to better teaching outcomes, not participation in pedagogical courses alone. In order to decrease sample-bias, data from

36 teachers with no pedagogical training were included.

Because student-centred teaching is what the university is promoting, the participants of this study might have answered more positively to the CCSF approach scale since social desirability might have an effect on the answers. However, this issue was discussed in the interviews with the teachers and social desirability did not appear to flaw the data.

The results found in this study suggest that pedagogical training, of the form used in the University of Helsinki, should be at least a 1 year long process or at least 30 ECTS. Short courses may make teachers' more uncertain about themselves as teachers. The 'collapse' in scores measuring teaching approaches and self-efficacy beliefs could also be explained by 'an intermediate phase' of expertise. Lueddeke (2003) argues, that those in 'mid-career' have a conscious or unconscious desire to avoid change or they have a fear of choosing or making commitment. A similar phenomenon might be found within teachers who are used to teaching in a safe and familiar way; first they realise that they are not as good teachers as they have thought, but a change to another way of teaching feels not so comfortable. Also Boshuizen (2004) found that the process of expertise development is not continuous and uninterrupted. Although there is strong evidence in favour of a continuous process of knowledge integration and encapsulation, other findings suggest a discontinuity in the development. Research shows, that expertise development processes are less smooth than theory predicts and that disturbances may occur. Boshuizen (2004, pp. 81–84) refers to studies (e.g., Boshuizen & Schmidt, 1992) in which expertise development of medical students have been examined. On the basis of these studies Boshuizen asks, whether there is a crisis in learning and development, since they found that the difference between the 4th year students, compared to 5th and 6th year medical students and medical specialists is striking; on all measures the 5th year students showed fewest elaborations and their diagnoses or their post hoc explanations were not better than those given by 4th year students, and they used fewer biomedical concepts and auxiliary lines of reasoning in their clinical reasoning, while a year later they seemed to have partly overcome these effects.

The same phenomenon was found in this study; those who had the least and the most of pedagogical training reported to be most student-centred and



least teacher-centred and their self-efficacy scores were highest. Boshuizen (2004, pp. 87–88) presents some possible explanations to this kind of phenomenon, which could explain the findings of this study as well. Firstly, he argues that stress and required development could account for this delay. Secondly, the phenomenon also reminds us of processes in child development, in which a child may move from one stage of skill mastery to the next, but before the next level is reached goes through a period during which performance is lower than before and after. A process like this may be based on complete reorganisation of the knowledge base. Thirdly, he suggests that the developing knowledge structure might not fit the requirements in practice. Boshuizen addresses the issue that expertise development is a slow and discontinuous process as can be stated on the basis of the present study.

The results of this study will be utilised in designing pedagogical courses at the University of Helsinki. More interviews will be analysed in the future to deepen the understanding of the effect of pedagogical training on teaching. On the basis of the results of this study teachers should be encouraged to continue their studies after the first 10–12 ECTS course in order to increase their student-centredness and finally to improve students' learning. Further analysis of the interviews will give us more information of the most effective form of pedagogical training. Further research in this field is still needed, as stated by many researchers examining pedagogical training in higher education (Coffey & Gibbs, 2002; Gibbs & Coffey, 2004; Gilbert & Gibbs, 1999; Norton et al., 2005), since pedagogical training in higher education is a relatively new phenomenon in most countries and it is getting more common around the world.

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