Development paths of university teachers during a pedagogical development course

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Abstract

The aim of the study is to analyse the development of university teachers' pedagogical expertise during a five-month, 10-credit pedagogical development course. The data consists of reflection diaries of 18 participants who participated in the course. The method of content analysis was applied to identify different development paths from the reflection diaries. The paths differ from each other in terms of development in teaching practices, conceptions and teacher identity. The results suggest that some teachers resist changing their understanding about teaching and learning while others describe strong changes both in their conceptions of teaching and learning, as well as in their teacher identity. These results are reflected in light of *boundary crossing* theory presented by Akkerman and Bakker (2011).

Keywords: expertise development; pedagogical development; development paths; university teachers; pedagogical development courses; reflection diaries.

Resum. *Trajectòries de desenvolupament del professorat universitari durant un curs de formació pedagògica*

Aquest estudi té com a objectiu analitzar el desenvolupament de l'expertesa pedagògica del professorat universitari durant un curs de formació pedagògica de deu ECTS de cinc mesos de durada. Les dades recollides consisteixen en un diari reflexiu dels divuit participants en el curs. El mètode d'anàlisi de contingut va servir per identificar les diferents trajectòries de desenvolupament del professorat des dels seus diaris reflexius. Les trajectòries difereixen les unes de les altres en termes de desenvolupament de les pràctiques, concepcions docents i identitat professional. Els resultats mostren com alguns professors es resisteixen a canviar les seves concepcions sobre l'ensenyament i l'aprenentatge, mentre que d'altres descriuen importants canvis tant en les seves concepcions sobre l'ensenyament i l'aprenentatge, com en la seva identitat docent. Aquests resultats estan d'acord amb la teoria del boundary crossing d'Akkerman i Bakker (2011).

Paraules clau: desenvolupament de coneixements; desenvolupament pedagògic; vies de desenvolupament; professors universitaris; cursos de desenvolupament pedagògic; diaris de reflexió.

Resumen. *Trayectorias de desarrollo del profesorado universitario durante un curso de formación pedagógica*

El presente estudio tiene como objetivo analizar el desarrollo de la experticia pedagógica del profesorado universitario durante un curso de formación pedagógica de diez ECTS de cinco meses de duración. Los datos recogidos consisten en un diario reflexivo de los dieciocho participantes en el curso. El método de análisis de contenido sirvió para identificar las diferentes trayectorias de desarrollo del profesorado desde sus diarios reflexivos. Las trayectorias difieren unas de otras en términos de desarrollo de las prácticas, concepciones docentes e identidad profesional. Los resultados muestran cómo algunos profesores se resisten a cambiar sus concepciones acerca de la enseñanza y el aprendizaje, mientras que otros describen importantes cambios tanto en sus concepciones sobre la enseñanza y el aprendizaje, como en su identidad docente. Estos resultados están en consonancia con la teoría del *boundary crossing* de Akkerman y Bakker (2011).

Palabras clave: desarrollo de conocimientos; desarrollo pedagógico; vías de desarrollo; profesores universitarios; cursos de desarrollo pedagógico; diarios de reflexión.

Summary

1. Introduction

In terms of teacher development, previous research has shown contradictory results regarding the effectiveness of pedagogical development courses organised for university teachers. Some research focusing on the impact the courses have on teachers' approaches to teaching and on self-efficacy beliefs have shown positive effects of such courses in terms of an increase in the student-centred or learning-focused approach to teaching and self-efficacy beliefs of teachers (e.g. Gibbs & Coffey, 2004; Postareff et al., 2007, 2008). However, some research has found no evidence for changes in teachers' behaviour or conceptions (e.g. Ho et al., 2001). Stes et al. (2007) showed that the long-term impact of development programmes is affected by contextual elements to a great extent. Most of the studies focusing on analysing the effectiveness of pedagogical development courses have reported changes in teacher development at group level, while analysis focusing on changes in individual teachers' behaviour or conceptions has gained less attention. When the focus is on individual teachers, it is possible to conduct a more fine grained analysis of why and how changes in teacher development occur or do not occur. In this paper we report the results of a study that considers different developmental paths of university teachers when participating in a single pedagogical development course.

*Influence of pedagogical development courses on the development
of teacher expertise in higher education*

All pedagogical development courses aim to improve teacher expertise in some aspects of participants' teaching or to change participants' conceptions of teaching and learning to support improvement of their teaching and interaction with students. However, all changes ultimately depend on the participants' willingness to change. Further, most academics commit themselves strongly to research on their own discipline and consider that their expertness is based on being a researcher of the subject. Teaching is sometimes seen as less important in academic careers and an obligatory duty without ambition to develop expertness in teaching, that is, scholarship in teaching (Boyer, 1990; Knight, 2002). Moreover, being an expert in one field may prevent developing expertise in other fields, especially for those who cling to their expertness in one field and do not accept that they may be novices in another field (see Akkerman & Bakker, 2011).

Several studies suggest that the development of expertise is not a linear and uninterrupted continuum, but rather that experienced teachers' professional identity may experience conflicts in cases of educational change or change in their immediate working environment (Beck & Young, 2005; Boshuizen, 2004; Sikes, 2006). There is evidence that expertise development processes are often faced with disturbances (Beijaard et al., 2004; Boshuizen, 2004). Furthermore, contrary to vertical and smooth process of expertise development, there is evidence of complex and horizontal development of expertness (see Engeström et al., 1995). The concepts of boundary and boundary crossing have become interesting key concepts in understanding how expertise develops between and in different domains (Akkerman & Bakker, 2011). The development of expertise is not seen only as a vertical acquisition of expert knowledge and skills; instead the multi-dimensional view of expertise has led research interest to be focused on the horizontal processes of expertise development (Engeström et al., 1995).

Referring to Critchley and Casey (1989), Lueddeke (2003) argued that people in their 'mid-career' avoid change either consciously or unconsciously and they usually have a fear of making commitment. This 'intermediate phase' of expertise was identified also by Postareff et al. (2007) in their analysis of the effectiveness of pedagogical development courses on teachers' approaches to teaching and their self-efficacy beliefs. They noted that teachers who had participated in a six-month pedagogical course reported being less learning-focused than teachers who had no pedagogical courses at all. In addition, their self-efficacy beliefs were lower than those of the non-trained teachers. Oosterheert and Vermunt (2003) emphasised that teachers should be made aware of the possible delay in the development of more sophisticated conceptions of teaching. Previous research has shown that teachers who are motivated to develop their professional expertise in terms of pedagogical knowledge engage in the type of reflection that leads to higher quality teaching, and they also

have a willingness and an ability to take risks in their teaching (McAlpine & Weston, 2000).

Åkerlind (2003) explored ways of understanding development in university teaching. She described teaching development as an increase in teachers' comfort with teaching, knowledge and skills and finally, in learning outcomes of the students. In a later study, Åkerlind (2007) identified five qualitatively different approaches to growing and developing as a university teacher. The first category is about building up a better knowledge of one's content area in order to become more familiar with what to teach. In the following three categories, the focus is on building up practical experience or developing teaching strategies in order to develop own skills as a teacher. The fifth category is about continually increasing understanding of student learning in order to become more effective in facilitating learning processes.

A Pedagogical development course as a space of crossing boundaries of expertise

Most academics who participate in pedagogical development courses do not have any, or have only limited knowledge of pedagogical theories and educational sciences (see, for example, Postareff et al., 2007, 2008). However, their expertise in their own academic domain, as well as their research experience, teaching traditions and thinking and reasoning, are all deeply rooted in their own field or discipline (see Becher & Trowler, 2001; Neumann, 2001; Neumann et al., 2002) and other academic disciplines could be considered as territories of other tribes (see Becher & Trowler, 2001). In order for teachers to develop their pedagogical expertise, they need to cross the boundaries between their own subject domain and the domain of pedagogical theories and knowledge (see Akkerman & Bakker, 2011).

Pedagogical development courses are a domain where experts from various fields meet and interact with each other. Although they share similar interests in terms of teacher development, as a group they are heterogeneous and represent different professional and academic cultures and are separated by sociocultural boundaries (Akkerman & Bakker, 2011). For an individual teacher it is a great challenge to develop expertise in another field than the own discipline, which requires crossing boundaries and familiarising oneself with new ways of thinking and reasoning (Akkerman & Bakker, 2011). Participating in a pedagogical development course offers teachers both challenges and opportunities to develop their expertness in teaching. Teachers are challenged by new theories of teaching and learning, and they are involved in a continuous process of going beyond the borders of their own discipline and pedagogical field.

2. Aim and method of the study

The aim of the present study is to analyse individual teachers' development paths during a pedagogical development course in order to capture variation in how

teachers describe and experience the courses and in how they describe the development of their pedagogical expertise during the course. In addition, the aim is to analyse what kind of discontinuities and resistance can be identified in the teachers' development paths.

The data consist of reflection diaries of 18 participants (10 female, 8 male) of a pedagogical development course the University of Helsinki offers its teaching staff. The teachers represented a range of different disciplines: Agriculture and Forestry, Arts, Behavioural Sciences, Biological and Environmental Sciences, Business and Administration, Law, Medicine, Social Sciences, and Theology, and their teaching experience varied from 0 to 25 years. The teachers were aged between 29 and 50 years. The teachers' academic positions at the university ranged from doctoral student to senior lecturer and professor.

The teachers participated in a five-month, 10-credit basic pedagogical course at the University of Helsinki. The aim of the course was to provide the teachers the basic skills to plan, instruct and assess teaching and learning in their classes and to become capable of using learning-centred ways of teaching. In addition, the aim was that the participants recognise their conceptions of teaching and learning and become aware of themselves as teachers and of their own ways of teaching. The course consisted of nine, full-day contact seminars and assignments. In the most time demanding assignment, the participants re-designed one of their courses according to the principles of constructive alignment. The instruction in the second assignment was to interview the teachers' own students, and in the third assignment to observe the teaching of other teachers.

Finally, the teachers were instructed to write a learning diary regularly (at least after each of the nine contact seminars) during the pedagogical development course and to write a five-page summary of their diaries. This summary is called a *reflection diary*, since the teachers were instructed to reflect on the topics they had written about in the learning diary. The reflection diaries were supposed to contain the key points from the diaries, including an analysis of how they had developed as university teachers during the course, and what kinds of ideas they had about their teaching development. The participants were also asked to ponder and reflect on their learning from the viewpoint of personal goals, teaching and learning at university, teacher identity and course planning. The requirements for the assignment were explained and discussed with the participants at the first course session. The length of the reflection diaries varied from 703 to 2494 words, and were typically between 1200–1500 words. All the participants examined their diaries in-depth and wrote a summary following the guidelines.

The teachers were informed at the beginning of the course that their assignments might be used for research purposes and that no references to the identity of an individual teacher would be revealed.

Analyses of reflection diaries

The authors were the coaches of the pedagogical development course. The reflection diaries were analysed six months after the course ended in order to minimize the possible effect of the authors' impression of the participants on the analysis of the diaries. Furthermore, to ensure the anonymity of the participants, the date and exact location of the course is not described.

The reflection diaries were inductively content analysed by the first and second authors independently. In a first phase, they both read the reflection diaries independently several times and then discussed their impressions. Similarities were found among certain teachers in how they described their development paths and changes in their conceptions, practices and teacher identity. Therefore, each diary was reanalysed by both authors independently in order to capture the changes in conceptions, practices and teacher identity in each diary in depth. Both authors obtained similar results from the analysis. In the next phase, different types of development paths related to teachers' conceptions, practices and teacher identity were identified by both authors independently. Both authors observed similar development paths, but the analysis continued with a short summary of one to two pages which concisely described the development path of each participant separately. The summaries helped to identify and compare the changes in individual teachers' teacher development during the course. The summaries were written by the second author, and the first author confirmed that each of them corresponded to the description in the reflection diary. Both authors then read the summaries, and identified teachers who described their development in a similar way. There was high consistency between the first and second author regarding the categorisation of similar paths, and unclear cases were discussed in depth. The analysis of the summaries resulted in five different types of development paths.

3. Findings

We focused on the development paths of individual teachers and identified five groups of development paths: 1) teachers describing smooth development and changes in their conceptions and practices; 2) teachers describing unexpected changes in their conceptions; 3) teachers describing fewer conceptual changes and more changes in their teaching practices; 4) teachers describing resistance at the beginning but who eventually experienced changes, especially in their conceptions; and 5) teachers describing resistance towards change. Teachers who were grouped under the same development path described similar changes in their conceptions, practices and identity.

First developmental path group: Teachers describing smooth development and changes in their conceptions and practices

Five teachers' development paths were characterised by a high motivation to participate in the course and by substantial changes during the course. Their

high motivation was due to a genuine interest in teaching and/or the critical feedback they had received from their students about their teaching. These teachers did not describe large obstacles in their development, nor did they describe resistance at any point, but instead described being very enthusiastic about developing their pedagogical expertise. After analysing these diaries in more depth, these teachers were found to lack a very strong teacher identity; however, they were very interested in teaching and reported a strong need to develop both their understanding of basic teaching and learning theories and principles. These teachers had many years of teaching experience, but the amount of their teaching had not been limited as a result of other duties. They represented both soft and hard disciplines and belonged to some clearly distinct professions (e.g. physicians, social workers, or lawyers) and had worked in these professions before or during their university teaching career. They described being professionals in their own field due to their practical expertise. They noted that gaining pedagogical expertise strengthens and complements their expertise in their own field. The changes the teachers described were mostly on the conceptual level, but they also described changes in teaching practices. The following narrative of one teacher's reflection diary describes a typical teacher in this group:

Case 1 - Matt
Matt attended the basic pedagogical basic course because his superior had encouraged him to participate. He had also received negative and harsh feedback from students concerning his class and therefore had a strong motivation to develop his pedagogical skills. He is a professional in the field of medicine but as a teacher he reported that he is poor and lacks both teaching experience and knowledge of teaching. However, his aim was to improve and become a good teacher. Participating in the course did not add any merits to his CV because he was already well positioned in his field of expertise. The teaching methods seen in the course surprised him in a positive manner. He had very strong emotional reactions towards diverse teaching and learning methods, although these feelings were mostly positive. At the end of the course, he explained and discussed in his reflection diary many new concepts he had learned. He stated that he had gained new insight into teaching and had become more confident as a university teacher. Though he still lacked teaching experience, he reported in his reflection diary that he is confident to try new teaching methods with his students, including the reflection diary.

Second developmental path group: Teachers describing unexpected changes in their conceptions

Secondly, three teachers' reflection diaries were characterised by a very narrow description of goals or motives for the course, but during the course they formulated new goals or described different types of changes during the course. Specifically, they described changes in their conceptions of teaching and

enhanced pedagogical awareness. These teachers were typically surprised by how much they had learned during the course. They were young and had very little teaching experience. All of them were doctoral students and held a rather weak teacher identity. They represented both soft and hard disciplines.

Case 2 - Pete
Pete is a young post-doc researcher who has seven years of teaching experience. However, he stated that he is very unsure as a teacher and his supervisor recommended that he undertake pedagogical studies. He had also pondered whether it would be beneficial to participate in a pedagogical development course in order to develop his teaching skills. He attended the course in order to gain broader insight into pedagogy and to meet other university teachers. In his reflection diary, he described how his own motivation and interest or lack thereof affects his learning. He reflected on his actions and behaviour as a teacher and how he tries to be interactive and create an open and friendly learning atmosphere in his classes. He described how his conceptions of learning and teaching changed during the basic pedagogical course and how he is now eager to try new teaching methods in his classes. He also stated that his self-confidence as a teacher had increased and how the course inspired him to reflect on what kind of a teacher he is. He said that he got more out of the course than he expected and that he has also become more critical towards his teaching practices.

Third developmental path group: Teachers describing less conceptual change and more changes in their teaching practices

Thirdly, two teachers described very practical goals and their development during the course, focusing mainly on practical aspects of teaching. These teachers described changes mostly related to their own teaching practices but not in their conceptions of teaching and learning. These two teachers were also young and had limited teaching experience. Both of them were from the behavioural sciences and already had theoretical knowledge of teaching and learning.

Case 3 - Maria
Maria is a young doctoral student who participated in the pedagogical basic course because she aimed to learn what teaching in practice could be. She had no previous teaching experience; however, she began to tutor a student group at another course during the basic pedagogical course. In her reflection diary, she described how she was afraid and anxious at the beginning of the basic pedagogical basic due to her lack of teaching experience. She explained that she did not at all see herself as a teacher and that she often gets nervous if she has to speak in front of large groups. However, in thinking about herself and her strengths as a teacher, she stated that she was very interested in students and how students learn. During the pedagogical development course, she

realised how simple theoretical concepts like "interaction" are complex and problematic when attempting to activate interaction with students in order to help them learn. She decided to focus on learning more about interaction and students' activation and described that this also helped her as a tutor in another course. At the end of the basic pedagogical course, she did not yet see herself as a teacher. However, she explained that she had learned a lot about how to design and plan courses and many tips on how to activate students.

Fourth developmental path group: Teachers describing resistance at the beginning but who eventually experienced changes, especially in their conceptions

Fourthly, four teachers' development paths included some resistance towards the pedagogical course, mostly at the beginning of the course. These teachers typically experienced irritation towards the content and methods of the course, especially with regard to the group activities. Despite their resistance and irritation, they were finally open to change and described several changes as a result of the course. These teachers also had limited teaching experience and were rather young, and stated that they had a weak identity as a university teacher. Most were from the hard sciences. They described changes mostly in their conceptions of teaching and learning and felt that the course encouraged their pedagogical thinking.

Case 4 - Linda
Linda already had some teaching experience but not with large classes. She attended the pedagogical course because she wanted to have better teaching tools and hoped to better understand learning processes. In her reflection diary, she pondered more on herself as a student than as a teacher. She did not reflect on what kind of a teacher she is, but she only described her actions as a teacher without reflecting upon the intentions or motivation behind her actions. In the first days of the course, she lost her motivation and was irritated about the learning theories and teaching models, and was especially annoyed with the group work methods in the course. She explained that her annoyance with group work was the result of her own negative experiences with group work as a student. She spoke with other participants who were also annoyed with the course and she contemplated withdrawing from the course. However, she noted that many practices and working methods seen in the course helped her to improve her teaching straight away and that she uses a new assessment method in her own class that she learned on the course. Surprisingly, her students achieved better learning outcomes than in any of the classes she gave prior to attending the course. The assignment to design a course based on constructive alignment in learning motivated her highly because she will be in charge of teaching a new class next semester. Her attitude changed from negative to positive and inspired her. At the end of the course, she reflected on her own attitude towards pedagogy and now plans to apply new teaching and assessment methods in her courses.

Fifth developmental path group: Teachers describing resistance towards change

Finally, three teachers' descriptions of their development were characterized by resistance to change. After a deep analysis, these teachers were found to have a very strong identity either as a university teacher or as an expert in their own field, although only two of them had ample teaching experience. Two of them were from the soft sciences and were rather young, while the third one was from the hard sciences and was middle aged. They did not describe having a strong intrinsic motivation towards the course. Two of them stated that they already applied a student-focused approach to teaching and that the course only strengthened their previous understanding. They all painted an ideal picture of a university teacher and felt that this picture was incompatible with what was taught in the course. They also stated that the only necessary requirement for them to be experts in their subject matter was to be competent university teachers. These teachers described only minor and more practical changes, such as becoming familiar with new activating methods.

Case 5 - Ellen
Ellen is a young researcher with broad experience as a teacher and extensive pedagogical training. Her main motivation to participate in the course was to earn a certificate for having completed a pedagogical development course and being able to add this to her teaching portfolio. She described herself as having a strong identity as a teacher as a result of her many years of teaching experience outside the university. However, to her great disappointment, this experience was not valued at the university and she noted that in order to secure a position as a university teacher or lecturer, she needed to participate in some pedagogical development courses. She had a negative attitude towards the course due to what she had heard in her faculty. Her negative attitudes arose at the beginning of the course when she became irritated about the theories and concepts of approaches to teaching and learning. In her reflection diary, she reported that she had become acquainted with constructive learning theories more than ten years ago. However, as the course progressed, she realised that many of the course assignments and tasks were meaningful and interesting and that she could learn something from them. In her reflection diary, she described in depth how her conceptions concerning university teaching had changed, but did not mention any changes in her understanding of herself as a teacher. She ended her reflection diary by stating that she was a competent university teacher, but did not mention any desire to develop as a teacher.

There were no differences in teaching experience between the teachers who were open to and those who were resistant to change. Thus, the results of the present study indicate that the amount of prior teaching experience does not explain the variation in how teachers experience pedagogical courses or in how they develop as teachers. The results suggest, however, that if teachers have a very strong conception of themselves as teachers and view themselves as

experts, or have a very strong conception of what it means to be an expert university teacher, their conceptions and teaching practices may be difficult to change.

4. Discussion

When university teachers participate in a pedagogical development course, their expertness as academics and researchers is challenged and negotiated with the theories and practices of the new field of teaching and learning (Winberg, 2008). Teachers may sometimes reject the new theories and practices as being unnecessary and their expertness as academics remains unchallenged. This was the case of the teachers in *group five* in the present study who clearly resisted change. Guskey (2002) suggested that if a teacher has no opportunity to experiment new teaching methods by teaching during the pedagogical course, the teacher may reject the theories. Furthermore, Martin and Lueckenhausen (2005) found that teachers with a more sophisticated understanding of teaching and learning more likely change their understanding of teaching and teaching practices. The results of the present study indeed suggest that teachers holding strong opinions or attitudes about teaching and pedagogical theories are less likely to change their understanding or practices. They may have a profound and sophisticated understanding of learning theories but they seem to resist changing their own understanding and conceptions of teaching and learning.

Åkerlind (2007) noted that for some teachers, developing as a university teacher simply means adopting new teaching strategies in order to develop their own skills as a teacher. In our study, the teachers in *group five* who were resistant to change described mainly rather superficial changes in their teaching practices. On the other hand, Åkerlind (2007) identified teachers who continually increased their understanding of student learning in order to become more effective in facilitating learning processes. Similarly, the teachers in *groups one and two* were more oriented towards developing their conceptions and understanding of learning, and described how their teaching might affect their students' learning. For them, crossing a border between the domain of the own discipline and the domain of pedagogical theories seemed to happen smoothly.

In order to understand why some participants resisted changing their understanding about teaching and learning while other participants described strong changes in their teacher expertise in terms of their concepts of teaching and learning, we examine the findings of our study in light of the idea of *boundary crossing* as presented by Akkerman and Bakker (2011). They define *boundary* as a sociocultural difference which leads to discontinuity in action or interaction. The term *boundary crossing* refers to situations in which experts enter into unfamiliar territory in which they are to some extent unqualified or novices (Akkerman & Bakker, 2011). In their review, they discerned four different mechanisms which constitute the learning potential

boundary crossing: identification, coordination, reflection and transformation (Akkerman & Bakker, 2011).

Identification occurs when a person encounters a different domain of practice or knowledge which leads to questioning of the core identity of each of the intersecting sites and how these practices are related to each other. Two distinct processes emerge in the dialogical process of identification: *othering* and *legitimating coexistence*. On the basis of our results, we interpret that othering occurs when a teacher participating in a pedagogical development course encounters cultural differences between the teaching practices of own domain and the teaching practices of the pedagogical course, which may lead to feelings of tension and even rejection. The new pedagogical theories remain as the "other" and a teacher will not accept them as being useful for developing teaching practice in the own domain. The process of othering was revealed in the developmental paths of those teachers who resisted changing their conceptions and already had a strong identity as a teacher (fifth developmental path). These teachers' previous teaching experience and knowledge of learning theories seemed to prevent them from reflecting and developing as teachers.

However, if a person continues with the identification process in terms of legitimating coexistence, it is possible to reconstruct own identity in light of the other and to develop own teaching practice based on the pedagogical theories and on the substance of the own domain (Akkerman & Bakker, 2011). In our study, pedagogical theories were useful for the young novices in teaching and research (second developmental path) and they changed their teaching in line with what they had learned. They accepted pedagogy as a new field of expertise and reconstructed their teacher identity and their conceptions about teaching and learning to match their disciplinary background. Furthermore, those of the first developmental path, experts from another domain who were very motivated to develop their teaching expertise, also reflected on how pedagogical theories helped them to develop their teaching practices and how they applied these new theories and practices in the teaching of the own domain.

Coordination is about creating cooperative and routinized exchanges between practices, and comprises four different processes which aim to allow diverse practices to work together efficiently (Akkerman & Bakker, 2011). Firstly, coordination requires a *communicative connection* so that relevant information can be exchanged between partners. This means that participants of pedagogical courses have to learn the new language of pedagogy and understand ordinary terms like "learning" as a theoretical concept. The participants who reported a change in their conceptions of teaching and learning stated that they began to understand the simple and everyday word "learning" in a new and different way. This understanding led them to reflect on learning theories and relate theoretical concepts in teaching and learning situations in their own discipline. In order to do so, they had to translate the pedagogical concepts to their own disciplinary context. This was the case especially among

teachers in the first and second developmental path groups. This *effort of translation* (Akkerman and Bakker, 2011) seems to be a very necessary process in the development of pedagogical expertise besides expertise in own discipline. The teachers belonging to the fifth developmental path group seemed unable to translate the pedagogical concepts to match their own disciplinary context, while the teachers in the third developmental group found it difficult to develop their conceptions of teaching and learning, which could be related to the difficulty of translating the concepts.

According to Akkerman and Bakker (2011, p. 144) there are still two processes of coordination: *enhancing boundary permeability* and *routinization*. Enhancing boundary permeability means that one is not even aware of different practices but moves smoothly from one practice to another. Routinization means that crossing boundaries and moving from one practice to another becomes automatized and easy. In order to interpret these two processes in developing expertise, we may assume that both occur when a person can easily change his/her perspective from own discipline to the domain of pedagogy and vice versa. These kinds of processes did not emerge from our data. The pedagogical development course was the first pedagogical course the participants had attended, and so it may not have been possible for them to develop teacher expertise in such a way during the first pedagogical course.

Reflection is a process in which boundary crossing and boundary objects become explicitly discussed and compared. Participants of university pedagogy courses become aware of the differences in teaching culture among disciplines and aware of differences between pedagogical training and teaching in their own discipline. Reflection as a process has two different reflective mechanisms: *perspective making* and *perspective taking* (Akkerman & Bakker, 2011). Perspective making means that a person makes explicit his/her understanding of a subject or an issue. The assignment to write a reflection diary aimed to increase participants' understanding of pedagogical issues, and differences in the development of pedagogical expertise may be related to how well they managed to make their understanding of pedagogical theories and concepts explicit for themselves. Perspective making was revealed in the changes of conceptions of teaching and learning and in changes of teaching practices. Participants with many changes in their developmental paths (especially the first and second groups) reflected in multiple ways how they had gained a new understanding of learning and teaching and how this new understanding had changed their intentions to teach or even teaching practices. Teachers in the fourth developmental group also described these aspects after they overcame resistance. Perspective making was not that clear among teachers in group three as they mostly described changes in their teaching practices, while changes in conceptions were scarce. Among the teachers in group five, reflection was very narrow or totally lacking. Perspective taking is an action in which a person is able to look at own field in the eyes of another. The lack of perspective taking may result in misunderstandings (Akkerman & Bakker, 2011). When one holds tightly to the own previous understanding of teach-

ing, and is not able to look at it from another viewpoint, the development of expertise in pedagogy is prevented. This lack of perspective taking was revealed in the experiences of the teachers in the fifth group, who had a negative attitude towards the university pedagogy course and were not able to change their opinion. However, the participants who began to reflect on what they had learned (especially teachers in groups one and two, and also those in group three and four) could overcome this obstacle and were able to look at pedagogical theories from another perspective, as well as to look at their own discipline from a pedagogical perspective, and thus develop their understanding of pedagogy.

Transformation is the fourth learning mechanism identified by Akkerman and Bakker (2011). Transformation leads to profound changes in one's teaching practice, even to new modes of teaching and assessment. *Confrontation* is needed to start the transformation process. Teachers who were frustrated with their own teaching and had encountered problems, such as negative feedback from their students, were more receptive to new modes of teaching and learning and also more eager to change their teaching, even during the course. For them, the university pedagogy course provided the opportunity to develop their teaching and understanding of teaching and learning and to develop their expertise in pedagogy. In contrast, those who described being rather satisfied with their teaching did not have a specific need to develop as teachers or change their conceptions of teaching and learning, which was the case of the teachers in the fifth group. They did not describe a strong intrinsic motivation towards the pedagogical course, and it is likely that these teachers had more extrinsic motives, such as earning the course certificate.

Recognizing a shared problem space follows confrontation often as a direct response to it (Akkerman & Bakker, 2011). For teachers participating in a pedagogical development course, this shared problem space is the pedagogical improvement of their teaching. Those teachers whose developmental paths included confrontations in the domain of own teaching were open to discussing and sharing their problems concerning teaching and learning. For them, the pedagogical development course was a shared problem space in itself. This led them to the third process of transformation, *hybridization*; in which they changed and developed their own courses and teaching towards something new in which the pedagogical theories were combined into the teaching of their own subject. *Crystallization* is a fourth process of transformation and is seen as real consequences in practice. This type of transformations was revealed in those developmental paths in which a teacher described how the pedagogical ideas will work as basis for the continuous development of own teaching after the course. However, the continuous joint work at the boundaries of pedagogical domain and other academic disciplines was not revealed in the developmental paths. This was the first pedagogical development course for the participants, so more effort and cooperation may be needed after the course before more fundamental and permanent changes in teaching practices emerge.

To conclude, the idea of boundary crossing (Akkerman & Bakker, 2011) provided interesting explanations for the differences between the five development paths. The boundaries between academic domains may lead to resistance and minimize the social interaction between the members of different academic domains, as was the case of the teachers in the fifth developmental group. However, the boundaries may also function as opportunities for mutual understanding and for the creation and development of new teaching practices in diverse academic fields, as among teachers in the first four developmental groups. As a practical implication of the study, we would like to address the importance of paying more attention to the sociocultural differences among teachers who attend pedagogical courses. If these differences remain implicit, the process of teacher development may be hindered for those participants who hold strongly to the ideals of themselves as experts in teaching their own academic domain or who see pedagogy as a totally strange and less-valued domain. In addition, we see value in using reflection diaries in the courses, as they provide teachers with the opportunity to reflect on their own development and to identify obstacles during their development. Had the teachers not been asked to write the reflection diaries, their development paths may have been different since they would not have realised as much as they did through writing them.

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