



Inquiry-based learning as a tool during transitions in the teacher education program

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Abstract

The transitions between the statuses of pupil, student teacher and professional teacher remain some of the most fundamental challenges for student teachers. Teacher education programs emphasize that students should become equipped with competences to cope with change and adhere to career-long learning. In this study, we make use of inquiry-based learning (IBL) and qualitative data collected from student teachers at three different departments at a university in Norway to investigate how student teachers reflect on these transitions. The findings suggest the need to assist the students in engaging in a dialogue between theory and practice in relation to these transitions, and that IBL cannot be developed hermetically at the university without a close dialogue with the practice field.

Keywords

inquiry-based learning, teacher education, student teachers, transitions, practice-theory gap

Introduction

Teacher education programs are increasingly focusing on how to equip teachers with strategies for implementing responses to new circumstances and problems (Donnell & Harper, 2005), and for engaging in a continuous dialogue between theory and practice (Allen, 2009). In this paper, we ask the question: How can a varied set of inquiry-based learning methods support student teachers' different learning processes? In answering this question, we aim to investigate how inquiry-based learning may be employed in different ways to enable student teachers to reflect on their transitions from pupils to student teachers and eventually beginning teachers who are expected to remain engaged in career-long learning.

Transitions

To become a teacher, alumni will go through a *rite de passage* which involves at least three important *transitions* in the shape of processes in which student teachers change status during the teacher training program. These transitions include 1) leaving school and entering the university; 2) temporarily leaving the university for teaching practice; and 3) leaving the university and entering work as a professional teacher. While all alumni go through these transitions, the individual's experience of them is of course highly subjective and dependent on prior teaching experience and other factors.

The first transition concerns leaving school and entering university. This implies changing status from pupil to student and getting used to another culture of studies and knowledge. Students often experience a so-called *transfer shock* (Hills, 1965), related to weaker academic and social support networks at the university level (Townsend & Wilson, 2006; Bashaar et al., 2019). Furthermore, entering the teacher education program, alumni have previously experienced thousands of hours of instruction with up to 50 different teachers throughout more than a decade of schooling (Terum & Heggen, 2010). Consequently, they carry with them certain preconceptions on both schooling and the role of the teacher based on personal experience and cultural beliefs (Joram & Gabriele, 1998; Cheng et al., 2010). These preconceptions have been found to influence the student teachers' learning process during the teacher education program, and to carry into their future practice (Hiebert et al., 2007; Korthagen, 2010).

The second transition concerns the phase during which students temporarily leave the university and go to schools as part of their teaching practice, changing their status from a theoretically trained student to a student with some practical teaching experience. This is an active, participative learning process in which they are expected to reconcile the theory they have learnt so far during the teacher education program with the practical realities of the teaching practice. They are *betwixt and between* the statuses as students and teachers, needing to balance the roles of *learners* and *teachers* (Nilssen & Klemp, 2014). While students often appreciate this part of their education and relate these experiences to what they learn during the rest of the program (Arnesen & Aamodt, 2010; Finne et al., 2013), it can also be an overwhelming and stressful experience for them. They may experience something akin to a *transition shock* in which they put theory aside and instead rely on emulating the practice of the more experienced teachers they observe around them (Veenman, 1984; Cohn, 1981; Korthagen, 2010; Allen, 2009).

Finally, a third transition occurs when the students are leaving the university and entering professional work, changing their status from students to professional teachers. This is where a 'transition shock' may have a more profound and long-lasting impact (Korthagen, 2010). Putting what they have learnt in the teacher education program into practice in the

classroom has proved to be a consistent challenge in teacher education (Cheng et al., 2010; Allen et al., 2010; Ministry of Education and Research, 2010; Finne et al., 2013). This may partly be related to relatively inflexible school cultures where established patterns are difficult to change (Zeichner & Gore, 1990; Damsgaard, 2010). While novice teachers often encounter difficulties during their first year of work, there is often a lack of support from the school management and colleagues (Caspersen & Raaen, 2014; Howes & Goodman-Delahunty, 2015). Research has also shown that while teachers do update their disciplinary knowledge, the rich educational research base is rarely used by them (Manger et al., 2009; Hattie, 2009). Furthermore, research rarely leads to policy changes that affect teaching practices (Hattie, 2009). Thus, beginning teachers may confront a *performance paradox* in which the knowledge they have from their education programs is not necessarily consistent with what they are able to employ in practice (Pfeffer & Sutton, 2000; Chang et al., 2010).

On the other hand, student teachers may also experience that lecturers in teacher education programs do not necessarily have up-to-date experience from the practice field. While most of the lecturers may have experience from teaching at schools, it may not be all that recent. At the same time, the professional cooperation between the university and practice schools may be inadequate (Finne et al., 2011). Thus, these factors may contribute to prevent the development of a dialectical relationship between theory and practice. Pointed out by Dewey as early as 1904 (Korthagen, 2010), this *theory-practice gap* has remained a fundamental challenge in the educational system for at least a century. The current consensus on *knowledge* is that it is no longer considered to be fixed and stable, but tends to be perceived as complex, uncertain and fluid (Gilbert, 2005). Consequently, one of the major issues in teacher education programs is how to encourage student teachers to be flexible, adaptable and prepared for change (Hiebert et al., 2007). Teachers are now expected to engage themselves in a career-long process of learning, constantly updating their knowledge and reflecting on their own practice. Thus, student teachers “should be provided with a solid base for keeping abreast of new developments (e.g., developing habits of enquiry and reading) and with opportunities for problem-solving and reflection in the hope that they will be adaptable, questioning, critical, inventive, creative and reflective.” (Kellaghan, 2004:23).

Inquiry-based learning

To address the challenges related to these transitions, the teacher education program at a university in Norway employed *inquiry-based learning* (IBL) as a tool to aid the students. IBL has increasingly become employed in teacher education programs to address the theory-practice gap (Darling-Hammond, 1994; Donnel & Harper, 2005). Advocated by Dewey more than a century ago, and echoing Freireian pedagogy, IBL has become an umbrella for a number of related learning approaches which aim to empower learners to integrate theory and practice, and apply knowledge, skills and reflection to solve problems (Savery, 2006). It is emphasized that learning must be related to the students’ experiences and that they need to be active learners rather than passive recipients of teaching (Barrow, 2006; Freire, 1970). It can be defined as a process of discovering new causal relations, with the learner formulating hypotheses, inquiring central questions, exploring connections and testing them through a variety of methods and practices.

Critiques of IBL approaches have addressed the shortcomings of minimal guidance (Roblyer et al., 1997), and the need to make a distinction between the learning methods of an expert professional researcher and novice students who are essentially new to the discipline (Kirschner et al., 2006). Furthermore, while facilitation of reflection through inquiry

has been considered a major route towards helping student teachers develop in practice and actively reconstruct their own knowledge base for teaching (Tilema, 2000; Olson, 2000; Vaugelade Berg, 2013; 2014), research has found that projects may often employ general approaches which may not necessarily link inquiry to curriculum, learning progression, learning outcomes or practice (e.g. Andersen, 2013; Berg et al., 2003). In a Norwegian setting, studies have shown that IBL pedagogies have been implemented to a limited extent (Lipowski et al., 2011; Ødegaard & Arnesen, 2010; Stavik-Karlsen & Gray, 2013), and that although teachers would like to use more IBL strategies in their day-to-day teaching, it may involve uncertainty and foster tensions in teacher practice (Sikko et al., 2012; Goodchild et al., 2013).

In the present context, we will refer to IBL as approaches in which students are nurtured to become professionals who engage in exploring, questioning and developing critical and independent insights into their profession by becoming engaged in learning contexts modelled on the investigatory activities of professional researchers (Kirschner et al., 2006; Jaworski, 2007). We follow Yackel and Rasmussen (2002) in understanding IBL as an approach which encourages students to develop meaningful solutions, to explain and justify their thinking, to make sense of the thinking of others, and to raise questions when they disagree or do not understand.

The current study

The Framework plan for the general teacher education in Norway states that the education is intended to develop the students' ability for reflection and provide research-based methods to collect and update their knowledge throughout their careers (Ministry of Education and Research, 2009). This provided a framework for interdisciplinary collaboration between three departments in the fields of education: Nordic and Media Studies; Education; and Mathematical Science in the teacher education program at a university in Norway. The overarching project aimed to increase the competence of future teachers by giving the program a stronger research base upon which to develop the students' capacities for curiosity, systematic thinking and intellectual independency. Each department developed distinct IBL approaches in this context, addressing separate transitions. The research questions of the current study were:

	Research question	Transition	Department
1	Which kind of experiences and perceptions about teachers do student teachers bring with them into the studies?	From pupil to student teacher	Dept. of Education
2	Which views on the relationship between theory and practice do student teachers have after their first teaching practice period?	From theoretical studies to teaching practice	Dept. of Nordic and Media Studies
3	Which perceptions do student teachers have about the role of learning among professional teachers?	From student teacher to professional teacher	Dept. of Mathematical Science

Methods and material

Inquiry-based learning is often organized into inquiry phases that together form an inquiry circle, but different variations can be found throughout the literature. By means of a systematic literature review, Pedaste et al. (2015) identified the core features of IBL, and labelled

them Orientation, Conceptualization, Investigation, Conclusion and Discussion. These phases correspond well not only to how research as a process is usually conducted, but also on an overall level to the journey students are invited to engage in when participating in and completing a study program. In our work the different parts of the journey are conceptualized through transitions on a timeline, and they can be connected to different aspects of the five core features of IBL, as described by Pedaste et al. (ibid). To analyze how student teachers reflect on the three major transitions in their education program, we draw on material collected in relation to the described IBL approaches at each department. This includes 1) narratives (Orientation); 2) data from questionnaire and focus-group interviews (Conceptualization); and 3) research-based essays (Investigation). The different approaches and sets of data were chosen to activate different thinking and problem-solving skills needed in their study program and also in their future professional role, to provide the teacher students with different specific methods that are transferable to their future professional work, and also to reflect on different stages in the teacher study program (Conclusion and Discussion). All research participants have signed a form to consent to participate in the study, and the study has been approved by the Norwegian Data Protection Official for Research (NSD).

Narratives

Focusing on RQ 1 and the first transition, first semester students at the Department of Education were asked to write down a significant event from their own schooling: “Describe a situation from a specific lesson that has made an impression on you as a student/pupil. Choose a specific experience involving a teacher that has influenced and shaped your view of what is important about being a teacher.” When describing the event and their experiences, the students themselves chose a narrative form without having been explicitly asked to do so. This observation reinforced a perception that the descriptions must be analyzed as narratives (Haraldstad & Kristiansen, 2019; Jonsdottir, 2012). Subsequently, they were asked to reflect on the teacher role in relation to the narrative, and finally to rewrite the narrative from the perspective of the teacher involved in the story. The material consists of 168 narratives from two classes of first-year students in 2015.

The narratives were analyzed using a framework developed by Labov and Waletzky (1997). This implies identifying the following categories: a) Abstract, a brief summary of the story; b) Orientation, who, when, where; c) Complicating Action, what happened next; d) Evaluation, what it means; e) Result, what finally happened (the end); and f) Coda, summary (“this event has meant a lot to me and I learned that . . .”). To highlight this framework even more, an overarching category called “plot” was included. This is a category where the researcher interprets and characterizes the narrative as a whole to establish a ‘plot’ around which the narrative regarding the teaching role and the specific context was structured. Some of the responses (17) fell outside of these criteria and were omitted from the analysis. These texts had a less narrative structure, lacked the categories related to chronology and place, and focused heavily on brief appraisals of a previous teacher.

Questionnaire and focus-group interviews

Focusing on RQ 2 and the second transition, third-semester students at the Department of Nordic and Media Studies were invited to participate in a qualitative open-ended questionnaire after their teaching practice, being their last teaching practice period with the subject

“Norwegian” as a main focus area. The questionnaire focused on the students’ own experiences with the relationship between the education on campus and the professional experience during the teaching practice. Furthermore, they participated in focus-group interviews which enabled them to elaborate on themes from the questionnaire. Data consists of responses from 51 students in 2014, as well as transcribed focus-group interviews with four groups of a total number of 10 students in 2014. In this context, focus is on two questions in the open-ended questionnaire and focus-group interviews: 1) *How can you become a good teacher?* and 2) *The responsibility to ensure that the teacher education program emphasizes coherent education and connections between theory and practice, is shared between teaching practice teachers and professional teachers at the University. To what extent do you experience that this is maintained in the teacher education program?*

The questionnaire and transcribed focus-group interviews were analyzed using categorization techniques in which two researchers read the dataset independently and identified recurrent themes in the students’ replies to the questions. By comparing the resulting categories, accordance was made about dominant themes.

Research-based essay

Focusing on RQ3 and the third transition into professional teaching, third-semester students at the Department of Mathematical Science were instructed to engage in research by providing word problems to their pupils, systematically observing their experiences and writing a structured research essay with reflections on their own learning process and their own development as future mathematics teachers. The students could select one of three themes for the essay: 1) *Use of diagnostic assignments to expose misconceptions in mathematics*; 2) *About pupils’ difficulties with mathematical work problems*; and 3) *About Algebraic thinking*. The assignment aimed to encourage reflections about the students’ experiences at a meta-level. Students were guided through the process and had the option of writing a research-based essay in groups of up to four, or alone. The material consists of data from 29 individual and 35 group essays in 2011; 52 individual and 59 group essays in 2012; and 35 individual and 41 group essays in 2013. The data was analyzed using the same method as in the questionnaires and focus-group interviews, as described above.

Findings

Transition 1: Leaving school and entering university

We have grouped the student teachers’ narratives about their own experiences with their past teachers into four categories: a) Deterrence (I would not want to become that sort of teacher); b) Social care; c) Creativity (untraditional dissemination); and d) Professional skills. Importantly, the additional task of rewriting the narrative from the perspective of the teacher engaged the student teachers in a reflective process in which they describe various skills and competences that they expect they will need in a daily classroom situation.

The *deterrence* narratives illustrate concerns about undesirable teacher behavior, such as having low expectations, accusing pupils, stereotyping pupils, and being lazy. The underlying plot was often that “I don’t want to turn out like this”. For instance, in the following narrative, one of the student teachers describes a teacher who tended to favor certain pupils. The student tells a story of a “cool” teacher who tended to favor the most popular and cool kids in the class. A consequence was:

The class became split in half during his lessons, between those who were good and those who were less good. The reason I selected this story is because this teacher shaped my view on what is important in a teacher, I don't want to become like him. I wish to become a teacher who treats everybody equally, but who sees everybody. I think the teaching profession is an incredibly important task, and I think a central skill for a good teacher is to show respect and care about people¹. (student 2A)

Reflecting on the narrative from the perspective of the teacher, the student also seems to be able to reassess the situation and identify competences and skills that are needed to avoid ending up in a similar dilemma. Reflections about the narrative are used as a guideline for awareness about the student's own approach to creating relationships in class, as a future teacher:

Looking at the event from the teacher's perspective, one of the reasons why he became like he did, may have been that he attempted to create a good relationship with the class by becoming "buddies" with the most popular pupils. The popular or lead pupils often set the trends for who among the teachers became respected. There is also a chance that he was not aware that he was favoring certain pupils. You don't have the same chemistry with everybody, so perhaps he just had better chemistry with those pupils we felt he favored. (student 2A)

The *social care* narratives illustrate situations in which teachers may play an important role in providing care for their pupils. For instance, in the following narrative one of the students reflects on how a teacher contributed to making her want to continue coming to school despite a painful illness:

She could always tell when I was in pain, telling me that "I can see that you are not in shape today", and would take this into consideration. I could step out for some fresh air if I needed it, and to relax and not participate fully in the instruction, and if I needed to go home or arrive late, she fully understood my needs. It was of great benefit to me that somebody took care of me both at home and at school when I was in pain. Not all teachers are as considerate with their pupils [. . .] She made me like going to school, she made me try to get to school if I could. (student 22A)

The *creativity* narratives illustrate episodes in which teachers successfully employed spontaneous and creative approaches in class. For instance, one of the students described how a teacher acknowledged that her pupils would probably benefit from a field excursion when learning about wool:

I remember it well when the teacher stood in front of class, holding yarns in her hand and asking: "Where does this come from?" Rather than looking the answer up in a book, we went out to a farm and participated in the whole process: shearing the sheep, skinning the fleece and classing the wool. To me, the process of observing and doing assignments in this way has been educational. I don't remember too many teachers, but this creative teacher who closed the books and rather took the pupils out of the classroom, left her mark. We acquired a lot of knowledge in a slightly "different" and creative way. This has helped form my view on what constitutes important qualities in a teacher. Creativity, positive mindset, while you also need control and boundaries. (student 22B)

The narratives about *professional skills*, in turn, identified academic knowledge as important traits in their former teachers. The narratives illustrated how the student teachers as former

1. This and all following quotes are our translations from Norwegian to English.

pupils had received help and found a solution to their problems. For instance, one of the students had struggled with mathematics as a subject, and described how the teacher approached the problem:

The teacher walked around (in the classroom) and observed how we were managing. He quickly noticed that I was struggling with the tasks. He moved a chair over to my desk and sat down next to me. He thoroughly instructed me in the underlying rules and principles and watched as I solved the tasks. He devoted perhaps a quarter of an hour to helping me. When he was confident that I was managing on my own, he proceeded to help others. After that lesson, I never struggled with those types of tasks anymore, and this was thanks to that teacher. (student 2B)

When given the opportunity to rewrite the narrative from the perspective of the teacher, this student adopts a first-person perspective, temporarily “becoming” the inspiring teacher:

I went to school ready to teach my pupils a new subject in mathematics [. . .] I walked around the classroom and paid close attention. It was important to me to help pupils with little self-efficacy in mathematics. I noticed a pupil who seemed to be struggling and thought he might need some help. Consequently, I moved a chair over to his side. It became apparent that he had not understood what I had shown on the blackboard. I taught him how to do it again while I analyzed what he was doing incorrectly. I explained this to him, and after we had gone over it for about a quarter of an hour, he managed on his own. (student 2B)

The assignment encouraged the student teachers to reflect on the influence of the teaching they have received at school throughout the years as a starting point for the transition from being pupils to becoming student teachers. In this way, they entered into a self-reflective learning process about how their own experiences help form their perceptions and theories about teaching.

Transition 2: Entering teaching practice

The findings from the questionnaires and focus-group interviews indicate that the students emerge from their teaching practice with new experiences from classroom teaching and new ideas about what constitutes a good teacher. We have identified two major themes in our material: a) Practice-theory gaps; b) Practice-theory bridges.

Responses related to the *practice-theory gap* often reflected on the practical classroom challenges that confronted the students during their teaching practice. Some seem to have struggled with gaining adequate control over the class and emphasized the need for authoritative skills. Thus, they consider being a good teacher is considered to involve “having the skills to relate to children, without losing the authoritative leader role” (Student 19, Questionnaire), and “being as authoritative as possible, a sharply defined leader who sees each pupil and their needs” (Student 37, Questionnaire). A good teacher is perceived as a strong leader with good professional disciplinary and relational competences. This is in contrast with the findings from the first transition described above, where the aspect of leadership was not as much in focus, although relational competences were emphasized in both cases. It is only after experiencing classroom situations from a teacher perspective that the students seem to become aware of the need for this kind of competence.

Furthermore, while many student teachers acknowledged the need for professional competence in various scientific disciplines such as mathematics, natural sciences and so forth, they tended to subordinate it to the need for skills in professional didactics:

You need a lot of competence about the disciplines you are teaching in. But to disseminate this knowledge to the pupils in such a manner that they grasp it, to have that dissemination competence, is crucial. (Focus-group interview #1)

Many of the students reflected on their lack of proper techniques related to dissemination of knowledge in a classroom situation. For instance, one of them responded that: “I feel we lack tips and methods on how we can or should disseminate things in the best way possible” (Student 14, Questionnaire). Many also called for more teaching about practice situations:

There is a wholeness and connection (in the education program), but I still miss more theory that is relevant for what we encounter in the everyday school situation, and different ways to teach. (Student 14, Questionnaire)

Many of the student teachers seemed to expect to be provided with methodological tools at campus that can be implemented in the classroom during the teaching practice. In other words, there is little awareness of this part of the training as a learning arena within the overall education program. Thus, a sharp distinction is made between theory and practice, and teaching and learning, despite intentions to connect these areas in the education program.

However, while responses grouped into the theme *practice-theory bridges* were sparser, they seemed to reflect an acknowledgment that the theory-practice gap can only be bridged through experience. For instance, one of the students reflected that:

I think that in reality you actually have to just jump in and find your way forward. You can't develop all competences by reading about it. You must go out there and try it too, especially in the teaching profession. You must dare to try and fail. That's how you learn. Even though you've been a teacher for 20 years, you are never fully educated. So, I think that the combination between theory and practice, you just have to try and fail. (Focus-group interview #1)

Another student responded that:

It is very useful to be able to read about the different types of pupils, the degree of professional competence on instructions in reading and writing. And to observe in practice how this plays out in the classroom and the challenges this entails, both for teacher and pupil. To read about how reading and writing instructions may be done (phonology, lettering, the alphabetic principle), and then observe it being performed by a teacher, and to get to try it out for yourself. (Student 9, Questionnaire)

When reflecting on the need for this kind of integration of practice and theory, the students also tended to start to grasp the need for career-long learning. For instance, one of the students reflected that being a good teacher involves the ability to be “understanding, caring, inquisitive and constantly being creative and trying out new methods” (Student 8, Questionnaire). This line of thinking seems to be in line with the intentions in the education program, and the overall strategy of the authorities to promote career-long learning. However, this only applied to some of the students while the majority of them arrived from the teaching practice period with an experience of a gap between theory and practice.

Transition 3: Becoming professional teachers

In the student teachers' reflections on their own learning experiences and their own development as future mathematics teachers, three interrelated themes were identified:

a) Awareness; b) Distance; c) Critical questions. Responses which focused on *awareness* often addressed the need to become mindful of events and processes which may occur in and out of the classroom. For instance, one of the students reflected on the need “to use inquisitiveness as a tool in the education and the importance of setting aside time to map misconceptions that occur in the classroom” (student 3, 2013). One of them had “become much more aware that I need to reflect more on my own instruction, both in preparation, and assessing it in retrospect” (student 2, 2013). Some of the students also explicitly linked this competence to leadership: “There is no doubt that this kind of awareness and reflections will be part of my profession as a teacher in future and I hope this will enable me to become a better leader for my pupils” (Student 7, 2012). Thus, some seem to be starting to develop a more nuanced notion of leadership than what we found when students reflected on their classroom experiences during the teaching practice period earlier in the educational program. As in the case of the teaching practice, the research assignment provided students with practical experiences which could make them reconsider theoretical perceptions, at least when given the opportunity to reflect on them.

Responses which focused on *distance* acknowledged the merits of being able to step in and out of roles. By temporarily becoming researchers, some students had found themselves able to employ analysis as a new tool. For instance, one of the students reflected that:

I see a huge difference between being a researcher and being a teacher. As a researcher, you must distance yourself from the pupils and analyze their thinking; as a teacher, the contact with pupils is the most important. I see now clearly that there is a link between theory and practice and it is particularly relevant for my work as mathematics teacher – much more than what I thought in the beginning. (student 9, 2013)

Finally, responses which focused on asking *critical questions* often addressed the need for reassessing both theory and practice. For instance, one of the students wrote that:

As I worked with my essay I learned a lot concerning what it means to be a teacher engaged in research and how important it is, in order to become a better teacher. I have learned to ask myself critical questions about what I read and about my own teaching (Student 1, 2011).

Another student reflected that “I challenged myself by asking ‘why do I want this method?’ (. . .) I think I want to continue with researching my own teaching practice (. . .) varying my teaching methods even more” (student 11, 2012). Furthermore, some students emphasized the importance of encouraging pupils to ask critical questions in class: “If we have such an attitude as teachers, we will be able to influence our pupils to ask questions, to be curious, to investigate” (student 3, 2012).

Discussion

The major transitions facing student teachers during the teacher education program include leaving school and entering university; entering teaching practice at schools; and becoming professional teachers. The study employed inquiry-based learning (IBL) as a tool to aid the students through these transitions and become professionals who engage in exploring, questioning and developing critical thinking and reflection (Kirschner et al., 2006; Jaworski, 2007). The approach did not replace more traditional teaching directed at general knowledge and comprehension, nor did it involve minimal guidance (Kirschner et al., 2006). Our findings suggest that by employing a range of IBL approaches ranging from writing

narratives to being involved with research as both respondents and researchers, the students may become engaged in reflections about their own experiences and the interplay between theory and practice. Previous research has suggested that these types of inquiry activities, where students need to apply what they learn in new situations, may take time (Wiske, 1998).

An important part of the first transition, from pupil to student, is to define and redefine constitutive events and experiences, roles, challenges and expectations that are to be addressed throughout the study program, themes that are found in the first general phase of IBL, Orientation (see Pedaste et al., 2015). The aim is to get the learner started with a new topic for investigation. In the current study, the students reflected on the first transition from school to the university through the perspectives of both pupils and teachers. This led the students to emphasize the need for competences such as social care, creativity and solid professional skills. During the second transition into teaching practice in schools, new perspectives on teaching were starting to form as the students gained practical experience and started to realize the need for skills and competences which they had not necessarily been aware of up until that point. This can be connected to the general inquiry phase Conceptualization (Pedaste et al., 2015), the core experience being that as a teacher one needs skills in making fruitful connections between actual academic subject knowledge and thinking, and relational didactics and methods towards the actual pupils one engages in learning activities with. One needs subject knowledge to question and determine what needs to be known, to define problems one encounters in the classroom, and to make predictions on how best to meet the expectations that are put forth in the pupils' curriculum. Finally, when approaching the point of becoming professional teachers themselves, the students became engaged with research projects with pupils and reflected on the need for career-long learning. This corresponds to the general inquiry phase Investigation (Pedaste et al., 2015), in which planning of what methods to use, carrying out a plan, designing teaching, identifying resources, investigating and analyzing are essential activities. By gradually developing this kind of dialectical relationship between theory and practice, pre-service teachers may be given the opportunity to gradually move from being passive students to becoming active participants in the learning process (Healey & Jenkins, 2009; Vaugelade Berg, 2014). These three stages – Orientation, Conceptualization, and Investigation – lead up to the two final stages, Conclusion and Discussion (Pedaste et al., 2015). Our three sub-investigations could together be seen to address core activities needed for a professional teacher: to reflect on one's role as a teacher, and the experiences, way of thinking and relationships that inform one's behavior towards others, specific academic subject knowledge and the skills needed to actively make fruitful connections to didactic practices and methods to enhance learning processes among pupils in schools, and to continuously be aware of how knowledge is achieved, to question designs and data used in learning resources, and to put effort into investigating hypotheses that arise in one's professional work throughout one's career.

There have been many incentives to build bridges between theory and practice, including providing opportunities to enact classroom strategies; allowing the students to see and rehearse teaching practices during their university training; and the introduction of professional development schools (PDS), and lab schools (Darling-Hammond, 2014; Klette & Hammernes, 2016; Thompson et al., 2013). This implies closer collaboration between school and university, where candidates receive more supervision and feedback, and participate in more collective planning and decision-making among teachers at the school. Our study suggests that experiences gained from engaging in IBL may encourage reflection, analytical distance and critical thinking. Hence, this may help bridge the theory-practice gap and enable

the gradual development of inquiry as a fundamental professional stance during and after the teacher education program (Vaugelade Berg, 2014; Cochran-Smith & Lytle, 1999). In a Freireian perspective (Freire, 1970), the final transition between being a student and a teacher is fictional: the teacher is also ideally a student engaging in a career-long learning process. Previous studies of professional teachers support this notion, finding that many teachers do not regard themselves as fully qualified but rather express a need for further learning and updating their knowledge (e.g. Damsgaard, 2010). Thus, in this perspective, the teacher education program is merely a learning foundation on which to expand. Yet, some of the students failed to reflect on the role of the teaching practice in schools as a coherent learning arena within the education program, and rather “accused” the theory they had learned so far of being inadequate. To the extent that students do expect that the education program should produce a form of readymade teacher, it may contribute to making the transition into professional practice another *transfer shock* (ibid). Previous studies have shown that the historical divide between theory and practice may be reinforced in teacher education in various ways (Klette & Hammernes, 2016; Darling-Hammond, 2014), and that initial teaching experience may result in the abandonment of theory in favor of emulations of the practices of more experienced teachers (Korthagen, 2010; Allen, 2009).

One limitation of the present study is that the coherence of the IBL approach across the three departments was probably not made sufficiently explicit to the candidates. Previous studies have emphasized that students should be encouraged to learn about the programs’ vision of good teaching, to connect ideas from one class to another, and to experience coursework that is intended to build understanding over time (Klette & Hammernes, 2016). Furthermore, the study suggests that IBL may not “automatically” lead to the kind of reflections we would like to see, and that IBL cannot be developed hermetically at the university without a close dialogue with the practice field. As Darling-Hammond (2014) has suggested, efforts to connect theory and practice requires a rethinking of the relationships between universities and schools that aims to produce changes in the content of schooling as well as teacher training. Relatively inflexible school cultures may have established patterns that are difficult to change, influencing student teachers in ways which may not be in accordance with the intentions of the teacher education program (Zeichner & Gore, 1990; Damsgaard, 2010). The lack of a proper dialogue between theory and practice throughout teacher education programs and teacher careers may lead to a lack of making use of educational research as a basis when teachers update their disciplinary knowledge (Manger et al., 2009; Hattie, 2009). Consequently, the result may be a *performance paradox* (Pfeffer & Sutton, 2000; Chang et al., 2010) in which newly educated teachers find themselves *betwixt and between* the demands, priorities and practices of two different educational systems.

The findings in our study imply that IBL as a tool proves fruitful in student learning processes, but also that there is a need for transparency as to what the different methods provide, and how the different stages interact with each other throughout the study program to inform the IBL stages Conclusion and Discussion. In retrospect we see the need for more metacommunication. In this study we explored IBL as a tool used in three different subjects in the teacher education study program. Future studies should investigate whether this kind of approach helps students cope with the transition from student teacher to professional teacher in the reality of their workplace. To fully explore the potential of IBL, the process of using inquiry-based learning should be a joint mission between the teacher education institution and the practice field.

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