The Relationship between Finnish Student Teachers' Practical Theories, Sources, and Teacher Education

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Abstract

The purpose of this research is two-fold: 1) to describe what kind of practical theories student teachers have in the Finnish class teacher education context and 2) to analyse their differences and similarities at the initial and final phase of teacher education. We further analyse the relationship between the practical theories and their sources. The data include an e-form questionnaire with 1052 self-reported practical theories collected from 180 student teachers. The analysis of these theories is based on Levin and He's (2008) model which was modified by adding categories appropriate for the Finnish context of teacher education. The research results were obtained through quantitative analysis with an emphasis on categorical qualitative data. On the basis of the findings it can be concluded that the main contents – and especially the main sources of these theories – differ in the two student teacher groups examined, i.e. the initial-stage and the final-stage groups. The analyses concentrating on the theory-source relationship show that teacher education has the potential to affect the content of practical theories. The so-called 'well-developed practical theories' and the sources of these theories related to teacher education were detected more often in the data from the end of teacher education than in the data from the starting phase.

Keywords: Teacher beliefs, Practical theory, Teaching, Student teachers, Teacher education

1. Introduction

Teachers use practical theories and personal beliefs as a framework to plan, interact and reflect on teaching (Cornett, 1990; Elbaz, 1983; Gatbonton, 1999; He & Levin, 2008; Levin & He, 2008; Marland & Osborne, 1990; Mitchell & Marland, 1989; Moallem, 1998). Buitink (2009, p.119) summarizes the essence of practical theory as follows: 'Practical theory is thus the fairly integrated sum total of experiential knowledge (as a person and as a teacher), academic or theoretical knowledge and knowledge acquired through interaction with others'. A few researchers use the term 'personal practical theories' (PPTs) (e.g., Cornett, Yeotis, and Terwilliger, 1990; Levin & He, 2008), whereas others use the broader term 'teacher beliefs' (e.g., Pajares, 1992, 1993; Richardson, 1996, 2003). The teacher's beliefs and cognitions together form a conceptual whole, which we refer to here as the teacher's practical theories (PTs).

Empirical research suggests that practical theories held by teachers can influence their professional decisions and actions concerning classroom instruction (Chant, 2009; Tatto, 1999). But *what kind of practical theories are valuable?* Can any criteria be presented for the theories which, for example, will help teachers to support their *pupils' learning activity*? We argue here that 'going backwards' from pupil to teacher (thinking) will illuminate criteria for developing teacher PTs as a part of teacher cognition. Sztajn et al., (2012) have sketched a paradigm which highlights pupil learning and learning trajectories as a basis for constructing a theory of teaching. Recent findings in teacher-oriented research (aiming at such an understanding of teaching that makes a difference in teacher quality; Bakkenes, Vermunt, and Wubbels, 2010; Darling-Hammond, 2006) and learning-oriented research provide us with essential criteria regarding how to evaluate teachers' – and especially student teachers' – thinking.

2. Literature Review

2.1 A goal of teacher education: towards well-developed practical theories

A few studies are reviewed here which evaluate student teachers' cognitions using either the concept of practical theory or some other similar concepts. In fact, the studies which use the term 'practical theory' are not very numerous; most use other terms which have roughly the same meaning.

Buitink (2009) examined how student teachers learn to teach during school-based teacher education in Holland. He believes that mere adaptation to everyday teaching practice is not an adequate goal for teacher education. The main finding was that all student teachers developed broad, well-structured practical theories that focused on pupils' learning processes, which can be interpreted as a feature typical of an expert teacher. The author explained that close coordination between the teacher training college lecturers and the school teachers was probably a relevant factor to the results.

Nowadays part of teacher educators are interested in setting higher standards for student teachers. For example, Fairbanks et al., (2010, p.161) concluded as follows: 'Positive effects will be realised through development in which the goal of teacher training will be thoughtful teachers who are responsive to students and situations'. In the early phase of their professional development, such student teachers would be able to show an interest in creating learning environments which are useful for student activity, motivation and learning. The results of a study conducted by Doyle (1997) demonstrate that pre-service teachers start their teacher education with the conception of teaching as a process in which students passively receive the content of the curriculum. As teachers progress, teaching is increasingly viewed as facilitating and guiding learning. As a result of this evolution, teachers are able to focus less on the management of teaching. Nettle's (1998) research findings indicate that student teachers can also adopt a more traditional approach to teaching over time. This study also suggests that student teachers' beliefs after they have experienced practice teaching are affected by the beliefs they had before this experience. To sum up, the findings reflect both stability and changes in student teachers' beliefs.

Lamote and Engels (2010) conducted a study on student teachers' perceptions of their professional identity. When they compared the findings between first-, second- and third-year student teachers, they found that second- and third-year students were more confident about the outcomes of student engagement and learning results. They also focused less on discipline and transferring knowledge. Cheng, Tang and Cheng (2012) investigated the professional learning of student teachers using a four-year longitudinal research design. They applied Griffiths and Tann's (1992) five-level framework and illustrated the fifth level by using 'Stanley's case', which typically represents properties of the reflective-theory approach. This case reflects a shift from managing teaching or survival to focusing on pupils' learning, which is regarded as a more advanced form of a practical theory (such as well-developed practical theories; Buitink, 2009). In Bronkhorst et al.,'s (2011) study, a category system of student teacher learning was introduced, consisting of the categories of survival orientation, reproduction orientation and meaning-oriented learning. The third category has a clear connection to learner-centred teacher beliefs. It is an orientation in which the essential purpose is to understand the underlying processes that play a role in teaching, for example, why something may or may not work. This orientation clearly leads to an understanding of how pupils learn (Mansvelder-Longayroux et al., 2007). Leavy, McSorley and Boté (2007) examined the metaphor construction of prospective teachers' beliefs. In the initial phase of the study nearly half of the student teachers demonstrated thinking characterized by behaviourist notions of teaching and learning. However, the pre-service teachers in this study demonstrated an increase in the number of constructive metaphors they used in comparison with behaviourist metaphors. Notwithstanding this change, researchers have concluded that changing student teachers' beliefs in teacher education is an extremely difficult and challenging task.

These variations in the levels/phases of student teachers' thinking provide us with the task of categorising and evaluating practical theories in future studies. A number of previous studies show that student teachers' learning experiences from childhood to adulthood are so influential that the relatively short period of teacher education will not necessarily change their 'common sense' practical theories. It seems that student teachers' beliefs are rather stable. Traditional conceptions of the teacher's role have been documented in a few studies, particularly among students during the beginning phase of their teacher education program. During this stage, student teachers express beliefs that reflect a passive way of learning and the importance of classroom management. However, a few studies reflect a more optimistic view of the potential of teacher education, enabling us to understand that such education does influence student teachers' capacity to see themselves in a supportive and directing role as facilitators of learning (Buitink, 2008; Cheng et al., 2012;.Doyle, 1997; Leavy et al., 2007).

2.2 The sources of practical theories

Many researchers emphasise the experiential origin of practical theory/knowledge (see for example Gholami & Husu, 2010; Zanting, Verloop, & Vermunt 2003). On the other hand, experiences of teaching alone do not lead to the maximum quality of teaching. Lunenberg and Korthagen (2009) illustrated the problem, i.e. the gap between theory and practice, as they described teachers who have a lot of experience in teaching, but who do not automatically 'act wisely'. Their actions may have been affected by earlier successful situations, by 'what works to keep the class going', instead of by good insights regarding what promotes effective learning. Empirical studies indicate that student teachers and in-service teachers also utilize educational research as a source for their practical theories (Kennedy, 2002; Levin & He, 2008; He, Levin, & Li, 2011).

It is necessary to understand the relation between the contents and the sources of student teachers' practical theories if we, as researchers and teacher educators, want to develop such theories and teaching practice. Levin and He (2008) have studied these contents and sources. Students' ideas seem to come fairly equally from their teacher education courses, their field experiences of teaching, their experiences as students and their upbringing at home. Their practical theories are mostly related to the following three main categories: instruction (35%), the classroom (29%) and teachers (28%). A smaller proportion of their practical theories are related to pupils (8%). Levin and He (2008) concluded that very little empirical research has emerged about the sources of practical theories.

It is essential to focus on the analysis of the sources of practical theories to determine their relationship to research findings, educational theories (Kvernbekk, 1999; Pitkäniemi, 2010) and experiences in teaching (Gholami & Husu, 2010). It seems that teachers need systematic educational knowledge if they desire to improve their students' learning (Kennedy, 2002). Thus, there is a logic between the goals of teacher education (student teachers who will utilize educational research in their decision making) and the contents of student teachers' practical theories (interest in theories focusing on the learner).

2.3 Conclusions and directions for our research questions

At present there is a shortage of studies conducted using systemic and comprehensive designs which focus on the variety of teachers' practical theories. Levin and He (2008) are an exception as they included data from several teachers. The data for their study were collected at the end of a teacher education program and before a student teaching phase. One positive result was that practical theories were influenced by the teacher education program. On the other hand, we do not know what kind of practical theories and sources student teachers had at the beginning of the teacher training process.

This research project as a whole aims at analysing the differences in practical theories in formal teacher training. This analysis will enable us to develop a greater understanding of the complexities and evolution of practical theories. We are also interested in the relationship between practical theories and their sources. We will value the practical theories which Buitink (2009) categorizes as 'well-developed practical theories' (p. 119). In such theories student teachers achieve thinking which is close to expertise.

The present study was guided by three research questions:

(1) What practical theories and sources are typical in the Finnish teacher education context (which represents a teacher education model referred to as 'research-based teacher education')?

(2) What are the possible differences between practical theories and their sources at the beginning and the end of teacher education as an indication of the effect of teacher education?

(3) What is the nature of the relationship between practical theories and their sources?

3. Method

3.1 Context of the study

The study was carried out at the Department of Teacher Education, University of Helsinki, Finland. Teacher training is a very popular field of academic studies in Finland. For example, in 2012, less than 7% of the applicants were accepted to the class teacher programme of the University of Helsinki. All teachers graduate with a master's degree. The study programme is structured according to a systematic analysis of education, and teaching is based on research. Furthermore, the studies at the department are organised to give students the opportunity to practice arguing, decision-making and justifying arguments. During their studies, students also learn formal research skills, with the aim of developing students' ability to integrate research and theory in practice (for more, see Kansanen, 2007; Krokfors et al., 2011; Toom et al., 2010; Westbury et al., 2005). The teacher educators hold doctoral degrees and are required to conduct research. The study programme takes five years to complete and consists of general education studies,

pedagogical content knowledge studies, teaching practice, research methods and research projects (i.e. bachelor's and master's theses).

3.2 Participants

In total, 180 student teachers participated in this study. The students who participated were class teacher students; in other words, they will be graduating as primary school teachers (teaching pupils between the ages of seven and 12). One hundred and forty-seven (81.7%) of the students were women, and 33 (18.3%) were men. Eighty-one (45.0%) of the student teachers had worked as substitute teachers for half a year or more either during or prior to their studies.

3.3 Data collection

The first part of the research data (autumn of 2010) was collected in the first stage of teacher training, when students were starting their courses (n = 68). The second part of the data (spring 2011) was collected during the final stage of teacher training, when they had already completed the majority of their studies, i.e., after they had already studied at the university for three to four years (n = 112). The data were collected not only for research purposes but for the ongoing process of coaching students to reflect on their own practical theories during teacher education. The aim of this process is to make student teachers' implicit theories explicit, and to give the students an opportunity to reflect on different aspects of their practical theories at various stages of their education.

The students were asked to describe the practical theory which 'guides their teaching and schoolwork'. They wrote down four to ten beliefs and used a real-life example to describe how each belief was connected to practice. For example, one student teacher wrote the following belief: 'A teacher must treat his or her pupils fairly and equally'. This student teacher then provided the following real-life example of this belief in action: 'A teacher must assess tests, other work and contents on the same grounds'. Contrary to Levin and He (2008), who constructed their categories on the basis of research data, in our study the informants were asked to classify their personal beliefs and sources of practical theories themselves; in other words, *they were asked to define what their answers meant in greater detail*. At the same time, this was a pedagogic process in which the student teachers learned to consciously think about their practical theories and their sources.

After writing about and classifying their practical theories and their sources, the students shared their theories and discussed them in groups. (The process was begun during the course and completed as a homework assignment.) In our study, we asked the students to choose the 'right' categories even though university lecturers had already given detailed advice regarding the coding process for the data. This solution probably increased the validity of the coding process as the teacher students themselves interpreted and made decisions when choosing the categories to show how their instructional thinking worked.

The students analysed their own statements on the basis of Levin and He's (2008) categorization, which was modified to suit the purposes and the context of the Finnish school system and teacher education (Tables 1 and 2). The six main categories for the personal practical theories were *Teacher, Pupil, Classroom Community, Physical Environment, Instruction* and *Sociocultural Aspects of Education*. The students also analysed the sources of their personal practical theories, and the main categories for these sources were *Experiences as A Teacher, Teacher Education, Personal Learning Experiences and Values* and *Other Learning Environments*. One wider social point of view, *Sociocultural Aspects of Education*, was added as a new content category to Levin and He's original system. We believe that this new category is useful in the context of Finnish teacher education. As a category, the Classroom can mean both the social and physical environment. Thus, we distinguished between the two meanings of the concept as follows: *Classroom Community* and *Physical Environment*. It is interesting to see that the statements concerning Physical Environment are not central in the data. Either the students consider the matter self-evident in Finland because of the high standard of living or ascribe little significance to the physical environment in their practical theories. We constructed a few sub-categories under the Pupil category which were not included in Levin and He's study. We think that the Pupil category is a key describer of the quality of teacher thinking. Before we collected the actual research data, we tested the system with Finnish student teachers and used their feedback to edit and construct the final version of this system.

On average, there are 5.84 practical theories in the whole data (median 6, mode 5). If we examine the data as a whole regarding one practical theory as the observation unit, there are 1052 of them in the data (from 180 student teachers). There are 1039 sources related to the practical theories. Thus the size of the research data is about twice as large as that found in Levin and He's study (2008); this is true whether the comparison is made on the basis of the number of informants or practical theories (Levin and He collected 472 personal practical theories from 94 student teachers). There is no statistically significant difference in the number of theories between men and women ($t = 1.75$, $df = 178$, $p = .08$). On average, women had six practical theories (n = 147, mean = 5.95), while men had a little more than five

theories (n = 33, mean = 5.36).

Table 1. The contents of practical theories (modified from Levin and He 2008)

1.	Teacher	2.	Pupil	3.	Classroom Community	4.	Physical Environment	5.	Instruction	6.	Sociocultural Aspects of Education
11	Organization and planning	21	Ways of learning	31	Classroom management	41	Physical surroundings of the classroom	51	Instructional strategies	61	General school culture
12	Professional development	22	Pupil expectation	32	Relationship			52	Assessment	62	Local/national ways, history
13	Roles and responsibilities	23	Background of pupil	33	Respect			53	Differentiation of instruction	63	Societal effectiveness or impact
14	Quality of good teacher	24	Other views concerning pupil	34	Teacher expectation					64	Other
15	Creativity										

Table 2. The sources of practical theories (modified from Levin and He 2008)

7.	Experiences as a Teacher	8.	Teacher Education	9.	Personal Learning Experiences and Values	10.	Other Learning Environments
71	Experience from the teaching practice	81	Literature	91	Philosophy of life, religion, values	101	Literature (not in teacher education)
72	Observing teaching	82	Lectures	92	Upbringing at home	102	Learning environments such as media, internet
73	Other experience as a teacher	83	Group activities	93	School and learning experiences as a pupil	103	Discussions
		84	Theories	94	Other early learning experiences	104	Theories (not in teacher education)
				95	Work experience (not as a teacher)	105	Art, literature (fiction), etc.

4. Results

4.1 Descriptive results for practical theories and their sources

The largest main category is properties which are related to the Teacher (n = 456, 43.3%.). The next in size are Classroom Community (n = 287, 27.3%), Pupil (n = 128, 12.2%), Instruction (n = 102, 9.7%) and Sociocultural Aspects of Education (n = 79, 7.5%). The viewpoints which are related to the teacher and the preconditions of teaching, i.e., Classroom Community, are central in their practical theories. In the Finnish data, the aspect which is related to the teacher is thus emphasized even more than in the American data (Levin and He 2008). The data seem to reflect the typical properties of novice teacher cognition.

The main categories of the sources are as follows: *Experiences as A Teacher, Teacher Education, Personal Learning Experiences and Values* and *Other Learning Environments*. The most often mentioned category is Personal Learning Experiences and Values (n = 447, 43.0%), while the second most mentioned is Experiences as A Teacher (n = 315, 30.3%). This means that they consider their own personal experiences as particularly relevant 'building materials' for their practical theories. Courses completed during Teacher Education (n = 190, 18.3%) is also a significant category; its

share increases in the data during the later stage of teacher education.

4.2 A comparative analysis of practical theories and their sources

There is a connection between the stage of teacher education and the number of practical theories: on average, more practical theories are mentioned at the end of the teacher education programme (n = 112, mean = 6.13) than at the beginning (n = 68, mean = 5.37) (t = 2.90, df = 178, p < .01). The difference in the contents of practical theories between the initial-stage data and the final-stage data was tested with the Chi-square test, and the difference was found to be statistically significant ($X^2 = 11.40$, df = 4, p < .05) (Table 3). This means that the practical theories which focus on the Teacher are a little more popular at the first stage than at the final stage. In addition, the theories which are related to the Classroom Community – among others, the control of classroom interaction – appear relatively more often in the initial-stage data than in the final-stage data. The final-stage students, on average, discuss practical theories which focus on Instruction and the Sociocultural Aspects of Education more often.

Table 3. Relationship between the stage of teacher education and the contents of practical theories

		Main content of practical theories					
		Teacher	Pupil	Classroom Community	Instruction	Sociocultural Aspects of Education	Total
Beginning of Studies	Count	168	43	109	29	16	365
	% within	46.0	11.8	29.9	7.9	4.4	100.0
Later Stage of Studies	Count	288	85	178	73	63	687
	% within	41.9	12.4	25.9	10.6	9.2	100.0
Total	Count	456	128	287	102	79	1052

Clearer differences can be seen between the stage of the studies and the main categories of the sources of practical theories ($X^2 = 116.35$, df = 3, p < .001) (Table 4). Teaching experience – either in the field of education or in another environment – is considered an essential source for practical theory more often at the final stage than at the beginning. At the final stage, more significance is also given to the courses students competed during their teacher education programme. The students' own learning experiences at home and school lose their significance as a source as they progress through the teacher education programme. As a whole, one can say that teacher education is ascribed essential significance in the source evaluations of the final-stage data.

Table 4. Relationship between the stage of teacher education and sources of practical theories

		Main sources of the practical theories				
		Experiences as A Teacher	Teacher Education	Personal Learning Experiences	Other Learning Environments	Total
Beginning of Studies	Count	80	20	229	37	366
	% within	21.9	5.5	62.6	10.1	100.0
Later Stage of Studies	Count	235	170	218	50	673
	% within	34.9	25.3	32.4	7.4	100.0
Total	Count	315	190	447	87	1039

In order to understand the connections between the sources and the contents of practical theories, we examine how the main categories of the sources are divided into each category of practical theory. The practical theories on Instruction are divided into the following three sub-categories: *Instructional Strategies, Assessment* and *Differentiation of Instruction* (Table 5). For a teacher, the experiences of teaching are the most significant source; however, the personal

experiences as a pupil and teacher education are almost equally significant. Taken together, teacher education comprises more than 60% of the contents of the Instructional Strategies. Teacher education has an especially clear significance in pupil Assessment as 78% of its sources are either the study modules of teacher education or teacher practice. Teacher education is also the most important factor in the study of Differentiation of Instruction because even without the teacher practice it reaches 40%. The significance of other learning environments seems to be the smallest in all sub-categories of instruction (cf. methods).

Table 5. Relationship between practical theories about instruction and their sources

	Instructional Strategies	Assessment	Differentiation of Instruction
Personal Learning Experiences and Values	29.7%	22.2%	32.0%
Experiences as A Teacher	34.4%	44.4%	20.0%
Teacher Education	26.6%	33.3%	40.0%
Other Learning Environments	9.4%	0.0%	8.0%

The practical theories which focus on the Teacher comprise the largest main category in frequency. The contents of this category focus on the teacher more distinctly than teaching – i.e. contents such as *Organization and Planning, Professional Development, Roles and Responsibilities* and *Quality of Good Teacher* (Table 6). Upbringing at home and earlier learning experiences as a pupil have a noticeably significant effect on the students' understanding of the teacher's responsibility and roles as well as the properties of a good teacher. In the teacher education courses, the teacher's professional development is also discussed. Teaching practice and experience in an ordinary school is mentioned as the biggest influence on learning how to plan the schoolwork.

Table 6. Relationship between practical theories about teachers and their sources

	Organization and Planning	Professional Development	Roles and Responsibilities	Quality of a Good Teacher
Personal Learning Experiences and Values	18.8%	34.4%	44.3%	49.2%
Experiences as a Teacher	52.2%	17.2%	29.9%	32.3%
Teacher Education	24.6%	39.1%	15.0%	13.1%
Other Learning Environments	4.3%	9.4%	10.8%	5.4%

The subcategories of practical theories which are related to the Classroom Community are not connected to the goals of teaching but rather to the relationships between a teacher and a pupil, which are essentially affective and related to the so-called 'necessary conditions of teaching' (Table 7). One can say that student teachers' views on management found in the contents of their practical theories seem to reflect their school experiences and ideas learned at home. The teacher education courses have a relatively minor influence on the contents of classroom-community-oriented practical theories. It should be noted that no sources from the Teacher Education category relate to teacher expectations.

Table 7. Relationship between practical theories about classroom community and their sources

	Classroom Management	Relationship	Respect	Teacher Expectations
Personal Learning Experiences and Values	41.1%	47.1%	65.2%	64.3%
Experiences as a Teacher	45.2%	26.0%	12.4%	35.7%
Teacher Education	11.0%	17.3%	13.5%	0.0%
Other Learning Environments	2.7%	9.6%	9.0%	0.0%

The practical theories which focus on the Pupil have been divided into the following four subcategories in this study: *Ways of Learning, Pupil Expectations, Pupils' Backgrounds* and *Other Views Concerning a Pupil* (Table 8). In this main category the sources usually relate to the student's own experiences as a pupil and child and to teaching practice, whereas teacher education courses have an especially minor significance to the sub-categories, such as the Pupil's

Background, and other points of view which are related to the pupil. Teaching practice has a clear influence in most sub-categories – as a rule, this means that the ideas which are related to pupil characteristics are learned through the student teacher's own observations and experiences. For most student teachers, the educational psychology courses completed during their theoretical studies fail to have any real effect. It is also worth noting that Other Learning Environments are a fairly considerable source category for the Pupils' Backgrounds.

Table 8. Relationship between practical theories about pupils and their sources

	Ways of Learning	Pupil Expectations	Pupils' Backgrounds	Other Views Concerning a Pupil
Personal Learning Experiences and the Values	31.8%	29.4%	38.1%	42.9%
Experiences as A Teacher	33.3%	41.2%	28.6%	38.1%
Teacher Education	22.7%	23.5%	9.5%	4.8%
Other Learning Environments	12.1%	5.9%	23.8%	14.3%

A comparative statistical examination indicates that the sources rather than the contents of practical theories reflect the differences between the two sets of student data. For example, there is no statistical difference between the main content categories of practical theories for gender ($X^2 = 7.02$, df = 4, $p > .05$), but men emphasize teaching experience a little more than women in their sources, whereas women learn relatively more often on their own learning experiences outside the context of teacher education ($X^2 = 9.88$, df = 3, $p < .05$). Although the contents of the practical theories show no statistical differences ($X^2 = 3.29$, df = 4, $p > .05$) in terms of working experience, work experience of half a year or more is naturally mentioned as a source ($X^2 = 30.32$, df = 3, $p < .001$). The student teachers who have work experience also appreciate the significance of the teacher education courses. Other learning environments are emphasized by those who have no work experience of teaching. Of course, such people have experiences and views based on their own study history.

4.3 Differences between the well-developed and the common practical theories

Practical theories can be divided into two comprehensive categories, *Common Practical Theories* and *Well-developed Practical Theories*. The former means practical theories which focus on the Teacher or the Classroom Community, while the latter refers to those that focus on the Pupil, guiding her/his studying through Instruction or the significance of Social and Cultural Views of Education.

We use the term 'common practical theories' here because it is usual that student teachers and novice teachers concentrate mostly on themselves and some basic aspects of instruction (such as management) at the beginning stage of their career. A case in point is the student teacher ID-number 52, a 27-year-old woman in the initial stage of her studies, who has produced five practical theories. She has worked as a teacher for three to five years. On the basis of the primary coding of the data, we noticed that the contents of her practical theories can be classified into the categories of Teacher (sub-categories 14, 14 and 13 of the coding system) and Classroom Community (subcategories 33 and 31). Thus, all the content categories of her practical theories belong to the comprehensive category referred to here as Common Practical Theories. The sources of her practical theories are conceptions which are based on her personal experiences during her school years or her upbringing at home (sub-categories 93, 92, 93, 93 and 93). The contents of her beliefs relate to the teacher's fairness and how the teacher has to act with the pupils (e.g. maintaining discipline in the classroom, teacher as an exemplary person). She also emphasizes the educational significance of teaching. The following excerpts from her written data illustrate her pedagogical thinking: 'The teacher has to be just and impartial' (14, 93); 'The teacher has to do his best to make sure that her pupils learn' (14, 93) and 'One of the teacher's functions is to be a model of good conduct for her pupils' (13, 93). Two of her practical theories are connected with the classroom community: 'The teacher has to keep his word the best he can' (33, 92) and 'The teacher should save raising his voice for an emergency' (31, 93).

We use the term 'well-developed practical theories' as this term has a connection to previous studies where teacher thinking which takes into account factors such as pupils' views, more comprehensive and societal aims of education and instruction which potentially connects teacher action to a pupil's learning goal. Our example case, ID-number 116, a representative of category II, is 27 years old, and she was in the final stage of her studies (a fourth-year student) during the time of data collection. She has half a year of work experience as a teacher. The following excerpts of written data show a teacher whose beliefs are mostly coded into the main categories of Pupil and Social Factors of

Education: 'The teacher has to handle everybody impartially and the pupil's treatment must not be influenced by the teacher's own attitudes' (23, 91) and 'The teacher has to use versatile illustrating methods consequentially and has to pay attention to different learning styles' (21, 71). She has a modern conception of teaching because she emphasizes cooperation in the planning and realization of teaching: 'The teacher's profession does not need to be lonely' (61, 84) and 'The teacher should not demand too much from herself' (64, 102). In this example, the codings 23, 21, 61 and 64 from the comprehensive category, well-developed practical theories, are emphasized. Some of the codings are outside this comprehensive category, such as 'The teacher's work is never done, and the work includes the constant developing of herself and her work' (12, 81) and 'The teacher's character and personal qualities can have a great impact on the working of the class' (31, 71).

After recoding the content categories of practical theories, the researcher comprehensively examined if the *sources* of the well-developed practical theories and the common practical theories differ. In this analysis, which contains 948 practical theories, GLM-modelling was used as a statistical method. The well-developed practical theories consist of only about a quarter of the data (n = 223, 23.5%) and the rest belongs to the common practical theories (n = 725, 76.5%). For the whole model, a statistically significant connection is obtained (X^2 = 12.86, df = 5, sig = .03). As we can see in Table 9, the *Main Sources serve as separating factors between well-developed and common practical theories*.

Table 9. Test of model effects: Relationships between the well-developed/common practical theories and their main sources, the phase of teacher education and gender

	Wald Chi-Square	df	Sig.
(Intercept)	89.745	1	.000
Main Sources	10.483	3	.015
Phase of Teacher Education	.314	1	.575
Gender	.024	1	.876

The comparisons in Table 10 show that *experiences of teaching in teacher education and at work* (p = .04), variety of sources in *teacher education* (p = .01) and *other learning environments* (p = .02) are connected more often to the well-developed practical theories than to the common practical theories. The personal learning experiences and the values of student teachers relate more often to the common practical theories.

Table 10. Tests of comparisons in pairs between the main sources for the well-developed/common practical theories

(I) Sources	(J) Sources	Mean Difference (I-J)	Std. Error	df	Sig.
ET	TE	.03	.042	1	.414
	PL	-.07[a]	.033	1	.043
	OL	.06	.058	1	.282
TE	ET	-.03	.042	1	.414
	PL	-.10[a]	.041	1	.014
	OL	.03	.062	1	.657
PL	ET	.07[a]	.033	1	.043
	TE	.10[a]	.041	1	.014
	OL	.13[a]	.055	1	.021
OL	ET	-.06	.058	1	.282
	TE	-.03	.062	1	.657
	PL	-.13[a]	.055	1	.021

Note: Pairwise comparisons of estimated marginal means based on the scale of the dependent variable, i.e. the well-developed/common practical theories (Sources: ET = Experiences as a teacher, TE = Teacher education, PL = Personal learning experiences and values, OL = Other learning environments). a. The mean difference is significant at the .05 level.

5. Discussion

The practical theories focusing on the teacher and the classroom community are a little more popular at the first stage of teacher education than at the final stage. There are relatively clear differences between the main categories of the sources of practical theories. The experiences in practice teaching are considered as an essential source of practical theory more often at the final stage than at the beginning. This can be explained by the fact that there are teaching experiences that are gained in teacher education as well as in working life, which is typical of student teachers in Finland. The same can also be said about the other courses of teacher education. It seems that teacher education probably does not have much effect on the contents of practical theories, nor does it reform them. However, *teacher education provides the student teachers with argumentation skills based on scientific theories and studies* (i.e., courses of teacher education). In other words, they will learn during teacher education which arguments – some of which will be new arguments – support certain contents of their practical theories. Overall, one can state that student teachers ascribe essential significance to the source evaluations contained in the teacher training, particularly during the decision stage of their education. Personal source contexts not connected with teacher education lose their position in student teachers' evaluations at the final stage.

Some studies defend the view that the better the learner's perspective is represented in a teacher's thinking the more advanced the thinking is (Bronkhorst et al., 2011; Buitink, 2009; Cheng, Tang, & Cheng, 2012; Doyle, 1997; Lamote & Engels, 2010; Leavy, McSorley, & Boté, 2007). One explanation for this may be that a beginning teacher has been compared to an expert in her own field (see, for example, Berliner, 2001; Buitink, 2009; Levin & He, 2008). The contents of the well-developed practical theories are based on these arguments. This research conducted a study of the differences between the sources of the well-developed and the common practical theories (the latter are related to the role of the teacher and the basic conditions of instruction in the classroom). Many of the main sources serve as separating factors so that the experiences of teaching practice, the courses of teacher education and the other environments of learning are connected more often to the main category of well-developed practical theories than to the common practical theories. Factors such as student teachers' personal learning experiences, which typically originate from their school years and upbringing at home, are connected with the contents of their practical theories which focus on the teacher and the classroom community.

On the basis of the data reported by student teachers, it seems that teacher education probably has an effect on their practical theories of instruction. The themes which are related to the individualization of instruction have an especially strong effect, while the theories which are related to the teacher are usually influenced by the student teacher's own study history and personal values (in areas of PT such as Roles and Responsibilities and Quality of a Good Teacher). The results of our study suggest that planning is a skill which probably is learned when practicing teaching and when reflecting on it, rather than during the theoretical educational studies. This point is likely also connected to the nature of the student teacher's conception of teaching at the first stage of teacher education. Traditionally, these kinds of 'novice' approaches emphasize that matters such as classroom management or discipline are among the main duties of a teacher. Student teachers' experiences at home in childhood and in their school years are very significant in terms of how they consider a variety of areas in the teacher's work. Stenberg, Karlsson, Pitkäniemi and Maaranen (2014) analysed student teachers' identities based on their practical theories at the beginning of their studies. The point of view in their study differs from this study as it concentrates on a variety of the teacher's roles (teacher as educator, orchestrator or supporter). According to the main findings of their study, a student teacher's positions mostly concern didactical issues. On the other hand, the finding that contextual issues related to school and society, along with matters related to content, had little representation in the first-year student teachers' identities conforms quite well to the research results of this study.

Teacher education does not seem to have much of an effect on student teachers' ideas of the necessary conditions of teaching or on their PTs regarding the classroom community. It seems that such things are learned in other contexts. On the other hand, one can argue that perhaps teacher education has not succeeded in this area. While there are abundant research findings and theories of educational psychology for PT-related subjects, including Classroom Management, Relationship, Respect and Teacher Expectation, the student teachers in this study have not adopted such theories. They prefer their own practical experiences and values to theories presented in their courses or textbooks. The contribution of teacher education is also quite small – except for teaching practice – in influencing the student teachers' practical theories focusing on the pupil. One cannot help thinking that the contents of teacher education should be developed in this area; in other words, contents which deal with the pupil's characterization, learning process, learning styles and other research subjects related to the psychology of learning should be added to the modules of educational sciences. According to the findings of an earlier study, those who study to be teachers have the motivation to utilize research findings when student teachers' focus is on the promotion of learning (Kennedy, 2002).

Student teachers' change of focus towards learner-centred perspectives in their later stage of studies is supported by our research data. A few earlier studies have also shown that the beliefs of student teachers can change in a positive direction even in a short period. Some researchers, however, have been critical about the conventional teacher education's chances of making student teachers' thinking more learner-centred. These critics think that teacher education only strengthens the traditional thinking which has failed to take into account the learner's contribution to his own learning. The essential question is how student teachers as well as in-service teachers can get support from teacher education and educational research to help focus on the pupil and his learning processes. Buitink's (2009) suggests this is possible if academic research staff in universities and tutors in teacher practice work in close cooperation. One can call this 'synchronized cooperation'. Even if in the Finnish data the learner focus is linked with sources which underline the effectiveness of teacher education, it seems to us that this case of teacher education does not demonstrate the kind of intensive cooperation reported in Buitink's study.

We wanted to further develop Levin and He's (2008) coding system to include contexts beyond the classroom in the contents of practical theories and their sources. When considering the sources of practical theories, Levin and He's original coding system functions well in the Finnish context. It seems that this extension was useful mainly when the contents of practical theories were classified. One such content category is the Sociocultural Aspects of Education, which represented 10% of all of the contents in our study. On the basis of the experiences of this study, we can state that the classification of practical theories requires further development. Some categories of the coding system are probably too 'formal' and thus allow a variety of contradictory contents. Let us consider, for example, the Qualities of a Good Teacher. When we try to divide practical theories qualitatively into well-developed and common theories, the contents should encode what a good teacher is like in more detail. The coding can be developed so that the features of the 'good teacher' which are supported by empirical study are estimated to be of a higher level than the others. Correspondingly, the teaching methods could be evaluated so that the learner-centred approaches are given a higher status than the teacher-centred approaches because, according to a new meta-analysis, they support the pupil's learning more on average (Cornelius-White, 2007).

Sometimes the coding processes were difficult in this study. The analysis of the research data was based only on primary codings by student teachers; in other words, it was based on the codings which primarily describe the contents or sources of the practical theories. A number of informants also gave a second and even a third code for their practical theory and its source. Student teachers commented that sometimes it was a little bit challenging 'to remember' the source that certain content in a practical theory was based on. Without question, the coding process should be developed to raise validity and reliability.

The size of the research data is large enough – about twice as large as that in Levin and He's (2008) original study – to draw preliminary and careful group-specific conclusions. For example, while the idea that the final-stage student teachers focus more on how pupils learn is supported by the data, when examining change the follow-up design would be more valid than the comparative design that was applied in our study. One central study task would indeed be a follow-up study which examines how the contents of practical theories develop and how changes in these theories are linked to the contribution of the courses of teacher education.

One relevant way to raise the validity is to diversify research designs for the methods which are used in data collecting. He, Levin and Li (2011, p. 166) suggest that

> *in addition to using the survey instrument developed for this study, other data collection methods, such as observation, interviews, and focus group discussions, could be explored in the study of teacher beliefs in other educational settings. Multiple data sources would allow other factors, including pre-service teachers 'age, previous professional and life experiences in the development of their pedagogical beliefs, to be explored.*

Further qualitative and in-depth experimental 'micro-studies' in which a conscious attempt is made to develop well-developed practical theories which are based at least partly on educational studies and theories are needed. The Dutch study conducted by Buitink (2009) is a good example of this kind of methodological trend. However, this will place greater demands on the staff working in teacher education programmes (see Lunenberg & Korthagen, 2009, p. 237–238).

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