

How do teachers reason about their practice? Representing the epistemic nature of teachers' practical knowledge

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ABSTRACT

The present study focused on the epistemology of teachers' practical knowledge by addressing the following research question: how do teachers attempt to reason about their practices and their practical knowledge? The results indicated that teachers supported their practical knowledge claims using the "practical argument". Within this conceptual framework, they relied on contextual grounds that call for the fact that something should or should not be "done", rather than something is "true" or "false". Contextual grounds, then, were found to be backed up by two significant types of warrants: moral ethos, and "what works" notion. Depending on what kind warrants they used, teachers' practical knowledge was interpreted to be based on two different epistemic statuses: "practicable" knowledge and "praxial" knowledge.

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1. Introduction

The present study focused on the epistemology of teachers' practical knowledge by addressing the following research question: how do teachers attempt to reason about their practical knowledge? Practical knowledge is based on assumptions of Greek " 'practical philosophy' which aims at developing the kind of context-based practical reasoning that is employed in the conduct of wide range of morally informed human activities" (Carr, 2004, p. 61). A critical review of the literature shows that there is no concrete agreement about the concept of practical knowledge (Meijer, Verloop, & Beijaard, 1999). It is a multi-faceted concept that embraces various characteristics. However, many researchers have focused on the "experiential character" of teachers' practical knowledge (e.g., Black & Halliwell, 2000; Elbaz, 1981, 1983; Fenstermacher, 1994; Meijer, 1999; Meijer et al., 1999; Zanting, 2001; Zanting, Verloop, & Vermunt, 2003). In this paper, we describe mainly the concept of teachers' practical knowledge based on its function. Regardless of the source from which teachers' practical knowledge originates (i.e., whether experiential, personal, social, or theoretical), it is most often transformed in order to be used effectively in the volatile situations of the teaching context. This argument brings up a significant

question regarding teachers' practical knowledge: what is its function?

Teachers generally acquire most of their knowledge during their interaction with a variety of systems. This knowledge is then converted into practical knowledge in order to meet the practical and situational demands of teaching. Practical knowledge constitutes "those beliefs, insights, and habits that enable teachers to do their work in schools. It is time bound and situation specific, personally compelling and oriented toward action" (Feiman-Nemser & Floden, 1986, p. 512). As Clandinin and Huber (2005) state, "teachers teach what each situation, each encounter pulls out of their knowing" (p. 43). It is basically working knowing (Yinger & Hendricks-Lee, 1993) that guides action, and it is considered a key factor in a teacher's successes: the failure to develop sufficient practical knowledge will result in rapid frustration and possibly early burnout (Sternberg & Caruso, 1985). Simply put, the function of teachers' practical knowledge is to guide their actions when they encounter the critical question, "what should I do in this particular situation?" In this paper, practical knowledge, as defined by Zanting (2001), includes all teachers' cognitions (e.g., beliefs, values, and motives) guiding their actions.

2. Epistemology of teachers' practical knowledge

"Epistemology" is a branch of philosophy that is connected with the nature and the scope of knowledge and the general reliability of claims to knowledge (Hamlyn, 1967). According to Van Goor,

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Heyting, and Vreeke (2004), the foundational system of justification has thus far dominated epistemological studies in philosophy.

The application of the foundational system of the justification of propositional knowledge is widely acknowledged. However, in practical domains such as teaching, the foundational system has faced challenges (Kansanen et al., 2000). The problem is that the situational knowledge derived from teaching contexts may not be justified on foundational or universal grounds. However, teachers still need to prove that what they claim as practical knowledge should not lead to “wrong” actions. As Fenstermacher (1994) has argued:

Both teacher formal knowledge and teacher practical knowledge are subject to evidentiary scrutiny if they are to count as knowledge in any useful sense of the term That teachers claim to have practical knowledge does not release them of the obligation to show how it is objectively reasonable to believe what they are contending (pp. 27–28).

Epistemological studies of teachers’ practical knowledge, however, do not follow the same criteria and procedures as propositional knowledge. Most philosophers of education, according to Van Goor et al. (2004), highlight the fact that the justification of knowledge claims in education and teaching is embedded in the personal and social context in which individuals work and “still treat justification as a process of giving reasons ... and maintain that the validity of reasons, and the processes in which giving reason takes shape, will vary based on the contexts” (p. 182, see also Boyles, 2006). Fenstermacher (1994) called this form of justification the “good reason-approach” and noted:

The provision of reasons, when well done, makes action sensible to the actor and the observer. This is the minimal form of warrant for practical action. Such reasoning may also show that an action is, for example, the reasonable thing to do, the obvious thing to do, or the only thing one could do under circumstances (pp. 44–48).

From the same point of view, most neo-Aristotelian philosophers of education (e.g., Carr, 2004, 2005; Carr & Kemmis, 1986; Dunne, 2003, 2005; Hamilton, 2005; Kemmis, 2005; Noddings, 2003; Schwandt, 2005) argue that teaching is a kind of practice closer in meaning to the Greek term *praxis* (i.e., a kind of practice that has internal good) and can best be understood within the conceptual framework of *phronesis* or practical reasoning. In this sense, *phronesis* is one way of supporting practice and teachers’ knowledge within the contextual system of justification (see Kristjánsson, 2005).

In a different way from the *phronesis-praxis* perspective, some educational researchers (e.g., Fenstermacher, 1986; Fenstermacher & Richardson, 1993) have introduced a **conceptual framework**, the so-called “practical argument.” The practical argument is derived from Aristotle’s account of “practical syllogism” to explain and improve teachers’ reasoning about pedagogical decisions, and it is seen different from practical reasoning. While practical reasoning describes the more general and inclusive activities of thinking, forming intentions, and acting, practical argument is the formal elaboration of practical reasoning: it has a specific structure, including a series of reasons (i.e., premises) that are connected to a concluding judgment or action (Fenstermacher & Richardson, 1993; see also Audi, 1989, p. 95). Following Fenstermacher and Richardson, other researchers (e.g., Fallona & Johnson, 2002; Morgan, 1993; Morine-Dershimer, 1987, 1988; Vasquez-Levy, 1993, 1998) studied teachers’ practical argument. The findings reported in these studies indicated that practical argument, including different premises (i.e., value, empirical, stipulative, and situational) were readily identifiable in a large number of the comments made by teachers.

Teachers’ practical reasoning, in addition, represents other patterns of thinking whenever teachers try to discuss the grounds on

which they make practical knowledge claims. Kennedy (2004) found that there were at least three different levels of thinking when teachers talked about their practical intentions: 1) Teachers saw a situation and tried to “read” or “interpret” that situation so that they could act on the situation or formulate an intention to act on it; 2) teachers’ thoughts were a set of “accumulated principles of practice about how to respond to certain situations”; and 3) “teachers often justified their principle of practice by referring to a set of standing beliefs and values” (pp. 9–10) (see also, Alexanderson, 1994; Tirri, Husu, & Kansanen, 1999; Harrington, 1995).

3. Method

3.1. Participants

The source of data in this study were experienced teachers who had been teaching for at least four years, because one of the most important sources of teachers’ practical knowledge is professional experience. We also looked for the teachers whose language of instruction was English, since the interviewer was not familiar enough with the Finnish language. In addition, we tried to choose primary school teachers (and not secondary school teachers) from elementary schools, because it was supposed that the teachers’ practical reasoning could differ significantly when confronted with a range of subjects. This selective choice of participants is called “purposive sampling” whereby participants are chosen based on some topic of interest or criteria.

With these considerations in mind, we provided a descriptive summary of the research plan and its major task, sending it by e-mail to the principal of one elementary school in the metropolitan area of Helsinki to be delivered to the teachers. The aim was to find participants for the study on a voluntary basis. Two teachers indicated their willingness to participate in the research. The next step was to meet the teachers in person in order to discuss the duration and conditions of the study and the nature of their cooperation. Following our discussion, the two teachers decided to continue their participation in the research. Table 1 shows the general background of the two participants.

3.2. Data

3.2.1. Focus and forms of data

In this study, we focused on teachers’ practical knowledge about general pedagogy. Drawing from Borko and Putnams’ (1996) classification of teachers’ general pedagogical knowledge and based on a preliminary conversation and interview with three teacher educators at the Department of Applied Sciences of Education in the University of Helsinki, we included the following main domains in the teachers’ general pedagogical knowledge and beliefs: teachers’ knowledge and beliefs about “classroom management”; teachers’ knowledge and beliefs about “instructional strategies”; and teachers’ knowledge and beliefs about “learner learning and teaching” (pp. 675–676).

We focused on two distinct forms of teachers’ practical knowledge: teachers’ overarching beliefs and teachers’ knowledge-in-use. In other words, we studied the reasoning behind teachers’ overarching beliefs and their knowledge-in-use of general

Table 1
The background of the two participating teachers in the study.

| Participants | Teaching experience (year) | Age | Grade | Gender | Education |
|--------------|----------------------------|-----|---------|--------|------------------|
| Teacher 1 | 4 | 25 | 4 and 5 | Female | M.A. (Education) |
| Teacher 2 | 15 | 37 | 3 and 5 | Female | M.A. (Education) |

pedagogy. On the one hand, overarching beliefs were considered to be the most inclusive beliefs and values of teachers. [Elbaz \(1981\)](#) described this kind of practical knowledge as “image.” [Kennedy \(2004\)](#) refers to such inclusive beliefs as “standing beliefs,” which teachers may have developed over a lifetime. Drawing on [Grossman \(1995\)](#), [Borko and Putnam \(1996\)](#) have pointed out that teachers’ overarching knowledge “serves as a conceptual map for instructional decision-making; it serves as the basis for judgments about classroom objectives, appropriate instructional strategies, and students’ assignments, textbooks, and curricular materials, and the evaluation of students’ learning” (p. 676).

On the other hand, knowledge-in-use referred to knowledge that teachers use at the actual time of teaching; thus, they could demonstrate by doing (i.e., by teaching). This form of knowledge was connected to “interactive teaching” ([Calderhead, 1996](#)), wherein teachers were found to act in such a way that they could track the progress of their pupils’ classroom learning. We could follow this form of practical knowledge through active observation of the teachers’ lessons. In teachers’ knowledge-in-action, two distinct but interrelated courses of action were studied. One was “situational” knowledge in which teachers’ actions and reactions to novel encounters were examined. “Routines” were the other form of knowledge-in-action. During observation sessions, we found that the two participating teachers frequently used repeated actions in almost all the lessons. We identified such actions as routines. These actions were like a “default pedagogical setting” for guiding their actions. [Vasquez-Levy \(1998\)](#) reported such a pedagogical setting as “a sequence of actions stored within the teacher’s repertoire of routines that permit a teacher to perform his or her every day activities” (p. 537).

3.2.2. Data collection tools

We used interviews and observations to collect data. The main interview strategy was to ask direct and indirect “why-type questions” for finding out why our participant teachers engaged in or believed in some particular pedagogical action. Depending on the forms of data mentioned above, two types of interview were used. We used the semi-structured interview for collecting data related to the reasoning behind both overarching beliefs and the routines of our participants. The content and questions for these interviews were prepared before the interview sessions. The main criterion for including questions in the interviews was their relevance to the teachers’ practical knowledge about general pedagogy as described in previous chapter.

The stimulated recall interview ([Calderhead, 1996](#)) was the other type of interview used for gathering data related to the teachers’ reasoning underlying their practical knowledge-in-use. The general procedure in this interview was to observe and audiotape the teachers’ lessons. One hour after the lessons, we questioned them to discover the reasons behind the significant pieces of pedagogical actions they had undertaken. In addition to using audiotape, we used notes and questions that we had already developed during our observations in order to aid the teachers’ recall of the incidents.

3.2.3. Data collection procedure

At the beginning of the study, we did the first round of semi-structured interviews with the two participating teachers in order to understand their overarching beliefs concerning general pedagogy. In the second step, based on a mutual agreement, the teachers were given an observation schedule with each teacher allowed eight sessions. We observed each classroom for approximately eight hours. The observations were spread out over the academic year and over different subjects in such a way that we could observe as much detail and as many pedagogical actions as possible. The first four sessions were devoted to becoming acquainted with

the context and the culture of the classroom. We audio-taped and reviewed these sessions to obtain more insight into the teachers’ methods and their reasoning.

There was no interview corresponding to these initial observations. Observations helped us establish a relationship and a baseline about each teacher’s practices ([Vasquez-Levy, 1998](#)). For the next observations, notes were made about each teacher’s pedagogical actions in classroom; moreover, all conversations between teacher and students were audio-taped. As mentioned, one hour after observation, we interviewed each teacher on the basis of an observation unit. The observation units were considered particular and significant pieces of practice or knowledge that teachers insisted on while teaching. The units had to be related to general pedagogical knowledge. The last step in the data collection was to conduct the second round of semi-structured interviews. At this stage, we interviewed each teacher separately to gain some insight into the reasoning behind their routines.

All interviews with the two participants were conducted in English. Each interview was transcribed verbatim during the same day or at most one day later; the necessary notes and reflections were made during transcription; then the material was organized according to the date of the interview and the teacher’s name.

3.3. Data analysis

The data consisted of two transcriptions related to the teachers’ overarching beliefs, two transcriptions about their routines, and eight transcriptions about their knowledge-in-use. We endeavored to describe the nature of the teachers’ reasoning given in to support of their practical knowledge. Such a task involved developing a system of categories. The process of developing the system of categories was “an iterative and interactive process between theory and data” ([Mansvelter-Longayroux, Beijaard, & Verloop, 2007](#), p. 52) and involved a series of different steps.

3.3.1. Categorization of data

At this stage, we turned to the theoretical arguments of noted educational philosophers and researchers (e.g., [Boyles, 2006](#); [Carr, 2004, 2005](#); [Fenstermacher, 1994](#); [Hamilton, 2005](#); [Orton, 1996, 1997, 1998](#); [Pendlebury, 1990](#)) and considered three inclusive types of “reasoning” for guiding the data analysis: “moral ethos,” “contextual reasoning,” and “effectiveness of action.” We began an intensive reading of the data in order to know how and to what degree the three categories could describe the material. This kind of data analysis is called “abductive” in that a list of concepts and meanings was provided to develop categories. In this way, in light of the concepts mentioned, we could develop a new system of categories and subcategories. The full description of these categories and their patterns will be presented in the [Findings](#) section.

3.3.2. Description of data

In order to describe the categories, the same transcriptions that we used for data categorization were entered into the ATLAS/ti program ([Muh, 1994](#)), which enabled us to encode the data and organize it based on the new system of categories. The coding units were units of meaning (i.e., argument), in which a teacher’s justification revolved around a specific knowledge claim. For full description of the codes and categories, we displayed the data related to the two teachers’ reasoning in a two-dimensional matrix with the two teachers’ names heading the columns and rows consisting of different types of reasoning (i.e., categories). Each cell of the matrix therefore contained a description of each particular teacher’s reasoning. Based on the description from the data, we could outline the structure and the nature of the teachers’ practical argument. [Fig. 1](#) illustrates the methodological steps.

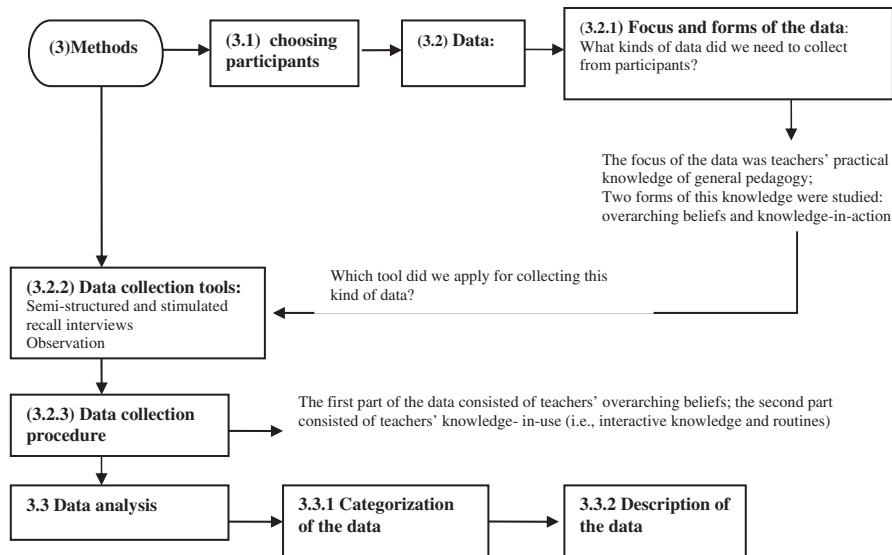


Fig. 1. The procedure of data collection and analysis. The figure shows how different actions related to data collections and data analysis was done during the research. Each action is placed inside a rectangle, and in the cases needed there is a brief explanation. Even though we have put each action inside a rectangle and we have linked them with arrows to each other, it does not mean that there was a hierarchical structure between different phases of data collection and analysis. In fact, the rectangles and arrows show how different parts of data collection and data analysis are presented in the paper itself. Moreover, the numbers inside the shapes indicate the section and subsections of methods in the paper as they are presented.

4. Findings

4.1. Contextual grounds

The findings generally indicated that the two teachers' reasoning behind their practical knowledge could be conceptualized within the framework of "practical arguments" (see, for example, Fenstermacher & Richardson, 1993). Each unit of the two teachers' practical arguments was found to be a coherent explanation of a practical judgment that they should or should not do something. At each stage of their practical arguments, the two participating teachers tried to support their knowledge claim by relying on some specific grounds in order to convince their audience that they were not in "error." The possible grounds in any practical argument could be implied by asking, "What kinds of reasons, evidence or justifications did the two teachers mention to convince others to believe in their main knowledge claim?"

The findings showed that the two participants mainly used "practical reasons" as the primary basis for supporting their knowledge claims. These practical reasons were found to be contextual premises that they relied on in order to show that what they just did or believed was "good enough" and not necessarily "true." Thus, in each particular situation, the two participating teachers believed in or did something on the basis of the idea that the situation had specific characteristics to which they could not be respond using universal or fixed rules. The findings suggested that the two participating teachers used various meanings to represent the contextual or situational emphasis on their work. Three broad categories, including the concepts of "difference in pedagogical variables," "particularity in teachers' understanding," and "pedagogical obligations," were the central contextual grounds on which the two teachers relied to justify their practical knowledge. These findings accords with understanding proposed by Boyles (2006) and Van Goor et al. (2004) who have emphasized that justification in teaching practice is contextual and not universal.

4.1.1. Difference in pedagogical variables

The two participating teachers frequently justified their practical knowledge based on the different characteristics of pedagogical

variables (i.e., variables that had an effect on pedagogical decisions and actions), which they encountered in the classroom. These variables were mainly related to general aspects of teaching, curricular features of the lessons, and the characteristics of the learners (i.e., the pupils).

General aspects of teaching such as the time of teaching (e.g., teaching in the morning or afternoon) and the number of the pupils in each classroom were found to be two basic factors that could turn the classroom into a "different context," requiring different practical pedagogical decisions. For example, in the case below, the teacher justified her action by showing how the number of pupils in each classroom limits her "pedagogical flexibility":

Question: How do you deal with students who don't like to talk with you or don't like to engage in the learning activities?

Answer: That is a hard question; there are many of these students in my classroom. Such students never like to talk, but they think, but they are still really good and know a lot of things. And also they are those who are not listening and have difficulties with learning. And one problem with my class, which is a big class, is that I cannot always talk with every single student. And it is sad that for a lesson I have only one minute for one person to talk, if I want to talk with everybody: that is a problem (Teacher 1, four years teaching experience).

The time of teaching also influenced the teachers' pedagogical decisions. For example, in the following transcription an experienced teacher explains how the time of teaching affects her decision about what to do:

Question: Why did you change the class setting in the middle of your teaching?

Answer: You have to know your students very well. Then you have to be prepared to change anything that might happen during the lessons. There are some changes during teaching, for example they do not have the same mood at different hours in the day; for example, at the beginning and end of a school day, they would have different mood In this case, because it was the last hour of my teaching for today and they already seemed to be tired, I tried to make a little change so that they could still

feel good. So you have to understand the situation and atmosphere (Teacher 2, fifteen years teaching experience).

The curricular aspect of the lessons was another contextual variable that teachers addressed in their practical arguments. The subject of teaching was the most frequently stated variable about which teachers stated that various subject matters “differ” from each other, specifically from the viewpoint of how to teach them. In other words, they generally justified their “instructional strategies” to be good on the basis that each subject matter has a “different curricular” structure. Such an understanding was related to the content and topics of teaching in each subject matter, thus representing the fact that each particular content has a “different pedagogical” bearing and calls for different pedagogical actions. The following statement shows how the teacher justified her knowledge claim:

Question: Why did you ask the students to repeat words in this lesson?

Answer: I think it is based on behaviorism, by which I mean that you need to repeat certain things and you need to give examples and they repeat some things; I think that it is not totally a bad thing. In certain subjects you need to do that. Like, you need to do that in languages. You cannot always let them ok, what do you think of these words that you have just learned and studied by heart? So, in the certain ways I do believe in behaviorism (Teacher 2).

Characteristics of learners were found to be another important variable that the two participating teachers used as a basis for justifying their practical knowledge. Our data revealed that they were very focused on the characteristics of their students, which had a great effect on their teaching practice. They generally stated that because their students had different “learning capacities, interests, and orientations,” they had to deal with them in different pedagogical ways. This pedagogical approach sometimes involved the entire class. In these cases, each class was treated differently pedagogically than other classes taught by the two teachers in the same academic year. In the following example the teacher distinguished classes from each other:

Question: How strict are you about the rules that you have put into force regarding your pupils?

Answer: I think it also depends a lot on the class itself; you have different classes, different kinds of students in different classes, so with some classes you need to be stricter and with others not so strict (Teacher 1).

In another way, the two teachers sometimes identified a particular class as having “different students” with “different learning capacities.” They noted that they needed to establish a pedagogical environment such that each pupil could engage in the learning tasks and thus take advantage of the pedagogical approach based on her/his learning capacity and interests:

Question: What has stood out for you over the last two or three years?

Answer: Well! I think that the most important issue has been that I have not been able to teach every pupil personally at the same time. So I have started to conduct group-work strategy. And then I learned that students can teach themselves quite well, too. I was worried about those students who had difficulties in their learning, and there were so many of these students. In addition, I could not have a suitable interaction with talented students; I could not give them anything. If they just sat there and had nothing to do, what would they learn, then...? So engaging all the kids with different capabilities and interests has been a big concern for me, and for coping with this problem I have usually used a group-work setting in the classroom (Teacher 2).

Moreover, the two participating teachers justified their actions based on the personal knowledge that they had about particular pupils. In other words, they justified their particular actions vis-à-vis particular pupils who differed from the rest of students.

Question: Why did you stop Mika [the name of a student] from continuing his discussion? Did you think that there would be any negative consequences?

Answer: For him, I know it does not matter, because it depends on the students. I have given Mika rewards many times and appreciated him because of his being so active. But sometimes I need to stop him and say ok! It's someone else's turn and you should stop commenting. He has never been angry. But sometimes he says something like that, meaning he couldn't say what he wanted. If let him, I would have to listen the Mika's stories all the time in the lessons (Teacher 1)

In general, we found that the contingencies described in teaching represented situations in which teachers were faced with “pedagogical possibilities” on the one hand and “situational restrictions” on the other hand. The extent and area of “pedagogical flexibility” to make decisions and to act were mainly related to the interaction between those possibilities and restrictions. Along with Pendlebury (1990), and based on findings related to “different pedagogical variables,” we argue that “the world of teaching is characterized with three central, related features: mutability, intermediacy, and particularity” (p. 175).

4.1.2. Particularity in teachers' understanding

In many cases each teacher was found to be “distinctive” in meaning-making about pedagogical events. One way of representing the particularity of teachers' understanding was through their professional experiences. The two participating teachers pointed out that they had a great deal of experience regarding various important issues in their job, such as how to deal with different types of pupils, how to conduct various instructional strategies in different conditions, how to deal with managerial issues, and how to conduct the practice of teaching as a whole. They believed that these experiences helped them to improve their personal and situation-specific pedagogical capacities for teaching. Generally, teachers justified their practice by their experience. The following transcription shows how the teacher's distinctive understanding is rooted in her professional experience: 老师的独特的理解是根植于他的专业经验:

Question: How do you normally become certain about your beliefs in your work?

Answer: I learned my beliefs over the years and by working in my job. For example, students often like to talk, so I think that might be a point in that...I do not ask the other teachers to approve of my actions, but I look at my results. If something is wrong, it becomes clear in my work. I do not ask other teachers because they have personal views that may not match my situation, and also we do not have time to reflect on things together (Teacher 2).

In addition to their own professional experiences, the two teachers' personal views were found to have a significant effect on their understanding as a basis for justifying their knowledge claims. This part of the findings indicated that under many circumstances and even though teaching is potentially a communicative job, teachers as individuals have their “voice,” in the processes of professional development. The logic that underlies these types of justification was a self-referential argument, which, however, was rooted in experiential knowledge. In these cases, the two teachers frequently used the subject “I,” and saw themselves as the source of knowledge:

Question: Who is a good teacher?

Answer: I think first of all you have to be quite strict. By strict, I mean that the students need to understand that you are the one who tells them how to behave, and they have to trust you because if you give them too much freedom, they actually, I have experienced, cannot work. You have to; you anyway have to give them the rules (Teacher 1).

4.1.3. Pedagogical obligation

The two participating teachers frequently stated that the purpose of their actions was to establish a good and suitable “learning environment.” They wanted to do something that could help them conduct their classrooms activities smoothly in order to do their teaching practice well and to engage students in the learning tasks more effectively. Our findings indicated that such courses of actions and its supporting beliefs had two inclusive features. First, actions were considered “pedagogical initiatives” for establishing a better learning environment. In this way, while teaching situations were running in a normal way, teachers still wanted to improve the learning atmosphere in their classrooms:

Question: Why do you often move around the classroom?

Answer: Because I could not see what the students are doing, if I only stood in the front of the class. I enjoy walking around and see how they are solving some problems. I do not interfere, and say ok! This is what you should do. But then when I walk around, I hear how they try to solve their tasks when they are talking with their friends (Teacher 1).

Second, actions were considered “pedagogical preventions” by which the two teachers tried to address learning dilemmas in the classroom. In such situations, they could see a problem, and they tried to take suitable actions to deal with the problem. Two basic examples of such problems were found to be related to managerial problems (e.g., how to deal with a misbehaving pupil) and pupils’ engagement in the learning tasks (e.g., how to deal with the pupils who did not raise their hands to answer the teachers’ questions).

Question: It seemed to me that you tried to support some pupils when their answers were not correct: why?

Answer: They are less-active pupils, and I want them become more participatory by saying “well done” and other encouraging words. I try to motivate them when they sometimes answer my questions, even though their answers are not totally correct. They are shy and somehow their social skills are influenced by their shyness. So, I am more concerned about these pupils and about their social skills than whether or not their answers were correct at the time (Teacher 1).

Either implicitly or explicitly, the two teachers wanted to show that their actions and their knowledge claims were justified because teaching is bounded by “pedagogical obligation” and what they just did or believed was part of this obligation. Pedagogical obligation turns teaching into a “distinctive context,” requiring distinctive practical knowledge. This practical knowledge may then be justified on the grounds of this professional distinctiveness.

4.2. Epistemic conditions of practice

Our data suggest that our participating teachers wanted to make sure that their practical knowledge claims were based on the professional values and principles of teaching. We call these professional values a “warrant” or the “epistemic conditions of practice.” The epistemic conditions of practice were the implicit or explicit values embedded in the “contextual grounds” on which the two teachers relied to justify their activities. Unlike grounds that were

contextual or situational, warrants were found to be the universal and foundational principles implicit in the mind of the two teachers. These warrants were supposed to have an epistemological superiority in their knowledge claims. The epistemic conditions of practice could be implied by asking the question, “why did a teacher rely on a particular principle?” The findings indicated that the teachers had two significant warrants in mind when they spoke about their practical knowledge: “moral ethos” and “efficiency of action.”

4.2.1. Moral ethos

In many cases the two participating teachers warranted their knowledge claims and any corresponding grounds on which they relied with “moral ethos.” Moral ethos was found to be based on the teachers’ “professional commitment.” The findings indicated that the concept of “care,” including care about professional responsibilities generally and care about pupils specifically, was placed at the heart of the professional moral ethos. In other words, the teachers tried to warrant their practical knowledge in the light of taking care of their professional responsibilities in order to provide a good educational environment in which to nurture their students. The concept of “care” from this point of view was found to be characterized by the following three features: teachers tried to provide “equal educational opportunities” for their students, they tried to do their “best” in pedagogical encounters with their students, and they tried to hold back “rebuttal pedagogy” related to the main knowledge claim.

Equal opportunities: Equality is a commonly agreed-upon principle in the life of a human being. In the present study, we found that the two participating teachers frequently warranted their practice based on this foundational principle. They argued that educational and pedagogical strategies should be provided in such a way that every pupil could have access to learning opportunities in the classroom. With this kind of caring, the teachers tried to improve students’ engagement in their academic tasks. In the following situation, the teacher tells why and how she uses her specific way of questioning students:

Question: When you asked questions and some students raised their hands to answer, you usually paused for a while and then picked someone to answer. Could you please talk a bit about this rule?

Answer: First of all, I want to know who is willing to answer, and very often it is the same students who are always raising their hands. And usually the students notice really well who has been given the chance to answer. If I call on one student too many times, then the others say, oh, he or she always gets to answer. And then I also try to think that if some students have not raised their hands for a long time, then suddenly I see their hands raised, I try to give them the chance to answer and try to encourage them (Teacher 1).

Best-possible actions: Another important feature of care was related to teachers’ commitment to do their best in problematic situations. Teaching contexts were seen as being bounded by the situational restrictions. In such situations, the two participating teachers were conscientious about being tolerant toward their students, and they looked for appropriate pedagogies to ease emergent dilemmas. In those situations, either explicitly or implicitly, they wanted to maintain that education is a long-term project and you may need to be patient when you as a teacher decide about the critical aspects of educating people. Thus, on these critical points, the two participating teachers warranted their actions and their beliefs based on the professional value that they should make their “best-possible” actions:

Question: Some students came to the class late and you gave them permission to sit without making comments: why?

研究结果表明,教师有两个重要的证据,当他们谈到了他们的实践知识:

实践的知识状况

Answer: That also depends. Regarding those boys, they seldom come to school. We have a system on the computer where poor timekeepers are listed. According to the system, if they have been late five times or more, they will receive certain sanctions. Therefore, I am happy that they are arriving in my class, because without attendance they do not have any chance to pass their exams. They dropped out of so many lessons, and I know that preaching about this issue does not help; I'll let them in my class – even if they are late (Teacher 2).

It seems that the principle “less harm, more benefits” was behind this kind of warrant. In other words, based on the potential characteristics of students and their academic and personal backgrounds, the teachers wanted to do something that would create less harm for those students while at the same time providing some benefits for them. In this way, the two participating teachers were found to be professionals who were hopeful that they could get some positive outcomes from their students.

“But-pedagogy”: Another significant part of teachers' justifications that could imply the concept of care was what we call “but-pedagogy.” While having a main point of view or practical knowledge claim, teachers frequently tried to appreciate different arguments for countering the main point. The chief intention for presenting such an argument was to improve and complete the main argument. But-pedagogy was found to be a “new window” that teachers could open in order to cope with the very volatile and complex nature of classroom life. This very important pedagogical tradition was found to represent the concept of care, since teachers considered their knowledge claims to be existing in hypotheses that may or may not work for everybody and may or may not be suitable for every situation. Thus, the two teachers needed to formulate a new or complementary hypothesis in order to improve on the existing one so that everyone could benefit. In our earlier example, Teacher 1 described her strategy of questioning pupils. The following transcription illustrates how she presented a complementary argument to the main point:

I am observing all the time students who have been raising their hands, and I'll try to make as many students answer as possible. Because I know that they really have a good feeling from getting a chance to answer, even if their answers were not totally correct. They enjoy the fact that I know, and I am giving them a chance to know by answering. **But** sometimes I also call them by their names, especially those who would never raise their hands. Because I do not want them to think that if you do not raise their hands, they would not have to do anything in my class. Many times they say: “Oh, I did not raise my hand!” And I say: “You still need to learn, even if you do not raise your hand” (Teacher 1).

It is important to consider the difference between the “best-possible pedagogy” and the “but-pedagogy.” In the former case the two participating teachers were faced with a critical or restricted situation in which the existing ways of running the classroom or the ongoing pedagogical actions did not work: thus, the teachers had to think about other alternatives. When faced with such situations, they tried to make the best-possible pedagogical decision. However, in the case of the “but-pedagogy,” teachers generally supposed that the learning situation was normal. They also assumed that the ongoing pedagogy was good enough for the situation, but it still needed to be improved. The “best-possible pedagogy” calls for responding to specific cases in demanding situations, while “but-pedagogy” often covers all the moments in classroom life and calls for fostering students' learning abilities whenever the teacher has the opportunity.

It thus appears that the target of actions associated with the moral ethos is not simply the academic aspects of teaching, and the

two participating teachers wanted to nurture the dignity of the students as a whole. This type of epistemic condition of practice is in accord with those moral theories by which human beings are considered to have intrinsic worth. From this perspective, even though “the practice of teaching is [a means primarily] intended to bring about learning in students... [,] the ‘bringing about of learning’ and the ‘learning’ cannot be meaningfully separated” (Hansen, 2001, p. 830; see also Gudmundsdóttir, 1990; Lampert, 1990). In this sense, “it is not only students' rationality that must be respected; students need and want teachers to care for them as persons and to convey this care through listening and responding to their expression of concern. The teacher as a person is centrally important in teaching... the teacher sets an example with her whole self; her intellect, her responsiveness, her humor, her curiosity... her care” (Noddings, 2003, p. 244, see also Audi, 2006, pp. 139–140; Fenstermacher, 1990, 1992). The activities related to moral ethos were mainly found to be based on “a one-sided feeling coming from the teacher's side. [This feeling is] a teacher's pedagogical love (that) can be a foundation for *pedagogical friendship* which is reciprocal relationship between teacher and her pupils” (Kakkori & Huttunen, 2007, p. 27).

4.2.2. “What works” warrant

Alongside moral ethos, our two participating teachers generally warranted their knowledge claims and their supporting grounds in the light of their effectiveness in bringing about possible intentions. In other words, the teachers did (or believed) something that they thought was effective in bringing about some intended results here and now. In this type of warrant, the two participating teachers mainly insisted on the notion of “what works.” The stance implies what they had been able to put into practice – in a way that produced at least something of the intended results.

Thus, they may have continued to employ “what works” methods and materials with negligible attention to “what didn't work” for a significant percentage of their students, differences between students, changes in students over time, and other such important variables that they were attentive to moral ethos. In the following situation, our example teacher explains why she sometimes had to throw a student out of the classroom:

Question: Have you ever asked misbehaving students, for example, to leave your class?

Answer: I have very seldom asked pupils to leave my class, just in those situations students simply cannot calm down. I mean, in the situations when one starts confusing the whole class, and fighting with students in such a way that the others cannot concentrate. The good thing would be if there would be a class and a teacher, and you could send students there to calm down. But we have no such classes because we do not have enough teachers. So I think that it is not a good thing for the students I asked to leave my class, because they will not learn. But then again, I have to think; should I consider the best for one student, or the best for all of the students? In general, sometimes students need to be punished, if they have been misbehaving. If always you just say: “Please, please, please ...” it does not work. I have to say: be quiet, calm down, and keep your mouth shut (Teacher 1).

The “what works” warrant was found to represent the concept of “practicable knowledge” where the two participating teachers reasoned that what they were able to put into practice was “good enough.” This notion also differs from the best-possible action in the moral ethos: in the best-possible action our participating teachers were found to “care about pupils” so that their actions did not harm them. However, in the “what works” notion, they may have failed to care about their pupils in various ways. While in the “best-possible action” our participating teachers tried to choose the

most “practicable and careful” pedagogy, in the “what works” notion they wanted to employ the most “practicable and effective” one. These two types of warrants were found to be similar, since they were addressed in the “though restricted” situations.

We would like to point out that the source of this type of practicable action is the embedded restrictions in different classroom situations, and thus the two teachers put something into practice to cope with these restrictions. But they still did not carefully reflect on the consequences of their actions for misbehaving students, and most likely they wanted to think of other students in the classroom. In this case, the teachers’ caring motive was displaced from one student to other students, owing the failure in the reception of care by the student cared for (Noddings, 2001).

5. Discussion

The main research task of the present study was to describe the epistemic nature of teachers’ practical knowledge by addressing the question of “How do teachers try to reason about their practical knowledge?” The results indicated that teachers used “practical arguments.” Within this conceptual framework, they relied on contextual grounds that call for an action to be done or not “done,” rather than or whether an action is “true” or “false.” As our data suggest, contextual grounds were found to be a kind of baseline on which the teachers relied to justify their practical knowledge. Associated with the concept of “warranted assertibility,” contextual grounds indicated that in teachers’ practical reasoning the correspondence of their beliefs to those of the external world was not their case. Instead, the point was the interdependency of their practice and its supporting practical knowledge within any given context in which they worked (see e.g., Boyles, 2006). This accords with Kennedy’s (2004) notion, according to which “at any given moment, one intention may become more prominent in the teachers’ reasoning” (p. 27). Moreover, teachers dealt with three types of meaning as representations for contextual grounds: “different pedagogical variables,” “particularity in teachers’ understanding,” and “pedagogical obligation.” Particularity in teachers’ understanding is based on phenomenological assumptions that each teacher as a person has experienced a distinctive life; different individuals thus have particular understandings of meanings, which may differ from other individuals (see also Van Goor et al., 2004). Two other examples of contextual grounds, however, indicate that the teaching context is bounded by pedagogical obligations, on the one hand, and restricted by situational variables, on the other hand. This phenomenon turns teaching into a “distinctive profession” that calls for particular courses of practice and knowledge.

From the structural point of view, contextual grounds were found to be backed up with two central “warrants”: the “moral ethos” and the “what works” notion. This structure accords with the model of argument proposed by Toulmin (1958), in which each good argument has three basic elements: claim, data, and warrant. The claim is the main knowledge assertion, the data provide evidence for the claim, and the warrant is an implicit value that links the claim to the data. In our findings, the epistemic conditions of practice were warrants that established an epistemic link between teachers’ practical knowledge and the contextual grounds on which they relied.

These warrants bear more epistemological power than do contextual grounds only; they are also more foundational and thus acceptable to others. From this point of view, as argued by various researchers (e.g., Feiman-Nemser & Floden, 1986; Fenstermacher, 1994), the situational character of teaching does not allow teachers and teacher educators to relive them, thus showing how teachers’ knowledge claims are “objectively reasonable beliefs.” Thus, warrants may function as the epistemological tool that links contextual grounds to practical knowledge and indicate how the teachers’ beliefs are objectively reasonable.

As mentioned above, we found that the two participating teachers used two significant types of warrants: the moral ethos and the “what works” notion. Associated with the *phronesis-praxis* perspective, moral ethos indicates that the concept of “care” is placed at the core of teachers’ practical reasoning (see, e.g., Carr, 2004, 2005; Carr & Kemmis, 1986; Dunne, 2003, 2005; Hamilton, 2005; Kemmis, 2005; Noddings, 2003; Schwandt, 2005). From this perspective, teaching is a kind of *praxis* (i.e., practice) that has an end in itself (i.e., good). Our findings indicated that teachers characterized the concept of care using three important features: First, teachers wanted to show that they are “caring professionals,” and it was their intention to provide a learning environment in which all pupils could have equal opportunity to engage in learning tasks (see, e.g., Kennedy, 2004). Second, the teachers wanted to make the best-possible pedagogical decisions in difficult situations. Such intentions may correspond to what Pendlebury (1990) called “situational appreciation” in which “a competent practitioner is one who has a rich understanding of the goods of the practice and a realistic, clear-sighted perception of what is possible under different situations. That is, she should consider good ends and possible means” (p. 178). Third, teachers often considered their practical knowledge as existing hypotheses that may be improved upon by new hypotheses, which in some cases conflict with and in other cases complement one another (see, e.g., Kennedy, 2004; Kuhn, 1991, 1992).

In the second warrant, the temporary solution for coping with a situation and producing some intended results was important regardless of the means. Therefore, teachers tried to consider some means to bring about results without enough reflection on whether these means reflected the concept of “care.” In such cases, it appears that the nature of the teacher reasoning was based on a “rationalization” process in which they failed to understand and recognize the “salient” features of the case (Pendlebury, 1990).

Based on our results, we would like to argue that teachers’ practical reasoning represents the notion of “*praxial* knowledge” when teachers use the “moral ethos” in order to warrant their practical knowledge and its supporting contextual grounds. In the *praxial* notion of practical knowledge, teachers use what Pendlebury (1990) calls “constituent-to-ends” reasoning by which the means and ends stand in reciprocal positions to each other – meaning that they are not technically isolated from ends. Rather, the concept of care is embedded in both means and ends, which places them in a mutual position so that the means constitute the ends. Thus, each course of teachers’ practice and any pedagogical decision have an “end” (i.e., a good) in themselves. On the other hand, teachers’ practical reasoning represents the notion of “practicable knowledge” when teachers use a “what works” notion to warrant their practical knowledge and its possible contextual grounds. In this way, teachers use means-to-end reasoning in which the notion of the means is isolated from the ends; thus, teachers’ practice may not include any “internal good.” Fig. 2 presents how we constructed the outline of the teachers’ practical argument based on our studies.

As Fig. 2 shows, the teachers’ practical argument has three important elements: practical knowledge claim, grounds (i.e., contextual grounds), and warrants (i.e., the conditions for good actions). Their practical argument goes as follows: First, teachers make a claim about different pedagogical issues; second, they support their claim on different contextual grounds; and third, they connect their contextual grounds and practical knowledge by means of two basic warrants (i.e., moral ethos and efficiency of action). When teachers warrant their knowledge claim and its corresponding grounds by moral ethos, they are applying *praxial* knowledge. When they support their knowledge claim and its corresponding grounds by efficiency of action, they are using practicable knowledge.

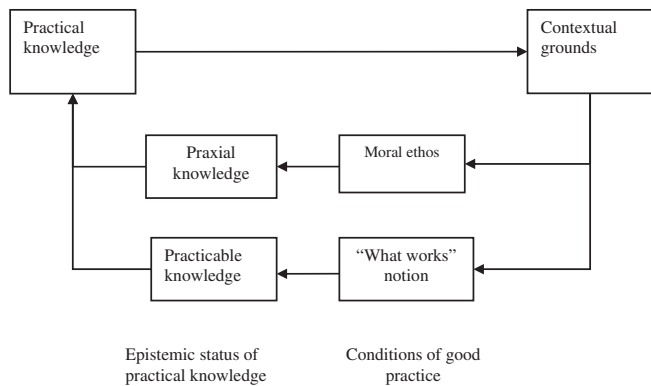


Fig. 2. Outline of teacher reasoning underlying practical knowledge. The figure shows a theoretical pattern of teachers' reasoning that was frequently found in the data. It illustrates that teacher reasoning includes four interrelated elements: practical knowledge, contextual grounds, conditions of good practice, epistemic status of practical knowledge, as it shows, teachers reason about their practical knowledge based on contextual system of justification. The contextual system of justification is warranted in the light of two important conditions: moral ethos and "what works" notion. Moreover, teachers' epistemic conditions are associated with one particular epistemic status: moral ethos is rooted in what we call praxial knowledge, and "what works" notion in practicable knowledge. In a cyclical way these two types of knowledge expand the teachers' practical knowledge to meet the situational demands of teaching practice.

Because of the situational character of teaching, teachers use both "effective" and "moral" reasoning in their work. Thus, in many situations teachers' lines of reasoning may conflict with one another. In this way, it might be that many examples related to effective teaching are in conflict with moral reasoning. In her study, Kennedy (2004) found that "not only are teachers' intentions numerous and diverse, but they often contradict one another, so that it would not be logically possible for teachers to actually achieve all the things they intended to do" (p. 28). Thus, as Shulman (1987) argued, teaching is both an effective job (i.e., what teachers are able to do) and a normative one (i.e., what teachers ought to do). In the present study, we found that "teachers' praxial knowledge" calls for responding to the normative demands of teaching and "teachers' practicable knowledge" calls for responding to the effective demands of teaching contexts; teachers' practical knowledge including these two epistemic statuses (i.e., praxial and practicable) is a balancing and regulating professional cognitive tool that makes the complex work of teaching possible: it establishes a practical balance between pedagogical opportunities and contextual restrictions.

However, in the language used in this research, teachers' practical knowledge has higher epistemic worth when it is based on principles embedded in praxial knowledge in comparison with principles based on "practicable knowledge." This means that the teacher educators and policymakers should try to educate, or at least provide the grounds for, prospective and in-service teachers to develop their practical knowledge and their pedagogical thinking in line with praxial knowledge. The question is still how do teacher educators and policymakers educate teachers (in-service and pre-service) to align with praxial thinking and knowledge in their jobs?

One immediate solution is to use the results of this research as one category of a knowledge base for teaching. To use the results of this research in educational contexts such as schools and teacher training programs may help teachers to be more reflective in their teaching by conducting "reasoned-based teaching." In other words, by engaging in discourses such as "teachers' practical arguments," teachers' pedagogical reasoning, and praxial and practicable knowledge, teachers may be motivated to reflect on the reasoning that lies behind their actions and beliefs and thus evaluate their reasoning themselves.

In addition, this study as a "discourse" may provide methodological grounds for policymakers to bridge the gap between theory and practice. This can be done through eliciting and reconstructing teachers' practical arguments by cooperating with a person who is typically called the *other*, and who plays the role of the teacher's partner in dialogue (Fenstermacher & Richardson, 1993). The *other* (e.g., a researcher, a mentor, an educator) has expertise in the field of teaching with theoretical and empirical understanding of how a classroom functions and how students learn. The *other* helps teachers find the weaknesses in their practical arguments and then reconstructs it by means of existing teaching theories and learning. In this way, teachers can use the theories and results of empirical research in practice. This process can also be carried out by a community of teachers. More experienced teachers can observe the classrooms of their colleagues and then provide a discussion session to review each other's actions and beliefs. We should point out that in the course of this research and the interviews with participating teachers, the teachers acknowledged the positive and pragmatic effect of the "procedure" and the "discourse" embedded in the interviews, which were based on practical arguments related to their thinking and actions. The teachers appreciated that there were many things on they had never reflected; however, during the interviews they found that those things could be improved. This indicated that the "practical argument discourse" has a normative function and different applications can help teachers reflect on and improve upon their practice.

Based on our findings, a further significant line of research would be to study how teachers can develop their practical knowledge, and thus move from the practicable status to the praxial status. We also need to study how the teachers' praxial and practicable knowledge functions in different learning subjects, different levels of schooling, and different cultural settings.

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