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A Foundation for Effective Teacher Education: Teacher Education Pedagogy Based on Situated Learning

Fred A.J. Korthagen

INTRODUCTION

The aim of this chapter is to offer a theoretical basis for the pedagogy of teacher education by building a framework describing (student) teacher learning. This seems important, as before the turn of the century the area of teacher learning had been almost overlooked by educational researchers (Beijaard, Korthagen, & Verloop, 2007). Although many studies showed that the *outcomes* of teacher learning were generally disappointing, the *process* of (student) teacher learning was seldom studied in depth. Still the question of how (student) teachers learn may be fundamental to the development of effective approaches in teacher education.

In this chapter, two seemingly opposite perspectives will be integrated, namely the traditional cognitive perspective and the situated learning perspective. The integration of these two perspectives will make it possible to build a framework for teacher learning that can serve as the basis for a successful pedagogy of teacher education, as will be shown in this chapter.

TEACHER LEARNING

A large number of research studies on beginning and experienced teachers has led to a disappointing picture of the impact of teacher education on teachers'

classroom behavior (Cochran-Smith & Zeichner, 2005; Hawley & Valli, 1999; Webster-Wright, 2009; Wideen, Mayer-Smith, & Moon, 1998). The cause seemed to lie in the traditional approach to teacher education, which was based on the assumption that theory can be taught to (student) teachers with the effect that they apply this theory within the school context. Clandinin (1995) suggested this was based on a view that theory drives practice, a kind of sacred theory-practice story. A fundamental problem with this approach was that the theory was often taught in isolated courses, with little connection to practice (Barone, Berliner, Blanchard, Casanova, & McGowan, 1996).

As Grossman and McDonald (2008) stated, various studies showing the meager results of this traditional model created a crisis in teacher education, and promoted an awareness that not only the content of teacher education programs should be research-based, but also the pedagogy used in teacher education. Researchers started to realize that if we wish to develop a more effective pedagogy of teacher education, we need to have a clear view of the intended processes of teacher learning and of the kind of learning that actually takes place (Knight, Lloyd, Arbraugh, Gamson, McDonald, Nolan, & Whitney, 2015). Hence, attempts to improve teacher education became linked to the issue of teacher learning.

For example, in the 1990s an important line of research focused on the *beliefs* student teachers have when entering teacher education programs and on the development of these beliefs during teacher education (e.g. Hofer & Pintrich, 1997; King & Kitchener, 1994; Pajares, 1992). This research revealed the difficulty of changing beliefs, for example because these beliefs have been formed during the many years the students have spent in education. Although this was an important contribution to our understanding of what happens in teacher education (and what does not happen!), most of this research strand focused on the *outcomes* of student teacher learning in terms of their beliefs, and less on the *learning processes* and the various positive and negative influences on these processes.

The process of teacher learning did become a more central focus when teacher education became more school-based and researchers started to study workplace learning (Fuller & Unwin, 2004). The overall insight stemming from this type of research is that practical experience, reflection, and the role of context are important factors in (student) teacher learning (Webster-Wright, 2009). Leeferink, Koopman, Beijaard, and Ketelaar (2015) emphasize that the *relational* aspect is also very important, as new insights are often developed by student teachers after relevant teaching situations, in interaction with others, for example mentors or peers. In addition, as Leeferink and his colleagues noted, teaching experiences often become sources of student teacher learning through the connections that student teachers make with previous experiences in other contexts, but rarely with experiences gained in their teacher education programs. These authors conclude: 'It was this circular process of moving back and forth between past and present experiences through which the student teachers gave meaning to their practical experiences' (p. 345).

Leeferink et al. (2015) are also critical of the research on workplace learning, as the focus of this research is often limited to one specific aspect, such as the role of mentoring or the quality of written reflections. A more general theory of (student) teacher learning is missing and this is a serious threat to the development of effective approaches in teacher education. Although during the last decades new and well-elaborated pedagogical strategies have been developed, such as the promotion of teacher research and the use of portfolios, there is a need for a coherent framework describing student teacher learning.

TWO CONTRASTING VIEWS OF LEARNING

A helpful step could be to look at more general theoretical frameworks about human learning and apply these to teacher learning. Two important frameworks that we will focus on in this chapter are *situated learning theory* and *traditional cognitive theory*. The first fits in well with the current emphasis on practical experience in school contexts as the basis for teacher learning, whereas the traditional cognitive model seems to offer important guidelines for building cognitive representations of theory as well as practice. However, it is not immediately clear how to connect these two perspectives, let alone to understand how to help teachers link theoretical knowledge about education to practice. Hence, as Wideen et al. (1998) stated, we need an integrated view, in which all the aspects influencing teachers' professional development are taken into account. In order to develop such an integrated view, we will first take a closer look at each of the two perspectives and their significance for teacher learning. Greeno (1997) refers to them as the 'situative perspective' and 'the cognitive perspective' (p. 6); these are the terms we will use below.

The Situative Perspective

As Clandinin and Connelly (2000) and Knight et al. (2015) conclude, (student) teacher learning is *relational* (experiences take place in social contexts), *temporal* (experiences are framed through previous experiences and influence new experiences), and *situational* (experiences are grounded in situations). This view concurs with what Lave and Wenger (1991) described as *situated learning* within *communities of practice*. It implies a significant shift away from the traditional view of teacher education and the habit of presenting theories to prospective or in-service teachers within isolated courses. Greeno (1997) summarizes this shift by stating that within the situative perspective 'knowledge' is seen as a misleading term 'because it attributes something like a substance or structure to the knower' (p. 11).

As Webster-Wright (2009) notes, this shift has led to 'the introduction of innovative pedagogical practices, such as problem-based learning, action learning,

and practice-focused service learning and the use of collaborative, flexible, and interdisciplinary teaching strategies' (p. 708), and to an increased focus on field experiences (American Association of Colleges for Teacher Education (AACTE), 2010). It has gradually made the traditional view of teacher learning feel outdated, i.e. the view based on 'the assumption that learning consists of discrete finite episodes with a beginning and end', as Webster-Wright puts it, with a reference to Wenger's (1998) critique on this view.

Discussing the situative perspective, Lave and Wenger (1991) maintain that learning emerges from and is intertwined with our actions and those of others. It is an ongoing process of participation in social practice (Wenger, 1998), and 'an integral part of generative social practice in the lived-in world' (Lave & Wenger, 1991, p. 35). As Greeno (1997) notes, this leads to important pedagogical consequences.

Related to the situative perspective is the *cognitive apprenticeship model* (Brown, Collins, & Duguid, 1989), in which a novice is placed with a more experienced professional and learns the essential aspects of the profession within authentic contexts. This view concurs with most recent approaches towards school-based teacher education.

The Cognitive Perspective

Concurrent with Greeno (1997), Cobb and Bowers (1999) conclude that the situative perspective is a radical move away from the traditional cognitive model of learning. According to this latter, mainly mentalist, model, people build representations in their brains of phenomena in reality. These representations are seen as maps of reality and are called *cognitive schemata* (Ausubel, 1968). According to the traditional cognitive view, new knowledge, also knowledge gained from a lecture or a book during an individual activity, can be assimilated in these schemata and can then be applied to new contexts, perhaps after some practice (Novak, 1977). Although cognitive learning theory encompasses a variety of different models, each stressing other aspects of the theory (Anderson, Reder, & Simon, 1996), always the underlying assumption is that people build knowledge through maps of reality (schemata) and that it is possible to 'transfer' knowledge. Cobb and Bowers (1999) called this the idea of 'the transportation of knowledge'.

The cognitive perspective has led to numerous applications in education. For example, it has led to the insight that students in school need strong conceptual frameworks, but also that they come to the classroom with preconceptions about the world and that teachers should build on those preconceptions when trying to develop deeper conceptual knowledge (Donovan, Bransford, & Pellegrino, 1999).

The cognitive perspective has been critiqued for not adequately describing the complexity of experiential learning and the social interactions determining

what is being learned from experience (Cobb & Bowers, 1999; Greeno, 1997). As a result, traditional didactic approaches, such as lecturing, are often seen as pedagogically wrong, and many consider experiential and interactive modes of instruction as crucial in education, both in schools and in teacher education. However, before abandoning the traditional cognitive perspective and embracing the situative perspective too rapidly, it seems important to take a closer look at this issue. For example, it is certainly possible to learn things in a non-experiential setting and without much social interaction. This is noted by Greeno (1997), who adheres to the situative perspective, as well as by Anderson, Reder, and Simon (1997), who defend the cognitive perspective. Indeed, it is not difficult to find examples of situations in which a lecture or book changed a person's perspective and even this person's behavior. Returning to our topic, teacher education, this elicits the question of whether it is really true that knowledge transfer is such a wrong pedagogical approach when teaching teachers. What seems needed is a more encompassing view of teacher learning, as already noted above. Developing such a view is the aim of the next section.

AN INTEGRATIVE MODEL

Although Cobb and Bowers (1999) maintain that the different metaphors underlying situated learning and cognitive theory are incompatible, we will now introduce a model integrating the situative perspective and the traditional cognitive perspective in a way that can be helpful for making teacher education successful. This concurs with a position defended by Bereiter (1997) and Greeno (1997), who both stated that the two perspectives may be integrated in a fruitful way.

Our starting point is a model that distinguishes three levels in teachers' professional learning (Korthagen et al., 2001). It is an elaboration of a theory on three levels in mathematics learning (Van Hiele, 1986), which in turn is based on Piagetian notions about levels of cognition, but also differs from the Piagetian approach. The most important difference is that Piaget considered the levels in cognitive development that he defined as age-dependent (Siegler, 1991), whereas Van Hiele emphasizes the influence of experience and education on level transitions.

The three levels in our model are named the *gestalt level*, *schema level*, and *theory level* (Figure 30.1). Empirical data supporting the model are discussed in Korthagen and Lagerwerf (2001, pp. 185–190) and Korthagen (2010a). We will also present some illustrative data below.

The Gestalt Level

The first level deals with the processes in teachers guiding their classroom behavior when there is not much conscious awareness of what is actually going
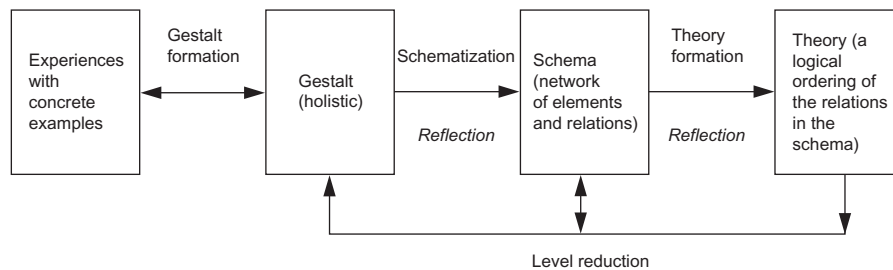
Figure 30.1   The three-level model and the accompanying learning processes (Korthagen et al., 2001)

on. Several authors (e.g. Beck & Kosnik, 2001; Eraut, 1995) have emphasized that so many things happen during a lesson that it is impossible for teachers to be aware of all of them, let alone of all of their behavior and the reasons for and implications of this behavior. There is simply not enough time to be consciously reflective about all this. Hence, many researchers consider automatic (routine) behavior as crucial in teaching. Dolk (1997) speaks about the frequent occurrence of *immediate teaching behavior*, i.e. behavior that takes place instantaneously and without reflection.

Already decades ago, Epstein (1990) introduced the notion that automatic, unconscious behavior is mediated by the so-called *intuitive-experiential body-mind system*, which processes information rapidly (for a recent discussion, see Sladek, Bond, & Phillips, 2010). Korthagen and Lagerwerf (2001) and Korthagen (2010a) discuss empirical data suggesting that such automatic behavior is momentarily triggered in teachers by images, feelings, notions, values, needs, or behavioral inclinations, and often by combinations of these factors. They form an internal, unconscious conglomerate of cognitive, affective, motivational, and behavior-oriented factors, based on previous experiences. Korthagen and Lagerwerf (2001) called such a conglomerate a *gestalt*. As in Gestalt psychology the gestalt concept was originally used to describe the organization of the visual field (Köhler, 1947), this implies a broadening of this classical concept, which concurs with Lecky (1945) and Korb, Gorrell, and Van de Riet (1989). In this broader conceptualization a gestalt encompasses the whole of a teacher's perception of the here-and-now situation, i.e. both the sensory perception of the environment as well as images, thoughts, feelings, needs, values, and behavioral tendencies evoked by the situation.

In line with views proposed by Lemke (1997), Hargreaves (1998), and Sutton and Wheatly (2003), the gestalt concept helps to consider the cognitive, affective, motivational and behavioral aspects of teacher's functioning as thoroughly interrelated. This concurs with insights from brain research about the close connections between various aspects of the internal processes in human beings (Immordino-Yang & Damasio, 2007).

With an example from an empirical study on an experienced teacher, Hoekstra and Korthagen (2011, 2013) illustrated how the influence of gestalts can be counterproductive to teacher learning. A biology teacher, named Nicole, wished to encourage her students' intrinsic motivation so that they would become more capable of independent learning. Hence, she wanted to reduce direct instruction time. However, in several lessons Nicole slipped back into her old routine of giving frontal instruction, which is an example of the strong influence of a previously formed gestalt. This gestalt was especially triggered when Nicole perceived her students as being uncertain. She reported (translated from Dutch):

> I noticed that they liked it that I put them back on track. I gave them a feeling of certainty about the exams next week, because they really don't look forward to that. (Hoekstra & Korthagen, 2013, p. 97)

The Schema Level

Nicole did not critically examine her immediate behavior until a coach helped her become aware of the influence of her own feelings of uncertainty and her preconception about 'supporting students'. Only then did she develop a framework for understanding the relation between her educational goals and her teaching, which in turn started to influence her decisions during her lessons. This can be illustrated by her own words during the coaching she received:

> In moments that students seem to give up, you have the tendency to solve this for them, by encouraging them to keep working. … Would it be possible that students themselves learn to see within themselves what is happening to them? And that they think about whether they want to continue like this? You may explain to them that if they don't learn how to do this and motivate themselves, they may fail at school. That way you would be coaching them in how to be self-directed learners. (Translated from Dutch, and published in Hoekstra & Korthagen, 2011, p. 85; this publication presents a detailed description of the coaching process leading to these insights)

During the coaching process Nicole has become aware that a teacher can talk with students about their feelings of uncertainty, can help them become aware that these are a natural part of a process towards becoming more independent learners, and can challenge the students to accept these feelings. She developed a schema, which included notions such as 'a behavioral tendency [of herself]', 'solving issues for the students', 'promoting students' thinking about themselves', and 'self-directed learners', as well as relations between these notions. This is characteristic for a schema: it consists of a network of relations between concepts or notions.

A schema differs from a gestalt in a fundamental way. Whereas a gestalt is an unconscious whole of cognitive, emotional, and motivational factors triggering a certain type of routine behavior, a schema is a conscious mental map, easily accessible for introspection.

For the transition from the gestalt level to the schema level, people use what Epstein (1990) called the *rational system*. This means that external phenomena and internal reactions to these phenomena become more conscious to the person, as *reflection* takes place. The transition is characterized by a process of *desituating* the knowledge derived from various specific situations (cf. Hatana & Inagaki, 1991; Lauriala, 1998). Still, it is important to note that teachers' schemata are very much colored by the desire to *know how to act in specific situations*, instead of having an *abstract understanding* of these situations. In the example, Nicole's schema was mainly aimed at knowing what to do to overcome her struggle with situations in which her students became uncertain or tended to give up.

The Theory Level

If teachers develop more and more knowledge in a certain area, they may become experts in those areas. This often means that their schemata are full of concepts and relations that help them understand a wide variety of practical phenomena in a deeper way. If so, they may start to become aware of if-then connections (logical relations) in their own schemata, as shown by Copeland, Birmingham, DeMeulle, D'Emidio-Caston, and Natal (1994). These researchers asked teachers to reflect on classroom vignettes on video and found that experienced teachers were able to formulate more if-then relations than less experienced teachers.

In this way, people may gradually grow towards the *theory level*. This is the level at which a logical ordering is constructed within the schema formed beforehand. The Van Hiele theory states that the relations in the schema now become objects of reflection, and an analysis of the logic within these relationships leads to a theoretical framework. The theory level makes it possible to *logically understand* and *analyze* a certain category of situations and answer *why questions* about these situations (why does this happen?). Characteristic for this level are if-then-because relations, such as: 'If a student has to become an independent learner, then this student will regularly encounter feelings of uncertainty, because support by the teacher is diminished. If this causes too much of a challenge for the student, then the teacher should use a more gradual scaffolding approach, because otherwise learning may stop altogether. These rules are based on the following principles from theories on self-directed learning, meta-cognition and scaffolding: … (etc.)'.

Although scholars in a certain field may generally function at the theory level, it is not common for teachers to reach this level, as Hoekstra (2007) found in an in-depth study of the learning of experienced teachers. The explanation presented by Hoekstra is that teachers generally wish to know *what to do* in practical situations, and for this aim the gestalt and schema level are generally sufficient. On the contrary, a scholar's schema will be more aimed at *understanding* the crucial concepts in a certain area and the relations between these concepts, and hence for scholars it is fruitful to reflect on a logical ordering within their schemata.

In order to decide whether someone has reached the theory level, one can ask the person to draw a mind map of the logical relations in his or her schema. In one study, Korthagen and Lagerwerf (2001) did so, and they present a complex drawing with many relations, made by a respondent showing his theory on teacher–student interactions (p. 189). It is significant that this particular respondent was a professor of education who specialized in interpersonal relations in the classroom, and that it appears difficult to find similar examples among teachers.

LEVEL REDUCTION

We already noted that Hoekstra (2007) found that the teachers in her study were generally focused on what to do in certain situations they were concerned about. In general they did not reach the theory level, although teacher educators or researchers might feel this would help these teachers to find more fundamental and evidence-based solutions to their concerns. In order to bridge the gap between what the teachers are focused on and the theory level, a *translation* of theoretical knowledge is needed that makes the teachers feel more able to deal with practical issues. This requires a kind of knowledge aiming more at the schema level than the theory level, but ideally this knowledge is based on the theory level and is concurrent with research findings. In other words, what is needed is what Clandinin (1985) named *practical knowledge*, but preferably practical knowledge based on research-based theoretical frameworks. Hence, translating frameworks from the theory level to the schema level is an important challenge for teacher educators if they wish to successfully connect theory and practice. This process is called *level reduction* (Van Hiele, 1986, p. 46).

After some time, a person's schema can become self-evident, and the schema can then be used in a less conscious way. It is as if the whole schema has been reduced to one gestalt. This is an important form of further level reduction, as only then will the teacher's everyday behavior be influenced (see Figure 30.1).

In the case of Nicole, the teacher described above, level reduction took place after several weeks of deliberate application of her newly developed schema. At first she consciously resisted her tendency to start explaining the subject matter as soon as her students showed uncertainty. Instead she took more of the role of a coach for individual students or small groups, and talked with her students about the fact that such uncertainty is a regular part of the process of learning to become self-directed learners. This means that she developed metacognitive awareness in her students not only of this purpose of the learning process, but also of the feelings involved, and she challenged her students to not be carried away by these feelings. Although initially this new behavior felt somewhat awkward to her, as she did not yet feel completely competent at having such conversations, she gradually started to feel more comfortable with the new approach. After some time Nicole's old habit of explaining in front of the classroom disappeared, and

she developed a routine of walking around in her classroom, checking with her students how they were doing, and helping them to become aware of their own learning process. This now felt to her like a natural thing to do. Her schema had gradually become a gestalt:

> I learned that if you point out their feelings when you see how the student is doing [emotionally], and when you point that out, that part of her [the student's] frustration disappears, because I acknowledge those feelings. … [Talking about the past:] When a student didn't do what I wanted, I quit. … I thought like: 'it doesn't work. The whole strategy doesn't work, it is clear, they don't feel like it.' I looked at a student from the perspective of 'he doesn't do anything, and that is wrong'. Now I see: 'he is doing something else'. Now I look at what they are doing instead, when it's not what I want them to be doing. That opens a world of possibilities to start a conversation with them. When you ask them the right questions, they will be more open, and will start doing their work. (Hoekstra & Korthagen, 2013, pp. 102–104)

As a result of level reduction, the relevant schema or theory needs less attention during one's actions. This allows the individual to concentrate on other things. The phenomenon of level reduction concurs with Berliner's (1986) model of professional growth, in which the expert level is the level at which the professional can act fluidly on the basis of an intuitive grasp of the situation.

REALISTIC TEACHER EDUCATION

The three-level model can serve as an important basis for effective approaches in teacher education. For example, the model is basic to the so-called *realistic approach* described by Korthagen et al. (2001). For decades this approach has been used in a one-year postgraduate teacher education curriculum at Utrecht University in the Netherlands.

Realistic Experiences as the Starting Point

Fundamental to the realistic approach is that the teacher education program builds on practical experiences that feel authentic to the student teachers. At the beginning of the program, these are not necessarily experiences with teaching in schools, for early experiences with classroom teaching tend to trigger 'survival gestalts'. This means there is a risk that the gestalt formation process is rapidly shaped by undesirable habits and norms (Feiman-Nemser & Buchman, 1986).

Therefore, in the Utrecht program there is a focus on other types of experiences, for example the coaching of one secondary school student once a week, during six weeks (the so-called *one-to-one experience*). Another example from the beginning of the program is giving a ten-minute lesson to the peer group of student teachers, with the assignment to make these peers active during the lesson. Such experiences focus the attention on learning processes, rather than on classroom discipline.
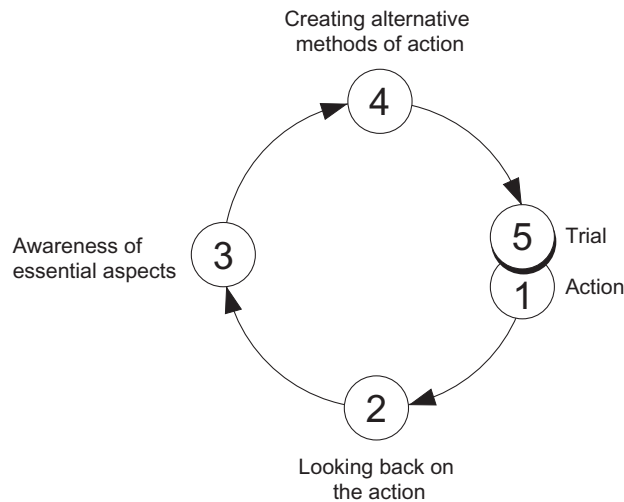
Figure 30.2   The ALACT model (Korthagen et al., 2001)

Promotion of Reflection and Schematization

In the case of the one-to-one teaching experience, each lesson is recorded on audio, and after the lesson the student teacher reflects on interesting episodes, with the aid of a logbook. The intended learning process follows a model that helps to structure this reflection (Figure 30.2).

This reflection model is named the *ALACT model*, after the first letters of the phases (Korthagen et al., 2001). The third phase is crucial, as it gets to the essence of what is happening in the lesson, and thus to schematization. Often the student teachers become aware that they did not really listen to their student, or were explaining something that did not seem to come across. There can be considerable differences between the learning processes within any group of student teachers. This is important as it allows student teachers to develop their own gestalts and schemata, based on their personal concerns, with regular support from a teacher educator.

Interaction with Peers

The situative perspective emphasizes the social aspect in learning. This points towards the need for opportunities of *peer supported learning* in a realistic teacher education program. During the whole program, many interactions with peers are organized, promoting the sharing of experiences, discussions and joint reflection processes aimed at schematization. For example, during the one-to-one teaching period, the student teachers form pairs. Part of the one-to-one lessons are discussed in each pair (with written reports to the teacher educator) and the remainder of the lessons by the teacher educator and the pair together. The

teacher educator can then bring in theoretical notions that fit in with the processes the student teachers are going through, thus supporting schematization.

Cohort Groups

In a realistic program the students work together in cohort groups (of 15–25 student teachers), serving as 'communities of practice'. One or two teacher educators are responsible for one cohort group and bring in theoretical notions if these seem to match the needs and gestalts of the student teachers triggered by their practical experiences. These can be principles from general psychology, classroom management, subject matter methods, and so forth, depending on what is needed in the here-and-now. This implies that the teacher educators need to be flexible 'generalists' who are able to tune in to the student teacher's concerns.

A Focus on Practical Knowledge rather than Theory-with-a-Capital-T

As explained above, theoretical notions are not so much aimed at building academic knowledge (Theory-with-a-capital-T), but at deepening and structuring gestalts and developing schemata characterized by practical knowledge that helps to guide perception and action in practice. *It requires a translation and adaptation of academic theory to the specifics of the situation at hand.* This concurs with Aristotle's metaphor of an architect who cannot work from fixed rules, but has to apply his knowledge to the specific situation at hand (Kessels & Korthagen, 1996, pp. 25–26). Similarly, teacher educators in a realistic program work more like flexible architects than as scholars sticking to their fixed academic knowledge, although of course, this academic knowledge helps to bring quality and validity into the practical knowledge.

The Place of Theory

As we have seen, the presentation of theory, either by teacher educators or through books, can have a significant place in teacher education, for it can help to support the transition from the schema level to the theory level. However, not every moment in the process of learning to teach is suitable for the presentation of theory. The three-level model helps to identify those moments in which a transition to the theory level can be fruitful, namely only *after the student teacher has developed the wish for a deeper understanding*. This is why at the end of the one-year realistic teacher education program, several theoretical workshops are given by experts in certain areas. These workshops are partly programmed parallel to each other. Hence, the student teachers can make choices based on their interests. This strategy helps to bring them to the theory level in specific areas.

Research on the Realistic Approach

A variety of qualitative and quantitative research studies have been carried out on the Utrecht program (see Brouwer and Korthagen, 2005; Korthagen, 2010b; Korthagen et al., 2001). Although the present chapter does not allow an extensive discussion of these studies, we wish to emphasize the main findings, namely that graduates of the program reported a seamless connection between theory and practice, and that classroom observations showed specific effects on their teaching behavior, concurrent with program goals. Hence, as Brouwer and Korthagen (2005) put it, teacher education can make a difference by building on the principles discussed above.

CONCLUSIONS AND DISCUSSION

This chapter described an integrated view of teacher learning, based on both the situative and the cognitive perspective. Concurrent with the situative perspective, a basic principle underlying the three-level model is that all knowledge is grounded in personal encounters with concrete situations and is influenced by social values, the behavior of others, and implicit perspectives embedded in practice (Lave & Wenger, 1991). Traditional cognitive theory, as discussed by authors such as Ausubel (1968) and Novak (1977), is helpful for describing the learning process after a teacher has reached the schema level and the need for a deeper understanding or cognitive reorganization presents itself.

The three-level model emphasizes that there is a *difference in the way knowledge can be used* (cf. Anderson & Herr, 1999; Fenstermacher, 1994). If the focus is more on using knowledge for action, the first two levels of the model are more relevant than if knowledge aims at a deeper understanding of a category of situations. An important implication of the model is that only in the latter case does the theory level become important. The need for this level is not self-evident in teachers and is generally only triggered after a sufficiently rich schema has been developed, and the teacher develops the wish to reduce the complexity of this schema, or to reorganize the schema using a logical ordering. At this stage, the cognitive perspective explains that it is certainly possible to 'transfer' theoretical knowledge to a teacher.

The three-level model also highlights that teacher behavior is to a large degree grounded in gestalts and explains why – without serious attention for level reduction – theory does not easily have an influence on practice.

Another implication of the three-level model is that both researchers and teacher educators may be too strongly focused on the conscious and rational sources of teacher behavior (cf. Hargreaves, 1998; Sutton & Wheatley, 2003). They might take immediate teacher behavior more seriously, as well as the gestalts unconsciously and automatically directing much of a teacher's behavior. As teaching

is to a large degree a gestalt-driven activity, the kind of professional learning needed in teacher education is not so much characterized by *conceptual* development, but rather by what Marton and Booth (1997) called *the development of awareness* of what is going on during one's teaching. This includes awareness of one's own feelings, values, needs, images, and, most of all, of their relations with one's behavioral tendencies, as the case of Nicole clearly showed. This implies a transition from the gestalt level to the schema level based on reflection. Next, level reduction is important, so that the heightened awareness can start to influence the teacher's daily routines.

For teacher educators, the fundamental question becomes: what kind of experiences can be organized that will both effectively shape student teachers' gestalts, and elicit concerns in them that can serve as a good starting point for reflection and the development of adequate schemata? This question is completely different from the more traditional question of what theory can best be presented. The latter question focuses the attention on the right side of the three-level model, instead of the important and more natural process from left to right.

In line with a view proposed by Bereiter (1997) and Greeno (1997), the situative perspective and the traditional cognitive perspective represent two valuable, complementary ingredients for an integrated model describing professional learning. The integrated view presented in this chapter points to the need for a pedagogy of teacher education different from the traditional theory-to-practice approach (cf. Clandinin, 1995). Basically, a didactic approach based on the presentation of theory starts from the wrong side of the three-level model and thus *tends to create a gap* between theory and practice. As shown, an alternative approach, such as the realistic model, can influence teacher education in a more successful way. Research has shown that this does make a difference for the graduates' practices (Brouwer & Korthagen, 2005).

It would be important to design more applications of the three-level model and study the outcomes, not only in terms of effects on teacher cognition and behavior, but also in terms of the actual learning processes taking place. For one important message of this chapter is that it is important to deepen our knowledge on the relation between (student) teacher learning and interventions in teacher education.

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