

Linking Theory and Practice: Changing the Pedagogy of Teacher Education

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The pressure towards more school-based teacher education programs, visible in many countries, creates a need to rethink the relationship between theory and practice. The traditional application-of-theory model appears to be rather ineffective and is currently being replaced by other, more reflective approaches. However, until now the variety of different notions and assumptions underlying these new approaches have not provided a sound basis for further development. Two related theoretical bases are presented for a new paradigm in teacher education. The first uses the concepts of episteme and phronesis to introduce a new way of framing relevant knowledge. The second is a more holistic way of describing the relationship between teacher cognition and teacher behavior, leading to a model of three levels in learning about teaching, the Gestalt level, the schema level and the theory level, which are illustrated by interview data. Building on these two theoretical frameworks, a so-called "realistic approach" to teacher education is introduced. The teacher educator's role within this approach is analyzed as well as organizational consequences. First evaluative results are presented.

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Introduction

In several places throughout the world, teacher education is in trouble. The pressure towards more school-based programs, which is visible in many countries, is a sign that not only teachers, but also parents and politicians, are often dissatisfied with teacher education (Barone, Berliner, Blanchard, Casanova, & McGowan, 1996, pp. 1108-1109; Ashton, 1996). In Great Britain, for example, a major part of preservice teacher education has now become the responsibility of the schools, creating a situation in which, to a large degree, teacher education takes the form of "training on the job." The argument for this tendency is that traditional teacher education programs are said to fail in preparing prospective teachers for the realities of the classroom (Goodlad, 1990).

Teacher educators would object that a professional teacher should acquire more than just practical tools for managing classroom situations and that it is their job to present student teachers with a broader view on education and to offer them a proper grounding in psychology, sociology and so on. Although these are valid arguments, the polarization that is characteristic of this type of discussion is dangerous as it focuses on the question of whether teacher education should start with theory or practice instead of the more important question of how to integrate the two in

such a way that it leads to integration within the teacher. This latter question, fundamental to the effectiveness of teacher education, is seldom discussed in depth in the professional literature, although recent insights into teacher development and the nature of the relationship between teacher cognition and teacher behavior could offer a sound basis for a paradigmatic change in the pedagogy of teacher education. This will be explained in the present article, in which we also describe the so-called *realistic approach*.

The Traditional Approach to Teacher Education

During the last century, an enormous amount of psychological, sociological, and educational research has been carried out, offering us a body of knowledge that in principle can be very useful to the practitioner. It seems reasonable to try and disseminate this knowledge. In fact, in many professions a major aspect of the professionalization process has been the introduction of an extensive theoretical basis for the practitioner's work (McCullough, 1987; Hoyle & John, 1995). In teacher education, the desire to use as much of the available knowledge as possible has led to a conception of teacher education as a system in which experts, preferably working within universities, teach this knowledge to prospective teachers. In the best case, they also try to stimulate the transfer of this knowledge to the classroom, for example, by the use of assignments to be carried out during field experiences. This is how teacher education became known as "teacher training" (Bullough & Gitlin, 1994). Schön (1987) critically called it the "technical-rationality model." Barone et al. (1996) state that many teacher programs consist of a collection of separated courses in which theory is presented without much connection to practice. Ben-Peretz (1995) says:

The hidden curriculum of teacher education tends to communicate a fragmented view of knowledge, both in coursework and in field experiences. Moreover, knowledge is

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"given" and unproblematic. These views of knowledge are likely to become quite problematic as teachers gain experience. (p. 546).

Imig and Switzer (1996, p. 223) state that in many places in the world the tendency to focus on knowledge bases to be taught to prospective teachers has become even stronger. This emphasis on expert-knowledge (Sprinthall, Reiman, & Thies-Sprinthall, 1996), dominant for many decades, basically has not changed, although many studies have shown its failure to strongly influence the practices of graduates of teacher education programs. Zeichner and Tabachnick (1981), for example, showed that many notions and educational conceptions, developed during teacher education, were "washed out" during field experiences (compare Bullough, 1989). Lortie (1975) presented us with another early study into the socialization process of teachers, showing the dominant role of practice in shaping teacher development. At Konstanz University in Germany, large-scale research has been carried out into the phenomenon of the "transition shock" (Müller-Fohrbrodt, Cloetta, & Dann, 1978; Dann, Cloetta, Müller-Fohrbrodt, & Helmreich, 1978; Dann, Müller-Fohrbrodt, & Cloetta, 1981; Hirsch, 1979), which regrettably went largely unnoticed by the English-speaking research community. It showed that teachers pass through a quite distinct attitude shift during their first year of teaching, in general creating an adjustment to current practices in the schools, and not to recent scientific insights into learning and teaching. Building on the work of the Konstanz research group, Brouwer (1989) did an extensive quantitative and qualitative study in the Netherlands, also showing the dominant influence of the school on teacher development. He found that an important factor promoting transfer from teacher education to practice was the extent to which the teacher education curriculum had an integrative design, that is, the degree to which there was an alternation and integration of theory and practice within the program. We will return to this issue later.

The Transfer Problem

Some of the causes of the transfer problem in teacher education have also been well documented (see also Wubbels, Korthagen, & Brekelmans, 1997). Using a cognitive-psychological perspective, we will mention three major causes here:

1. A first cause has to do with the learning process within the teacher education institute itself, even before the implementation stage. Research on learning and teaching shows that prior knowledge plays a powerful role in comprehension and learning (Scardamalia & Bereiter, 1989). Students in teacher education do have *preconceptions* about learning and teaching (Wubbels, 1992), but these notions often do not agree with the theories taught in teacher education programs. Preconceptions show a remarkable resistance to traditional attempts to change them (Wahl, Weinert, & Huber, 1984), which can in part be explained by their firm roots in the many years of experience that student teachers themselves have had as students within the educational system (Lortie, 1975). Stofflett and Stoddart (1994), for example, argue that teachers' conceptions of teaching subject matter are strongly influenced by the way in which they themselves learned this subject

content. They have shown that student teachers who themselves experienced learning in an active way are more inclined to plan lessons that facilitate students' active knowledge construction. Huibregtse, Korthagen, and Wubbels (1994) showed that even with experienced teachers there is a strong relationship between their preferred way of teaching and the way they themselves are used to learning: They have a limited view of the learning styles of their students and tend to project their own way of learning onto the learning of their students.

In sum, Corporaal (1988) interprets the poor transfer of theory to practice as a lack of integration of the theories presented in teacher education ("the teacher educator's theory") into the conceptions student teachers bring to the teacher education program ("the student teachers' theory").

2. Another, more fundamental cause of the transfer problem has been named the *feed-forward problem*: "Resistance from the student teacher at the time of exposure to given learnings and, later, protestations that the same learning had not been provided in stronger doses" (Katz, Raths, Mohanty, Kurachi, & Irving, 1981, p. 21; see also Bullough, Knowles, & Crow, 1991, p. 79). This problem can also be stated as follows: In order to learn anything during teacher education, student teachers must have personal concerns about teaching or they must have encountered concrete problems. Otherwise the fruitfulness of the theory is not clear to them and they are not motivated to study it. In fact, this is nothing more than a concretization of the well-known principle that learning only takes place if the learner has some personal goal that is, in the view of this person, served by the learning (Skemp, 1979). And even if there are such personal goals, for example, because the student teachers have developed concerns during their teaching in school, general theory is only helpful if there is some kind of coaching of the student teachers in connecting the theory to their actions in the concrete practical situations in which they encounter their problems (Joyce & Showers, 1988).
3. A third cause of the problem has to do with the *nature of the relevant knowledge*. Clark and Lampert (1986, p. 28) state that once inside school, teachers "are expected to accomplish complex and even conflicting goals. Under these circumstances, a priori knowledge identified by researchers about the relationship among particular decisions or actions and their outcomes is of limited worth." Teachers need quick and concrete answers to situations in which they have little time to think. This type of action-guiding knowledge is rather different from the more abstract, systematized and general expert-knowledge that teacher educators often present to student teachers (Korthagen & Lagerwerf, 1996; Tom, 1997). This issue will be further elaborated in this article, as we consider it one of the major reasons for the lack of success of teacher education all over the world.

Although the transfer problem in teacher education is well-known and its causes have been thoroughly researched, it is remarkable that many teacher education programs still reflect the traditional "application-of-theory

model" described above (Korthagen & Russell, 1995), although it is hard to derive reliable conclusions about this from the literature. Zeichner (1987) once noted that very little is published about concrete strategies and program arrangements. In our own work as trainers of teacher educators in various countries, we did have the opportunity to analyze the "everyday pedagogy" of teacher education. It led us to conclude that the traditional view of teacher education has basically not changed and even that many "new" approaches often take the form of sophisticated procedures to try and interest student teachers in a particular theory, or bridge the gap between the theory presented and teaching practice. This means that the traditional approach, in which teacher educators make an *a priori* choice about the theory that should be transferred to student teachers, represents a very dominant line of thought (compare also Oldfather, Bonds, & Bray, 1994 and Bullough & Gitlin, 1994). The fundamental conception inherent in this line of thought is that there is a gap to be bridged. One often forgets that it was the *a priori* choice that created this gap in the first place.

Of course, the conditions under which teacher education takes place are generally not very supportive of a change in old habits: Large enrollments and limited time for teacher educators to visit student teachers during their teaching practice are inhibiting factors (Barone et al., 1996, p. 1117).

Towards a New Paradigm

Although the application model represents the general picture, there are interesting exceptions (see, for example, Zeichner, 1995; Clandinin, 1995; Richardson, 1997), but they are often realized by a few isolated educators within an institute and are frequently criticized heavily by their colleagues. As a reaction to weaknesses of the traditional approach to teacher education, such innovative educators have developed new ways of preparing teachers for their profession. Many of these attempts can be characterized by an emphasis on reflective teaching (Calderhead, 1989), implying that teacher development is conceptualized as an ongoing process of experiencing practical teaching and learning situations, reflecting on them under the guidance of an expert, and developing one's own insights into teaching through the interaction between personal reflection and theoretical notions offered by the expert.

In many teacher education programs this alternative view is currently being worked out. Impressive steps were made towards the construction of a theoretical basis for such an approach, for example, by formulating the cognitive psychological underpinnings, mostly in terms of constructivism (e.g., Oldfather et al., 1994; Bell & Gilbert, 1996), or sociological considerations, generally in terms of goals to strive for and methods to reach these goals (e.g., Zeichner, 1983; Liston & Zeichner, 1990), and the ethical dimensions involved (Zeichner, 1986). Research into strategies and effects has also been published (e.g., Zeichner, 1987; Zeichner & Liston, 1987; Gore & Zeichner, 1991).

Although the large number of influential publications in this area is still growing, there are two respects in which the theoretical basis underlying this approach remains weak. First, compared to the traditional theory as found in academic textbooks, "theory" takes on a completely different form in a program aiming at the integration of theory and practice. The nature of this different kind of theory has not yet been thoroughly studied (an important exception is

Fenstermacher, 1994). Consequently, the characteristics of effective types of knowledge, with possible indications about what to offer when and to which student teacher, are as yet unknown. In order to develop such a theory on the use of theory in teacher education, a second theoretical basis for teacher education is needed, concerning the relationship between teacher cognition and teacher behavior. Recent insights into this relationship contradict the classical view of the teacher as a theory-guided decision-maker, but a new, comprehensive theory on teacher thinking and teacher behavior has yet to take the place of the old. Several notions, which are in fact remnants of an outdated view, still survive, such as the concepts of "declarative and procedural knowledge" or terms like "misconceptions" of teachers. The variety of different notions and assumptions underlying new approaches have not yet created a sound basis for further development.

This article aims at contributing to the development of these two theoretical bases for a new approach to teacher education, the one concerning the nature of theory relevant to teachers, the other concerning the relationship between teacher cognition and teacher behavior. Moreover, an attempt is made to connect these two theoretical frameworks.

The ideas developed in this article are to a large degree derived from theories on mathematics learning and teaching. In fact, mathematics education appears to be a domain where many problems have been first spotted (and also partly solved) that are very similar to the kind of problems teacher education faces. However, the connection between these two domains has seldom been made. Thus, without trying to dive into mathematics education too deeply here, a short overview of relevant developments in this domain may be helpful to the development of a theory of teacher education. This is the focus of the next section.

Mathematics Education as a Paradigmatic Example

For two reasons, mathematics education is an interesting field on which to build our thinking about teacher education. The first is that for many children, and thus also for teachers, mathematics causes so much trouble. This implies that there is a very strong need to find productive ways of helping children acquire necessary knowledge and skills in a manner that helps them apply what they are learning. This need has promoted the development of a theory about learning and teaching mathematics that is directly relevant to classroom practices. Secondly, since mathematics as a field of study can more easily be isolated from other knowledge domains, psychologists have here been rather successful in discovering the mechanisms underlying learning.

One of the most impressive recent developments in education has been the introduction of so-called "realistic mathematics education" (Treffers, 1987; Freudenthal, 1991). It can be characterized by a complete break with the traditional approach, which goes from "theory" (principles, rules, theorems) to "practice." For many years, children in mathematics classes had to learn to apply mathematical structures, developed during centuries of study, to practical problems. Although with sufficient support they often succeeded in working their way through series of textbook problems, in ordinary life these children were often unable to solve the simplest everyday problems, even when these problems were similar to those in the math class (Schoenfeld, 1987). In

other words, a transfer problem was clearly evident in mathematics education.

The great mathematician and mathematics educationalist Hans Freudenthal analyzed this transfer problem and pointed out how, in fact, the traditional didactic approach contradicted the essential nature of mathematics. In his view, mathematics is not "a created subject" to be transferred to children, but "a subject to be created" (1978, p. 72). When one pursues his line of thinking, mathematics becomes, or rather has always been, a *human activity*, based in the reality of the world around us. (This is why he called the approach "realistic.") Activity leads to consciousness of structures underlying the problems at hand. These structures, constructed by the learner, represent his or her idiosyncratic way of making meaning out of a problem situation. This means that these cognitive structures are closely connected to the way the learner will deal with similar problem situations in the future.

The realistic approach towards mathematics, as summarized in Freudenthal (1991), started in the 70s in the Netherlands (Freudenthal, 1978). Through the work of the Freudenthal Institute at Utrecht University, it has now spread to many other countries as well, for example, to the United States, where it fit into ideas about changing mathematics education developed in the 80s. An important starting point in the realistic approach is the assumption that students can and should themselves develop mathematical notions on the basis of practical experiences and problems. The problems are presented within a context recognizable for children, and often taken from everyday situations. Emphasis is put on the *practical use* of mathematics, *inquiry* and *reflection*, *group work*, and *hands-on activities*. Freudenthal (1978, 1991) characterizes the resulting teaching and learning process as one of *guided reinvention* (a term also used by Fischer & Bullock, 1984). To put it in its shortest form, the realistic approach goes from practice to theory. An interesting aspect is that the gap between theory and practice disappears, although it is better to say that it is not created by the educational process itself, as is the case in the traditional approach. In cognitive psychological terms one can say that the intended learning processes start from "situated knowledge" (Brown, Collins, & Duguid, 1989), developed in the interaction of the learners with the problem situations, and that the concrete situations remain the reference points during the learning process. This immensely diminishes the classical "transfer problem" in application situations. In the next section we will discuss the question of what teacher education can learn from the developments in mathematics education.

Realistic Teacher Education

When comparing traditional approaches to teacher education with the above example of mathematics education, there appear to be striking similarities.

In Freudenthal's terms one could say that in this traditional approach, knowledge about teaching is considered as a created subject and not as a subject to be created by the learner, that is, the student teacher. An approach more in line with Freudenthal's ideas about learning would take its starting point in real problems encountered by student teachers during field experiences. The student teacher would then develop his or her own knowledge in a process of reflection on the practical situations in which a personal need

for learning was created. As is the case in realistic mathematics education, the emphasis shifts towards inquiry-oriented activities, interaction amongst learners, and the development of reflective skills.

In our work with teacher educators and program coordinators, we often hear the concern that this implies theory will disappear from the teacher education curriculum and student teachers will have to reinvent the wheel over and over again, the teacher educator's only task being to ask "what do you yourself think?" This is a caricature based on a complete misunderstanding of the processes involved in a realistic approach. During the learning processes involved, the teacher educator has an important role, although completely different from the traditional role of the lecturer. The kind of support that he or she should offer (including theory!) has to be very much adjusted to the specific problems the student teachers are having. As a consequence, the nature of fruitful "theory" becomes completely different from that in the traditional approach. This will be analyzed in the next section.

Episteme Versus Phronesis

In teacher education there is much confusion about at least two different meanings of the word "theory." Kessels and Korthagen (1996) go back to Aristotle's concepts of *episteme* and *phronesis* to explain the difference. If a teacher educator offers *epistemic* knowledge, he or she uses general conceptions, applicable to a wide variety of situations; this knowledge is based on research and can be characterized as "objective" theory, theory with a big T. This is the type of knowledge that plays a central role in the traditional approach and that should certainly not be left out of teacher education programs: Now and then student teachers should be helped to see the larger picture of educational knowledge. More often, however, they need knowledge that is situation-specific and related to the context in which they meet a problem or develop a need or concern, knowledge that brings their already existing, subjective perception of personally relevant classroom situations one step further. This type of knowledge is called *phronesis*. We could also call it "theory with a small t." The character of *phronesis* is more *perceptual* than *conceptual*: It—often unconsciously—focuses the attention of the actor in the situation on certain characteristics of the situation, characteristics important to the question of how to act in the situation. To put it concisely, *episteme* aims primarily at helping us to *know* more about many situations, while the emphasis of *phronesis* is mostly on *perceiving* more in a particular situation and finding a helpful course of action on the basis of strengthened awareness. This strengthened awareness of concrete characteristics in specific situations is also the fundamental difference between *phronesis* and procedural knowledge (knowledge about "how to . . ."). The danger of an emphasis on procedural knowledge in teacher education is that student teachers learn a lot of methods and strategies for many types of situations but do not learn how to discover, in the specific situations occurring in everyday teaching, which methods and strategies to use. Advocates of the traditional approach would, of course, state that this is exactly the competency that should be trained in teacher education. However, they often forget that the assumption underlying the idea that teachers should be trained to recognize typologies of situations is that during their teaching, teachers

make a logical analysis of situations, followed by a conscious decision about the course of action to take. In the next section, this assumption will be challenged and a new theory on the relationship between teacher cognition and teacher behavior will be presented.

What Guides Teacher Behavior?

The "teacher thinking movement," which started in the 70s, has created a view of teachers as conscious "decision-makers" (Clark, 1986). It was assumed that teachers possess theoretical structures, which they apply to practical situations. Teacher cognition was viewed mainly as being cognitive and the common line of thinking about the relationship between teacher cognition and teacher behavior fit into the process-product approach in the research on teaching prevailing at the time: The idea was that once inside the schools, teachers, when making practical decisions, would simply use the research-based knowledge offered to them. Although, as noted above, this assumption

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appeared to be invalid, a more realistic theory of teacher cognition and teacher behavior has not yet evolved. Only fragmentary building blocks of such a theory have been introduced by researchers, through new notions, such as "personal theories" (e.g., Carter, 1990), "images" (e.g., Elbaz, 1983; Calderhead & Robson, 1991), or "practical knowledge" (e.g., Fenstermacher, 1994). These were interesting attempts at emphasizing the idiosyncratic and situational character of teacher cognition. In Aristotle's terms one could say that the importance of *phronesis* was being rediscovered. However, researchers using the new notions seldom clarified the relationships of these notions to other related concepts, nor did they say much about the question of *how* cognition influences teacher behavior. This has left the field with a rather confusing series of scattered and unfinished attempts at developing the necessary theoretical basis for teacher education.

In a recent article (Korthagen & Lagerwerf, 1996) a proposal was presented for an integrative framework that could offer this basis to teacher education. This framework takes account of the conclusion stated by Floden and Klinzing (1990, p.18) that "teacher educators may be especially interested in studies that describe how teachers learn routines and schemata." It is grounded in recent developments in neurophysiology (e.g., Lawson & Lawson, 1993), linguistics (Johnson, 1987), social psychology (Watzlawick, 1978), and cognitive psychology (Van Hiele, 1986), all pointing toward the central role of figurative and analog mental structures

in constructing meaning and directing behavior. Notions like *images*, *personal theories*, *reflection*, the *washing-out effect*, *conceptual change*, and the role of student teacher *concerns* can be understood from within this framework. In order to make the founding principles of this framework understandable within the limitations of the present article, we start with a relatively simple example of a problem situation that could occur while teaching a class in primary education.

During the days preceding the present episode, the children have worked on many addition and subtraction problems like $27 + 5$, $68 - 9$, and so forth. While teaching the whole class, the teacher, Mrs. Wilson, now wants to offer some more practice with this type of exercise with the aim of proceeding to the next topic. She puts the following problem on the blackboard: $34 + 7 = \dots$

Jim, in the front row, gives the answer 42. Mrs. Wilson immediately reacts by saying, "That's wrong. You know that $34 + 6 = 40$, so $34 + 7 = 41$."

Most educators would disapprove of this reaction. First of all, Mrs. Wilson made no attempt to discover how Jim had arrived at the answer 42, even though we know it is important in teaching to take account of students' preconceptions. Secondly, she did not promote Jim's reflection on how he had solved the problem, though such reflection is important to developing independent learning. Finally, she did not help Jim develop his own strategy for solving the problem. This increases the likelihood that he will make the same type of mistake again next time.

How can we explain the teacher's reaction? For many years, the view of teachers as "thinkers" and "decision-makers" has led us to believe that the teacher in our example has a theory about this type of situation, interprets the situation on the basis of this theory, and rationally arrives at the decision to react the way she did. If we ask Mrs. Wilson to explain her behavior after the event, she may indeed give an explanation that resembles this type of reasoning, that is, a chain of perception, interpretation, logical thinking, decision-making, and acting. However, is this indeed a valid account of what really happened during the split second between Jim's reaction and her own?

Korthagen and Lagerwerf (1996) state that in a case like this, which Dolk (1997) calls an *immediate teaching situation*, it is almost impossible to separate perception, interpretation, and reaction, but they all take place within a split second. Together they form a unity rooted in many earlier experiences in the teacher's life, for example, in situations in which she was a student (compare Lortie, 1975) or situations in which she saw her mentor teacher react to students like Jim. This unity of perception, interpretation, and action is certainly not of an exclusively rational nature, and is not even necessarily something the teacher is conscious of. Without trying to present an exhaustive list of possible origins of the teacher's behavior, we can quickly see that the following aspects may play a role:

- *feelings*, for example, irritation that Jim is still making mistakes;
- *former similar experiences*, for example, with Jim or with other children who keep making mistakes;
- *values*, for example, the teacher may find it important that children in this grade are capable of performing additions up to 100 without making mistakes;

- *role conceptions*, such as the conception of a teacher as someone who "transmits" correct answers;
- *needs or concerns*, for example, the wish to get through the present problem quickly and give more attention to the other topic she had in mind, or the wish to avoid a disorderly classroom situation;
- *routines*, for example, the routine of quickly correcting a wrong answer as a means to circumvent a problem.

All these needs, feelings, values, conceptions, and so forth, together—within a split second—create the personal meaning of the situation to the teacher, and—often unconsciously—lead to a behavioral inclination, namely, to react by correcting the mistake and repeating the right solution procedure. Korthagen (1993) proposed the term *Gestalt* to indicate the dynamic and holistic unity of needs, feelings, values, meanings and behavioral inclinations triggered by an immediate situation.

Gestalts

Central in Gestalt psychology is the notion that the most elementary way individuals acquire a grasp of their environment is through the formation of Gestalts, which, often unconsciously or semi-consciously, help us to see objects or situations as an entity and to respond to them as such (Ellis, 1950). For immediate teaching situations this means that the many and multifaceted conditions and events embedded in a given situation are combined into one holistic perceptual identity. This implies a complex interplay between social, cultural, psychological, and physical factors. Firstly, the knowledge imbedded in Gestalts is linked to concrete situations previously encountered by the person (often very early in life) and colored by the subjective and value-laden experiences of such situations. This is in line with Van Manen's (1990) conception of the interplay of a situation and the person experiencing that situation and the role of context in that experience (compare also Clandinin, 1985 and Carter & Doyle, 1996). For example, in Mrs. Wilson's situation described above, negative experiences with classroom discussions may shape her present behavior.

Following the work of authors such as Vygotsky (1978) and Giddens (1984), we can look at the role of context from a broader socio-cultural perspective. For example, it is possible that Mrs. Wilson is strongly influenced by her need to get through the lesson quickly, which may in turn be influenced by pressures put on her by a prescribed and overloaded curriculum. This may in turn reflect a macro social-economic emphasis on productivity, and diminishing consideration for the value of care in human relationships. As Berlak and Berlak (1981) pointed out, the teaching profession is filled with such dilemmas between conflicting values, goals, conditions, and personal needs of the participants in classroom interactions. To give an example of the latter, Mrs. Wilson may also be influenced by her feeling Jim's resistance toward being asked to reflect on his own thinking, which again may result from his cultural background.

However, being "in action," Mrs. Wilson will not have the time to reflect on such important, but numerous and very complex relationships between the various factors imbedded in the situation: Foremost, she has to *act*, and a Gestalt of the situation helps her in doing so.

For the purpose of describing the holistic and direct relationship between context, situation, person, and behavior,

we borrow the notion of *closure* from Gestalt psychology: the tendency of an organism to complete incomplete information. Well-known examples are that we tend to see a whole picture in a number of scattered parts and hear the next part of a song if an audiotape suddenly stops. In the same way, teachers tend to "close" situations with responses that reflect well-known ways of behaving in similar situations. In the example of Mrs. Wilson, this may mean presenting the right answer. In this way, people's Gestalts often reflect and at the same time reproduce sociocultural patterns.

Many authors use the term *images* to refer to the holistic perceptions guiding behavior (e.g., Denis, 1991; Connelly & Clandinin, 1984). However, there are two problems with this term, causing us to prefer the term *Gestalt*. First, Calderhead and Robson (1991) point out that "the concept of image is a fairly crude one that has not been very precisely defined either in cognitive psychology or in research on teaching" (p. 3). Indeed, the term is used for different phenomena, for example, both in the sense of a context-bound, concrete mental picture of a certain situation and in the sense of a general view of teaching or education, thus coming close to the concept of a metaphor. Second, the term *image* seems to refer to something visual, while it is important to include imprints from other sensory perceptions (Dennett, 1991) and behavioral tendencies. This is in line with recent neurophysiological research showing how the implicit or nondeclarative memory processes parallel sensory inputs. Barlow (1990) notes: "Neurons respond selectively to just the characteristics of the image that the Gestalt school drew attention to" (p. 21). Indeed, the application of the well-known Gestalt laws (for example, the above-mentioned law of closure) to processes in teaching appears to deepen our understanding of phenomena in educational contexts (see Dolk, Korthagen, & Wubbels, 1995 for an elaboration).

This alternative analysis of the processes going on inside the teacher do not imply a complete rejection of the classical analysis of the relationship between teacher cognition and teacher behavior. It may be that the description of the process in terms of a chain consisting of perception → interpretation → analysis → decision → action is more accurate in cases where the teacher is operating at a fairly conscious level, especially if the teacher reflects *after* the lessons ("reflection-on-action"; Schön, 1987) or if there has been a fraction of stop-and-think before reacting ("reflection-in-action"). Probably, not only *phronesis* but also an *episteme* type of knowledge can be helpful in such situations. However, in most situations during a lesson the "split-second" way of reacting, rooted in Gestalts triggered by the characteristics of the situations, is probably much more common. This assumption builds on the literature on teacher routines (e.g., Clark & Yinger, 1979; Halkes & Olson, 1984), which stresses the fact that the automatic or mechanical performance of acts is characteristic of a good deal of teacher behavior (see also Unwin & McAleese, 1978). Carter (1990, p. 297) concludes that teachers' actions seem to be governed largely by rules and routines, with decision-making in a studied, deliberate sense taking a minor role in their interactive thinking. Elbaz (1991) notes that teachers' knowledge is non-linear, holistic, imbued with personal meaning, and largely tacit. As Russell, Munby, Spafford, and Johnston (1988, p. 67) put it: "professional knowledge consists of more than that which can be told or written on paper."

Levels in the Development of Knowledge About Teaching

If it is true that Gestalts play such an important role in teaching, how are these Gestalts related to the *episteme* type of knowledge contained within the available body of knowledge about teaching—knowledge that teachers can and should at least partly acquire as a basis of their professional thinking? And what is the role of reflection-on-action in developing *episteme*? These are fundamental questions asking for a synthesis of the two rather new knowledge bases presented in the two previous sections, one concerning the nature of “theory” and one concerning the relationship between teacher cognition and teacher behavior.

To answer these questions, Korthagen and Lagerwerf (1996) use a model of levels in learning, summarized in Figure 1, again based on a theory of mathematics education (a theory developed by Van Hiele, 1986). The bottom level is the Gestalt level, as described in the previous section. If teachers come across unexpected situations or if they are stimulated by someone else (for example, a teacher educator) to take time and look more closely at their teaching, *reflection* on their own Gestalts is promoted. By examining the question of what it is that guides their own behavior, teachers can become aware of the elements that constitute these Gestalts and the relationships between these elements. They can start to develop a more consciously available *schema*, which on the one hand is still tied to concrete experiences, but on the other hand becomes more detached from these experiences. Van Manen (1977) refers to this as “the process of analyzing and clarifying individual and cultural experiences, meanings, perceptions, assumptions, prejudices, and presuppositions, for the purpose of orienting practical actions” (p. 226). For instance, in the above example Mrs. Wilson may notice that she uses concepts like “slow learners” and “repeated instruction,” their relationship being that slow learners need repeated instruction. She then starts to develop a schema, that is, a conscious mental framework of concepts and relationships, which gradually gets more *interiority* (a term used by Skemp, 1979). The kind of knowledge imbedded in a schema shows characteristics of *phronesis*, as it builds on Gestalts and is thus connected to specific situations and personal perception. It is also highly subjective, as the example shows; Mrs. Wilson’s inference is certainly not in line with the ideas of modern educationalists. On the other hand, the knowledge in schemata is often also somewhat more generalized over different situations

and makes use of concepts, which means that schemata also show characteristics of *episteme*.

The schema level itself can also be reflected upon, leading to the *theory level*. In this reflection, the teacher makes logical connections between the relationships in his or her schema. For example, some relationships in the schema may appear to be a logical consequence of others, or may themselves appear to be if-then relationships that apply to a large variety of situations. Constructivism is such a theory, built on the assumption that people actively construct meaning on the basis of their experiences.

The theory level is characterized by the formulation of definitions, axioms (basic relationships), and logically derived propositions. This level has the clearest characteristics of *episteme*.

After some time, knowledge on the schema or even the theory level can become self-evident to the teacher, and the knowledge can be used in a less conscious, “intuitive” way. It is as if the whole schema or theory has been reduced to one Gestalt. Van Hiele (1986, p.46) calls this *level reduction*. We give an example:

Before entering teacher education, a student teacher reacted automatically to a child who wrote down “ $12 + 9 = 22$ ” by pointing out his mistake. During teacher education she went through a process of change by experiencing in a variety of situations the fact that knowledge transmission is not actually very effective. She became aware of the importance of creating learning experiences for children, and promoting their reflection as a prerequisite for their learning. In supervision and during group discussions, she developed a schema about teaching and learning, of which she is consciously aware. In this schema, notions like “experience” and “reflection” play a central role. Having taught for some time on the basis of this schema, she again reacts “automatically” to a pupil who writes “ $12 + 9 = 22$,” but this time her reaction is to ask him how he can check his work. In the concrete action situation, her schema now functions as if it were a Gestalt: She uses it almost unconsciously.

Thanks to level reduction, the relevant schemata or theories need less attention. This allows the individual to concentrate on other things.

Illustration of the Three Levels, Based on Empirical Evidence

In this section, we illustrate the three level model with concrete examples. We present data from a type of interview we

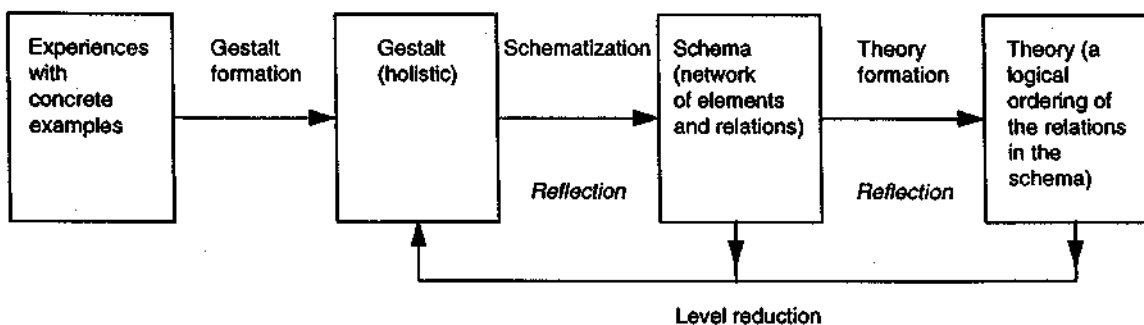


FIGURE 1. Levels in the process of learning with regard to a certain domain.

developed on the basis of research designs used by other researchers in this field, such as Carter, Cushing, Sabers, Stein, and Berliner (1988) and Copeland, Birmingham, Demeulle, D'Emidio-Caston, and Natal (1994). In these interviews, the respondents watched classroom vignettes on video and were subsequently questioned about them. The three cases described here are drawn from semi-structured interviews about a five minute video recording showing a discussion between a small group of high school students and their biology teacher, about a test many students had failed.

Respondent 1: A 13-Year-Old High School Student

Interviewer: Can you tell me what you've just seen, in one sentence?

Student: A teacher who has a talk with students about a test they failed.

Interviewer: What do you think about that talk?

Student: Well, I think, that the teacher, he . . . It is indeed kind of dry material. If you would have a book that has pictures and good, readable pieces of text in it. Isn't that much nicer to study than when a teacher tells you about things in class you have to memorize right away?

Interviewer: So you're saying: I understand what those students are trying to say.

Student: Yes. In our class we always have practicals and nice pictures and stuff, and then it's easy. You know right off how everything is put together and how it works, just from looking at those pictures.

Interviewer: What do you think about the talk?

Student: You know, teachers always think: this is my subject and you have to start three days in advance and this, that and the other. But we get other assignments too, you know! We might well have two more tests to study for before that one, and that's it then. Then it's really impossible to study for all of them days in advance.

Interviewer: So what you're saying is: Some of the problems those students mention are well-known to me. What do you think of the teacher in that talk?

Student: That teacher puts it all down to pace, but pace has nothing to do with it! If you explain everything well, use good pictures to go with it, and you just understand everything, you could make it as fast as you like. . . .

Interviewer: And what did you think of the talk?

Student: Well, I think things didn't get any clearer for the students. I mean, if they studied as hard as they could this time, then I think they'll probably fail the next test, too.

Interviewer: Is there a logic to what you're saying?

Student: I don't know.

Interviewer: I mean, could you make a sentence that goes like: "If this, then that"?

Student: Well, if teachers would explain things better and be clearer and draw easier pictures, then that'd mean the grades would go up.

Interviewer: Do you know any theory about this?

Student: No? [The student seems to be surprised by the question.]

Though the interviewer makes several attempts to focus on the discussion itself, the student is hardly aware of the structure in the communication on the video. Instead, she has focused her attention on high school students' problems and teachers' classroom behavior. These issues apparently reflect her "concern," shaping her perception of the video. With regard to these issues, she seems to have a kind of schema with concepts and relationships, even a logical relationship.

However, as far as the communication structure on the video is concerned, we are inclined to conclude that she is at a Gestalt level; there seems to be one overall idea that characterizes the conversation for her, which is something like: Such a conversation does not help and is irritating. This is only verbalized after repeated inquiry. The student does not seem to have many concepts at her disposal to describe this Gestalt in more detail. It is typical of the Gestalt level that the phenomenon is self-evident for the person. This seems to be the case here. The student seems to think: This is just the way teachers talk. This example shows how cultural factors shape students' perception and is an illustration of the complex interplay between cultural, social, and psychological factors in the Gestalt formation process. It is also the reason why we started with the example of a non-teacher: We found that, as soon as people start to think seriously of becoming a teacher, their reflections on the video are more focused on the teacher-student interaction and its limitations.

Respondent 2: A Postgraduate Student Teacher in Chemistry

Interviewer: Can you sum up what you have just seen in one sentence?

Student: A lecture, he was giving a lecture, pure and simple. He was trying to find the reasons to explain to the students why they'd failed the test. He's already analyzed it completely, he knows exactly what the problem is. That's fairly obvious. It was a lecture I saw.

Interviewer: What makes you say that? Why is it a lecture?

Student: He was talking for a fairly long time. At a certain point he's listing the things he thought had caused the students to flunk the test. The fast pace, outside pressures. He didn't allow the students to speak very often, either. The students tried to, several times, by saying: "Yes, but don't you think it could've had something to do with the way you teach?" Well, of course that wasn't it, obviously. That didn't fit in with his explanations. Those were not the problems he foresaw. It was more like a one-way transfer of what was really at the bottom of it. And as for the students' role in it, there hardly was any. . . .

Interviewer: Do you know more about this type of situation, in terms of the words you use, like lecture, one-way transfer?

Student: I perceive it as a lecture, because that's how I experienced lectures at university. That's what a lecturer is there for, he transmits his views on a particular subject and you really just absorb that and maybe you put it to use at a later stage. There is no interaction, really. Also, I could appreciate where those students were coming from. Because that is how you often feel, that the teacher really knows best, because of his experience.

Interviewer: When I ask you, what do you know about these things, I am referring to educational and pedagogical knowledge too. What is your reaction to that?

Student: When I look at a situation like this one, I'm thinking: They'll leave in a minute, but they haven't achieved anything. They've discussed the problem, but whether they'll actually be able to do something about it, that wasn't the issue here. So, I think that in that respect, he didn't make the most of the discussion. It was an exchange of ideas, more than anything. The students came to him with a problem, but he didn't solve it for them. At the end he just goes: "Well now, you'll start to study a couple of days sooner, you'll put in more time. And this time, don't just put it off till one day before the test." You see, he claims that is what happens 99% of the time. And then their simple admission that they're just not going to do that. The discussion hasn't changed anything.

Interviewer: Do you know any educational or pedagogical theory that could apply to this situation?

Student: No, you're right, I don't know much about that.

We conclude that this student teacher has reached a schema level with regard to the communication between a teacher and his students, in which some first logical relationships are discernible. The elements of the schema are concepts like "lecture" and "one-way transfer." A logical relationship seems to be: "If a teacher employs such a one-way transfer approach, then a problematic situation like this will not change much." From the last part of the interview, we conclude that this student teacher has not yet reached the theory level.

Respondent 3: A Professor of Education

In the first part of the interview, this respondent describes his thoughts on what he saw in the video. Basically, he feels that the students in this situation analyze the problem differently than the teacher, and that the teacher tries to explain that his way really is the right way. In answer to the question "What do you know about this kind of situation," the respondent refers to publications by Gordon on teacher-student interaction and Leary on interpersonal behavior and theory of discussion techniques.

Interviewer: Summarizing the things you brought up in answer to my question about what you know about this kind of situation, I heard you mention Gordon, a number of his principles, like "whose problem is this," you refer to discussion techniques, you comment briefly on the fact that there's little or no communication in this situation, you mention Leary, you regard it from a Leary point of view, you picture a Leary-rose [the model for mapping behavior, developed by Leary], you thought about what you could do about it, and then you observe that this would be probably very hard, since this type of thing is usually very deep and fixed. It is rather a lot of different subjects you mention there. Is there any logical structure behind that multitude of things? Is there a logic which ties it all together?

Professor: If I start with non-communication I'd probably be able to draw circles and arrows or something to connect it to the other concepts. [He starts to make a drawing.] Leary is one way to study that communication; Gordon provides another way to look at it, and I should add here that I usually tend to use this to look at classroom situations and that I apply that to discussion situations outside the classroom situation. And of course they're closely related, because of escalating processes, for one thing, symmetrical communication and complementary relationships, things

like that. This makes up one theory, and then you have . . . [He is elaborating the drawing.]

Interviewer: You're referring to this as a theory?

Professor: You can combine this into one theory, I think that in my head this might be something in the shape of one theory, more or less. . . .

Interviewer: You say that was not on your mind when you were looking at the video, but could you describe it . . .

Professor: I'm thinking of guidelines, like if this man really wants the students to start now, make them start studying for the next test earlier, he'd better do things differently. That type of thing crossed my mind constantly, but I couldn't simply add them here [in the drawing]; this is more like a sort of overall network of concepts. There's bound to be some logical structure in there, but I can't see that now.

There is no doubt that the professor has reached theory level with regard to the theories he mentions, since he has written several books on some of them. In the interview he even tries to find logical relationships between these separate theories. The theories and theory-elements seem to play a role in the way the professor interprets the vignette, but not so much at a conscious level. He is more focused on finding practical guidelines for action. He reports that only afterwards, during the interview, he becomes aware of the connection between these guidelines and the theories. We are inclined to regard this situation as an example of a reduced theory level. This seems to be characteristic of every situation in which a respondent who has reached the theory level is asked to reflect on a practical case: It appears that in such cases the connection with practice can only be established through level reduction.

Consequences for Teacher Education

It is important to note that people often try to find logical explanations for phenomena before a sufficiently rich schema has been formed. They use "local" orderings leading to a *subjective theory*¹—for example, one which contains the proposition, "If a student does not understand my explanation, I have to give the explanation again." Such subjective theories lack the characteristics of an empirically based and coherent "Theory with a big T" (*episteme*). It is here that teacher education becomes difficult: "Reframing" such subjective theories in the student teachers' minds (a term used by Schön, 1987) requires much more than presenting sound theoretical frameworks to them, as the research on learning and instruction shows. The level model presented above clarifies that a teacher educator should not try to induce change on the theory level, but should go down and start on a lower level, especially the Gestalt level. This means that the student teacher should first gain more experiences that are suited to developing adequate Gestalts.

Such experiences could, for instance, be the tutoring of a single high school student. In our own teacher education program at Utrecht University, a *one-to-one* arrangement is the first field-based experience for student teachers (Vedder & Bannink, 1988). The prescription to audiotape the one-to-one sessions and to analyze them afterwards causes student teachers to shift from a teacher perspective to a student perspective, as generally they quickly notice the communication gap between themselves and the child. At that point,

new Gestalts are formed—an auspicious moment for the teacher educator to ask further questions and focus the student teacher's attention on important details of the interaction with his or her student. Again, it is strengthened awareness that is the goal here. Only later on (after a few sessions) can reflection on the newly built Gestalts take place, leading to schematization. "Make haste slowly" is the watchword here: A pressure towards developing theory too quickly can easily become counterproductive, as the student teacher's actions in practice will be Gestalt-driven. As soon as the Gestalts directing the student teacher's split-second behavior are no longer closely tied to the theory offered by the teacher educator, this theory becomes ineffective, especially in cases where the student teacher gets blocked by theoretical guidelines that he or she cannot translate into practice. This means that the "theoretical" elements offered by the educator should have the characteristics of *phronesis* more than those of *episteme*.

This points toward another fundamental problem: Any *episteme* that is not connected to already existing *phronesis* will not change the practitioner much. Even if a student teacher gradually develops his or her Gestalts into schemata and finally into sound theories, *level reduction* should take place within the student teacher before any attained theory level is able to influence split-second behavior. This means that in the end, the theory in the student teacher's mind should itself become a Gestalt, that is, a dynamic unity intertwined with behavior in a certain type of situation and no longer needing much conscious reflection.

If we consider the long road from Gestalts, via schemata, to theory and then back again to Gestalts, it is no wonder that theory in the traditional academic sense can only have a limited place in preservice programs. Still it is an important place, as *phronesis* is to be considered of higher quality if it is fed by *episteme*. On the other hand, if we dare to view this *phronesis* as an important part of the relevant knowledge base for practitioners, a lot can be offered to teachers during the preservice period.

A New Role for the Teacher Educator

However, the realistic approach to teacher education requires a special and often unconventional role on the part of teacher educators. Their main task requires at least four competencies; they must be able to do the following:

1. Create suitable learning experiences for student teachers in which these student teachers can develop adequate Gestalts, the bases for the next step.
2. Promote further awareness and reflection in student teachers on their experiences, thus developing more elaborated Gestalts and schemata, leading to *phronesis*. It is often helpful to take *one* concrete, recently experienced, and relatively short teaching situation as a starting point for analysis, a situation that still evokes some concern or question in the student teachers.
3. Offer theoretical notions from empirical research in such a way that these notions at a specific moment for specific student teachers help their *phronesis* one step further, which means that they start to perceive more in the specific and in similar situations and are able to act upon their heightened awareness. The latter implies that the teacher educator must not only offer theoretical elements but should have the competency to:

4. Train the student teachers in acting in a productive manner.

This list illustrates that this new approach to teacher education is, in itself, an integration of several older approaches: the theory-based approach, competency-based methods, and the reflection paradigm in teacher education. It should be noted that the realistic approach cannot be equated with the so-called "concern-based" approach to teacher education (Fuller, 1969). In this latter approach the curriculum is grounded in research into general stages of concern development in student teachers and is structured accordingly beforehand. The realistic approach acknowledges such general trends in concern development but focuses on a more concrete level, that is, the specific concerns, questions, and problems student teachers take with them to the institute today on the basis of yesterday's experiences in the school. This implies a much greater flexibility and more limited possibilities to prestructure the program. As a consequence, the role of the teacher educator becomes certainly not simple. The "what do you yourself think" caricature forms a strong contrast to the professionalism required to put the realistic approach and the idea of guided reinvention into practice.

A very obvious consequence of this approach is that student teachers' Gestalts should be taken as a serious starting point for professional development. As we saw, Gestalts are certainly not only of a cognitive nature: The student teachers' needs, feelings, concerns, values, and so forth should be taken into account. This opens up a whole array of necessary teacher educator competencies, for example, the competency to create a safe learning environment by means of *acceptance, genuineness, and empathy* (Rogers, 1969). The ability to stimulate *concreteness* is another very important competency, as it is the tool by which differentiation within the Gestalts is promoted, leading to schematization. *Confrontation* should not be avoided, but a balance between safety and challenge is needed in order to make confrontation effective. The relationships between the use of teacher educator competencies and the intended reflective learning process in the student teacher are shown in Figure 2.

In the inner circle, the reflection process is described by the so-called ALACT model for reflection (Korthagen, 1985, 1988), named after its five phases: action, looking back,

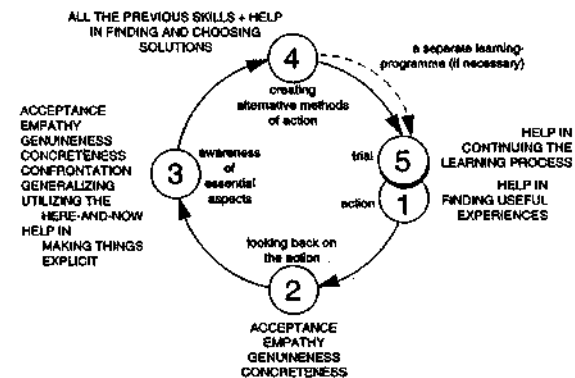


FIGURE 2. The ALACT model (inner circle) and the necessary teacher educator competencies (outer circle).

awareness of essential aspects, creating alternative methods of action, and trial. The fifth phase is itself again the first (action) phase of the next cycle, which means that we are dealing with a spiral model: The realistic approach aims at an ongoing process of professional development.

Of course, we should realize that many teacher educators, especially in North America, have to work with large cohort groups in which close personal supervision of student teachers is not always possible. As we also recognized this problem in our own program, we have developed structural methods in which student teachers do as much of the supervision as possible together. These methods of so-called *intercollegially supported learning* (Tigchelaar & Melief, 1997) aim at structuring the intended five-step individual reflection process about concrete teaching experiences (for example, in the one-to-one arrangement) through a series of questions (Figure 3), as well as promoting reflective discussion of the teaching experiences in groups of three to four student teachers. For this purpose, the student teachers are trained in using the very same supervision skills as indicated in Figure 2, which of course is also helpful for their guidance of their own students in the schools. Moreover, the small group discussion takes place according to a prestructured format, lead-

ing to a report to the teacher educator with concrete issues and questions, to which the educator can, to a large extent, react in meetings with the cohort group as a whole. Apart from the fact that such a method saves staff time, it prepares student teachers for inter-collegially supported learning during the rest of their careers, thus creating a counterbalance to the individualistic and non-collaborative culture of teaching that Feiman-Nemser and Floden (1986) point at.

Organizational Consequences

The realistic approach to teacher education not only has consequences for the types of interventions teacher educators should use to promote the intended learning process in the student teachers, but there are also consequences on the organizational level of teacher education curricula (see also Hermans, Créton, & Korthagen, 1993 and Koetsier, Wubbels, & Korthagen, 1997).

First of all, linking theory and practice with the aid of the ALACT model requires frequent alternation of school teaching days and meetings at the teacher education institute.

Secondly, in order to harmonize the interventions of school-based mentors and institute-based teacher educators, close cooperation between the schools and the institute is necessary. Not every school may be suitable as a practicum site; the school must be able to offer a sound balance between safety and challenge and a balance between the goal of serving student teachers' learning and the interests of the school.

Thirdly, the approach advocated here implies that it is impossible to make a clear distinction between different subjects in the teacher education program. As Korthagen and Lagerwerf (1996) note, the realistic approach "is not compatible with a program structure showing separate modules such as 'subject matter methods,' 'general education,' 'psychology of learning,' etc. Teacher knowledge, which is assumed to function in practice, is knowledge based on experiences; and teaching experiences are not as fragmented as the programs of many teacher education institutes would suggest" (p. 185).

Finally, the realistic approach in teacher education requires specific competencies from both teacher educators and cooperating teachers, for example, those indicated in Figure 2, and most of all the competency to be themselves reflective with regard to their own supervision practices. This implies the need for the professional development and training of teacher education staff and cooperating teachers in the school.²

Empirical Support of the Realistic Approach in Teacher Education

Since the mid-80s, the Utrecht University teacher education program preparing for secondary education has gradually developed more and more toward the approach described in this article. Of course, an important question is: What are the results? Focusing especially on this question, we will briefly present an overview of several evaluative studies of the Utrecht program, which have been published previously.

A national evaluation study, carried out by an external research office (Research voor Beleid; see Luijten, Marinus, & Bal, 1995 and Samson & Luijten, 1996), of all Dutch teacher education programs preparing for secondary education has shown that 71% of a sample of graduates of the Utrecht program (N = 81) scored their professional preparation as good

REFLECTION QUESTIONS
Phase 5 of the previous cycle (= phase 1 of the present cycle):
1. What did I want to achieve?
2. What did I want to pay particular attention to?
3. What did I want to try out?
Phase 2 (looking back):
4. What were the concrete events?
- What did I want?
- What did I do?
- What did I think?
- How did I feel?
- What do I think the pupils wanted, did, thought, felt?
Phase 3 (awareness of essential aspects):
5. What is the connection between the answers to the previous questions?
6. What is the influence of the context/the school as a whole?
7. What does that mean for me?
8. What is the problem (or the positive discovery)?
Phase 4 (creating alternatives):
9. What alternatives do I see? (solutions or ways to make use of my discovery)?
10. What are the advantages and disadvantages of each?
11. What do I resolve to do next time?

FIGURE 3. Questions for promoting reflection, based on the ALACT model.

or very good (the two highest scores on a five-point scale). This is a remarkable result given that, in the total sample of graduates from all Dutch teacher education programs preparing for secondary education ($N = 5135$), this percentage was only 41% ($p < 0.001$).

In light of the present article, a fundamental question is: Does the realistic approach indeed reduce the gap between theory and practice? Several studies have focused on this more specific question. In 1991, an evaluative overall study among all graduates of the Utrecht University program between 1987 and 1991 showed that 86% of the respondents considered their preparation program relevant or highly relevant to their present work as a teacher (Koetsier et al., 1997). Hermans et al. (1993) illustrate this finding with more qualitative data from an experiment with a group of 12 student teachers, strictly incorporating all the principles mentioned in the two previous sections. All 12 student teachers reported a seamless connection between theory and practice—a noteworthy result, given the many research reports from all over the world showing the problematic relationship between theory and practice. Some quotes from student teachers' evaluations are: "The integration theory/practice to my mind was perfect"; "Come to think of it, I have seen and/or used all of the theory in practice"; "The things dealt with in the course are always apparent in school practice."

We already mentioned an extensive study by Brouwer (1989) into the relationship between program design and the effects of 24 teacher education curricula (related to 12 different school subjects) in use at Utrecht University during the 80s, that is, the years in which the realistic approach started to develop. At various moments during these programs and during the first two years in which the graduates worked as teachers, quantitative and qualitative data were collected among 357 student teachers, 31 teacher educators, and 128 cooperating teachers. Concrete learning effects on the work of the graduates during their first year in the profession (measured by means of 14 criterion variables) appeared to depend primarily on the degree to which theoretical elements in their preparation program were perceived by the student teachers as functional for practice at the time of their student teaching, and on the cyclical alternation between school-based and university-based periods in the program. Also, a gradual increase in the complexity of activities and demands on the student teachers appeared to be a crucial factor in integrating theory and practice.

Another fundamental question is whether the professional community would consider the knowledge base offered to the student teachers at Utrecht University to be sufficient. Some valuable indications may be derived from two external evaluations, in 1992 and 1997, by two official committees composed of experts in teacher education, researchers, and representatives of secondary education, instituted by the Association of Dutch Universities (VSNU). The program received very positive assessments. For example, in 1997 the program scored "good to excellent" on 25 out of 34 criterion variables, including the criteria "value of program content" and "professional quality of the graduates." On the other 9 criteria it received the assessment "sufficient." No other Dutch university teacher education program received such high scores.

However, the 1992 committee did comment on the fact that the final objectives of the program were not formulated

at an explicitly concrete level. This was recognized by the program staff. It is a difficulty almost inherent to the realistic approach that it is hard and perhaps even counterproductive to state in advance what the reinvention process should lead to. Perhaps this is the price to be paid for the shift from an emphasis on *episteme* toward the development of knowledge, skills, and attitudes that are really being used in practice. On the other hand, after 1992, years of experience with the realistic approach have enabled the program staff to predict rather precisely what types of problems and concerns are generated by what kinds of practical experiences of student teachers, as well as what kind of "theory" can effectively be connected to these problems and concerns. This made it possible to formulate the program objectives more precisely in advance and to not only follow the student teachers' concerns, but also generate them (Van der Valk, Somers, Wubbels, & Korshagen, 1996). This led the 1997 committee to score the degree of "completeness and clarity of the program goals" as good to excellent, as well as the degree to which the program goals were achieved. We believe that this is another indication that a new and sound "pedagogy of realistic teacher education" is now evolving. The first building blocks of this pedagogy have been described in this article.

Notes

1. The term *subjective theory* is typically European, while the term *implicit theory* is more common in North America (cf. Carter, 1990 with Mandl & Huber, 1983). The term *implicit theory* has a connotation of "tacit knowledge," which cannot be directly explicated. As the latter type of knowledge is more congruent with what we call a Gestalt, we prefer the term *subjective theory* to indicate a local ordering in schemata.

2. Such a training has been developed and implemented on a large scale in the Netherlands, causing a shift in the approaches of many Dutch teacher educators. The training has also been given to teacher educators from a variety of European countries, the U.S., Canada, and Australia.

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