Can Teacher Education Make a Difference?

Niels Brouwer
Radboud University Nijmegen
Fred Korthagen
Utrecht University

Occupational socialization in schools is a known factor counteracting attempts at educating innovative teachers. In this study, findings are reported from a longitudinal study conducted among 357 students, 128 cooperating teachers, and 31 university supervisors from 24 graduate teacher education programs. Quantitative survey data as well as in-depth qualitative data were collected over a period of 4.5 years. Development of teaching competence was followed from candidates' enrollment until their third year as in-service teachers. Occupational socialization in schools was demonstrated to have a considerable influence on the development of graduates' in-service competence. However, evidence was also produced for an impact of specific characteristics of the teacher education programs studied involving the integration of practical experience and theoretical study. Implications of these findings for the design of teacher education programs and the conduct of teacher education research are discussed.

The impact of teacher education on teachers' behavior in schools has been a recurrent issue in the literature on teacher education. Several authors claim that the effects of teacher education on the actual practices of teachers are generally meager. A gap between theory and practice seems to persist

Niels Brouwer is an Associate Professor in the ILS Graduate School of Education, Radboud University Nijmegen, P.O. Box 38250, 6503 AG Nijmegen, the Netherlands; e-mail *n.brouwer@ils.ru.nl*. His research interests include the psychology of teacher learning, curriculum development and multimedia use in teacher education, and the epistemology of social research.

Fred Korthagen is a Professor at the IVLOS Institute of Education, Utrecht University, P.O. Box 80127, 3508 TC Utrecht, the Netherlands; e-mail *f.a.j.korthagen@ivlos.uu.nl*. His research interests include mathematics education, the professionalization of teacher educators, and the development of inspiration in teaching.

across different times and contexts. Various explanations exist for this phenomenon. An influential type of explanation is based on the concept of socialization, "the process by which people selectively acquire the values and attitudes, the interests, skills and knowledge—in short the culture—current in groups to which they are, or seek to become a member" (Merton, Reader, & Kendall, 1957, p. 287). The literature on the occupational socialization of teachers emphasizes the dominant influence of the school context on teacher behavior, discouraging the modernization of teaching.

Relatively little is known about the degree to which specific arrangements and strategies in teacher education can counterbalance prospective teachers' socialization into established practice in schools. One reason is that research into this issue requires large-scale studies and complex methodological designs, including longitudinal data collection.

The study reported here[1] was designed to address the issue whether teacher education can make a difference in graduates' teaching competence. Specifically, we addressed the following research questions:

1. How does teaching competence develop over time?
2. What are the relative influences of teacher education programs and occupational socialization in schools on the development of teaching competence?
3. Which program characteristics are related to competence development?

The design used was a longitudinal one focusing on the long-term processes student teachers went through as they developed into beginning teachers. A diverse body of data was collected among these beginning teachers and the other main participants involved: university supervisors and cooperating teachers. The programs studied were situated in a Dutch university teacher education institution and were deliberately aimed at bridging the gap between theory and practice.

In the sections to follow, we first describe the theoretical framework, context, and design of the study. We then report the main findings of the investigation. Finally, we offer conclusions and recommendations relevant to practice and research in teacher education.

Theoretical Framework

Teacher Socialization

In 1975, Lortie published his well-known volume *Schoolteacher, a Sociological Study,* directing attention to the dominant role of practice in shaping teacher development. In line with Lortie's work, Zeichner and Tabachnick (1981) argued that educational notions developed during preservice teacher education are "washed out" during field experiences. Comparable findings were reported in a review by Veenman (1984), who also pointed to the severe problems teachers experience once they have left preservice teacher

education. Similar indications of a lack of transfer from teacher education to practice have surfaced in reviews by Feiman-Nemser (1990) and Wideen, Mayer-Smith, and Moon (1998).

It is interesting to note that this problem is found in many countries and contexts. At Konstanz University in Germany, survey research on a national scale has been carried out demonstrating the phenomenon of "reality shock" or "practice shock" (Dann, Cloetta, Müller-Fohrbrodt, & Helmreich, 1978; Dann, Müller-Fohrbrodt, & Cloetta, 1981). Similar research was done in Hamburg by Hinsch (1979). In the United States, Corcoran (1981) spoke of "transition shock." Cole and Knowles (1993) reported that student teachers' idealistic images of teaching were shattered during their confrontations with the realities of teaching. All of these studies show that, during and immediately after their preservice programs, teachers experience a distinct attitude shift that entails an adjustment to teaching practices existing in schools.

What exactly happens during entry into the teaching profession that causes this attitude shift? From their review of the research on learning to teach, Wideen et al. (1998, p. 159) concluded that beginning teachers struggle for control and experience feelings of frustration, anger, and bewilderment. The process they go through is more one of survival than of learning from experiences. Novice teachers do not feel sufficiently prepared by their teacher educators and come to view colleagues in their schools as "realistic" role models, as the people who "do know" how one should go about teaching.

Building on Kelman's (1974) work on types of attitude change, Dann et al. (1978, pp. 96–104) identified as crucial in beginning teachers' socialization what they called "discrepancy experiences"; that is, these teachers experience a rift between idealistic notions developed during teacher education programs, on the one hand, and pressure from schools to rely on traditional patterns of behavior, on the other. These discrepancy experiences are strongest in situations in which practical action is required (Dann et al., 1981; Hinsch, 1979, pp. 187–188).

As more and more studies of teacher socialization based on different paradigms appeared, it became clearer that different "social strategies" (Blumer, 1969) are open to teachers. Lacey (1977, 1995, p. 619) distinguished among "internalized adjustment," "strategic compliance," and "strategic redefinition." Even so, the overall picture arising from studies on teacher socialization remains that it is quite difficult for an individual to really influence established practice in schools. Educational change appears to be a cherished ideal of teacher educators, but perhaps indeed not much more than an ideal. As Zeichner and Gore (1990, p. 343) put it in their review of teacher socialization:

> Studies that have focused on the institutional and cultural levels of analysis have clearly shown, for example, that various ideological and material conditions within teacher education institutions, schools, and societies serve to establish limits on the range of options available to both teacher education students and teacher educators.

Impact of Teacher Education

It is not a very favorable picture that arises from the literature on the nature of teacher development and the impact of teacher education on teachers' practice. Basically, Lacey's (1977) view still seems to hold; that is, teacher education provides a stressful, ineffective interlude in the shift from being a moderately successful and generally conformist student to being a pedagogically conservative teacher. However, this conclusion may be somewhat biased as a result of the nature of the dominating research strategies in this area, as we argue next.

To begin with, most studies lack a longitudinal design and do not cover long-term processes in teacher development. In contrast, the Konstanz research group mentioned earlier has demonstrated, through path analyses of large-scale survey data, that over a period of years the attitude development of prospective and beginning teachers shows a "U-shaped curve"; that is, certain innovative attitudes are strengthened during preservice teacher education but are weakened again as graduates enter in-service teaching.

Perhaps the most important contribution of the Konstanz research group is that program characteristics were shown to differ in how fast and in what respects they influenced the U-shaped curve in prospective and beginning teachers' attitude development (Dann et al., 1978, pp. 96–104 and chap. 10; Dann et al., 1981; see also Hinsch, 1979, pp. 177–244). This evidence supports the conclusion that integrative approaches in teacher education, in which student teachers' practical experiences are closely linked to theoretical input, strengthen graduates' innovative teaching competence (Dann et al., 1978, pp. 180, 258–263; Dann et al., 1981; cf. Hinsch, 1979, pp. 177–189, 209–224, 234–244). So far, the German research in this area has received little publicity in the English-speaking teacher education community, even though there are indications available pointing in the same direction (cf. Darling-Hammond, 2000, pp. 167–168).

The scarcity of longitudinal teacher education studies is not the only reason why determinants of program effects may escape attention. Quite a few researchers are themselves teacher educators. Therefore, they run the risk of overlooking the possibility that a lack of transfer from preservice teacher education programs to graduates' teaching practices is related to characteristics of these programs themselves. The teachers included in research studies may have received a form of preparation building on a "theory-to-practice model" (Carlson, 1999), described by Wideen et al. (1998, p. 167) as follows:

> The implicit theory underlying traditional teacher education was based on a training model in which the university provides the theory, methods and skills; the schools provide the setting in which that knowledge is practiced; and the beginning teacher provides the individual effort to apply such knowledge. In this model, propositional knowledge has formed the basis of university input.

Barone, Berliner, Blanchard, Casanova, and McGowan (1996) stated that many teacher education programs consist of a collection of separated courses

in which theory is presented without much connection to practice. Tom (1997) spoke of an "assembly-line model." Ben-Peretz (1995, p. 546) noted that "the hidden curriculum of teacher education tends to communicate a fragmented view of knowledge, both in coursework and in field experiences. Moreover, knowledge is 'given' and 'unproblematic.' " The structure of teacher education programs may indeed be counterproductive to student teacher learning, and teacher educators themselves may not display the best examples of good teaching.

The findings from the German research just summarized lead to the conclusion that specific characteristics of preservice teacher education programs can have a specific influence on graduates' teaching competence. This conclusion, together with doubts about a "theory-to-practice" type of pedagogy in teacher education, led us to focus the present study on the issue *in which ways* teacher education programs can and do contribute to the acquisition of teaching competence.

Epistemological Perspectives

The insights gained from the literature just presented also pose some important methodological challenges. As discussed, they first point to the need for teacher education research to take a more longitudinal approach. Second, because researchers are often also teacher educators, self-fulfilling prophecies in the production of research findings need to be avoided. Moreover, Wideen et al. (1998, p. 162) expressed concern about the ecological validity of studies of the development of beginning teachers. In their judgment, the theoretical basis of such studies should be made more explicit.

In preparing this study of teacher development, we found that the time had come to focus not only on attitudes, as in the Konstanz research project, but also on competence, especially as it develops in the workplace. The focus on attitudes is perhaps due to the sociological and social-psychological perspectives inherent in the study of socialization at the time when the Konstanz group conducted its research. In themselves, such perspectives are illuminating, but we wanted to build on this earlier work by taking a closer look at the learning processes involved while teachers practice and expand their professional skills. In connection with this perspective, we wanted to understand how specific characteristics of teacher education programs influence the nature and quality of their graduates' work.

As a research object, competence development in teachers is characterized by enormous complexity. In dealing with this complexity, we proceeded from three epistemological perspectives: ecological, genetic, and activity. The *ecological perspective* assumes that the research object in the social sciences always consists of a social system, a system that is at the same time internally structured and embedded within a wider, often institutional context (cf. Maschewsky, 1979; Tabachnick, 1981). The *genetic perspective* recognizes all learning as a set of processes whose unfolding influences learning. This perspective assumes that understanding learning outcomes

demands understanding the processes that produce them (cf. Davydov, 1977). The *activity perspective* entails a focus on the actions of people as these actions express the continual tension between their personal motives, on the one hand, and contextual constraints, on the other (cf. Zeichner & Tabachnick, 1985). In the method section, we describe how we used these perspectives in designing and carrying out this study.

Context

If teacher education programs suffer from a lack of practical relevance and if the transition to teaching in real-life settings is at the heart of the problem, the programs included in our study provide interesting cases because they represent deliberate attempts to integrate practice and theory into students' competence acquisition. Here "integration" refers to (a) arranging competence acquisition as a gradual process in which each step forms a preparation for the next, (b) coordinating the acquisition of theoretical knowledge with practice in teaching skills, and (c) arranging learning as an inquiry into one's own actions.

Program Principles

The central goal of the teacher education programs under study was to develop in students a basic teaching competence that would equip them for entry into the teaching profession. We term this goal "starting competence." This competence should, in the view of the university supervisors involved, include the potential to develop further during the first years of beginning teaching into an innovative type of competence encompassing teaching behaviors such as stimulating pupil activity[2] during lessons, problem-based learning characterized by authentic contexts and materials, and cooperative learning. We term this goal "in-service competence." In the present study, these two goals served as the anchors for operationalizing a number of criterion variables with which the outcomes of the programs could be assessed. We elaborate on these variables in the next section.

To achieve the kind of integration between practice and theory just characterized, the university supervisors involved considered three principles functional. The first principle, *cyclical programming of college-based and student teaching periods,* refers to the fact that teacher education proceeds as a sequence of four cycles revolving around four types of student teaching activity that gradually increase in complexity: (a) introduction and observation in the practice school, (b) teaching partial lessons, (c) teaching whole lessons, and (d) teaching series of lessons. Each cycle is subdivided into a college-based preparation stage, a school-based teaching stage, and a college-based evaluation stage. After the first period in the schools, each college-based period serves as a bridge to the next student teaching period. The contents and activities in college allow students to reflect on their experiences during the previous student teaching period and draw consequences and prepare for the next teaching period.

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The second principle, *supporting individual learning processes,* refers to the fact that conditions for student teacher learning are optimized in several ways. All student teaching is carried out by triads of student teachers in collaboration with a cooperating teacher and a university supervisor. Student teachers are grouped in triads so that a variety of opportunities are created for observing each other, providing each other with feedback, and developing ideas to try out in upcoming lessons. It is standard practice for the triads to analyze every lesson conducted by each member under the guidance of a cooperating teacher. They do so using a clinical supervision format in which description, analysis, and interpretation precede evaluation. The rationale behind this sequence is that students should not engage in new action until they have reflected upon the reasons why their teaching worked out as it did. Such understanding should form the basis of planning for and carrying out a new and different trial (see Goldhammer, Anderson, & Krazcuski, 1980; Korthagen, Kessels, Lagerwerf, & Wubbels, 2001). Throughout student teaching, university supervisors and cooperating teachers monitor each student individually as he or she experiences the ups and downs inherent in learning to teach.

The third principle, *intensive cooperation between teacher educators,* refers to the fact that university supervisors and cooperating teachers maintain regular contact to achieve coordination between activities in college and in the practice school as well as informing each other about the learning processes going on at both sites. To this end, plenary meetings of university supervisors and cooperating teachers are organized periodically for all of the personnel involved in the programs for each school subject.

The teacher education programs studied were carried out in groups consisting of about 15 students each. The standard duration of the programs assessed in this study was 4 months. A program began with an introductory week in college in which students got to know each other and made explicit their expectations of the teaching profession and the teacher education program. Then the first program cycle, revolving around observation in schools, was opened with an orientation on lesson planning and with role plays of teaching in small groups. On this basis, the students, grouped in triads, moved to their practice schools, where they observed daily goings-on during 1 full week. After coming back to the institute, they exchanged and discussed their impressions. At this point, the university supervisor encouraged the students to interpret their experiences in relation to coursework about the pedagogy of the school subject concerned.

With these interpretations as a starting point, the students prepared for the next program cycle, in which they taught partial lessons themselves. The preparation stage of this cycle included micro-teaching and training in the skills needed for postlesson conferences using the clinical supervision format described earlier. Also in this cycle, processes of classroom interaction were discussed and concepts relevant to adolescent learning and development were introduced by the supervisor. For instance, the concept of "circularity" (Watzlawick, Beavin, & Jackson, 1967) served to make

understandable how a teacher's actions and those of his or her pupils influence each other and, in so doing, can determine the course a lesson takes. Such use of theoretical notions to interpret practical observations and experiences took place both before and after teaching in the practice school so that students could learn to understand their personal experiences at a conceptual, pedagogical level. The student teaching stage in this cycle lasted 1 full week.

The next cycle of teaching whole lessons focused on preparing subject-specific lessons and improving lesson plans. The school-based teaching stage lasted 2 weeks. During as well as after it, reflection on feedback received from pupils, fellow students, and the cooperating teacher remained of central importance.

The final program cycle revolved around a design formulated by each student for teaching a series of lessons. The time needed to work on this design was explicitly included in the program under the label "free space." The school-based stage in this cycle lasted 4 weeks. After having taught their series of lessons in the practice school, the students came back to the institute and improved their designs on the basis of their experiences and the feedback received.

During the college-based stages of the programs studied, students worked in various groupings such as plenary sessions, group work, and individual study. They engaged in different types of collaborative activities, including excursions, discussions, presentations, and consultations, often in small groups. Each university supervisor monitored and mentored between three and five triads of student teachers and their cooperating teacher. Each triad was visited by the university supervisor in school at least twice and preferably more often. On one of these visits, video recordings were made of each student, and these recordings were analyzed at the institute. Evaluation of each student's progress and achievement was based on periodic self-assessments in relation to assessments made by the cooperating teacher and the university supervisor.

University supervisors and cooperating teachers used the program features just described to create and shape opportunities for students to learn the teaching profession step by step. Their intention was to attenuate discrepancy experiences by seeking a gradual increase in the complexity of student teaching at all times so that personal learning goals would remain within reach and students could experience success in practice. In guiding their students, the supervisors sought to stimulate them to reflect on their experiences in a way that would help them transform investigation of their own actions as teachers into a normal professional habit, instead of shifting their attitudes unwillingly or unwittingly, or both. Collaboration in triads was encouraged not only during student teaching, but also in college-based activities, to foster mutual support and collegiality instead of a situation in which students had to cope alone.

The preceding description summarizes the program concept shared by the university supervisors involved. We labeled this concept "integrative"

because cyclical programming, support of individual learning, and cooperation of teacher educators with each other and students all aim to encourage integration of practical experience and theoretical understanding in student learning.

The development and implementation of this integrative concept was facilitated by institutional conditions. In contrast to the way schools of education are institutionally positioned in many countries, the institute where this study was carried out was an autonomous unit within the university concerned. It offered postgraduate teacher education programs to students who enrolled—usually immediately—after completing a master's program in an academic subject. The institute employed staff solely on the basis of their merit as teacher educators. Thus, the institute's teaching personnel catered to all school subjects in secondary education under one roof.

Since the completion of this research, the integrative program concept has found its way to nonuniversity teacher education institutions, in which subject study and teacher preparation take place simultaneously in 4-year programs. Meanwhile, university teacher education programs in the Netherlands have been extended to 1 year. They now include a final program cycle consisting of an internship in which prospective teachers have full responsibility for approximately three classes. During this cycle, which lasts one half year, they are paid to teach about 13 hours per week and are supervised by a mentor teacher from the school (who is absent from the classroom). This setting affords the prospective teacher opportunities to function as a fully responsible member of the school team while keeping "transition shock" within manageable proportions.

This internship, labeled "individual transition practice," was designed and first implemented in the same institution where this study was carried out (Koetsier, 1991; Koetsier & Wubbels, 1995) and further developed in nonuniversity programs (Brouwer, 1987, 1997), where it received positive reviews from successive national audit committees (Ginjaar-Maas, Brouwer, & Leenderse, 1997, pp. 53–125; Kil-Albersen, 2004, pp. 263–297). It is now a regular part of all preservice teacher education programs in the Netherlands (Stokking, Leenders, de Jong, & van Tartwijk, 2003). The integrative program concept is at the root of this history of curriculum development. To date, the present study represents the only comprehensive, longitudinal research into the influence of integrative programs on students' and graduates' learning in the Netherlands.

Criterion Variables

Studying learning effects of teacher education programs requires concepts for the description and criteria for the assessment of these effects. We therefore formulated a set of eight criterion variables that, together, represent the objective of teaching competence. Because this study focused on competence development, the indicators for the criterion variables were operationalized in terms of teaching skills.

The indicators used are shown in Appendix A. The formulations in the left column were used to measure competence development during preservice teacher education. Those in the right column were used to measure competence development during the first years after graduation. For the sake of brevity, we use the terms "starting competence" and "in-service competence." We used these two different sets of indicators because we assumed that teaching competence does not necessarily manifest itself in the same behaviors among preservice teachers as among beginning teachers. Also, we wanted to explicitly incorporate in the indicators for in-service competence aspects of innovative teaching.

Normative aspects are inherent in any conceptualization of teaching competence. Even so, the actual goals of teacher education programs frequently remain implicit. If not, they tend to arouse controversy. This raised the problem of how to legitimize the criterion variables needed in the study. To solve this problem, we conducted two preliminary analyses to inform our operationalizations. The first was an analysis of program goals of the institution based on both external and internal documents. The second was a survey of available literature about the relationship between teaching and learning. Influencing this relationship is what teacher educators' work is about.

Draft versions of Appendix A were derived from official national documents regarding the goals of university teacher education (Commissie Universitaire Lerarenopleiding Academische Raad, Werkgroep Schoolpraktika, 1979, 1980), from internal documents reflecting fundamental discussions about the institutions' programs, and from the literature surveyed. These drafts were discussed by a committee of university supervisors participating in the programs studied. After their comments had been taken into account, the final versions received their endorsement. The criterion variables used in this study therefore represent the types of teaching competence that the university supervisors involved sought to develop in their students. The formulations in Appendix A should be understood in relation to each other. Their separation as items is a matter of form. Also, we do not pretend that these formulations are exhaustive, nor do we claim that they are valid at all times and places. What follows is a summary of the main considerations behind the choices made by the teacher educators involved in this study. Italicized words refer to concepts included in Appendix A.

Core aspects of the teaching competence the teacher educators sought to develop have to do with graduates' capacity to relate pupils' learning inside and outside schools. Professional teachers, it was felt, should not restrict their involvement in the school *organization* to delivering lessons within the standard setting of the closed classroom but should also be able and willing to encourage pupils to discover the real world outside of school. This entails a need for flexibility in organizing learning activities. Where *content* of learning is concerned, teachers should be able to go beyond transmitting and having pupils reproduce what is in the standard textbooks (see Bolhuis, 2003). This means that teachers should have a command of the

knowledge structures characteristic of the scientific disciplines underlying their school subject as well as the capacity to select, structure, and present learning content in forms learnable by the specific groups of pupils they teach (see the concept of "pedagogical content knowledge" introduced by Shulman, 1986). Stimulating "higher order learning" places demands on the *sequencing* of learning activities. Teaching pupils to use abstract concepts, to analyze problems, and to make adequate generalizations (cf. Davydov, 1977) requires the teacher to carefully balance deductive and inductive sequences of learning activities.

The preceding perspectives imply that a professional teacher is someone who not only implements learning but functions as a curriculum developer as well. This requires the capacity to select, use, and produce *materials* and *media* in line with consciously chosen learning objectives. These perspectives also imply that teachers are able and willing to cooperate with colleagues from other subjects and that, in using teaching *methods,* they can draw on a broad variety of activity settings (see Tharp, Estrada, Stoll Dalton, & Yamauchi, 2000) and "work forms." The latter term is a literal translation of a concept, common among Dutch teachers, denoting formats for pupil activity. Cooperation in small groups is one important work form suitable for enhancing pupils' activity and responsibility in learning, both as they cooperate in the classroom and when working individually. The kinds of learning and teaching the teacher educators aimed for equally necessitate *evaluation* of products and processes of learning. Their preference was to bring about a balance between standardized summative assessments and formative, situationally valid assessment practices (see Airasian, 2001, chap. 4).

In the domain of *interaction* with pupils, the teacher educators sought to develop a teaching competence that combines maintaining with justifying discipline and negotiating social order with exerting unilateral authority when necessary. In this perspective, professional teachers accept a leadership role and take responsibility for providing personal guidance to those under their care (Denscombe, 1985). The considerations just summarized entail a vision of the professional teacher as someone who is able to design learning and teaching in constructive collaboration with colleagues and to arrange and implement learning activities for and with pupils. Working as an educator in this way presupposes a capacity for *reflection*. Professional teachers improve their own work by critically investigating their practical experience through the use of theoretical notions (cf. Liston & Zeichner, 1990).

Method

Research Model

As discussed earlier, the findings of Dann et al. (1978) and Hinsch (1979) suggest that the balance of forces between teacher education and occupational socialization in schools has a considerable if not decisive influence on how teaching competence develops in the long run. To conceptualize this
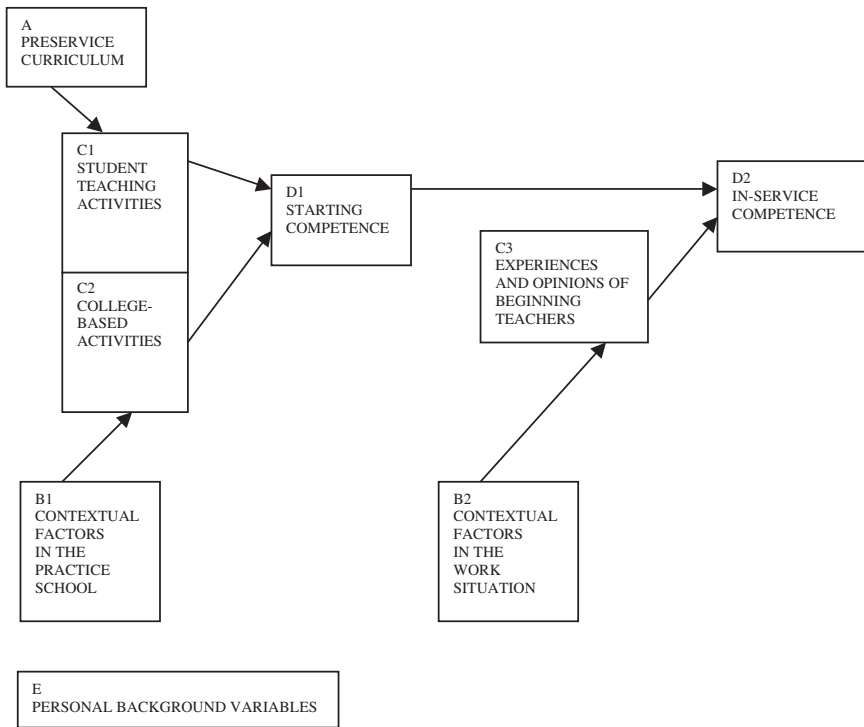
A
PRESERVICE
CURRICULUM

C1
STUDENT
TEACHING
ACTIVITIES

C2
COLLEGE-
BASED
ACTIVITIES

D1
STARTING
COMPETENCE

C3
EXPERIENCES
AND OPINIONS OF
BEGINNING
TEACHERS

D2
IN-SERVICE
COMPETENCE

B1
CONTEXTUAL
FACTORS
IN THE
PRACTICE
SCHOOL

B2
CONTEXTUAL
FACTORS
IN THE
WORK
SITUATION

E
PERSONAL BACKGROUND VARIABLES

Figure 1. **Research model.**

balance, we used the research model illustrated in Figure 1. In the following, we first present the rationale for the components included in this model and the selection of their content. We then specify the cause-effect relationships that we viewed as possible explanations of the development of teaching competence.

In the research model, conditions, processes, and products are distinguished (Peters & Tillema, 1987, p. 8). This conceptualization resembles the evaluation model developed by Stufflebeam and Webster (1988), who made the same distinction between *process* and *product* but further specified conditions as either *context* or *input* factors. Applying these categories to our object of study, we distinguished the following model components:

A.   Curricular program conditions
B1. Noncurricular program conditions
C1. Organization and content of activities during student teaching
C2. Organization and content of activities during college-based seminars
D1. Learning effects during preservice programs
B2. School context factors during beginning teachers' entry into the profession

An important distinction concerning the preservice period is between curricular and noncurricular conditions. We made this distinction because, from the literature on teacher socialization reviewed earlier, it is clear that prospective teachers' competence acquisition is shaped not only by the preservice curriculum (Components A, C1, and C2) but also by factors in the school context. The latter operate before as well as after entry into in-service teaching (Components B1 and B2, respectively).

The curriculum as intended (Component A) usually differs from the curriculum as implemented (Components C1 and C2). The latter, in turn, is experienced by students in ways that deviate to a greater or lesser degree from what was intended (see Kessels, 1993, p. 22). It is important to make these distinctions, because program effects can come about only through mediation of the learner's experience. This fundamental fact made it necessary to investigate not only the extent to which learning activities in the programs actually took place as intended, but also how the students experienced them as they moved through student teaching into their first years of in-service practice (see Dann et al., 1978, chap. 6). Within the model components covering the preservice curriculum, a distinction is made between student teaching activities in the schools (C1) and college-based activities on campus (C2). After graduation, Component C3 covers beginning teachers' experiences and opinions concerning their entry into the profession.

Specifically, in Component A, the constraints of time and place were operationalized within which students had to carry out the teaching activities characteristic of the four program cycles outlined in the previous section. Because the literature shows that occupational socialization begins as soon as student teachers move to their practice schools, Component B1 includes material conditions in practice schools and the way in which teaching staff and school management facilitated student teachers' learning as well as reactions and support from colleagues and school management.

Operationalization of Components C1 and C2 was guided by the program principles. Of particular importance here is how the alternation of student teaching and college-based periods and the increase in complexity of student activities actually took place. Component C1 covers how, within these constraints, interaction and cooperation among students, cooperating teachers, and university supervisors unfolded. This component therefore includes how the assignments given by the university supervisor shaped student teaching activities and which kinds of opportunities students were given for experimenting in their own lessons with various teaching approaches. Here, too, the ways in which university supervisors and cooperating teachers carried out their mentoring as well as the use of educational concepts in postlesson conferences are operationalized.

Component C2 involves the way in which student teaching triads were formed in college, the study content offered, and the learning activities undertaken there. Special attention was given to how students learned from linking practical experiences to theoretical concepts. Here we include retrospective opinions obtained from beginning teachers about the benefits they derived from topics discussed during preservice college seminars in regard to modifying and improving their in-service teaching.

During the period after graduation, Component B2 aims at context factors in the work situation relevant to occupational socialization, notably material conditions, the beginning teachers' teaching load and timetable, their school's staff composition, aspects of the pedagogical climate, and support received from colleagues. In Component C3, "transition shock" was operationalized in terms of beginning teachers' experiences in their classroom interactions with pupils. Also, their opinions about the teaching profession and their experiences in cooperating with colleagues are represented here.

In Components D1 and D2, the results of teacher learning are conceptualized as "starting competence" and "in-service competence," respectively. Finally, Component E comprises personal background variables, particularly the age, sex, school subject, and prior experience in education of students, cooperating teachers, and university supervisors.

In the research model, possible cause-effect relationships are indicated by the arrows between model components in Figure 1, which are intended to be read in both a chronological and a logical sense. The dimension of time runs from left to right. The arrows represent the cause-effect relationships under scrutiny. Technically, those variables grouped within the components lettered A, B, and C should be regarded as independent and those grouped within components lettered D as dependent. However, in specific analyses, especially those concerning learning processes and experiences, a number of variables are also conceived of as intervening variables.

Theoretically, we distinguished two possible lines along which competence acquisition could be influenced. Insofar as graduates' work as teachers was to be shaped by the initial competence resulting from integrative preservice teacher education programs, cause-effect relationships would follow the arrows between the model components A+B1→C1/C2→D1→D2. In-service competence would then result from the cycles of teaching activities and reflective learning, sequenced according to their gradual increase in complexity. Insofar as graduates' work was to be shaped by context factors in schools, cause-effect relationships would follow the arrows between the model components B2→C3→D2. In-service competence would then be the result of occupational socialization originating from the work context in beginning teachers' schools. We refer to these lines of influence as the "teacher education line" and the "occupational socialization line," respectively. What specifically interests us is how these lines of influence interact in bringing about teaching competence.

Design

In this study, we sought not only descriptions but also explanations of learning results, in this case teacher education outcomes. This raises the fundamental question when a causal interpretation of findings may be considered valid. To decide this issue, we set ourselves two demands: We would consider conclusions about cause-effect relationships valid only when (a) relationships between components of the research model were demonstrated and (b) the processes responsible for these relationships were reconstructed. The second demand implies that explanations of human learning are incomplete if only an experimentalist, black-box approach is taken. Such an approach would underestimate the role that subjective representations, such as perceptions, experiences, opinions, and attributions, play in human learning (see Maxwell, 2004).

What research design could fulfill these demands? The challenge in deciding on the design of the study was to reduce the complexity of the research object without wrecking ourselves on the Scylla of unjustifiable simplifications or on the Charybdis of an unmanageable research project. In steering our course, we used as a compass the three epistemological perspectives put forward in the introduction.

The genetic perspective obviously required a longitudinal design that would make it possible to follow the directly relevant groups of respondents—students, their university supervisors, and cooperating teachers—over a longer period of time. The ecological perspective called for the collection of data in such a way that the relationships between the social systems involved could be adequately registered. This consideration is especially relevant given that teacher education always involves at least two distinct social systems or subcultures: the teacher education institution and the schools where student teachers practice and beginning teachers come to work (see Fitzner, 1979). For this reason, we decided to involve in the study not only students but also university supervisors and cooperating teachers as representatives from these respective social systems. Finally, the activity perspective led us to focus not only on respondents' attitudes but, foremost, on their actions. So as not to have to rely solely on self-reports, we decided—in addition to using document analysis, questionnaires, and interviews—to carry out direct observations of graduates from the programs studied in their work as beginning teachers.

In specifying the research design, we faced the "breadth-depth problem": Either many situations and persons are studied superficially, or a few are studied thoroughly (Berger, 1974, pp. 22–29). As a solution to this problem, we selected from all of the programs and respondents in the study a smaller number to form a representative subset. We refer to these samples as the "whole sample" and the "subsample," respectively. The whole sample was studied via quantitative methods, and the subsample was studied by means of quantitative as well as qualitative methods. An overview of the

research design is presented in Appendix B, which specifies the instruments used among particular respondents and their order.

As reasoned earlier, if causal explanations are to be valid, quantitative relationships must be elucidated by qualitative reconstructions of competence development. To make this possible, we strove to ensure that the subsample was as representative as possible of the whole sample. If this attempt were to succeed, the subsample might, as it were, serve as a magnifying glass overlaid upon the whole sample. In this case, conducting qualitative analyses in the subsample and triangulating these analyses with the quantitative data could bring to light relationships between learning processes and learning outcomes in all of the teacher education programs studied.

To ensure that the subsample was as representative as possible, we applied several criteria in selecting programs and respondents. For example, the largest possible number of school subjects was included in the subsample. From the total group of 31 university supervisors, those with the most professional experience were selected, because we expected them to be most explicit about the notions underlying the programs studied. The cooperating teachers and the beginning teachers were selected in such a way that their answers to questionnaire items would mirror those of their colleagues in the whole sample. To achieve this goal, we used the following procedures.

In total, there were 128 cooperating teachers involved in the study. For each program included in the subsample, 2 cooperating teachers were selected for interview whose answers to questionnaire items about their collaboration with the teacher education institute were as widely differing as possible. We expected that the cooperating teachers, based as they were in daily school practice, would be in an excellent position to judge the practical feasibility of the program principles. The questionnaire items used were contained in Components B1 and C1 of the research model (see Figure 1).

Interviewing two outliers instead of one average representative from this respondent group appeared to us to be a good strategy to explore the entire range of their experiences with and opinions about the programs studied. Specifically, cooperating teachers selected for interviews were those who (a) had or had not been trained in clinical supervision skills; (b) had more or less than 4 years of experience as cooperating teachers (items from Component E); (c) were most or least satisfied with their organizational contacts with the teacher education institute and the support they received from it in carrying out their supervision tasks; (d) felt most or least enriched in their own professional development by doing this kind of work; (e) did or did not suggest topics for collaborative research together with university supervisors; (f) considered the student teaching assignments prescribed by the institute most or least useful; (g) had different preferences concerning supervising student teachers individually, in dyads, or in triads; (h) were most or least involved in student teachers' lesson preparation (items from Component C1);

and (i) perceived the opportunities for student teachers' learning offered by their school and their colleagues' willingness to support them as greatest or smallest (items from Component B1).

From the group of students, which totaled 357 individuals, we included in the subsample two triads participating in two experimental programs in biology for a duration of 6 months. These programs were of particular interest because the university supervisors involved assumed a pioneering role in making explicit the institute's program principles and innovating its programs.

From the beginning teachers, our resources allowed us to include only one person per program in the subsample. These respondents should ideally represent those events and experiences occurring most frequently among all graduates. We therefore selected beginning teachers who had given modal or near-modal answers to questionnaire items about their in-service competence, gender, working conditions and experiences in teaching, and opinions about the teacher education program and teaching profession. These items are contained in Components D2, E, B2, C3, and C2 of the research model (see Figure 1).

Specifically, those beginning teachers were selected who scored on or between the mode and the average for the items representing the criterion variables "deviation from timetable," "own issues," "cooperation in groups," and "analysis of own behavior" (items from Component D2); gender (item from Component E), teaching load, and class size; their judgment of the (in)sufficiency of the facilities in their most-used classroom; the amount of benefit they derived from cooperation with colleagues (items from Component B2); their judgment of the severity of discipline maintained in the school as a whole; the degree to which they found themselves forced by pupil reactions to take harsher discipline measures than they personally preferred; the degree of confidence they felt during classroom interaction; their skepticism about established teaching practices in their school; their estimation of the potential influence of education on pupils' development relative to genetic and environmental factors; their opinion about the degree to which ideals propagated in preservice teacher education had better been forgotten in in-service teaching (items from Component C3); and the amount of benefit they derived as beginning teachers from the topics discussed during college-based seminars in terms of modifying and improving their present teaching (items from Component C2).

As is apparent, the questionnaire items just detailed cover relevant aspects of and possible influences on competence development contained in different components of the research model. Selecting interviewees from members of each respondent group who simultaneously fulfilled all of the selection criteria described was not possible in 100% of the cases, but to a large extent it was. At the end of this section, we report the findings from our analysis of the degree to which the respondents actually selected in the subsample represented their colleagues in the whole sample.

Operationalization

In the operationalization of the research instruments, the three epistemological perspectives presented earlier served as a heuristic. The ecological perspective inspired questions about respondents' collaboration and about the contextual conditions in which it took place. The genetic perspective inspired repeated and retrospective questions about students' and beginning teachers' experiences and the development of their teaching competence. The activity perspective inspired questions about respondents' actions in classrooms and schools.

Each of the factors distinguished within the components of the research model was operationalized as a group of questionnaire items consisting of (a) items from the whole sample and (b) oral questions or points of observation from the subsample. The operationalizations in the whole sample and the subsample were structured analogously; thus, the same issues were studied with different instruments administered to different respondent groups.

In the whole sample, the aim was to record the degree to which the factors distinguished in the research model manifested themselves. Special care was taken to address two measurement issues. First, to record the curriculum as implemented, all available factual information was collected about how the programs were conducted and about variations occurring between them. As a means of surveying the curriculum as experienced, participants' perceptions and representations were measured via items worded as concretely and specifically as possible. This was done not only to avoid misinterpretation by respondents but also, in particular, because the participants themselves were the ones who could provide the personal information needed for understanding interpersonal variations in learning. In these respects, we followed the approach advocated by the Konstanz research group (see Dann et al., 1978, pp. 124–135, on "objectivist" and "subjectivist" approaches in operationalizing survey items regarding the conditions and processes of learning in higher education). Second, in developing constructs, the emphasis was on covering many factors with few items, rather than few factors with many items. As argued by Cronbach (1951, pp. 330–332 especially), homogeneity of items is more important in building constructs than number of scale items.

In the subsample, the aim was, in particular, to investigate the nature of the most important factors. Therefore, a combination of direct observations and in-depth interviews was used so that a multifaceted picture would emerge of not only the outcomes, but also the processes, of learning.

Data Collection

The first step in data collection was to determine which activities were carried out in each program, in which order, and at which moments. This was done by studying all of the available program documents. In two cases, such documents were unavailable, and separate interviews were conducted to

obtain the necessary information. Then all of the information about each program was schematized in the form of a concise program overview that was verified by the university supervisor responsible. The program overview specified when micro-teaching, subject-specific, and general educational issues were on the agenda in the college-based seminars and when each of the student teaching activities took place in the practice schools. In this way, an accurate description of each program was created, and dates could be determined for administration of repeated questionnaires among the students.

Whole Sample

In addition to the program overviews, written questionnaires were the chief instruments used to survey the whole sample. The students completed a baseline questionnaire at the beginning of the program and a questionnaire immediately after completing each student teaching period (see the sequence numbers 1, 3, 4, and 5 in the second column of Appendix B). In these questionnaires, repeated measures were used to describe how the programs were implemented, to trace how the students experienced them, and to record their self-evaluations of their progress on the criterion variables.

After the programs had ended, the graduates completed one additional questionnaire. This questionnaire consisted of only a few factual questions for those graduates who had not sought or found work as beginning teachers. Those who did find work as teachers answered questions about their employment (items from Component E), how they experienced the context and content of their work (items from Components B2 and C3), and how they evaluated their own competence development (items from Component D2).

The cooperating teachers completed a questionnaire immediately after the final student teaching period (see sequence number 6 in the second column of Appendix B) in which they answered questions about their cooperation with the students assigned to them and with the university supervisor, as well as about school context (items from Component C1). An important element of this questionnaire was the cooperating teachers' assessments of what the students had accomplished in their teaching (items from Component D1).

The university supervisors completed a questionnaire after completion of the entire program. In it, they answered questions similar to those answered by the cooperating teachers, but with a stronger focus on the degree to which they felt their programs had been carried out according to their intentions (items from Components A, C1, and C2).

The questionnaires used in the whole sample contained closed items with discrete categories as well as interval scales; the latter were 8-point scales in which ratings ranged from low (0) to high (7). The middle of the scale therefore stood at 3.5. Eight-point scales were used to offer the respondents a relatively large range of possible nuances and to make the lack of a neutral middle point less obvious.

Development of teaching competence was measured as follows. In the course of the preservice programs, the student teachers rated their own development on the criterion variables for starting competence (see the left-hand column of Appendix A). They did so, on 8-point scales, after each student teaching period. At the end of the preservice programs, the cooperating teachers rated the achievement of each student under their guidance individually on the same criterion variables. This permitted a comparison with each student's self-assessments.

After graduating and finding work, the beginning teachers answered the following questions regarding each of the 14 criterion variables relating to in-service competence (see the right-hand column of Appendix A): "Does this procedure or this activity constitute a part of your work in this school year, yes or no?" and "If yes, how much effort is usually involved for you to implement this procedure or carry out this activity?" Answers to the first, dichotomous question were coded as 1 or 0. In addition, these scores were summated over all 14 criterion variables for in-service competence so that an operationalization was produced of the variety occurring in the teaching activities of the beginning teachers. This construct was labeled "variety." The second question was scored by the beginning teachers on continuous 8-point scales. In addition, for all criterion variables they considered applicable, the continuous scores they gave were averaged so that an operationalization was produced for the overall effort each beginning teacher put into his or her work. The resulting construct was labeled "effort."

In measuring in-service competence, we used one dichotomous measure and one continuous measure for each indicator because we wanted to distinguish clearly whether the criterion behaviors actually occurred and, if so, how much effort this required from the beginning teachers. Our reason for focusing on effort was that we wanted to find out what it requires of beginning teachers to actually display, in real-life situations, the competence that their preservice programs aimed to foster.

Subsample

Data collection in the subsample took place as follows. For each program selected in the subsample, the concise program overview was expanded into an elaborate version that served as the basis for a 2-hour interview with the supervisor. The main topics covered were the content and sequencing of program cycles, especially the ways in which the students' practical activities and experiences could be linked to pedagogical theory, the way student teaching triads were formed (items from Components A and C2), cooperation with schools and cooperating teachers, and how this cooperation can best be organized to optimize student learning (items from Components B1 and C2).

The cooperating teachers in the subsample were administered 1.5-hour interviews immediately after the students had completed their student teaching. As indicated earlier, these interviews were structured in analogy to the

cooperating teacher questionnaire. Most interview questions took as their starting point the responses the cooperating teacher involved had offered in the questionnaire he or she had completed shortly before the interview. This procedure not only made the conversation quite specific and concrete but, more important, brought to the surface arguments, motives, and considerations regarding the education of teachers.

After graduation, each of the beginning teachers in the subsample was observed at work during 1 normal school day and completed an interview immediately afterward lasting approximately 2.75 hours. This combination of observation and interview was meant to determine in which ways and under which influences each graduate's teaching competence had developed at the individual level. Observations were carried out by two researchers[3] who each visited six beginning teachers. As a group, the beginning teachers visited had an average of 23.4 months of in-service teaching experience. Six of them were in their third school year, four were in their second year, and one was in his first year. During the visits, an average of 4.18 lessons (each 50 minutes in duration) were observed. The modal number of lessons observed was 3, occurring in the case of five beginning teachers. Four lessons of one teacher were observed, 5 lessons of three teachers were observed, and 6 lessons of two teachers were observed. All were asked whether the observations had made them behave differently from their normal teaching habits. Four beginning teachers said they had maintained slightly stricter discipline than usual. Three had felt slightly less relaxed, two of whom reported that this was the case only in the first observed lesson.

During the lessons, the observers used a protocol consisting of a number of columns in which they recorded time, activity formats used by the teacher, the actions of teacher and pupils, and numbers corresponding to the criterion variables related to in-service competence. During and immediately after each lesson, the observers recorded in the protocol which episodes were especially relevant in terms of the criterion behaviors (as specified in the right-hand column of Appendix A).

In the interviews that took place directly after the lessons, the observer summarized the selected episodes and used them together with the respondent's earlier questionnaire answers to elicit a dialogue about the reasons and motives behind his or her teaching actions that day as well as the development of his or her teaching competence. Although the focus of the interviews with the beginning teachers was on their competence development, other topics were also covered to probe for the factors influencing their development: conditions of work, collaboration with and support from colleagues, and the teaching culture in the school, as well as how the teachers experienced these elements (items in Components B2 and C3 in the occupational socialization line). The interview concluded with retrospective questions about the preservice program followed, its characteristics, and how respondents felt these characteristics had influenced their competence development (items in components A, B1, C1, and C2 in the teacher education line).

As intended, the combination of observations and retrospective interviews created a shared basis of information about beginning teachers' personal competence development. This approach ensured that the interviews involved a maximum of concreteness and depth, thus countering the risk of bias inherent in research based exclusively on self-reports.

Finally, we were able to retrieve the student teaching reports written by all but two of the beginning teachers in the subsample. All of the respondents selected to be interviewed in this study readily cooperated at first request. All interviews were audiotaped.

Data Analysis

The data analysis sequence in this study was based on the demand formulated earlier that explanations of learning outcomes should rest on a reconstruction of the learning processes involved. We therefore began by analyzing the qualitative data. The numbers in the right-hand column of Appendix B indicate the order in which the analysis steps were taken. Each of these numbers refers to the methods of analysis, data sources, and instruments mentioned on the corresponding line.

First, the program overviews were analyzed to determine in which respects program implementation differed from the curriculum as intended. Then all interviews from the three groups of respondents were typed verbatim from the audiotapes. The resulting transcripts were mailed to the respondents, who verified them. None of the respondents made changes to the transcripts. Next, in the case of each respondent group, a different pair of researchers[4] analyzed the responses, checking each other's work. Summaries were made of all answers given to the questions asked, and, for each question, all responses were studied for common dimensions and related topics. These dimensions and topics became the response categories. For each response category, the number of responses obtained was tallied and a synthesis written. These analysis steps yielded the interview results.

In a subsequent step involving the same procedure, all observations of beginning teachers and their statements in the student teaching reports relevant to the criterion variables were summarized and categorized. At this point, three data sources were available for use in reconstructing how individual competence levels had developed in each of the beginning teachers in the subsample. This reconstruction was carried out by comparing, for each respondent, what the three data sources showed about the development of each criterion variable from the beginning of preservice teacher education until the moment of observation during his or her beginning teaching. In this step, the following aspects were determined: the kinds of teaching activities the beginning teacher eventually came to practice, the characteristics of the preservice program or the school context that led to continuity in competence development, and the characteristics of the preservice program or the school context that led to *dis*continuity in competence development.

"Continuity" was defined as being present when a respondent's criterion behaviors developed in the same direction and in the same ways before and after graduation. "Discontinuity" was defined as being present when, after a respondent's entry into the teaching profession, more or less drastic change was aroused in the direction and nature of the development of his or her criterion behaviors. The mutual checks carried out by the pairs of researchers on each of the steps of the qualitative data analysis resulted in minor corrections only.

The quantitative data from the whole sample were analyzed with the individual respondent as the unit of analysis. Special care was taken to identify respondents while guaranteeing anonymity so that data collected at different points in time could be linked for each respondent individually. Also, all cooperating teachers' scores concerning the learning activities of the students under their guidance were converted to scores included in the data set for each student. This made it possible to triangulate, compare, or relate student and cooperating teacher scores.

The steps taken in the further analyses were based on the following rationale. Initially, descriptive statistics were produced for all variables separately so that the basic quantitative facts were established. Then we embarked on a search for patterns by examining the data structure. To maximize our chances of finding theoretically meaningful as well as empirically homogeneous groups of items, we used the following two-step procedure. First, we conducted a factor analysis on all of the variables falling within each of the model components to determine how these variables roughly correlated. Second, we grouped together items with an intercorrelation above .30 and a loading above .65 on one factor (using varimax rotation) and entered them into reliability analyses. Within each group, items for which Cronbach alpha coefficients exceeded .65 were incorporated in a scale. In this way, 86 items from the original total of 320 were used to form 28 constructs.

Next, to clarify how the consecutive cycles in the preservice programs followed on each other and to trace competence development during each cycle, all repeated measures concerning program characteristics and criterion variables were checked for significant changes over time via analysis of variance. Finally, as a means of examining the balance of forces between the teacher education line and the occupational socialization line, the research model was evaluated through multivariate regression analyses. The aim of these analyses was to determine which constructs and items exerted the greatest influence on the relationships indicated by the arrows in the research model. In total, 14 regression analyses were carried out between pairs of model components. In each analysis, one dependent variable was regressed onto a number of independent variables consisting of either a construct or a separate item that had not been included in a construct.

Table 1 shows the model components involved in the regression analyses and the numbers of constructs or items entered as independent variables. For a relationship to be considered influential, we stipulated in advance of the data analysis the following criteria: The first-order correlation should exceed

Table 1

Variables Included in the Regression Analyses

	Independent variables			Dependent variables
Model component	Number of constructs entered	Number of items entered	Number of relationships established[a]	Model component
A. Preservice curriculum	4	3	1	D1
C1. Student teaching activities	8	0	0	
B1. College-based activities	0	2	0	
A. Preservice curriculum	4	0	2	C2
D1. Starting competence	3	0	0	C3
B2. Contextual factors in the practice school	2	8	2	
D1. Starting competence	3	0	1	D2
B2. Contextual factors in the practice school	2	9	1	
C3. Experiences and opinions of beginning teachers	1	4	4	

[a] Correlation above .30; beta significant at less than .05 level.

.30, and the independent variable should have a beta weight with a significance level below .05. The "number of relationships established" column in Table 1 shows how many relationships proved to be influential according to these criteria. The difference between the number of constructs and items entered as independent variables in the regression analyses, on the one hand, and the number of relationships established, on the other hand, shows that indeed specific program features and conditions in schools that have a demonstrable relationship with competence development could be filtered out.

The methods of analysis just detailed, the sequence in which they were used, and the theory-driven use of regression analyses in particular characterize this study as belonging to the psychological discipline labeled by Cronbach as "correlational" as opposed to an "experimental" investigation. What we sought was not to manipulate a limited number of input and output variables isolated from intervening processes. Rather, we wished to identify and assess the relevance of several influences operating in the complex settings with which life outside the laboratory confronts us (Cronbach, 1957, 1975; cf. Maschewsky, 1979).

Response Data

Table 2 specifies the composition of the whole sample and the subsample, and Table 3 presents data on group sizes, moments of data collection, and response rates for the whole sample and the subsample. Response rates were calculated on the basis of the sample size within each cell of Table 3. The

number of beginning teachers in the whole sample was considerably smaller than the group of students, because 9 months after the end of the preservice programs only 148 of the 357 students (41% of those originally enrolled) reported seeking and acquiring work as teachers during the research period. To maximize the response to the beginning teacher questionnaire, it was administered in two rounds during which several reminders were sent to the respondents. Eventually, 26 months after the completion of the preservice programs, data were available for 115 graduates from full-time programs. This represented 77.7% of all graduates who reported having found employment.

All quantitative analyses relating responses given during and after preservice teacher education were carried out on this body of data. However, a risk of selection bias was created by the fact that 209 of the original respondents were not available. We assessed this risk in several ways. Chi-square tests showed that women did not find significantly more teaching jobs than men, nor did they apply for them more frequently ($p > .05$). Also, the beginning teachers did not show significantly more or less progress during preservice teacher education on any of the starting competence criterion variables than graduates who did not seek and find work as teachers ($p > .05$).

Alignment of Whole Sample and Subsample

As described earlier, our research design included an attempt to closely align quantitative data from the whole sample and qualitative data from the subsample. To determine the extent to which the scores of each respondent group in the subsample differed from those of colleagues in the whole sample, we conducted tests on all questionnaire items using cross-tabulation and chi-square analyses (Siegel, 1956, pp. 104–111). Overall, significant differences between the whole sample and the subsample ($p < .05$) were found for only 7.6% of the questionnaire items. This means that bias due to inadequate representation of the whole sample in the subsample can be virtually ruled out. We can therefore be reasonably confident that the subsample findings are generalizable to the whole sample.

This is an acceptable basis for triangulating responses from the whole sample and the subsample. As an illustration of how we did so, one item from the beginning teacher questionnaire and interview responses in relation to it are presented here. To probe for the relationship between schools' disciplinary regimens and discrepancy experiences, we asked the beginning teachers in the whole sample to what degree they felt their school "strictly enforces rules and habits such as following the timetable, recording pupil presence, and maintaining discipline during lessons and breaks." On the 8-point scale for this item, 79% of the beginning teachers scored 4 or higher, the mode being 6 and the average 4.8. In her interview, one beginning teacher from the subsample described the kinds of experiences underlying these figures:

Table 2
Composition of Whole Sample and Subsample

| | | Numbers of respondents | | | | | | |
| | | Whole sample | | | Subsample | | | |
School subject	Program number	University supervisors	Cooperating teachers	Students/ beginning teachers	University supervisors	Cooperating teachers	Students	Beginning teachers
Modern languages[a]	1	1	5	15				
	2	1	5	15				
	3	1	5	15	1	2		2
	4[b]	1	0	20	1	2		1
Dutch	1	1	5	15	1	2		1
	2	1	5	15				
Classical languages[c]		1	3	7				
Physics	1	1	5	15	1	2		1
	2	1	5	15				
Mathematics		1	5	15	1	2		1
Chemistry		2	7	18	1	2		1

	Group							
Biology	1[b]	2	8	15				1
	2	3	5	15				
	3	2	5	15	2		3	
	4[d]	2	5	15	2	1	3	2
	5[d]	2	5	15	2	1	1	1
Geography History	1	5	16	1	1			
	1	1	5	15	2	1		1
	2	1	5	15	1			
Social studies	1	1	9	19	1	1		
	2	1	10	17				
Religion	1	1	6	13				
	2	2	5	13				
Music	1	1	5	9				
Total	24	31	128	357	12	17	6	12

[a] Combination groups in English, German, French, and Spanish.
[b] Part-time group for uncertified in-service teachers.
[c] Combination group in Latin and Greek.
[d] Experimental 6-month program.

Table 3
Response Rates

Respondent group	Whole sample			Subsample		
	Size	Moment of data collection	Response rate (%)	Size	Moment of data collection	Response rate (%)
University supervisors	31	End of preservice program	90	12	End of preservice program	100
Cooperating teachers	128	End of preservice program	90.6	20	End of student teaching	85
Students	357[a]	End of student teaching cycle:		6	End of student teaching	100
		Observations	96.1			
		Partial lessons	97.6			
		Whole lessons	89.8			
		Series of lessons	91			
Beginning teachers employed	148[b]	Total, divided into:	91.2[b]	12	14–19 months after end of preservice program[e]	100
		First round started 9 months after end of preservice program	53.4[c]			
		Second round started 20 months and completed 26 months after end of preservice program	24.3[d]			

[a]Including 35 students in part-time programs.
[b]Including 33 graduates from part-time programs.
[c]79 graduates from full-time programs.
[d]36 graduates from full-time programs.
[e]Data verification completed 34 months after end of preservice program.

> Every afternoon, lunch break is preceded by prayer, but I don't see the need for this personally. The rules about eating candies are also something that I would like to enforce more flexibly, unless pupils eat them in outright indecent ways of course. In this school, you also have to do a lot of "shift work" and all that time is taken away from your own free hours. For everything there is a guard: near the school entrance, near the wardrobes, during meals, and at the exit. Pupils are being controlled and checked upon everywhere, whereas I feel one could quite as well give them responsibilities for themselves. After all, they also have a pupils' council. I do participate in keeping up all these house rules, though, for after all they are in the contract that I signed when I came here.

One difference between the whole sample and the subsample should be borne in mind. On average, the beginning teachers in the subsample had more teaching experience, ranging between 12 and 30 months after graduation, than those in the whole sample, which ranged between 11 and 22 months after graduation. The reason is that the observations of and interviews with the beginning teachers in the subsample were based in part on their questionnaire responses. Therefore, the school visits in the subsample took place some time after the questionnaires had been administered.

Results

In this section, we first examine the quantitative relationships found between the components of the research model. This leads to a broad view of the balance between the main influences at work in the "teacher education line" and the "occupational socialization line." On this basis, we specify the roles of program characteristics and school context factors in shaping the processes and outcomes of teacher learning. In this account, quantitative and qualitative findings are drawn together so that we can clarify under which influences the students' starting competence came about and developed further into in-service competence during their first years as beginning teachers.

Evaluation of the Research Model

In the data analysis section, we described the procedure used for examining the data structure and the balance of forces between the two lines of influence distinguished in the research model. Table 4 provides details on the names and contents of the constructs and items that emerged from the regression analyses as constituents of influential relationships between model components. For each component of the research model occurring in the results (cf. Figure 1), the percentage is given by which the original number of items was reduced in scale construction. For each scale appearing in the results, the constituent items and Cronbach's alpha are presented. For all items, whether they are part of a scale or separate, the literal formulation is presented or (if described earlier) referred to. Also, the

Table 4

Constructs and Items Included in Model Evaluation

Model component[a] (% reduction of items)	Constructs and items	α	M[b]	SD[b]
A. Preservice curriculum (24%)	*Periods alternation*	.67	4.0	1.7
	Because of the way student teaching was prepared in college I learned very little ↔ a great deal (student item after lesson series)		3.7	1.7
	Because of the alternation of theoretical and practical program components I learned very little ↔ a great deal (student item after lesson series)		3.8	1.7
	Because of the alternation of theoretical and practical program components I learned very little ↔ a great deal (beginning teacher item)		4.4	1.6
	Time in college	.68	2.4	0.8
	When I compare the time spent in school and in college, I find the time I spent on activities in college far too short ↔ far too long (student item after lesson series)[c]		2.5	0.8
	When I compare the time spent in school and in college, I find the time I spent on activities in college far too short ↔ far too long (beginning teacher item)[c]		2.3	0.8
C2. College-based seminars (4%)	*Lesson-plan improvement*	.79	4.1	1.7
	The exchange of ideas and experiences during the college-based seminars has been of very little use ↔ very great use to me in modifying and improving my present teaching (beginning teacher item)		4.1	1.7
	The topics discussed during the college-based seminars have been of very little use ↔ very great use to me in modifying and improving my present teaching (beginning teacher item)		4.0	1.6
D1. Starting competence (student self-assessments after lesson series on criterion variables[d]) (60%)	*Educative starting competence*	.79	4.4	1.6
	Organization	.70	4.3	1.7
	Content		4.7	1.4
	Evaluation		4.0	1.7
	Interaction		4.5	1.5

		α	M	SD
	Instructional starting competence		4.9	1.6
	Media		4.8	1.6
	Methods		4.9	1.5
C3. Experiences and opinions of beginning teachers (10%)	*Discrepancy experiences*	.76	3.2	1.9
	To which degree has it occurred in your classes that pupils do not keep appointments which you had made with them? Slightly ↔ Considerably (beginning teacher item)		3.1	1.9
	To which degree do you find yourself forced by pupil reactions to take harsher discipline measures than you would personally prefer (for instance removing someone from the classroom, using impositions on pupils, and the like)? Slightly ↔ Considerably (beginning teacher item)		3.5	2.2
	To which degree has it occurred in your classes that pupils reacted in a lukewarm fashion to lessons which you had prepared with special thoroughness or which you had planned so that pupils might particularly enjoy them? Slightly ↔ Considerably (beginning teacher item)		3.0	1.7
	Program relevance			
	Some people say about teacher education that it propagates all sorts of idealistic theories that in-service teachers had better forget in everyday school life. What is your opinion in this matter, considering the daily goings-on in your school? I strongly disagree ↔ I strongly agree (beginning teacher item)		3.6	2.0
B2. Contextual factors in the work situation (10%)	*Class size*			
	In my classes there are on average . . .ᵉ pupils (beginning teacher item)		23.5	3.0
	Teaching load			
	At present, my appointment comprises . . .ᵉ 50-minute lesson units per week (beginning teacher item)		14.8	4.6

(continued)

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Table 4 (Continued)

Model component[a] (% reduction of items)	Constructs and items	α	M[b]	SD[b]
	Collaboration	.65	4.4	1.8
	How often are your colleagues willing to support you in your new work situation with advice and practical help? Very seldom ↔ Very often (beginning teacher item)		5.2	1.7
	How much real profit do you have in your teaching from the collaboration with your colleagues? Very little profit ↔ Very much profit (beginning teacher item)		3.6	2.0
D2. In-service competence (beginning teacher self-assessments on criterion variables[c]) (18%)	*Identifying learning obstacles*	.72	4.0	1.9
	Justifying discipline		4.5	1.8
	Motivating disciplinary measures		4.6	1.8
	Analysis of own behavior		4.3	1.7
	Giving pupils a say		3.1	1.9
	Cooperation in groups		3.8	1.9
	Effort[f]		3.8	2.0
	Variety[f]		4.0	1.7

[a] See Figure 2.
[b] On an 8-point scale coded from 0 to 7 (low to high valuation), unless noted otherwise.
[c] On a 5-point scale coded from 0 to 4 (low to high valuation).
[d] See Appendix A.
[e] Absolute number.
[f] See text for operationalization.

moment of data collection is mentioned, and means and standard deviations are specified.

Together, the relationships that emerged from the regression analyses give the research model its empirical substance, as illustrated in Figure 2. Here the capitalized names of constructs and items refer to Table 4. Each arrow represents an empirically demonstrated relationship whereby the upper number relates to the first-order correlation and the lower to the beta weight.
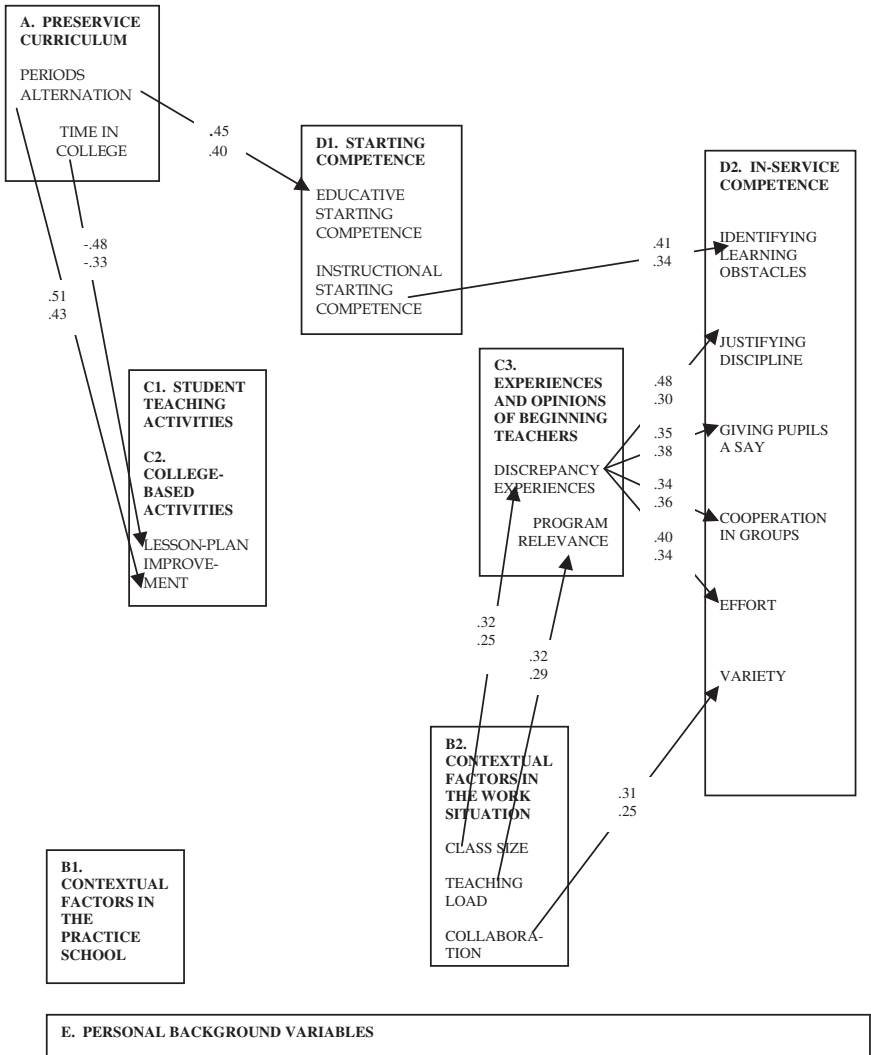

Figure 2. **Relationships among model components.**

Regression results are detailed in Table 5. As can be seen from a comparison with Table 1, 11 of the 14 regression analyses yielded relationships that fulfilled our criteria for considering relationships influential (first correlation above .30 and beta weight significance less than .05). Two independent variables from Component B1 were entered in the regression analyses but did not fulfill the criteria. No independent variables from Component E were entered. On the basis of these findings, we can now describe the patterns underlying our respondents' acquisition of teaching competence.

The outcome for the teacher education line A+B1→C1/C2→D1→D2 was as follows: The more beneficial the students found the alternation of student teaching periods and college-based periods during the preservice program (*periods alternation* construct), the greater they estimated their progress in acquiring educative[5] starting competence (*educative starting competence* construct). Also, the more beneficial the beginning teachers found this alternation in retrospect, the more they felt the exchange of experiences and the contents of the teacher education program had enabled them to improve their teaching plans in in-service practice (*lesson-plan improvement* construct). At the same time, the less the beginning teachers felt they had learned to improve their teaching plans, the more strongly they felt that the college-based periods had lasted too long (*time in college* construct).

In the occupational socialization line B2→C3→D2, the following relationships emerged as influential. The more hours per week the beginning teachers taught (*teaching load* item), the more skepticism they expressed about the practical relevance of the teacher education program they had completed (*program relevance* item). Also, the more pupils per class the beginning teachers taught (*class size* item), the more intense their discrepancy experiences (*discrepancy experiences* construct).

Extent of discrepancy experiences was in turn related to the amount of effort the beginning teachers felt they had to put into their work: The more such experiences, the more demanding they found their work (*effort* construct). This was particularly apparent in the effort they had to invest in maintaining order in the classroom, giving pupils a say in the treatment of subject matter, and introducing and carrying out work in small groups (*justifying discipline* construct and *giving pupils a say* and *cooperation in groups* criterion variables).

The more the beginning teachers experienced collaboration with colleagues as beneficial (*collaboration* construct), the more they practiced a variety of teaching activities (*variety* construct). One teaching activity displayed a direct relationship with the preservice program: The more progress toward instructional starting competence the students attributed to themselves (*instructional starting competence* construct), the more able they felt as beginning teachers to discuss classroom assignments with pupils (*identifying learning obstacles* item).

Before drawing conclusions about the balance of forces between the two lines of influence, we now combine the quantitative and qualitative findings to examine more closely how the respondents' teaching

Table 5
Regression Results

	Independent variables	Regression statistics[a]					Dependent variables	
Model component	Constructs and items	Multiple correlation (R)	Percentage of variance explained (R²)	Single correlation (r)	β	Significance of F	Constructs and items	Model component
A	Periods alternation	.63	39	.45	.40	<.005	Educative starting competence	D1
	Periods alternation	.57	32	.51	.43	<.005	Lesson-plan improvement	C2
	Time in college	.57	32	−.48	−.33	<.005	Lesson-plan improvement	
B2	Class size	.39	15	.32	.25	.03	Discrepancy experiences	C3
	Teaching load	.45	20	.32	.29	<.005	Program relevance	
D1	Instructional starting competence	.45	20	.41	.34	.01	Identifying learning obstacles	D2
B2	Collaboration	.43	19	.31	.25	.01	Variety	D2
C3	Discrepancy experiences	.55	31	.48	.30	.045	Justifying discipline	D2
	Discrepancy experiences	.43	19	.35	.38	.01	Giving pupils a say	
	Discrepancy experiences	.43	18	.34	.36	<.005	Cooperation in groups	
	Discrepancy experiences	.48	24	.40	.34	<.005	Effort	

[a]See Table 1 for the number of constructs and items entered in each analysis.

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competence developed from the beginning of preservice teacher education to their first years of practice as beginning teachers.

Development of Starting Competence

The repeated measures of the criterion variables during the preservice programs revealed differences in the development of students' starting competence, not only between the moments of data collection but also between the variables and between respondent groups. In Table 6, mean values and standard deviations for the 8-point scales show how the criterion variables for starting competence (see Appendix A) developed. At the baseline measurement, the students indicated to what extent, in their opinion, they had already developed the various teaching skills (baseline column in Table 6). Immediately after the most important student teaching activities, teaching whole lessons and series of lessons, they indicated how much progress they felt they had made in the acquisition of these skills. The eighth criterion variable, reflection, was omitted from these measurements because it was likely to elicit socially desirable answers. In the cae of all eight criterion variables, the cooperating teachers assessed the students' progress immediately after the student teaching period. Comparisons by means of analysis of variance were carried out, on the one hand, between the consecutive student measures and, on the other hand, between the final self-assessments of the students and the assessments of the cooperating teachers.

The mean values recorded among the students show, without exception, a highly significant rise over time (see Table 6). The fact that, in their opinion, the extent of their progress clearly increased with time indicates cumulative progress in competence development. From these findings, two different areas of competence development emerge that were already apparent in the data structure of Component D1 of the research model: instructional and educative starting competence. The criterion variables *media* and *methods,* which constituted the instructional starting competence construct, exhibited a lower level at baseline and a higher level at the end of the preservice program than the criterion variables *organization, content, evaluation,* and *interaction,* which constituted the educative starting competence construct (see Table 4). This means that predominantly instructional skills developed faster, whereas predominantly educative skills developed more slowly.

The findings described in the sections to follow show how the program principles shared by the university supervisors and the cooperating teachers were implemented in practice. These findings help explain under which influences starting competence developed.

Variation in Program Implementation

The architecture of the programs rested on the principle of cyclical programming, as described earlier. However, the analysis of the program overviews brought to light variations in how this principle was implemented. In all but

Table 6
Development of Starting Competence

	Self-assessment of starting competence (values)						Assessment by cooperating teachers after series of lessons (4)		Significance (p) of analysis of variance on repeated measures	
	Baseline (1)		After teaching activity							
			Whole lessons (2)		Series of lessons (3)					
Criterion variable[a]	M	SD	M	SD	M	SD	M	SD	1 vs. 2 vs. 3	3 vs.4
Organization	2.5	2.1	4.0	1.6	4.3[b]	1.7	4.4	1.6	<.005	<.005
Content	2.5	2.0	4.4	1.4	4.7[b]	1.4	4.6	1.5	<.005	<.005
Sequencing	2.3	2.1	4.8	1.4	5.0	1.6	4.8	1.5	<.005	<.005
Media	1.6	1.8	4.5	1.5	4.8[c]	1.6	4.9	1.5	<.005	<.005
Methods	1.7	1.8	4.6	1.4	4.9[c]	1.5	4.5	2.4	<.005	.04
Evaluation	1.4	1.8	3.5	1.7	4.0[b]	1.7	4.3	1.5	<.005	.03
Interaction	1.9	1.9	4.0	1.6	4.5[b]	1.5	4.5	1.6	<.005	<.005
Reflection							4.9	1.7		

[a] See Appendix A.
[b] Part of the *educative starting competence* construct (see Table 5 and Figure 2).
[c] Part of the *instructional starting competence* construct (see Table 5 and Figure 2).

4 of the 24 programs, the stages in each cycle were programmed full time in the practice schools or the institute. This schedule ran under the label "block programming." However, 2 programs in physics involved "parallel programming," meaning that student teaching and college-based seminars took place within each week. This was done to enable a majority of the participating students to continue, during teacher education, their part-time jobs in university laboratories. Two other programs in modern languages served part-time evening groups of experienced teachers qualifying for certification in an additional school subject.

Table 7 shows that the consecutive student teaching periods in the full-time programs began at different moments and that the college-based periods between student teaching periods were of different durations. The modal program duration was 17 weeks. The average program duration was 21 weeks, because two experimental 6-month programs in biology were included (see Table 2). Also, the mathematics program began with a 16-week observation period that took place 2 days per week, and the two social studies programs began and ended with activities taking place 1, 2, or 3 days per week.

The moments on which the different student teaching periods began, expressed as work days counted from the initiation of the program, varied considerably, as shown by the ranges occurring for each of these periods. The college-based periods varied in duration as well. In some programs, different student teaching activities began at the same time or shortly after each other. Notably, teaching of partial lessons and whole lessons began at the same time in 7 of the 24 programs. The interviews with the cooperating teachers made clear that this deviation from the program principle of gradually increasing complexity occurred because practice schools wanted to avoid the changes that partial lessons required in their normal timetables. Fourteen programs concluded with college-based reflection periods of variable lengths.

Alternation of College-Based and Student Teaching Periods

The mean values found for the items of the *periods alternation construct* showed that students felt that the alternation of college-based and student teaching periods promoted their learning (see Table 4). Looking back on the preparations for student teaching that took place during the entire preservice program, the beginning teachers rated these preparations with a mean value of 3.7. During the preservice period, the student teachers rated the learning effect they experienced from alternating student teaching periods with college-based seminars with a mean of 3.8. Looking back on their preservice program as beginning teachers, they appreciated this alternation of program periods even more (with a significantly higher mean rating of 4.4, $p < .005$). As one beginning teacher told us: "The advantage of this alternation was that you can get the questions you develop in school answered in college rather quickly. And the other way round, you can quickly put theory into practice."

Table 7

Cycles Implemented in Full-Time Programs

Measure	Number of program weeks	First day of student-teaching activity				Preceding observation	Duration of college-based period in work days			
		Observation	Partial lessons	Whole lessons	Series of lessons		Preceding partial lessons	Preceding whole lessons	Preceding series of lessons	Following series of lessons
Minimum	15	3	3	11	21	2	0	0	0	0
Maximum	39	15	34	76	76	14	13	41	40	40
Range	24	12	31	65	55	12	13	41	40	40
Mode	17	6	21	21	46	5	5	0	15	0
Average	21.0	7.5	16.5	21.9	52.5	6.5	4.0	5.9	11.8	9.3
Standard deviation	7.6	3.5	6.1	14.0	13.4	3.5	2.9	9.2	9.4	11.9

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Increase in Complexity of Student Teaching Activities

The increase in complexity of student teaching activities was realized by students to a considerable degree, as shown by a mean rating of 4.5. Also, they experienced this increase in complexity as quite helpful for their learning, as shown by the mean rating of 5. The cooperating teachers held these views even more strongly; the mean ratings for the analogous questions put to them were 5.6 and 5.7, respectively, differing significantly from those of the students ($p < .005$).

Looking back on the preservice program, all but one of the 12 beginning teachers interviewed expressed positive opinions about the increase in complexity of student teaching activities, because it had provided them opportunities for learning. For one thing, they could get to know the procedures prevalent in their practice schools, and, for another, they had come to analyze their own lessons. This, they reported, had helped them avoid or at least reduce mistakes in their subsequent teaching endeavors. For example:

> I didn't do partial lessons, but I did observations, whole lessons, and a series of lessons. I liked this approach. Teaching was elaborated step by step, so you didn't have to tackle too much at the same time. You could reflect on things well and consider each aspect separately, for instance your interaction with pupils, what content to bring in, and how to present it. You get an overview gradually, so there is a sort of shift occurring.

> If you build it up slowly, it can only have a positive effect, I think. Suppose you immediately start a series of lessons, then you'd run the big risk of seeing something fail that basically, you want very much to accomplish.

In their interviews, the university supervisors unanimously noted that the benefit of the gradual increase in complexity resides in the fact that it creates opportunities for students to come to grips with the teacher role and its many demands. In addition, they reported, the increase in complexity makes differentiation in pace of learning possible. Thus, some students can proceed faster and others more slowly according to personal preference. According to one supervisor:

> Most students want to give whole lessons too fast. The cooperating teachers have the best view on whether they should hold students back or prod them forward. That's why we leave this to them. How they handle this is very important. For instance, a student who stumbles hard should also be recognized in doing so.

Twelve of the 17 cooperating teachers interviewed confirmed the advantages of gradually increasing complexity in each of the consecutive student teaching activities. In the cooperating teachers' experience, observing lessons taught by other teachers results in student teachers becoming aware

of the complexity of the teaching profession. Then teaching partial lessons offers them the opportunity to become accustomed to teaching themselves. Teaching whole lessons, the cooperating teachers reported, is suitable for experimenting with manageable portions of the overall range of activities required from professional teachers. When student teachers finally plan and teach series of lessons to pupils who have become familiar to them, this promotes growth in the area of professional responsibility.

Duration of College-Based Periods

The preceding account indicates that the alternation of student teaching and college-based periods and the gradual increase in complexity of student teaching activities were valued positively by all parties involved. However, there is another aspect of the principle of cyclical programming that requires a closer look. Evaluation of the research model has brought to light the fact that the duration of the college-based periods can, in the students' experience, detract from modifying and improving their teaching plans during their later in-service practice (see the single negative correlation in Figure 2 between Components A and C2).

The mean values found for the items in the lesson-plan improvement construct show that, in looking back on their preservice programs, the beginning teachers rated the exchange of ideas and experiences in college and the topics discussed there as moderately useful for improving their in-service teaching (as can be seen by the respective means of 4.1 and 4.0 in Table 4). Also, while in college, the students felt the student teaching periods were too short, as shown by a mean rating of 1.6 (measured on a 5-point scale ranging from 0 to 4). As beginning teachers, they maintained this judgment. However, their ratings of the length of the college-based periods changed over time. While in college, the students felt the college-based periods lasted slightly too long, as shown by the mean rating of 2.5. As beginning teachers, their ratings changed slightly, but significantly ($p < .046$), in a positive direction (see the *time in college construct* items in Table 4).

These differences in ratings over time have to do with how the student teachers experienced the activities undertaken during the college-based seminars. Repeated measures administered after each consecutive program cycle make it clear that the students' ratings of the preparation stages preceding each cycle dropped from initially high to moderately positive levels. The preparations for teaching partial lessons were perceived as significantly more useful than those for teaching whole lessons (means of 5.0 and 3.9, respectively, $p = .02$) and series of lessons (mean of 4.1). On the other hand, as the preservice programs proceeded, the students' ratings of the evaluation stages after each cycle showed a rise. Reflecting about student teaching experiences, discussing them with others, and drawing consequences from them were perceived as useful after teaching partial lessons and as even more useful after teaching whole lessons and series of lessons (means of 4.1, 4.4, and 4.4, respectively).

The beginning teachers' interview statements clarified this shift in opinions. Nine of the 12 respondents mentioned aspects of the college-based seminars they had experienced in a positive way. Five of these individuals reported that the preservice program had led them to practice, during student teaching, the theory with which the program had acquainted them. They could then analyze their experiences in doing so in college, after the student teaching period. The following statement represents these experiences:

> In student teaching, you were confronted with so many things that you couldn't ever reflect on all of them at the same time. In fact, this reflection did not begin until the seminar. That's where you started sorting things out and exchanging experiences. You'd also get extra theory and after a while you felt the need to get back in front of the classroom, fortified as you were. And that was possible, then. I found this alternation a handsome arrangement. The college-based seminars were just long enough, fortunately not too long, otherwise it gives you the itches.

When asked why they found certain parts of the college-based program less beneficial, seven teachers reported that they preferred to address theoretical questions after and in response to practical experience. The following statement is illustrative:

> During the preservice program, I found the college-based periods lasted too long and student teaching too short, because I wanted to get in front of the class as soon as possible. Now I'm saying that you just need lots more theoretical knowledge before you start teaching. I don't mean the knowledge from textbooks, but just experiences, for instance those of [university supervisor], who has been teaching himself for years. I do agree with the policy of sending you off into practice first. After all, you just spent 6 years on a major in your subject. However, now I say that the theoretical foundations are absolutely necessary. The biggest advantage of the college-based seminars, as I remember them, is that you can exchange experiences with students whom you have known for years.

From these findings, it can be inferred that among the student teachers, the wish for practical experience and the wish for theoretical reflection peaked at different moments. In advance of their very first performance as teachers, they did feel some trepidation, and this is why preparations were welcome; later, however, they preferred theory to be tackled after practice. During the preservice programs studied, the value of the college-based periods apparently depended on how functional they were for student teaching. This inference was confirmed by the university supervisors' statements.

Different Approaches to Cyclical Programming

From the interviews with the university supervisors, it emerged that they tried to structure the alternation of college-based and student teaching periods in

such a way that they would, first, correspond with the current motivation of the students and, second, promote the mutual transfer of practical exercise and theoretical study. Central to their considerations was the question of how, in moving from each program cycle to the next, students make the transition from evaluating the most recent student teaching period to preparing the next.

An inspection of the elaborate program overviews with regard to this aspect resulted in an interesting finding. This had to do with the time spent in college on preparing for student teaching as compared with the time spent on evaluating and reflecting on student teaching experiences after students returned from their schools. In some programs, notably those in modern languages, mathematics, and geography, more days in college were spent on preparing for student teaching. In other programs, notably those in Dutch, physics, and biology, more college-based days were spent on evaluating and reflecting. This suggested that, among the university supervisors, two different approaches to cyclical programming can be distinguished: the "theory-to-practice" approach and the "practice-to-theory" approach.

In the theory-to-practice approach, the activities undertaken have a largely introductory and preparatory function with respect to student teaching. Some supervisors favoring this approach talked about student teaching as something for which students ought to be bolstered in advance as thoroughly as possible. One of them stated:

> The first weeks of the program are necessary to lay a theoretical foundation. . . . Micro-teaching is meant to have a transfer value to student teaching, but I don't see much evidence of that. In my impression, most students leave their subject major with a rather passive learning orientation. . . . In evaluations at the end of [teacher education] programs, some students state that they have to work through too much information during the first 4 weeks. But that can hardly be changed, because elementary pedagogical content knowledge is at stake and the program as a whole is too short.

Other university supervisors who favored a practice-to-theory approach were more easygoing about preparation and programmed a relatively fast entry into the field. They used college-based time above all to offer students opportunities for evaluating the experiences they had during student teaching. Another characteristic of the practice-to-theory approach is that students are given a relatively large amount of "free space," that is, college time in which they can work on questions and topics partly or entirely of their own choosing. Members of the biology department, which pioneered the two experimental 6-month programs in the study, argued explicitly for this approach. For example:

> Building on the students' questions and learning needs is our supervision principle right from the second week of the program on, only

> later, more time becomes available for this. We do leave the students free to plan their "free space," both in the contents and the groupings they choose to work in, but we also stimulate cooperation, suggest other possibilities than they think of themselves, and offer them program contents that fit their interests. All of this is meant to stimulate them to broaden their perspectives on teaching their subject.

The student triads interviewed about this approach reported that obtaining student teaching experience was an indispensable basis for using their "free space." According to one respondent:

> The program forced you to take position yourself, for instance when it comes to choosing textbooks. That's how we developed a better idea ourselves of what we think is good biology teaching. Especially at the end of the program, we got a little bit of a vision on teaching on the basis of goals. In the beginning, we didn't believe you could think of alternatives by looking back on your lessons, but once we got teaching our own lessons as a point of reference, this turned out to be possible. . . . Thinking about your teaching in such a theoretical way doesn't succeed until your own experience has given you a concrete basis.

Composition and Functioning of Student Teacher Triads

From the findings presented so far, it emerges that the cyclical sequencing of program periods did not in itself determine how the students learned. It did so only in conjunction with how the prospective teachers' individual learning was supported. The implementation of this second program principle was visible in how the student teacher triads were composed and functioned as well as in the cooperating teachers' use of the clinical supervision model.

Findings showed that 85% of the university supervisors, 71% of the cooperating teachers, and 72% of the students were in favor of the institute's custom of composing groups of three student teachers in each of the practice schools. At the beginning of the program, the students found it an attractive idea to work together in triads, as shown by their mean rating of 6 on an 8-point scale. They maintained this opinion during the program, although their mean score dropped slightly, but significantly ($p < .005$), from 5.8 to 5.6 between teaching whole lessons and teaching series of lessons. In looking back on their preservice programs, the beginning teachers equally valued student teaching in triads, with a mean rating of 5.8. The mean rating of cooperating teachers was 5.6.

Reasons for the popularity of the student teacher triads became clear in the interviews conducted with cooperating teachers. In their opinion, this group composition encourages student teachers to learn from each other as well as making a host of varied observations and extensive feedback avail-

able. In addition, the cooperating teachers' experience was that triads, more than dyads, left them free to concentrate on observation and to consider their interventions carefully.

Among university supervisors and cooperating teachers, it was a matter of debate what kind of influence the procedures for composing triads had on the cooperation between student teachers and its outcomes. In the procedures used, students' personal preferences for or against cooperating with specific peers were taken into account. Thirty-three percent of the university supervisors used a discrete ballot procedure, while 52% had students discuss their preferences publicly with each other. The latter majority expected the public procedure to encourage students in taking responsibility for their cooperation. The other supervisors wanted to avoid emotional confrontations between students. Of all of the procedures tried out in the course of time, only one was valued truly positively by the cooperating teachers: a working week with all parties involved somewhere in the countryside, during which activities undertaken together could make the acquaintance thorough enough to base the composition of triads on other than superficial grounds.

To examine possible effects of public or nonpublic procedures, we performed analyses of variance using a number of dependent variables: how positively or negatively student teachers valued the procedure they experienced, how positively or negatively they valued their subsequent cooperation, the amount of benefit they derived from this cooperation in preparing their whole lessons and series of lessons, and their starting competence at the end of the preservice programs, as assessed both by themselves and by their cooperating teachers. No significant effects emerged from these analyses ($p > .05$).

Using the Clinical Supervision Model

Use of the clinical supervision model in postlesson conferences was appreciated by the student teachers; mean values on the 8-point scales for the questions on how many new ideas and insights they had derived from the discussions of their whole lessons and series of lessons were 4.9 and 4.8, respectively. The benefits they derived from collaboration with fellow students were rated similarly highly, as shown by a mean value of 4.8.

In the interviews with beginning teachers, five of them referred to an approach used by the cooperating teacher that had raised the effectiveness of his or her supervision: He or she had left them as free as possible to decide on their teaching themselves and had kept an eye on whether they put their newly acquired knowledge into action in their subsequent lessons. According to the written questionnaire responses of the cooperating teachers, 58% of them felt they had made a real effort to offer students increasing opportunities for autonomous decision making in the course of student teaching. However, this intended increase was experienced by a significantly lower percentage (34%) of the students ($p < .005$); 64% of them felt the cooperating

teachers had allowed them the same amount of liberties throughout, while 40% of the cooperating teachers themselves reported doing so.

The aspects of teaching about which the students could make their own decisions were the following: using materials they produced, choosing activity settings and work forms for pupil activities, trying out different activity sequences, choosing lesson content, and organizing activities outside the classroom. The students' opportunities for making their own decisions about these aspects descended in the order just presented from a mean value of 6.2 to a mean of 4.7 on an 8-point scale, while the cooperating teachers significantly overestimated the liberties they gave by a difference on these items ranging between 0.2 and 0.6 ($p < .03$). The following is an illustrative example of how cooperating teachers went about giving student teachers opportunities for autonomous decision making:

> I go about this very gradually, because it can become a big mess if it goes too fast, for instance when a student suddenly decides to behave in a bossy way towards the pupils. If you support decision making, for instance about grouping pupils and types of activities so that they can slowly become more complicated, nothing much has to go wrong.

From the beginning teacher interviews, it became apparent that the cooperating teachers used three types of interventions: giving students opportunities for deciding about their own teaching (as described), offering information and ideas, and sharing their own opinions. These behaviors could go together well, as one beginning teacher recounted:

> I was left completely free by my cooperating teacher. I got lots of space to do everything myself, but he also had the guts to criticize me outright. When he attended a lesson, he never intervened. When pupils looked at him with glances like "Shouldn't you do something about this?" he looked out the window or just wrote on. But after the lesson he could tell you exactly how it went. He didn't add ideas to his comments until I asked him to. Then he came up with lots of ideas, not with comments like "You did it this way. Well, I would do it that way." He was a very good cooperating teacher.

In their interviews, some cooperating teachers reported that they structured postlesson conferences around comparisons between lesson preparation and lesson implementation to stimulate students to reorganize their teaching. Other measures taken by cooperating teachers to relate lessons given to upcoming lessons that students should plan included the following: scheduling a fixed moment during the week for postlesson conferences, discussing a lesson before the same or another student had to teach it to a parallel class, turning conseqences drawn from one postlesson conference into obligatory points of observation during a subsequent lesson, and planning several lessons ahead.

Cooperation Between Teacher Educators

The third program principle, cooperation between university supervisors and cooperating teachers, was implemented as follows. Of the cooperating teachers, 94% had received training in using the clinical supervision model recommended by the institute, and 45% indicated that they used it with considerable fidelity in the postlesson conferences. Eight of the 17 cooperating teachers interviewed noted that, as their supervisory experience increased, they used the model with greater flexibility.

The student teachers were supervised by the university supervisors not only at the institute but also during school visits. Sixty-five percent of the students were visited by their supervisors during their partial or whole lessons, and 87% were visited during their series of lessons. The interview statements of five beginning teachers indicated what was particularly instructive about these visits: confrontational feedback and the opening up of new perspectives. This was confirmed by 12 of the cooperating teachers interviewed. According to one of these teachers:

> The supervisor had different things to say, because he has other ideas about presenting subject matter, learning activities for pupils, inter-action patterns, and the like. As a cooperating teacher, you are constantly busy in practice and you lack the time to get informed more widely, and that's why the supervisor can make better links with theory about teaching.

According to another: "The supervisor never gives students ready-made answers, however much they would like to get them. The supervisor was good at renaming things so that the students found new openings for more effective action."

Development of In-Service Competence

In this section, the development of in-service competence is assessed on the basis of the data available from the 115 graduates, 44% of them women and 56% men, who sought and found employment as teachers. As described in the data analysis section, there were two types of data in the whole sample for each of the 14 criterion variables measured after the preservice program (see the right-hand column of Appendix A): dichotomous data showing whether the beginning teacher practiced the activity concerned and interval data showing how much effort this required. The values found are presented in Table 8.

When one considers the teaching behaviors listed in Table 8 according to descending frequencies, the following picture emerges of the beginning teachers' in-service performance. In the domain of relationships with pupils, almost all teachers made efforts to give personal guidance to individual pupils, to explain the reasons for disciplinary measures, and to analyze their own behavior. In the domain of instruction, at least three quarters of the

Table 8
In-Service Competence

| Criterion variable | Beginning teachers practicing behavior | | Effort expended | |
	Frequency (N = 115)	%	M	SD
Activities outside school	45	39	3.2	2.1
Deviation from timetable	42	37	3.0	2.1
Giving pupils a say	61	53	3.1	1.9
Own issues	89	79	4.1	2.0
Experimental sequencing	81	73	4.9	1.9
Additional materials	105	91	3.8	1.8
Cooperation in groups	74	65	3.8	1.8
Subject integration	39	34	4.2	2.0
Project education activities	39	34	3.3	2.2
Identifying learning obstacles	71	63	4.0	2.0
Verbal reports	15	13	3.0	2.7
Personal guidance	92	80	3.6	1.8
Motivating disciplinary measures	96	87	4.8	1.7
Analysis of own behavior	95	84	4.5	1.6

graduates made an effort to introduce issues not represented in textbooks. In addition, almost three quarters experimented with an alternative sequencing of learning activities, and two thirds succeeded in having pupils work in small groups for at least half of the time. Almost two thirds of the beginning teachers discussed test results with pupils elaborately enough to identify learning obstacles. Just over half of the teachers gave pupils a say in determining the subject matter to be treated.

Slightly more than one third of the beginning teachers deviated from the timetable and organized activities outside of school. Practicing subject integration and carrying out project education activities occurred among one third of the teachers. The least frequent teaching behavior was producing verbal assessments. In comparing the frequencies of the beginning teachers' activities with the effort they expended on them, it becomes clear that, generally, the most frequently occurring teaching activities required the most effort. This pattern was reversed only in the case of two activities. Provision of personal guidance occurred among 80% of the beginning teachers but required an average amount of effort, and integration of school subjects occurred among one third of the teachers but required a more than average amount of effort.

These findings characterize the beginning teachers' in-service performance as contributing toward introducing new subject matter, using activating teaching methods, and relating to pupils in respectful ways. They possessed a level of teaching competence that made it possible to teach less

through central leadership and more through decentralized guidance. It is notable that most of the infrequent activities required a break with the structural characteristics of the standard school system: the fixed timetable, the separation between school subjects and teachers, and quantitative, summative assessments. Consequently, insofar as the criterion variables for in-service competence indicate an innovative type of teaching, this was largely confined to the micro-situation of the classroom.

The question under which influences the beginning teachers' in-service competence developed as it did can be answered to an important extent on the basis of the qualitative reconstruction of competence development in the subsample. As described in the data analysis section, this reconstruction rested on a systematic comparison of the three data sources available: the direct observations of and subsequent interviews with the beginning teachers and their student teaching reports. The reconstruction brings to light the everyday teaching experiences of which the quantitative data are an indication.

In the following presentation, which is structured according to the criterion variables (see Appendix A), we confine ourselves to those trends and patterns that appeared among more than half of the 12 beginning teachers in the subsample. In this way, commonalities in the development of teaching competence are highlighted. As detailed at the end of the method section, the findings for the subsample can be considered generalizable to the whole sample. When necessary, differences between the subsample and the whole sample are taken into account. Additional information from the whole sample is provided in cases in which this is relevant because of influential relationships apparent from evaluation of the research model.

Our account focuses on the tensions the beginning teachers experienced between the teaching activities they strove to implement on entry into the teaching profession, on the one hand, and the socializing influences emanating from the school contexts in which they came to work, on the other. We also pay particular attention to the effects these tensions had on how the beginning teachers' daily activities and work style developed during their first in-service years. As a means of making the beginning teachers' experiences concrete, illustrative quotes are drawn from the interviews conducted after observation of their lessons.

Organization

Of all of the beginning teachers, 66% worked in a school with 600 or more pupils, and 52% worked in a school with 900 or more pupils. In the subsample, the average number of pupils in the 12 beginning teachers' schools was 904; 7 of them preferred a smaller school. On average, they taught 14.8 lessons (50 minutes in duration) per week to 5.8 different groups consisting of 23.5 pupils (see Table 4). Number of hours taught per week was significantly higher in the subsample: 20.2 ($p < .05$). After entering in-service teaching, 6 of the 12 beginning teachers in the subsample had worked in two schools simultaneously. Seven of them were satisfied about their teaching

timetable, but having to change rooms and buildings irritated them. Fifty-nine percent of all beginning teachers had no classroom of their own, 37% felt they had insufficient facilities in the classroom where they taught most of their lessons, and 39% felt there was not enough documentation (e.g., curriculum documents, teacher guides, and worksheets) available to support their work. All except one of the beginning teachers in the subsample had duties other than teaching, such as mentoring pupils and organizing extra-curricular activities. Eight reported enjoying doing this kind of work.

A mentor was assigned by school management to 56% of all beginning teachers, two thirds of whom were satisfied about how the mentoring worked out for them. The average rating of the beginning teachers in terms of their colleagues' willingness to support them was 5.2 on an 8-point scale, with a mode of 7. They were less positive, however, about the real benefits they derived from this support in their teaching (see the collaboration construct in Table 4).

In the subsample, 6 of the 12 beginning teachers felt that they were left to their own resources, and 5 expressed that the initiative to build good relations with colleagues should come from their side. During their first in-service year, they felt they had to prove to their colleagues that they could succeed in teaching before they were accepted and relations could become more open and productive. For example: "The first year, you are 'the new one,' so then you don't feel equal. . . . In the second year, you belong to the club and you're being treated on an equal footing, but it's also up to yourself." Ten of the 12 beginning teachers interviewed desired more cooperation with colleagues, especially concerning lesson content and assessment, but this was hampered by lack of time or unfavorable relations among colleagues, or both.

In their work, the beginning teachers had to become accustomed to the rhythm imposed on them by the school's timetable. They also felt that they were insufficiently prepared for planning their teaching, particularly in the longer term, because they lacked the experience to estimate the time needed for covering subject matter. Two of the teachers' comments were as follows:

> I put a lot of time into lesson planning: every evening from 7 till 10. On Sundays, I take it a little easier of course. That's when I make a planning for the whole week. . . . In my first year, I sometimes couldn't find enough time for planning, so I had to improvise in front of the class. That's a nasty surprise, but fortunately this doesn't happen anymore.

> In G. [first job], I had to do all the planning myself and I couldn't build on colleagues' experience in estimating the lesson time needed. In V. [second job], a colleague gave me the plannings he had made the year before. I can work with those quite well. Now, I prepare the new chapter for the third grade together with a colleague.

It was not until they were on the job that most graduates discovered the necessity of a system for keeping track of lessons and learning results. These

problems were then aggravated by the increased teaching load they had relative to student teaching and by the types of organizational obstacles just mentioned. Despite such obstacles, the beginning teachers persevered in their attempts to maintain the methods and quality of teaching they had practiced during student teaching. They felt they succeeded less in doing so only when they encountered more than one organizational obstacle at a time.

Content

The beginning teachers' teaching was influenced to a large degree by the textbooks currently prescribed in their schools, although almost all of them criticized these books. They preferred to work with textbooks that covered most of the content prescribed for examinations, contained concise overviews, made no extreme demands on pupils' activities and work pace, and included sufficient exercises and a variety of interesting topics from which pupils could choose.

Despite restrictions set by time pressures, curricular demands, and guidelines agreed upon by direct colleagues, the beginning teachers attempted to replace or supplement current textbooks in an effort to present subject matter to pupils in a structure they considered more logical and to create more variety in their lessons. They felt that collaboration with colleagues in shaping the curriculum and presenting its contents resulted in improvements in their teaching. For example:

> The book we use now has been introduced this school year. The contents are concise, very attractive, and often structured in a funny way. That makes it possible to use the book as a starting point. You can elaborate on it to introduce all sorts of things that are new for pupils.

The notions about structuring lesson content that the beginning teachers had brought from their preservice programs differed according to their subject. Language teachers foremost used deductive formats, "working from the rules toward the examples," while science teachers prioritized more inductive formats, "working from examples toward the rules." As an example of the latter, in one crammed room, 12-year-old pupils fired a barrage of questions at their beginning biology teacher about the peas they were trying to grow, both at home and in school, in jars and containers of all sorts. These pupils visualized in graphs the growth processes they observed.

Sequencing

The standard sequence of lesson activities used by most beginning teachers observed at work was discussing homework first and then introducing new content in the form of materials, demonstrations, or laboratory exercises. They explained the core aspects of new content by lecturing or in dialogue, or both, upon which followed instructions for assignments carried out by the

pupils in class or as homework. In the case of four teachers, this sequence covered whole lessons. Seven others repeated it twice within lessons, especially in science and language, because here relatively highly structured content was at stake. If pupils were to master such content, these teachers reported, explanation and exercise needed to be closely linked. One science teacher provided the following illustration.

> I always try to link a new piece of theory to subject matter that the pupils already have a command of. I try to make this link by means of dialogues in which I ask a lot of "why questions." So I try to rouse the pupils to ask themselves the question why things work the way they do. To achieve that, I find demonstrations and exercises in the laboratory very important.

Those teachers who activated pupils to practice and experiment during lessons tended to spend the least amount of their lesson time explaining content and to give study assignments as homework. Also, in their lessons, practice usually preceded theory. In reverse, teachers who spent most of their lesson time explaining mostly gave exercises as homework following their presentation of theoretical content. Here a contrast between inductive and deductive teaching styles was recognizable. The clearest examples of activating, inductive teaching could be seen in science lessons. For example:

> After a laboratory demonstration, we find out by means of dialogue what the theory is. In this way, the pupils do a lot of talking and asking. They're surely not too lazy for this. I like this way of working. Only, with 32 pupils, I get so much response that I have to hold them back and, of course, that's not nice for them.

The actions and accounts of 8 of the 12 beginning teachers made it clear that they adjusted their experiments with sequencing learning activities mostly on the basis of their observations of pupil reactions. Two examples are as follows.

> When I notice that pupils don't understand the subject matter, then I give extra examples. Otherwise, it's no use to give them homework. If they don't understand, they'll come back the next lesson without having made the assignments.

> When I notice that pupils begin to lose attention or to sigh or to look the other way, it becomes time for them to do something else. Then I let them work for themselves and at their own pace. Last year, I thought that I ought to speed up when attention drops. At the time, I thought they were getting bored.

In their work situation, there were also factors that hindered the beginning teachers in using the inductive, activating teaching style with which they

had become acquainted during preservice programs. A recurring experience for them was to feel compelled by the constraints of 50-minute lessons, traditional academic textbooks, and examination requirements to conduct high-speed frontal teaching (e.g., "When I'm in a hurry, I succeed less in eliciting questions and answers from pupils").

Media

Teaching materials produced by the beginning teachers themselves elicited positive as well as negative reactions from pupils. Positive reactions resulted from the fact that these materials promoted pupils' activity and involvement. For example: "The pupils appreciate my materials especially, because it shows them that I am quite involved in my work." When pupils reacted negatively, it was because the teachers' materials challenged them to work hard. Also, tests concerning these materials tended to be more difficult than tests involving standard textbooks.

Production of additional materials by the beginning teachers was hampered by lack of time, although experience with making one's own materials during student teaching was helpful. According to one teacher: "During the preservice program, there was much more time available for lesson preparation and producing materials than in beginning teaching. That's an unrealistic contradiction." Both before and after teachers' entry into in-service teaching, cooperation with colleagues greatly influenced their production of their own teaching materials. This influence worked in both positive directions, when colleagues were willing to cooperate, and negative directions, when they declined to do so.

Methods

The rate of occurrence of teaching methods in the whole sample was clearly mirrored in the subsample. The beginning teachers observed not only gave lectures and presentations to their pupils but also used types of discourse such as question-answer dialogues with one pupil at a time, while others listened, and group discussions. In addition, they supervised individual seat work and arranged for group work. For example:

> The group work with these [13-year-old] pupils has two reasons. First, they like it better, because they don't have to listen as much and they can be active themselves. Second, I have fewer discipline problems myself. For instance, there was a shoe in the middle of the classroom. During frontal teaching, that must never happen, but during group work, I can allow this.

Success with group work not only depended on clarity of instructions and suitability of teaching materials; the beginning teachers also found it necessary to train their pupils in skills needed for individual study and group work. One of the teachers stated:

> In my subject department, we are about to introduce an approach
> where pupils work together on themes. The group work that comes
> with that should support them on their way to working more auto-
> nomously. In principle, we would like to introduce this method also
> in [another stream], but those pupils have so few skills that we're
> still in doubt. Those pupils find it so hard to formulate their own
> opinions that, now, I let them practice first with giving their opinions
> about specific statements.

At the same time, prevalent practices in the schools as well as pupil expec-
tations could have a discouraging impact. According to one teacher:

> I am now trying to let the question-and-answer form flow over into
> group discussions, because I discovered that pupils hardly listen
> to each other. They pay little attention to each other's questions,
> because they aren't aware of how important listening can be. Teach-
> ing in this school is generally one-way traffic from the teachers
> to the pupils. That does make it difficult for me to keep up my
> approach.

When the beginning teachers had experienced using activating meth-
ods such as group work during their preservice period, this stimulated their
repeated use in later in-service work. In the beginning teachers' interview
statements, a number of reasons recurred as to why they changed their
teaching methods over time. For instance, as they developed a more precise
perception of how learning processes in pupils unfold, they introduced more
decentralized and activating methods. Also, as such methods led to discipline
problems and resistance from pupils, they resorted to lecturing and presen-
tation. They did the same when their command of specific content or meth-
ods was inadequate.

Evaluation

All beginning teachers we visited produced grades as a basis for the reports
that their schools periodically put together for parents, but they also voiced
dissatisfaction with the extrinsic motivation that the grading system encour-
aged in their pupils. For example: "The preoccupation of pupils with grades
was a big disappointment for me. They come to you because they think a
grade is too low, but not to get some more explanation about the subject."
During their preservice programs, at least five of the beginning teach-
ers had practiced making tests, but they had also become acquainted with
procedures for formative assessment such as monitoring pupils' progress in
qualitative ways or making verbal reports about pupil learning. However, in
their schools, they could use these procedures only marginally. In fact, their
use was restricted to the one class with which they were involved as a per-
sonal mentor. (A customary system in Dutch secondary schools is that each
teacher is assigned to one class whose well-being he or she must monitor

and care for.) Otherwise, class size resulted in qualitative assessment being too time consuming.

In their classroom teaching, 63% of the beginning teachers made a considerable effort to discuss test results thoroughly with their pupils (see the identifying learning obstacles item in Table 8). In fact, this practice is the only one that emerged in the evaluation of the research model as being related to instructional starting competence (see Figure 2). Apparently, this competence enabled teachers to integrate assessment with their teaching. Otherwise, they had to conform to pressure from the school to meet parents' as well as pupils' expectations and accept quantitative outcome measures as the predominant source of valid evaluation. In one school, "progress cards" for parents were used to report each week's grades. Two teachers' comments were as follows:

> This school is crazy with grades. This system of "progress cards" is meant to prevent parents complaining about grades when it's too late.

> The school obliges me to produce grades for selection purposes. I do so, but not wholeheartedly, because I think dropouts aren't stupid. They just get too little attention in school.

Interaction

As a group, the beginning teachers believed that their schools maintained a rather strict regime, as shown by the mean rating of 4.8 on the 8-point scale. On average, they encountered discrepancy experiences in classroom interactions to a moderate extent, as shown by the mean rating of 3.2 on the *discrepancy experiences* construct (see Table 4). The beginning teachers in the subsample reported discrepancy experiences to a similar extent, but on one item from the *discrepancy experiences* construct they scored significantly higher. They felt more forced by pupil reactions to take disciplinary measures in excess of their personal preference (as shown by their mean rating of 5.2 as opposed to 3.5 for the whole sample, $p = .01$).

In their interviews, the beginning teachers attributed their discrepancy experiences to three main causes. The first was their teaching load, which confirmed the relationship found between Components B2 and C3 of the research model (see Table 4 and Figure 2).

> I still feel teaching is a taxing job. I constantly have to put in all I can and it never stops. I can never let go or just take it a little easier, because I remain responsible and I must keep up being the stimulator. This pressure still plays through in my private life, because when I come home, I keep being tired.

Second, the beginning teachers perceived a lack of support from school management. Two representative comments are as follows:

> I think it's nonsense that pupils are not allowed to bring their coats into the classroom, but officially it is not allowed, so I forbid it. How-

ever, when pupils ask me about the reasons for this prohibition, I
know nothing sensible to say. I usually reply that it's just a rule,
although I find this one of the worst things to have to say. Also, I
would like to leave the building with the pupils, but this is not
allowed, so I just don't do it. I think I know exactly what I would be
told in that case, so my feeling tells me I had better leave it.

When I began, the deputy head said right away that I should just send
off a pupil when I found it necessary. Then he would take care of it.
In the second year, it happened to me once that I had to send a pupil
off. This pupil came back with the message that I should take care of
the matter.

A third source of discrepancy experiences was the interaction with and
between pupils. For example:

I don't like very much playing the cop, particularly during excursions,
but on the other hand I am the one who is responsible, so I have to
remain in control. No matter how stupidly they act, I remain respon-
sible. In daily classroom work, this kind of controlling is a little less,
but you still have to keep 30 pupils occupied in a sensible way.

My norms about discipline have shifted. For instance, now I will send
someone off far sooner than last year.

The beginning teachers encountered most of their discipline problems
during their first year in the profession. It was not until later that they
learned to prevent these problems by improving their instructional tech-
niques and by clarifying the rules they set for pupil behavior. None of the
beginning teachers could refrain from punishment now and then. Espe-
cially after the first in-service year, they succeeded in using the appropri-
ate levels of discipline to uphold their rules for pupil behavior and in
punishing transgressions. From then on, their punishments were usually
based on sanctions they had announced previously. The beginning teach-
ers displayed almost complete unanimity regarding the hierarchy of disci-
plinary measures they used, and they tried to be as consistent as possible
in taking and justifying these measures.

After their first year as teachers, most respondents developed more self-
confidence and more composure during teaching. According to one teacher:

In the beginning, I was too choleric. If there was a little chaos, I would
use my voice, which is already loud by nature. The kids would be
silent at once, but this was in a laughing way, giggling you know. The
first year, I yelled too often, while in fact this should be a last resort.
If you really get angry, you're actually too far gone. The second year,
I became a lot quieter and this had a positive effect on the pupils.

The decrease in discipline problems depended crucially on the degree
to which the beginning teachers accepted the leading role that pupils

expected of them as teachers. As one of the teachers stated, "I think for pupils it has become a little clearer where the limits of the acceptable lie for me. Last year, I too was still finding out about those limits."

The preceding quotes illustrate how the beginning teachers discovered in practice that the leading role is inherent in being a teacher. Their accounts included clear evidence that counterattitudinal action, as conceptualized by Kelman (1974) and Dann et al. (1978), led to attitude change. The experiences of the beginning teachers during their first year in school in terms of their interactions with pupils and colleagues had a noticeable influence on how their educational ideals developed. For example:

> The ideals I had and have are reasonably alive and well. It only takes a long time—more than you had imagined—to do something about them. You're searching for a certain balance between lesson planning, lesson content, and the pupils, and that takes a lot of energy. You can't work on your ideal until you've got a hold on that balance.

> In the preservice program, it was a sort of taboo that later you might get big discipline problems and, like me, get into a tangle with your ideals. . . . Yet, I also notice that if I hadn't formed ideals during the program, I wouldn't have got them anymore, because now the time to develop them is lacking. These ideals have lived on in me for a while and are now beginning to work as a source of inspiration. For instance, I now notice that pupils can indeed give useful signals about my way of teaching. Now, I also find that surely you can cooperate with colleagues.

Reflection

The approaches used during student teaching for analyzing and evaluating lessons had recognizable effects on beginning teaching practices. Teachers had internalized the interpersonal approaches used during their preservice programs, particularly clinical supervision and small group work, as intrapersonal approaches to self-evaluation. To this end, they mostly used self-observation, retrospection, and note taking about their lessons; to a lesser degree, they used feedback from pupils and colleagues. On the whole, they analyzed their lessons more on their own and less systematically than during student teaching, as a result of time pressure or an isolated position within their schools. For example:

> What I am consistent about, though, is having pupils fill in a questionnaire once a year, where they can indicate how they feel about my lessons. From those questionnaires, I try to draw my conclusions. . . . They like filling out such a questionnaire and they're serious about it. Of course, I learn from the conclusions and I try to use them to improve my teaching.

The beginning teachers' reflections on their work helped them improve their professional competence in the following ways: making instructions

and pupil assignments more precise, clarifying subject matter, activating pupils in more open types of discourse and through a stronger call for individual and group work, and improving their interpersonal relationships with classes and students, most of all by avoiding conflict about rules for behavior. Examples are as follows:

> For instance, because now I am more relaxed in front of the class than last year, I'm better able to make up examples on the spot. I can make better use of situations that arise momentaneously, so I don't stick so strictly to my lesson planning.

> Because I am teaching in a more relaxed way now, my relationship with the pupils has improved over last year.

> I have a good relationship with most classes. That's why I can do more with the pupils, especially with those classes that I have for the second time. I can work well there. Pupils don't necessarily have to like me, but the relationship with the group as a whole must be good. Then they are willing to work harder.

We conclude the reconstruction of the development of teaching competence in the subsample with the overview provided in Table 9, which shows which influences were sources of continuity or discontinuity (as defined in the data analysis section) in the development from starting to in-service competence.

Discussion and Conclusions

Occupational socialization in schools is a known factor counteracting attempts at educating innovative teachers. Even so, German research has indicated that strengthening opportunities for students in preservice teacher education programs to integrate practical exercise with theoretical study can mitigate "practice shock" during their subsequent entry into in-service teaching (Dann et al., 1978, 1981; Hinsch, 1979). In this longitudinal study, we sought to understand how far and in which ways such integrative preservice programs can counterbalance occupational socialization. In the following, we examine the interplay between influences on graduates' teaching competence originating from their work context and influences originating from their preservice programs, as observed in one university teacher education institution that aimed deliberately at integrating practice and theory.

Influences on Occupational Socialization

In this study, teaching competence was conceptualized as "starting competence," meaning the outcome of preservice teacher education observable immediately after its completion, and as "in-service competence," meaning the forms in which starting competence develops further during the first years in the profession. These two forms of competence were operationalized in terms of teaching skills (see Appendix A).

Table 9

**Continuity and Discontinuity in the Development
of Teaching Competence**

Criterion variable (see Appendix A)	Qualitative research material concerns	Factor influencing continuity	Factor influencing discontinuity
Organization	Lesson preparation	Student teaching experiences	More than one organizational obstacle at a time
Content	Structuring subject matter and use of examples in presentation	Pedagogical content knowledge covered in preservice programs	Use of prescribed textbooks
Sequencing	(Planning of) variety in the sequencing of sections of lessons	Student teaching experiences	Use of prescribed textbooks, curricula, examination contents
Media	Producing own teaching materials	Practice during preservice program; collaboration with colleagues during beginning teaching	Lack of time and collaboration with colleagues during beginning teaching
Methods	Use of settings for and forms of pupil activity	Student teaching experiences	Lecturing by colleagues, pupil expectations about "normal teaching"
Evaluation	Summative evaluation	Student teaching experiences	
	Formative evaluation	Student teaching experiences	Dominance of quantitative grading system; large class sizes
Interaction	Clarifying and upholding rules of behavior		Lack of/incomplete acceptance of leading teacher role
Reflection	Examination and modification of own teaching	Feedback on and modification of student teaching lessons	High number of hours taught per week; lack of (opportunity for) consultation with colleagues

In the research model, the development of starting competence and in-service competence is conceptualized as being influenced by factors in school contexts and in preservice teacher education programs. These factors and the relationships between them are included in an "occupational social-ization line" and a "teacher education line," respectively. Quantitative eval-uation of the research model served as an examination of the balance of forces between these two lines of influence.

The evaluation of the research model showed that the competence development of the teachers studied was influenced not only by the school contexts where they came to work but also by the preservice teacher edu-cation programs from which they had graduated. As shown by the regres-sion analyses performed, the influences originating from the school context were more numerous and powerful than those originating from the pre-service programs. Explanations for these outcomes were sought by combining the quantitative analyses with a qualitative reconstruction of competence development. This combination of methods led to the following conclusions.

Especially during their first in-service year, the beginning teachers found themselves forced to discipline pupils in ways discrepant with their personal preferences. These discrepancy experiences, in combination with class size, led to a decline in the use of teaching skills as developed during the pre-service period. Current school practices and existing pupil expectations led the beginning teachers to rely more on teacher-centered methods and less on a teaching strategy of activating pupils, as encouraged by the preservice programs. At the same time, their in-service teaching load furthered their skepticism about the practical relevance of the preservice programs they had graduated from.

The beginning teachers found that colleagues were generally willing to support them but that, to derive real benefits from cooperation, they had to take the initiative themselves. Insofar as cooperation with colleagues materialized, it was related to greater variation in beginning teachers' classroom activities. During their first in-service year, they attempted to continue using the kinds of teaching behavior they had practiced during student teaching, notably introducing new subject matter, sequencing pupil learning activities in an inductive order, using activating teaching methods, and relating to pupils in productive ways. However, it was after their first year of in-service teaching that they were most successful in these attempts.

The findings regarding the influences of the school context on the grad-uates' entry into the teaching profession were in line with the evidence pro-duced in most research on the occupational socialization of teachers. However, the fact that teaching behaviors practiced during preservice programs resur-faced during the second in-service year suggests that the starting competence resulting from these programs went through a "latency period" during teach-ers' entry into the profession. Similar indications were reported by Wubbels and Korthagen (1990), who compared two different teacher education pro-grams and concluded that differences between outcomes could be measured after the graduates had been in the teaching profession for more than 2 years.

At this point in time, significant differences were found among the quality of graduates' interpersonal relationships with pupils, the adequacy of their perceptions of these relationships, and their job satisfaction.

The indications of a latency period suggest that program effects may take a while before they manifest themselves. What the beginning teachers in our study told us about their discrepancy experiences clarifies what happened during this period. Educational ideals had to go underground, as it were, because the beginning teachers first had to accept the leading role of the teacher and had to develop more of the instructional and educative competence they needed to put their ideals into practice.

Contribution of Integrative Teacher Education

The preservice teacher education programs involved in this study have promoted graduates' competence to act in the classroom, particularly their capacity to activate pupils. Such a competence for changing the traditional passive role of pupils constitutes an important impulse for the school system. The influences emanating from the preservice programs studied on inservice competence were upheld, even though beginning teachers' teaching load increased their skepticism about the practical relevance of preservice teacher education and even though class size and discrepancy experiences worked together to increase the effort they needed to shape their work in ways they favored.

These findings show that the development of graduates' teaching competence was not determined exclusively by influences from the school context. In this respect, our study confirms the findings from related German research (Dann et al., 1978, 1981; Hinsch, 1979; Müller-Fohrbrodt, Cloetta, & Dann, 1978). The importance of these findings should not be underestimated. They mean that teacher education *can* make a difference in regard to the kind of teaching competence that graduates develop. Our study also shows that a longitudinal research design can generate a more positive view of the possible contribution of teacher education programs to teacher development than cross-sectional studies allow (see Wideen et al., 1998).

Our study not only shows that preservice teacher education can influence beginning teachers' professional performance and competence development but also identifies specific ways in which it can do so. Insofar as the programs studied were able to counterbalance occupational socialization within a time span of about 3 years, they did so by shaping the opportunities for student teachers to relate practical experience and theoretical study. The analyses of our data pointed toward particular program features influencing the relationship between practice and theory. These program features did not exert their influence in a direct or mechanical way, but in a complex interplay with each other. Most prominent in this interplay were (a) the gradual increase in complexity of student teaching activities; (b) the cooperation among student triads, cooperating teachers, and university supervisors; and (c) the alternation of student teaching and college-based periods.

Student teaching activities were carried out in the following sequence: observation in schools, teaching partial lessons, teaching whole lessons, and teaching series of lessons. This gradual increase in complexity enabled student teachers to experience success in using theoretical ideas offered by the program while at the same time perceiving the limits of their present competence. This made it possible to develop motives and find opportunities for further learning. This ongoing process of learning was encouraged by the fact that the student teachers went to the schools in triads, which created opportunities for mutual support and for paying attention to individual concerns. The triads were supervised by cooperating teachers and university supervisors who practiced a shared approach to clinical supervision to promote reflection. The student teachers believed that the alternation of student teaching and college-based periods during the preservice programs enhanced their competence. The more opportunities students were given in the programs for reflecting on their experiences during student teaching and for reorganizing teaching plans, the more benefit they felt they could derive from study time spent in college.

The combination of program features just discussed appears to have been effective, because students reported that moving back and forth between action and reflection collaboratively enabled them to achieve mounting levels of competence. The combined effect of program features suggests that the impact of teacher education programs may depend to an important degree on how learning environments are arranged as a coherent whole. This would mean that, to achieve a learning environment that consistently influences prospective teachers' learning, close cooperation between university-based and school-based teacher educators is a necessary condition. Moreover, integrating practice and theory and encouraging personal learning require from teacher educators specific expertise in the field of mentoring and supervision (Korthagen et al., 2001, pp. 108–130; Korthagen & Vasalos, 2005). We believe, therefore, that enhancing the effectiveness of teacher education is not only a question of curriculum development but also one of staff development.

Limitations of This Study

The quantitative surveys of occurrences and relationships included in this study afforded a helicopter view of the teacher education landscape in and around the institute studied, along with its surface and main features. The qualitative observations, interviews, and student teaching reports used in reconstructing the development of graduates' teaching competence enabled inspections on the ground. While this combination of methods in a longitudinal design was useful in answering our research questions, a number of limitations should be pointed out.

First, as described earlier, the beginning teachers taking part in this study entered teaching before the introduction of "individual transition practice," the additional preservice program cycle now institutionalized in Dutch

teacher education as a bridge between preservice and in-service teaching. Therefore, our respondents did not have the opportunity to experience full responsibilities as beginning teachers while receiving structural support from a mentor in school, a university supervisor, and a peer group with which to share experiences. Thus, their transition to the profession was probably more abrupt than what would now be faced by the average beginning teacher in the Netherlands.

Second, while the time span covered in this study was considerable, the attrition rate of 59% among graduates may have limited the scope of our findings. In carrying out the study, we faced considerable logistical demands. Therefore, no separate dropout study could be conducted that might have produced clues about differences between graduates who did and did not seek and find work as teachers that were associated with variables other than gender, number of applications, or progress during the preservice program (see the response data section).

Other limitations had to do with the intensity of data collection. In future research, further insights into the patterns and processes involved in teacher learning as it develops over time could result from intensifying qualitative data collection during preservice programs and carrying out repeated measurements and observations at increasing numbers of standardized moments after graduation. The resources available for this study and the moments when they became available constituted constraints on our research design. This is why, during the preservice period, no more than two triads of students from pioneering programs could be interviewed and why, during beginning teaching, the moments of data collection had to vary. Our prime consideration was to realize the longest possible time span in data collection.

In a study where quantitative as well as qualitative data collection was possible during each discernible stage of competence development, the measurement of criterion variables could be refined by using a more elaborate set of indicators. Since the completion of this study, the criterion variables used have been further developed; that is, they have been specified for each of four consecutive cycles in prospective teachers' competence acquisition (Brouwer et al., 2002).

Another issue worthy of consideration in designing future research is the selection of respondents in a subsample and the variables used to select them. In this study, our aim was to discover which program features had a demonstrable influence on the competence acquisition of the majority of graduates. This is why the reconstruction of competence development in the subsample involved a cross-case analysis (Miles & Huberman, 1994). The more we come to know about influential program features, the better they may be used to select respondents for observations, interviews, and other types of qualitative data collection. A refinement in research design would then be to follow the same students from the beginning of preservice teacher education until after their first years of beginning teaching and to carry out within-case analyses covering this entire time span. With such an approach,

however, the risk of attrition among respondents could increase, especially in periods of adverse education labor markets.

Implications for Teacher Education Research

"In the early years of the 21st century, teacher education is at a crossroads with unprecedented public attention focused on varying agendas for reform" (Cochran-Smith & Fries, 2001, p. 27). Under the pressure of teacher shortages, questions regarding the characteristics of effective teacher education programs are rapidly gaining importance, both in the policy debate and in research on teacher education. In such a context, it is all the more important that decisions about reform be based on empirical evidence about the relationships between the processes and outcomes of teacher education programs (see Zeichner & Schulte, 2001). At the same time, the knowledge base available for dealing with this issue is far from complete. On the basis of this study, we would like to suggest the following topics for further research.

Searching for ways of optimizing the integration between practice and theory in teacher education would appear a highly relevant endeavor. Recent research in Germany again points out the relevance of integrative programming for the types of learning induced in participants (Nölle, 2002). In the same country, members of the Konstanz research group have developed the "Konstanz Training Model," a successful approach for professional development in the domain of classroom management in which learning from experience plays a central part (Dann & Humpert, 2002). In the United Kingdom, the Oxford Internship model (McIntyre & Hagger, 1992) provides an interesting example. This program focuses on building on beliefs already existing in prospective teachers rather than trying to change them (see also Feiman-Nemser & Buchman, 1989, and Calderhead & Robson, 1991).

We need to know more about various types and characteristics of integrative curricula and mentoring approaches and their effects on the professional development of teachers. It would be worthwile to investigate specifically which types of programming are best suited to ensuring that practical competence and professional knowledge develop hand in hand, whether "practice-to-theory" programs can lead to greater learning progress among graduates than "theory-to-practice" approaches, and in which respects and at which moments it is useful to follow either of these approaches. An intriguing aspect of preservice teacher education is the so-called "feed-forward problem" (Katz, Raths, Mohanty, Kurachi, & Irving, 1981, p. 21): Theory offered by teacher educators before field experiences often does not really have an impact on prospective teachers, whereas after such experiences these teachers complain that, in retrospect, they had needed more structure and guidelines before teaching. It would be worthwile to devote studies specifically to this problem.

Finally, the knowledge base for designing preservice teacher education could profit from more evidence about the professional development of teachers from the preservice period until the middle part of their careers and

later. At present, we know little about the potential contribution that pre-service or in-service programs can make to the long-term development of teachers. Which conceptions of teaching do teacher education programs really promote, for instance in the domain of social interaction in the class-room? To what degree does teacher education succeed in counterbalancing the "early socialization" (Lortie, 1975, pp. 61–74) that has taken place during the many years teachers were themselves pupils in school?

If answers to such questions are to be found, more research is needed into the ways in which prospective teachers learn from practice and how, dur-ing this process, competence and attitudes develop in interaction with each other. Here a great deal of interindividual variability (see Oosterheert, 2001, and Oosterheert, Vermunt, & Denessen, 2002) and slow learning processes of an intimate nature (see Wahl, 2002) appear to be involved. Studying such issues empirically may bring us closer to answering fundamental questions about the role of the person in teacher learning (Korthagen, 2004).

All of the research topics just suggested involve normative choices, because any findings can and will play a part in decision making about pro-gram design in teacher education. In this study, we attempted to address such normative questions by being as explicit about them as possible. In par-ticular, we sought a dialogue with the teacher educators involved about the operationalization of the criterion variables. We think that this was a pro-ductive course to take and that it heightens the ecological validity of our find-ings. We are aware that explicitness about the goals of teacher education may spark criticism and debate. We consider this a necessary part of the human enterprise that is education.

We conclude on a methodological note. Answering the kinds of ques-tions just raised requires longitudinal studies combining quantitative and qualitative methods. We hope that the methodological strategies attempted in this study will contribute to the conduct of such research so that the types of shortcomings in studies on learning to teach discussed by Wideen et al. can be avoided. These authors advocated a systemic and ecological approach in investigating the ways in which learning outcomes of teacher education come about (Wideen et al., 1998, p. 168). Such an approach, we think, can be realized by heeding the calls made by the American Educational Research Association's Panel on Research on Teacher Education (Cochran-Smith & Zeichner, in press) for more longitudinal research; for a theory-driven con-ceptualization of outcome measures, whose operationalization should go beyond indirect verbal data; and for a focus on relationships between the processes and outcomes of teacher education programs.

Notes

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[1] This article is based on the first author's dissertation (Brouwer, 1989). A progress report (Brouwer, 1987) and an unpublished technical report on this study (Brouwer & Korthagen, 1995) can be requested by e-mail from n.brouwer@ils.ru.nl.

[2] For the sake of clarity, we reserve the term "student" to denote only student teachers or prospective teachers. The term "pupil" is used exclusively to refer to adolescents in secondary education entrusted to the responsibility of teachers.

[3] The two observers were the first author and Sabine Cohen Tervaert.

[4] We wish to thank Sabine Cohen Tervaert, Paul Hoop, and Eric van de Ven for their assistance in analyzing the qualitative data.

[5] We use the term "educative" to translate the concept "pedagogisch" (used by Dutch educators) or "pädagogisch" (used by German educators). This concept refers to teachers' mission of instilling prosocial behavior and democratic attitudes in pupils. To avoid misunderstanding, we do not use the American term "pedagogical" for this purpose, because this term is largely synonymous with "instructional."

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APPENDIX A

Criterion Variables

Starting competence	In-service competence
Organization: solving problems in organization of (educational) activities	*Activities outside school*: organizing (educational) activities during which pupils leave the classroom
	Deviation from timetable: organizing (educational) activities that require deviations from the normal timetable
Content: transmitting knowledge and stimulating insight in specific subject matter areas	*Giving pupils a say*: giving pupils a say in determining the subject matter to be treated
	Own issues: treating issues, problems, concepts, tasks, questions, and short elements of subject matter that are almost or completely absent from the usual textbooks
Sequencing: planning and carrying out (educational) activities in a premeditated sequence	*Experimental sequencing*: trying out new teaching sequences (i.e., pupils carry out learning activities in a changed order) when this might improve pupils' learning
Media: selecting, producing, and presenting learning materials	*Additional materials*: making and using learning materials to replace or supplement prescribed textbooks because they fit better with one's own educational objectives
Methods: selecting and using work forms	*Cooperation in groups*: having pupils spend at least half a lesson's time on cooperation in small groups
	Subject integration: coordinating lessons with those of one or more colleagues with a view to integrating school subjects (e.g., through precise agreement on lesson planning or through team teaching)
	Project education activities: organizing together with colleagues project work or similar educational activities (e.g., activities outside school, investigations by pupils)
Evaluation: evaluating learning and development processes in pupils	*Identifying learning obstacles*: discussing with pupils the results of various types of tests to such a degree of elaboration that their learning obstacles may be precisely identified
	Verbal reports: using words instead of numbers to assess pupil achievement in the majority of classes
Interaction: interacting with pupils in ways that stimulate (experiences of) active involvement	*Personal guidance*: discussing personal problems with pupils
	Motivating disciplinary measures: justifying disciplinary measures to pupils (e.g., by referring to the usefulness of concentration, appealing to stamina, or discussing the consequences of disruptive behavior for other pupils)
Reflection: critically investigating and, if necessary, modifying one's way of teaching	*Analysis of one's own behavior*: retrospectively analyzing one's own actions in tense situations with pupils (e.g., in cases of important decisions or conflicts with classes)

APPENDIX B

Research Design

Type of instrument	Data collection sequence	Instruments involving Components A through E (see Figure 2)	Data source	Methods of analysis	Data analysis sequence
Quantitative	1	Baseline questionnaire	A, B, E	357 students[a]	Descriptive statistics	8
	3	Questionnaire after observation	A, C, E		Comparison of whole sample and subsample	9
	4	Questionnaire after whole lessons	A, C, E		Construction of scales (reliability and factor analyses)	
	5	Questionnaire after series of lessons	A, B, C, E		Repeated measures analysis	10
	6	Questionnaire after student teaching	A, B, C, E	128 cooperating teachers[a]	Regression analysis	11
	11	Questionnaire after preservice program	A, B, C, E	31 university supervisors[a]	Contrasting groups (analysis of variance)	12
	12	Questionnaire during beginning teaching	B, D, E	357 graduates[a]		13
Qualitative	2	Concise program overview	A, E	31 university supervisors[a]	Description of programs, individual learning experiences, and beginning teachers' work (situations)	1
	9	Elaborate program overview	A, E	12 university supervisors[b]		2
	10	Interview after program	A, B, C, E		Document analysis and verification	4
	8	Interview after student teaching	A, B, C, E	17 cooperating teachers[b]	Summary, categorization, and verification of interview statements	3
	7	Group interview after student teaching	A, B, C	2 student teacher triads[b]		
	15	Student teaching reports	C, E	12 beginning teachers[b]	Reconstruction of competence development	6
	13	Classroom observation	D, E			7
	14	Interview during beginning teaching	B, D, E		Summary, categorization, verification of interview statements	5

[a] Whole sample. [b] Subsample.