Review

Tailor-made: Towards a pedagogy for educating second-career teachers

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ABSTRACT

Many countries suffer from teacher shortages. One possible solution to this problem is to recruit second-career teachers. These second-career teachers form an intriguing group. They bring an abundance of previous experiences into a new, professional domain. The purpose of this study is to identify pedagogical principles that support the training of second-career teachers. Special attention is given to the transfer of previous experiences obtained in different professional contexts. The literature on alternative certification programmes is reviewed from a pedagogical perspective. The results indicate that second-career teachers differ from first-career teachers in several respects. These differences appear to be related to their previous experiences. The differences also appear to influence their professional development. The study suggests that a tailor-made pedagogy for second-career teachers is needed, along with certain programme features, which take into account the specific needs of this group of students. Four design principles were identified, i.e.: addressing expectations, addressing challenges related to the transition to teaching, addressing transfer and developing a theory of practice.

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Contents

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1. Introduction

There are an increasing number of people being employed as teachers during their careers. This is related to a growing interest in changing careers. Teaching careers and lifelong learning are attracting more and more interest from researchers (Bakkenes, Vermunt & Wubbels, 2009). In many countries, teacher shortages form a serious problem (ETUCE, 2001). Therefore, attracting people to become teachers as a subsequent step in their career, is viewed as one possible solution to this problem. In this study, we focus on those professionals who leave a job to become a teacher. They form an intriguing group of new candidates, bringing many previous experiences with them into the teaching profession. What does this mean for their professional development? How do they make the shift into education? How do teacher education programmes adjust themselves to this phenomenon?

Second-career teachers are entering teacher education programmes where new courses have been developed. Over the last decade, the development of flexible, dual routes into teaching has expanded enormously. In these programmes, workplace learning is combined with teacher education programmes. From a pedagogical perspective, dual programmes aim to integrate practical experiences and theoretical insights. Special kinds of dual programming have become alternative certification programmes (ACPs). They have been developed for second-career teachers in order for them to obtain certification within a short period of time (Zumwalt, 1991, 1996; Zeichner, 2001). Programme participants show a great heterogeneity (Feistritzer, 2005). They differ in age, life experiences and work experiences and they encounter specific problems (Eifler & Potthoff, 1998). They are adult learners that are making the transfer into teaching; but how do they make this transfer? We know a certain amount about learning from previous experiences, but less is known about learning from experiences which are not directly related to the domain of teaching. In this study, we want to make a contribution to the development of a pedagogy for educating second-career teachers, particularly in relation to the transfer of previous experiences that have been obtained in another professional context.

Empirical research on alternative certification is gradually growing, especially in the U.S.A. (less so in Europe), where a tradition of two and a half decades of ACPs exist. In this discourse, the following topics can be distinguished: recruitment and retention of participants, effectiveness of programmes–often compared to traditional programmes–and teacher performance (Birkeland & Peske, 2004; Dill, 1996; Zeichner & Schulte, 2001; Zumwalt, 1996). This type of programme became a solution to teacher shortages, because it offered a way to expand a pool of qualified teachers using individuals who might otherwise not have become teachers. It has been suggested that the principle virtue of ACPs is that they are labour-market sensitive and can be tailored to address specific shortages (Adcock & Mahlios, 2005). There is evidence that ACPs support the need for teachers in specific fields, such as mathematics and science, and in regional shortages in rural and urban schools (Dill, 1996; Shen, 1997; Zeichner & Schulte, 2001).

Research has also demonstrated that there are great differences between the programmes—ranging from little more than dressed-up emergency licensing procedures, to programmes that closely resemble more professionally-defensible, one-year masters programmes (Zumwalt, 1991, 1996). Despite these differences, Feistritzer (2005) suggests that ACPs also share a few characteristics. In general, many ACPs require that participants have a bachelor's degree, pass a screening process, begin full-time teaching and engage in on-the-job-training, complete education coursework while simultaneously teaching, work with mentor teachers and meet performance standards.

In addition, Shen and Palmer (2005) show that the drop-out rates among participants of ACPs tend to be high. As several authors, notably Ingersoll (1997, 2001), have signalled, a "revolving door effect" is at work, meaning that people who change

careers and move into teaching, may disappear from the profession at a future date. Those who enter teaching with little professional preparation have greater difficulties in the classroom and tend to leave teaching at higher rates than those with a substantial professional preparation (Darling-Hammond, Chung, & Frelow, 2002). Moore Johnson, Birkeland, and Peske (2003) suggest that the demands for focussed preparation are even greater for prospective teachers in fast-track programmes than for candidates in traditional programmes. Researchers agree that it is necessary to prepare participants in ACPs to teach using specific methods. What these methods should be depends on what we know about how second-career teachers learn. In their review of the research on alternative certification, Birkeland and Peske (2004) conclude that much of the research on alternative certification "focused on the macro effects of the policy, rather than examining the specifics of the programmes and the participants' experiences" (p. 30). They, and others (Wilson, Floden, & Ferrini-Mundy, 2002) have called for a better understanding of how alternative certification programmes should be designed and implemented. But what are productive guiding principles for such a design?

In this study, we reviewed the literature on ACPs from a pedagogical perspective, i.e., the main purpose of the study was to identify principles that were specifically useful for programming ACPs and guiding the teacher educators' approach within such programmes. We wanted to answer the question: is there a need for a pedagogy specifically for second-career teachers? First, we focussed on the differences between first-career teachers and second-career teachers, and on possible problems and challenges relating to the learning processes facing second-career teachers. This review was aimed at the following research questions:

1. What are the characteristic differences between first-career trainee teachers and second-career trainee teachers?
2. What are the characteristic problems and challenges faced by second-career trainee teachers?

Research shows great differences between ACPs with only a few sharing some general characteristics. The study by Feistritzer (2005) indicated that there were also great differences in the frequency of the support second-career teachers received. This study revealed that school-based personnel provided the most frequent and helpful support to candidates who followed alternative routes. Freidus (1994) showed that second-career teachers needed as much support as first-career teachers. Therefore, we also decided to focus on the support that second-career trainee teachers perceived they needed. In addition, it is known that second-career teachers often combine full-time positions with alternative teacher education courses. In a study of the strengths and weaknesses of alternative teacher education programmes, introduced in the Netherlands, Brouwer (2007) highlighted the problem that the workload often takes priority over workplace learning. Therefore, we were interested to find out to what extent teacher education programmes succeeded in fostering the learning of this specific group of new teachers. These findings led us to add two more research questions to guide our review:

3. How do second-career teachers perceive the support they are given while in training?
4. In what way is the learning-to-teach process of second-career teachers fostered in alternative certification programmes?

In the following section, we describe the selection of the studies and how we analysed the literature. Then we present the findings on differences between first-career teachers and second-career teachers, the characteristics of second-career teachers who are learning to teach, their perceived support and the fostering of learning. Finally, we report our conclusions, discuss the implications for teacher education and make suggestions for further research.

2. Method

2.1. Selection of the sources

As a first step in the selection process, we searched the computerized database, Web of Science, to find studies based on empirical research. We composed a list of terms and divided them into four fields: alternative certification in teacher education (field 1); participants (field 2); support (field 3); and learning (field 4). In field 1, we looked for a broad entrance into teacher education and alternative routes, using the following search terms: alternative certification/routes/programmes, teacher, teacher education and teacher shortage. Field 2 contained a wide range of terms, because we knew, from previous studies on alternative certification that participants in these kinds of programmes were referred to in different ways (Birkeland & Peske, 2004; Dill, 1996; Zeichner & Schulte, 2001). For example, in recruitment programmes, participants were mostly referred to as "non-traditional students". In ACPs, participants were more likely to be referred to as "second-career teachers". Also, terms, such as, "career changers" or "participants or candidates of ACPs" were used. Therefore, in field 2 we used the following terms: participants, candidates, non(-)traditional student, second(-)career, first(-)career, mid(-)career and career change(r). In field 3, we used the following terms: support, needs, mentor, supervision and pedagogy. Finally, in field 4, we used terms referring to the learning process of second-career teachers: previous/previous experiences, professional identity, transfer, transition and learn. Each field functioned as an entrance level, in which each term was combined with each term from the other fields.

For example, one of the terms from field 1 was "teacher education" (teach* educat*). This yielded 31,285 hits (#). First, we combined these results with: second AND career (#55). Second, we combined the results (teach* educat* #31,285) with

non-traditional (#23), third, with non-traditional (#63), previous experiences (#63), previous experiences (#108), and so on, with the terms of the other fields.

2.2. Criteria for selection

In relation to time, we limited the search to 1996–2007 (July) since the study by Dill (1996) provided information about the research on alternative certification, until 1996.

Shen (1997) and Eifler and Potthoff (1998) showed that the group of ACP participants was heterogeneous in previous experiences and backgrounds. In a large-scale study (N = 47,105), Shen (1997) compared the characteristics of teachers who had been prepared to teach through traditional college-based programmes with those teachers who had been prepared through alternative routes. The main activities of alternative certification candidates, before entering teaching, were a surprise: "51 percent came right out of college, another (nearly) 24 percent already held teaching or education-related positions, and only (just over) 22 percent came from occupations other than education" (p. 279). Eifler and Potthoff (1998) highlighted the same problem in a slightly different way. They stated that the meaning of "non-traditional teacher candidate" needed more clarity for shared understanding. In an exploratory study (Tigchelaar, Brouwer, & Korthagen, 2008), we found that participants in ACPs could be categorized into five types: regular teacher education student (without work experience); parent (without any or without recent work experience); reintegrating employee (with non-recent work experience); employee with teaching expertise (with work experience and competence in teaching) and employee from a different sector (with recent work experience, but not in education). In this study, we decided to focus on the last type, the career changer who was interested, as we were, in the transfer of previous experiences from another professional domain. Consequently, only studies were selected in which the respondents had a previous career in a different sector (described in the method section or in the result section of the articles). For that reason, for example, we did not select for our database, the abovementioned synthesis of the literature on the characteristics and needs of older students by Eifler and Potthoff (1998), or the comparative study of Miller, McKenna, and McKenna (1998).

The first search resulted in a list of 12 studies. In addition, we studied the indices (1997–2007) of three journals not included in the Web of Science corps, but containing research reports relevant to our review questions. First, we focussed on the *Journal of Science Teacher Education* and the *Journal of Mathematics Teacher Education,* because we knew that in these subject fields, teacher shortages were a serious problem. Next, we studied the *European Journal of Teacher Education* in order to include European research on alternative certification and second-career teachers. This step revealed three, new relevant studies.

Subsequently, we checked the references of the studies that had been found. As we found new relevant studies, some of them published before 1996, we decided to include these studies also, although they were not all peer reviewed. We did so because the number of studies in which second-career teachers were distinguished, appeared to be small. As a final check, we retrieved the citations of all the studies found, both in Web of Science and through Google Scholar. The search eventually resulted in a data base of 36 relevant studies (see Appendix).

2.3. Analysis

We summarized the studies in the database using a range of characteristics: facts (author, title, year of publication, number of times cited); purpose of the study; theoretical perspective; methodology and findings. This resulted in an alphabetically-ranked table of all 36 studies. The Appendix contains a résumé of the purpose, participants and main findings. Most of the studies were exploratory, qualitative case studies. The results sections of all the studies were analysed regarding the differences between first-career teachers and second-career teachers (research question 1), characteristics of second-career teachers' learning (research question 2), perceived support (research question 3) and the fostering of learning (research question 4). This bottom-up analysis concluded with four sets of findings. Through discussion with several researchers, main categories were identified within every set. In the following section, we report the results for each research question.

3. Results

3.1. Differences between first-career and second-career teachers

Five studies, comparing first-career teachers and second-career teachers were analysed. Bendixen-Noe and Redick (1995), examined the career development of both groups and revealed quite different patterns in how the two groups (N = 430, N = 430) acquired the appropriate education to be eligible to enter into teaching. Also, Gonzales Rodriguez and Sjostrom (1998) demonstrated marked differences in the developmental process of becoming a teacher by comparing the professional beliefs and teaching behaviour of 27 traditional and 18 non-traditional adult teacher candidates. Powell (1992), studying the influence of previous experiences on personal constructs, found these to be an important influence on lesson planning and teaching. These findings were confirmed in a case study (N = 2) by the same author (Powell, 1997). Finally, Dickar (2005) focussed on differences in levels of success. The career changers involved (N = 26) appeared to congregate at the ends of the performance spectrum, ranging from "exceeding expectation" to "below expectation", whereas recent college graduates (N = 30) tended to be more evenly distributed across the spectrum.

The five comparative studies pointed to distinct differences between both groups in their professional development. The following four categories of differences emerged from these studies: motives; skills; knowledge and beliefs and autonomy. Apart from the comparative studies mentioned above, other studies in the database endorsed these categories, as is reported below.

3.1.1. Motives

Gonzales Rodriguez and Sjostrom (1998) found differences between both groups in the motivational process of becoming a teacher. Most of the non-traditional students involved were convinced they wanted to teach after a week in the teacher education programme. In contrast, the majority of the traditional candidates expressed doubts at that point.

Other studies provided more information about these differences. Second-career teachers were shown to bring a more articulated, intrinsic motivation derived from their previous experiences (Crow, Levine, & Nager, 1990; Chambers, 2002; Dietrich & Panton, 1996; Freidus & Krasnow, 1991; Serow & Forrest, 1994). A sense of mission was evident, first in terms of a desire to pass on knowledge about subject matter (Bullough & Knowles, 1990; Proweller & Mitchener, 2004). The participant in the study by Bullough and Knowles (1990), for example, wanted to continue his long and loving association with science. Second-career changers articulated a commitment in terms of love for children or helping young people (Chambers, 2002; Dietrich & Panton, 1996; Powers, 2002; Schwab, 2002). Finally, Dietrich and Panton (1996) and Richardson and Watt (2005) showed that intrinsic motivation was also expressed as wanting to contribute to society.

3.1.2. Skills

Authors of six studies agreed that the career changers they studied drew on valuable, transferable skills and complex routines developed during their previous careers (Chambers, 2002; Crow et al., 1990; Freidus & Krasnow, 1991; Madfes, 1989; Mayotte, 2003; Novak & Knowles, 1992; Schwab, 2002), whereas first-career teachers still had to develop skills and build up certain routines. The transferable skills mentioned in the studies involved were: communication skills, skills in problem solving and negotiation, coping skills, planning skills, managing skills, technical skills, skills in curriculum design and thinking skills.

Mayotte (2003) examined second-career teachers' (N = 4) recognition of competencies and attitudes developed within their previous careers and their transfer to teaching. This study showed the complexity in the transfer of competencies. On the one hand, competencies appeared to be very personal, detailed and directly related to previous work settings. For example, a former employee in the publishing business mentioned "knowing how to find a subtext of a work of literature" (p. 688). On the other hand, the participants described the skills as rather complex routines. For example: "Working as a staff psychologist, I was basically responsible for a group of people [. . .] I pretty much had to wing it and found that that is something I'm pretty good at. Kind of thinking on the fly and this whole concept of multidimensional thinking [. . .]. And I think the same is true with teaching" (p. 689).

3.1.3. Knowledge and beliefs

Shulman (1986) has described four major sources for the knowledge base of teachers. The last of these was "the wisdom of practice itself" (p. 8). In this respect, second-career teachers were shown to differ from first-career teachers, due to their previous work experiences. Five studies demonstrated differences in practical wisdom and beliefs.

Second-career teachers brought practical expertise into the classroom (Chambers, 2002; Novak & Knowles, 1992; Schwab, 2002). Schwab, for example, found second-career teachers introducing expert knowledge into the classroom: "When there was a direct connection between previous work experiences and the participants' teaching field, the experience added a special beneficial dimension to their teaching. They were able to share with students concrete examples of why various concepts were important in the world outside the classroom" (p. 148). In the study by Chambers (2002) on the attractions in teaching for career changers, the ten respondents emphasized another interesting aspect: the importance of helping students understand the real world application of the school subject at hand. One of the participants stated: "It is not what you do inside the classroom. It's what you do when you leave the classroom" (p. 4).

Second, career changers appeared to be more outspoken in their beliefs about teaching and the value of education in students' lives than first-career teachers (Chambers, 2002; Greenwood, 2003; Powell, 1992). In a comparative study, Powell (1992) showed that the traditional preservice teachers, who he had studied, needed assistance in developing and articulating their beliefs about teaching, whereas the non-traditional students were outspoken in their beliefs.

3.1.4. Autonomy

Three studies showed that in learning to teach and while functioning within the school, second-career teachers showed more autonomy than first-career teachers (Bendixen-Noe & Redick, 1995; Dickar, 2005; Gonzales Rodriguez & Sjostrom, 1998). This autonomy appeared to have three aspects: self-responsibility in learning and awareness of being an employee in an organization.

Bendixen-Noe and Redick (1995) found in their comparative, quantitative study that second-career teachers exhibited self-confidence in their goals, capabilities and desire to teach. Compared to first-career teachers, they had fewer self concerns and showed responsibility in learning and teaching. In addition, Dickar (2005) revealed that first-career teachers struggled with taking on authority, whereas second-career teachers did not.

These results were confirmed by Gonzales Rodriguez and Sjostrom (1998). The second-career teachers they studied were more self-initiating and self-confident about goals and capabilities than first-career teachers. Moreover, they were more aware of the social, cultural and political consequences of their behaviour.

The differences between first- and second-career teachers are summarized in Table 1.

Table 1
Summary of differences between second-career teachers and first-career teachers.

Categories	First-career teachers	Second-career teachers

Motives	Developing motivation	Being strongly motivated
		  to pass on (subject) expertise
		  to help young people
		  to make a contribution to society

Skills	Developing skills	Bringing transferable skills, which are personal and related to previous careers, either very detailed or complex routines.
		  communication skills
		  skills in problem solving
		  skills in negotiation
		  coping skills
		  planning skills
		  managing skills
		  technical skills
		  skills in curriculum design
		  thinking skills

Knowledge and beliefs	Developing practical expertise and beliefs	Bringing
		  practical expertise
		  real-world applications
		
		Having strongly developed beliefs about
		  teaching
		  the value of education in students' lives

Autonomy	Less autonomous	Autonomous learners
		  self-responsible
		  awareness of being an employee in an organization

3.2. Second-career teachers who are learning to teach: challenges in professional development

Concerning the characteristics of second-career teachers who are learning to teach, the relevant studies revealed five possible, underlying challenges in their professional development: motivation and reality, the transferability of skills and routines; linking practical experiences to the classroom; beliefs and change and autonomy and adaptation.

3.2.1. The challenge of motivation and reality

Five studies in the database focussed on second-career teachers' motives and their decisions to enter teaching. Three of these studies developed profiles based on differences in motivation (Chin & Young, 2007; Crow et al., 1990; Richardson & Watt, 2005). In these studies, the picture of the career changer having a strong intrinsic motivation and a sense of mission, was confirmed and refined. Yet, Schwab (2002) described, in an exploratory study, the "tremendous culture shock" (p. 165) that twelve second-career teachers had experienced. Despite deep-rooted motivations, the participants in this study had to face the gap between their motives, ideals and reality. This culture shock was confirmed by four other studies, describing students' survival during the first months of training and their feelings of frustration (Bullough & Knowles, 1990; Crow et al., 1990; Novak & Knowles, 1992; Powers, 2002).

At the same time, three studies (Crow et al., 1990; Dietrich & Panton, 1996; Richardson & Watt, 2005) showed second-career teachers' motivation for teaching could also be based on external reasons rather than intrinsic motives. Examples of external reasons were career advancement, burnout in a persons' current career and job security. Two studies suggested there was a relationship between motivation and success. For example, Crow et al. (1990), studying career changers' motives ($N = 15$), during their transition to teaching, found a small, problematic group of second-career teachers: the "unconverted" individuals who had achieved high status in other occupations and whose decision to become a teachers was based on dissatisfaction with aspects of their previous business careers and a broad, somewhat vague interest in education. These candidates did not express an initial commitment to a teaching career and they soon appeared to become disenchanted. In addition, Dickar (2005) showed that a strong motive and previous professional success were strong indicators of who was going to be successful amongst the career changers. Eight of the eleven career changers involved in her study were attracted to the programme because of past employment problems, rather than due to positive aspects of teaching; and they were performing below expectation.

3.2.2. The challenge of the transferability of skills

In their review, Eifler and Potthoff (1998) stated that the skills, which second-career teachers brought from previous careers, might not be the same skills necessary for successful teaching. In this respect, the studies in our database revealed mixed findings. Second-career teachers were shown to bring various valuable transferable skills, which were personal in nature and were particularly related to their previous careers. Five other studies showed that transferring skills into teaching was not an automatic process. Different experiences of transfer were reported, ranging from successful to unsuccessful practices. In the study by Novak and Knowles (1992), who were investigating computer use among beginning elementary teachers at the outset of their training ($N = 4$), this range was explicitly shown. Whereas Lilian, a former school secretary, reported a successful transfer: "I had many opportunities to hone my skills in communicating with kids," Michael, who used to work in a metal shop, stated: "These interactions were always one to one, not like the complex interplay of goings-on that occurs in classrooms" (p. 30). The other second-career teachers involved in this study felt able to handle some of the demands of teaching by drawing on skills developed during their previous careers, but only to a small extent. For example, all of them had previous experience in using computers, before entering their classrooms. Computer use in previous careers, however, was typically of a kind that was very specific to that job or business and did not relate to using computers with students.

Freidus and Krasnow (1991), characterizing second-career teachers' qualities and perceptions ($N = 20$), showed that participants realized they brought valuable skills with them from their previous careers. At the same time, participants did not intuitively understand how to translate these into effective classroom practice. Mayotte (2003), in contrast, found that competencies developed in one organization were readily available and applicable to another. The four novice second-career teachers in this study named competencies developed in their previous careers that benefited their teaching, including "knowing-why, knowing-how and knowing-whom competencies".

Finally, Schwab (2002) and Dickar (2005) studied second-career teachers' inflexibility in terms of continuously repeating familiar, traditional strategies. The two teacher educators involved in Schwab's study (2002), signalled that career changers frequently fell victim to the familiarity pitfall of over-using traditional strategies, such as lecture and recitation. In addition, the participants in Dickar's study (2005) found themselves unable to implement a literacy programme existing of a reading and writing workshop. They kept focusing on grammar drills and aspects of teaching English that were more familiar to them.

3.2.3. The challenge of linking practical expertise to the classroom

Second-career teachers were shown to bring practical expertise into the classroom. However, six studies showed mixed results in the benefit of this for the teaching practice of the second-career teachers. Sometimes, linking previous experiences and actual experiences was shown to be problematic. Three studies suggested that this was due to the influence of the school culture. The other three studies revealed a possible lack of pedagogical knowledge by the candidates.

Powell's study (1997) suggested that extensive work experience had not necessarily helped the second-career teachers to create and implement conceptually-rich teaching–probably due to the conventional school culture. However, opposing evidence was discovered by Proweller and Mitchener (2004) who investigated second-career teachers' professional identity ($N = 15$). They found that out of varied professional experiences within science and related fields, second-career teachers began to "craft linkages between their own personal and professional experiences with and relationships to science and interactions with their students that helped them begin to shape a visionary orientation towards science learning" (p. 1056).

Next, second-career teachers did not necessarily apply the content knowledge of their former careers to teaching, as found by Madfes (1989). In addition, Schwab (2002) described how second-career teachers believed that their subject-matter expertise was, to some extent, a compensating strength while acquiring the necessary pedagogical skills. One of the respondents sighed: "I do think deep knowledge of the subject area, particularly at the high school level, is a great advantage" (p. 150). Despite the general endorsement of the important role of subject-matter expertise in the induction process, one respondent stated that it could be a double-edged sword: "I've found on the job that it doesn't matter how much you know about the subject matter. If you don't have the right tools to teach it, you're fighting a losing battle" (p. 150).

Jenne (1997), studying the educational perspectives and career attractions of second-career teachers with previous military experience ($N = 4$). This study found that the participants relied on personal life experiences, rather than content or professional education preparation, as the primary knowledge base for their teaching. This study assumed the transfer of previous experiences led to the appearance of a smooth and seemingly unproblematic transition from a previous career to a career in teaching. However, the participants had only mastered the "form" of teaching while remaining ignorant about the substantive issues of teaching and learning.

3.2.4. The challenge of strong beliefs and change

Second-career teachers were shown to have strong, developed conceptions and personal beliefs by virtue of their previous experiences. Four studies reported on different characteristics of these conceptions and eight studies found mixed results in their benefits to the novice teachers' professional development.

The studies by Gomez, Walker, and Page (2000) and Powell (1992) revealed the influence of personal life experience on second-career teachers' beliefs. Bullough and Knowles (1990, 1991), Powell (1996), Proweller and Mitchener (2004) and Koballa, Glynn, Upson, and Coleman (2005) found an important relationship between teachers' personal belief systems about teaching and learning and the nature of their classroom teaching. Koballa et al. (2005) determined how second-career teachers' conceptions of teaching science influenced their classroom practices. They distinguished the following beliefs as promi-

nent in the participants' conception of teaching science (*N* = 3): the control of the lesson content; whether student learning should be active or passive; the role of the learners' existing science conceptions and the expected outcomes of the instructional process. In the case study by Greenwood (2003) describing the science practice of three second-career teachers, two participants, aged over 40 years, had strong, developed conceptions of science because of their previous work. One participant, on the other hand, in his late twenties, did not seem to have developed a conception of science beyond his own classroom experiences. These findings are, in a slightly different way, confirmed by Dickar (2005), who found that older participants were less open to change their attitudes. In other studies this problem of change was also demonstrated. The respondents in the studies of Koballa et al. (2005), Powell (1994), and Bullough and Knowles (1990, 1991) firmly held their personal world views and conceptions of teaching during their first years of teaching. On the other hand, Bennett (1991) showed in her study on the Teacher as Decision Maker Program, that career changers developed schematic conceptions of teaching that integrated work schemata, developed in previous careers, with pedagogical schemata. Most second-career teachers in this study held naïve and idealistic preconceptions of teaching that were rapidly transformed to a more theoretical and practical view.

3.2.5. The challenge of autonomy and adaptation

The studies involved in this review portrayed second-career teachers as autonomous learners (Gonzales Rodriguez & Sjostrom, 1998), consistently using a see-plan-act sequence (Cole White, 2002). However, the other side of this autonomy appeared to be the struggle to become accustomed to the school culture, the workloads overriding the process of learning-to-teach and dealing with the novice status.

To begin with, four studies reported on second-career teachers' struggle in "adapting to a school culture". Dickar (2005), Haggard, Slostad, and Winterton (2006), Madfes (1989) and Powell (1994) described the feelings of frustration that second-career teachers experienced at being confronted with the bureaucratic hierarchy in a school. In Powell's (1994) case study of Dan, a second-career teacher, who had been a hydro geologist for six years in an international science corporation, Dan's feelings of frustration were apparent. Dan had assumed that the freedom and autonomy he had enjoyed as a scientist would remain with him as a science teacher. In reality however, he was confronted with a bureaucratic hierarchy and power distributions within a public school.

In addition, three studies highlighted the problem of workload overriding the process of learning (Bullough & Knowles, 1990; Powell, 1994; Powers, 2002). The participants involved in these studies were often "forced" by family and financial circumstances to enter teaching and teacher education programmes while occupying full-time employment.

Finally, two studies highlighted the struggle of being a novice after having developed successful careers in another profession (Crow et al., 1990; Mayotte, 2003). Age, appeared to be a mixed blessing. On the one hand, it seemed to afford teacher candidates respect from students. On the other hand, older, second-career teachers were not always recognized as novices (Crow et al., 1990). These researchers found that career changers, who perceived continuity between past skills and present demands, were more likely to negotiate the novice role more successfully than those who emphasized a disparity between the past and the present.

In Table 2, the described challenges of professional development are related to the characteristics of second-career teachers from Table 1.

Table 2
Challenges of professional development related to characteristics of second-career teachers.

Categories	Characteristics of second-career teachers	Challenges of professional development

Motives	Being strongly motivated
	  to pass on (subject) expertise
	
	  to help young people
	  to make a contribution to society
		The challenge of motivation and reality
		  second-career teachers' reality shock: facing the gap between ideals and reality
		  motivation as a possible indicator for failure or success

Skills	Bringing transferable skills, which are personal and related to previous careers, either very detailed or complex routines.	The challenge of the transferability of skills
		
		  experiences range from successful transfers to no transfer
		  inflexibility: repeating familiar traditional strategies

Knowledge	Bringing
	  practical expertise
	  real-world applications
		The challenge of linking practical expertise to the classroom
		  school culture as an impeding or enriching factor
		  the influence of pedagogical knowledge

Beliefs	Having strongly developed beliefs about
	  teaching
	  the value of education in students' lives
		The challenge of beliefs and change
		  possible relation between age and strong beliefs
		  strong beliefs, based on personal and professional experience, were apparently hard to change

Learning	Autonomous learners
	  are self-responsible
	  are aware of being an employee in an organization
	  collaborate in professional relationships
		The challenge of autonomy and adaptation
		Struggling with
		adapting to the school culture
		  workload
		  novice status

3.3. Perceived support

In their conclusions, several authors expressed a range of suggestions to ensure better support for second-career teachers. However, the sources in our data base revealed little empirical evidence about how second-career teachers themselves perceived and experienced such support. We found six studies (Cole White, 2002; Jorissen, 2002, 2003; Koballa, Upson, Mechew, & Glynn, 2006; Mayotte, 2003; Schwab, 2002) in which second-career teachers mentioned five sources of support: the school mentor, the principal, the teacher educator, the cohort members and the family.

3.3.1. The school mentor

First, the mentor, being an experienced veteran teacher in the school, was mentioned by the participants in four studies (Jorissen, 2002, 2003; Koballa et al., 2006; Mayotte, 2003; Schwab, 2002). Here, the picture of the mentor arose as the "heart and soul" of alternative certification programmes. Jorissen (2003) for example, investigated the perceptions of six elementary teachers during their induction into teaching, six years after they had received their initial teaching qualifications. The participants reported different contributions of the school mentor's support to their learning process: development of competence and identity through improvement of teaching performance, the promotion of personal and professional well-being and socialization into the institutional culture. An important result was that the second-career changers also saw the mentor as a facilitator of the transfer of knowledge from the college components of their alternative teacher education programmes. The participants in another study by Jorissen (2002) and Mayotte (2003) confirmed the importance of the role played by the experienced teacher mentor, but in an opposing way. These respondents reported a lack of support from their mentors. In addition, Mayotte (2003) found an interesting difference between two mid-career changers and two younger career switchers. In this study, the older participants did not perceive the support, provided to them at their respective schools, to be adequate, whereas the two younger participants acknowledged a greater satisfaction.

The importance of the mentor was confirmed by Koballa et al. (2006), who explored the conceptions of school-based mentoring held by mentoring pairs (N=6), consisting of a beginning second-career science teacher and a mentor. In this study, three conceptions were found, which provided insights into the nature of the mentor's role, the mentoring context and the outcomes associated with mentoring. Apprenticeship was the dominant conception, in which the role of the mentor was that of a model, guide and leader—with an emphasis on advising. The outcome was a teacher who improved significantly in specific areas, such as classroom management. The next dominant conception was personal support. In this conception, the mentor was considered to be an advocate, counsellor and champion. This support functioned best when the classrooms of the new teacher and mentor were in close, physical proximity. The outcome was a teacher who felt better about himself both as a teacher and a person. In the least dominant conception, co-learning, mentoring was viewed as a collaborative partnership, where the second-career teacher and mentor brought different kinds of knowledge to the mentoring relationship and both grew in their understanding of their teaching practice. The outcome was a beginning teacher who felt empowered and who had developed broad-based understandings of teaching and learning.

3.3.2. The principal

The studies by Cole White (2002) and Jorissen (2002) showed that the support from the principal was particularly important for second-career teachers. First, participants in both studies reported the significance of the time release opportunities that they received from their principals—for example, to attend seminars, to visit other schools or to observe lessons from colleagues. Second, they mentioned the value of the school climate that was created by the principal. Principals providing a professional-growth environment functioned as leaders and guides for the participants in their professional development. The participants in Jorissen's study also reported the active support they received from their principals in overcoming resistance that they had experienced from parents and colleagues. Finally, Cole White (2002) explored the experiences of beginning minority teachers who had experienced previous careers as paraeducators. The participants in this study (N=5) reported that their principals had provided them with financial support, such as information about financial resources or paid employment following a period of internship.

3.3.3. The teacher educator

The teacher educator was mentioned in two studies, as another source of support (Jorissen, 2003; Powell, 1992) and as a role model for second-career teachers. Powell (1992) showed that the participants involved were primarily influenced by teacher education sessions on professional pedagogical knowledge. The career changers, for example, often referred to the principles of teaching and learning given to them in their teacher education course work. In addition, Jorissen (2003) showed that the six second-career teachers involved in the study, reported on the support they received from the teacher education programme staff and how they functioned as role models for them. The participants stated that they learned a lot when they were taught by teachers who were employing best practice in their own teaching strategies. One of the career changers stated: "The professors seemed to be modelling what they expected us to do. In addition to teaching us what was in the curriculum, they tended to model. Like when they wanted to teach you

about students constructing their own knowledge, instead of telling us what was up, they tried to pry it out of us" (p. 45).

3.3.4. The cohort members

Jorissen (2003) and Rintell and Pierce (2003) showed how cohort members functioned as a source of support in second-career teachers' professional development. Rintell and Pierce, investigating the experiences of paraeducators becoming teachers (N = 15), even noticed that the participants perceived their cohort members as a "second family" (p. 10). The support of the cohort was described by all of the participants in Jorissen's study as "the most important as far as developing a sense of collegiality" (p. 47). Both studies showed that, for the members of alternate route programmes, a cohort model that brought the members of the cohort together became a powerful aspect of their teacher preparation programme and it reduced their isolation. The second-career teachers, involved in both studies, developed trusting, collegial and personal relationships with each other, respecting individual differences and taking pride in their identity as a group. In addition to socializing, the cohort also served as a source of strength for its members in difficult times, and thus acted as an influencing factor for each of them in the completion of the programme.

3.3.5. Family

Finally, two studies underlined the particularly stressful situation of career changers having to combine three distinct "lives": working in schools, participating in the teacher education programme, and being a parent at home (Cole White, 2002; Rintell & Pierce, 2003). The five participants in Cole White's study showed how their immediate family provided a wide range of support. The participants' spouses, mothers, sisters and cousins, for example, were "sources of never ending wisdom, encouragement, and running interference when necessary" (p. 133). In addition, Rintell and Pierce (2003) described the role of the family as one of the "keys to success" (p. 11). In Table 3 we summarize the main sources and characteristics of support as perceived by second-career teachers.

Table 3
Sources and characteristics of support as perceived by second-career teachers.

Sources of perceived support	Characteristics of perceived support

School mentor	Being an experienced, older teacher
	Facilitator of the transfer of knowledge from teacher education
	Aspects of the school mentor's role
	  learning in apprenticeship
	  giving personal support
	  creating co-learning

Principals	Financial support Providing release time Providing a professional growth environment
Teacher educators	Model in teaching
Cohort members	Emotional support Collegial perspective A sense of professional community
Family	Providing a wide range of personal support

3.4. Fostering learning

Only a small number of the studies involved in this review described findings about ways of fostering second-career teachers' learning. Three studies focussed on programme characteristics and programme development in alternative routes (Bennett, 1991; Bolhuis, 2002; Haggard et al., 2006). One study (Schwab, 2002) explored patterns of practice supporting the induction process of second-career teachers in a large, suburban school district. From these studies we derived four pedagogical tendencies in fostering the learning of second-career teachers.

3.4.1. Advanced and tailored preparation

Bennett (1991), who described the development of a graduate teacher education programme for career changers (N = 12), showed that preparation in advance, tailored to the learning needs of second-career teachers, could be effective for the learning process. During the first summer of the alternative route described in this study, the second-career teachers completed course work that focussed on special themes, for example on the nature of middle school and secondary school learners, teaching and learning styles and alternative conceptions of intelligence. Also, case studies were used to develop problem-solving and decision-making skills related to middle and secondary school

classrooms. An educational laboratory was integrated into the course work, containing a microteaching laboratory to develop instructional decision-making skills and a one-week workshop on computers in education was organized. The findings showed that a major cognitive restructuring occurred during this practicum school experience, prior to teaching.

In a different way, this was confirmed by the study by Haggard et al. (2006), updating and revising a teacher education programme. The career changers involved ($N = 24$) "overwhelmingly requested more clinical field experiences. One student stated: 'Even though I was working full time, I would have liked to have some observation hours previous to student teaching'. . ." (p. 324).

3.4.2. Taking into account special needs

The study by Schwab (2002) pointed out the importance of taking into account specific second-career teachers' learning needs. Schwab first showed that the administrators organizing the programme emphasized the importance of setting career changers apart – as a group with specific needs – in order to promote retention. One of the participants stated: "I think one of the biggest strengths of the programme is providing flexibility from school to school and from individual to individual while maintaining an overall framework for the school district" (p. 115). In addition, administrators, attempting to meet the specific needs of second-career teachers, were shown to influence them in positive ways. For example, they provided a similar kind of support that graduates from regular teacher education programmes received.

3.4.3. Integrating previous career experiences with new experiences

Two studies suggested that integrating previous career experiences with new experiences had a positive influence on second-career teachers' learning. In research by Bolhuis (2002), for example, three alternative programmes for second career-teachers were analysed and compared; here, workplace learning was implemented as the main principle. This study showed an important difference in approach between two alternative routes, the so-called "side-entry" route, and the "artisan" route. In these routes, the teacher educators involved were not fully prepared to deal with participants' previous experiences. The starting point for them was the second-career teachers' perceived lack of competencies. The approach to the teacher educators in the artisan route was shown to be more effective. The artisans were approached as experts wanting to develop an interesting career. The competencies they brought were seen as a starting point in their professional development, which had a positive influence on their learning. From another point of view, Bennett (1991) showed that the use of research tools, some of which aimed to make previous experiences and conceptions explicit, helped second-career teachers chart their process of socialization into the teaching profession by connecting with previous experiences. The career-changers developed schematic conceptions of teaching that integrated work schemata, developed in previous careers, with pedagogical schemata, developed in the alternative programme. Although Mayotte's study (2003) did not describe or evaluate a programme, it did refer to an interesting framework, which might be helpful in building upon previous competencies during second-career teachers' transition to teaching and their professional development in the new profession.

3.4.4. Integrating theory and practice

The participants in Schwab's study (2002) agreed that second-career teachers' had a clear set of needs, which aimed to forge tighter relationships between university educators and school practitioners. One of the participants stated: "We sat down and brainstormed ways that the partnership could work and ways to blend the theoretical perspective with the practical aspects of the profession. Mentor coordinator training conducted by university personnel and a fall behaviour management workshop for new teachers, were two important by-products of the strengthened relationship" (p. 117). In addition, this study pointed out that a special, formal mentor training programme, aimed at mentors of second-career teachers – specifying responsibilities for all members of the mentoring team and supported by financial and time resources – was regarded as essential to the successful induction of second-career teachers. One of the professors of education involved emphasized the way in which the district's mentoring programme, for which he served as an advisor and consultant, was training experienced teachers to do things that, in the past, would have been done by university faculty and student teaching staff. One university professor stated that "the key for any alternative certification programme to work is going to be how good the mentoring system is" (p. 104). Veteran teachers, as mentors, were shown to provide second-career teachers in-depth teacher educational experiences and meaningful learning.

The study by Bolhuis (2002) confirmed these findings, albeit in a slightly different way. Here, a difference was reported between the "side-entry" route and the "artisan" route. Only in the latter route did the mentors, the second-career teachers and the teacher educators work in "partnership", meaning that there was frequent interaction between school, teacher and institute about these particular participants. This provided the second-career teachers with an opportunity to integrate school experiences and their learning within the institute.

Table 4 summarizes the four pedagogical tendencies, examples and possible effects.

Table 4
Fostering second-career teachers' learning: pedagogical tendencies.

Fostering learning: pedagogical tendencies	Examples and possible effects
Tailored preparation in advance	Course work on special themes Using cases Clinical experiences Possible effect: cognitive restructuring
Taking into account special needs	Setting second-career teachers apart as a group with specific needs Differentiating individual needs Possible effect: preventing retention

Integrating previous career experiences with new experiences	Earlier competencies as a starting point
	    Possible effect: continuous professional development
	
	Using research tools aimed at integration
	    Possible effect: developing rich pedagogical schemata

Integrating theory and practice	Tight relationships between university educators and school practitioners Mentor training Possible effect: in-depth teacher education experiences and meaningful learning

4. Conclusions and recommendations

The overall aim of this review was to contribute towards the development of a pedagogy for educating second-career teachers, especially in relation to the transfer of previous experiences obtained in different professional contexts. The review was restricted to second-career teachers (defined by tight criteria) and based on, mainly qualitative, studies. The findings confirmed and refined earlier research. Second-career teachers appeared to differ from first-career teachers in several respects. These differences related to their previous experiences and influenced their professional development. Second-career teachers faced specific problems and challenges (cf. Eifler & Potthoff, 1998). Concerning the support they perceived to receive and what fostered their learning, the results suggest that, in addition to certain programme features (cf. Feistritzer, 2005), a tailor-made pedagogy for second-career teachers (taking into account their specific needs) is needed. Four design principles for such a pedagogy were derived from the findings of this review and are discussed in the conclusions below: addressing expectations, addressing challenges of the transition to teaching, addressing transfer and developing a theory of practice.

4.1. Addressing expectations

Second-career teachers appeared to bring to the learning process a strong work ethic and a desire to serve fellow human beings. Despite their motivational strength, second-career teachers experienced a practice shock–a phenomenon known among by graduates from regular teacher education programmes (cf. Brouwer & Korthagen, 2005). Second-career teachers' practice shock was shown to be like a "reality shock" (Schwab, 2002) where their expectations collided with the reality of the classroom. These expectations were influenced by a strong and deep motivation and the life-changing decision to learn to teach, which had been made, often in specific financial and family circumstances. Moreover, the high expectations were affected by the assets, which second-career teachers were said to bring to teaching, for example, particular skills and practical expertise.

All in all, these findings indicate the necessity to carefully address second-career teachers' expectations. One way might be to further develop the induction periods of teacher educating programmes. Before an immersion into practice, second-career teachers should be enabled to orient themselves on the specific demands that teaching expects. In certain respects, the studies by Wilson et al. (2002) and Brouwer (2007) confirm this. They concluded that one of the features of high quality alternative certification programmes was a frequent, substantial evaluation and practice in lesson planning and teaching in advance, as a first step in teacher education programmes.

Another way of addressing expectations might be to support second-career teachers' process of decision-making. This review indicated that second-career teachers' decisions to become teachers were made before entering teacher education programmes. In this process of decision-making, strong motives, and rather idealistic images of the profession, appeared to play an important role. Therefore, it would be beneficial if teacher educators could develop individually-orientated induction procedures where second-career teachers are enabled to decide if teaching is a worthwhile and realistic career for them to pursue. Participation in real school activities could be part of such an induction. In this respect, the study by Dietrich and Panton (1996) suggested that specific advising strategies, as used by career-changer counsellors, could help address second-career teachers' expectations and ambitions in the initial training period. One of the strategies described involves exploring the new profession in real settings.

Addressing expectations during an orientation or induction period might diminish second-career teachers' reality shock, feelings of disenchantment and accompanying obstacles in workplace learning. Therefore, it would be useful if teacher

educators could develop these activities in cooperation with schools. This would enable the teacher educators and the schools to develop better understandings of second-career teachers' previous experiences. In the next two sections, we describe the pedagogical implications of taking these previous experiences into account.

4.2. Addressing challenges of the transition to teaching

Several studies involved in this review revealed that second-career teachers had developed strong beliefs about teaching and the value of education in students' lives. These beliefs were based on personal and professional experiences and had a strong impact on teacher behaviour and instructional management. Sometimes, they appeared hard to change. Also, adjusting to the school culture posed particular challenges to second-career teachers. These findings provide the empirical evidence for setting second-career teachers apart, as a group, with their own assets and needs in relation to the transition to teaching. Addressing the challenges of this transition implies that tailor-made programmes are needed. According to the findings in this review, teacher behaviour, instructional management and adapting to the school culture should be important topics in these programmes.

In addition, these findings are sustained and deepened by the theory on adult learning. Knowles, Holton, and Swanson (2005) referred to adult learners as self-directed. According to Friend and Cook (2000), adult learners learn best when they are actively involved in designing and managing their own learning. A hallmark of a successful alternative teacher education programme may be the level of self-direction given to second-career teachers during their transition to teaching. Tailor-made programmes might provide second-career teachers with opportunities to direct their own learning.

Interestingly, the findings of two studies in our database (Greenwood, 2003; Mayotte, 2003) suggested a possible relation between age and strength of beliefs. These studies found that second-career teachers' beliefs became stronger and harder to change, as the age of the teacher increased. From a pedagogical point of view, teacher educators, as well as school mentors, may find it difficult to take into account possible differences between older and younger second-career teachers.

4.3. Addressing transfer

What stands out in the findings of this review is that second-career teachers share specific backgrounds. They bring transferable skills, which are personal and related to previous careers. These skills can be detailed or complex routines. Successful, as well as unsuccessful transfers were reported. Second-career teachers also bring practical expertise and real world knowledge to the school. However, the process of linking this expertise to the classroom situation can be a challenging enterprise.

In an earlier study, we suggested that this linking problem was connected to the phenomenon of "crossing horizons" (cf. Tigchelaar et al., 2008). They found that in the transition to teaching, career changers face the need to traverse a new experiential landscape, replacing old for new horizons. Teacher educators and school mentors may underestimate how challenging this endeavour is, because they may be inclined to focus predominantly, or even exclusively, on the new horizon–the profession of teaching. However, second-career teachers will, at least in the beginning, operate predominantly within their former horizons, using points of reference from their previous work experiences. The findings in this review confirm that teacher educators, as well as school mentors, should pay careful attention to the ways in which this complex process of transfer can be improved. An active and explicit exploration of this bridging process, in order to address this transfer should be a substantial part of supporting second-career teachers. In addition, we know adult learners learn best when they receive recognition for their wide-ranging experiences. This implies the need to recognize and acknowledge past experiences and integrate them in special programmes (Friend & Cook, 2000; Graham, Donaldson, Kasworm, & Dirkx, 2000; Haggard et al., 2006; Knowles et al., 2005). In this respect, two studies involved in this review (Bolhuis, 2002; Mayotte, 2003) showed the importance of building upon existing competencies instead of proceeding from an attributed lack of competencies.

4.4. Developing a theory of practice

Within the school culture, the mentor, being a veteran teacher, appears to be the second-career teachers' most important source of support. This underlines and refines the findings of Moore Johnson et al., 2003, which already showed the importance of the school culture and the school mentor. This study demonstrates that the school mentor plays a pivotal role in the professional development of second-career teachers, providing practical support, giving insights into daily routines and helping them to adapt to the new school culture. The results also suggest that the mentor could function as a bridge between teacher education and practice, facilitating the transfer of knowledge. In addition, one of the pedagogical tendencies we found was that tight relationships between teacher educators and school mentors could lead to effective practices in which theory and practice are linked. Moreover, the study of Schwab (2002) indicated that a special, formal mentor training programme, aimed at mentors of second-career teachers, was essential to a successful induction of second-career teachers.

In the interesting study of Koballa et al. (2006), the concepts of mentoring and "co-learning" were perceived as collaborative partnerships, in which second-career teachers and mentors brought different kinds of knowledge to the mentoring relationship, both of them growing in the understanding of their own teaching practice.

Consequently, the development of a theory of practice might be beneficial in the support of second-career teachers. In this theory of practice, the concepts of complex routines and practical knowledge might be interesting starting points, both for second-career teachers, and school mentors (cf. Eraut, 2007). By making explicit the existing routines and underlying practical knowledge they bring, second-career teachers are enabled to change or enrich the routines, or even unlearn certain routines. In a collaborative mentorship, school mentors can support this process of change by sharing their routines and practical expertise by bridging theory and practice. According to Koballa et al. (2006), this could lead to co-learning, a reciprocal process of change. In this process, teacher educators should develop training programmes aimed at second-career teachers and school mentors, and support them in this reciprocal process of change.

4.5. Further research

In the discourse on alternative certification, the following topics can be distinguished: recruitment and retention of participants, effectiveness of programmes – often compared to traditional programmes – and teacher performance (Birkeland & Peske, 2004; Dill, 1996; Zeichner & Schulte, 2001; Zumwalt, 1996). Although the number of studies involved in this review was small – probably because it was limited to second-career teachers in a strict sense – it shows, above all, that the learning process of second-career teachers deserves more attention from researchers. Important issues for further research include the need to address second-career teachers' transition and to develop a theory of practice. In addition to the research reviewed, the body of knowledge on adult learners can support this research. Interesting topics could include self-directed learning, the transfer of prior experience and the role of peers (Friend & Cook, 2000; Graham et al., 2000; Kasworm, 2001; Knowles et al., 2005).

It is interesting that the discourse on alternative certification has almost exclusively been limited to the U.S.A. The number of European studies involved in this review is relatively small. However, a comparative study of the Directorate-General for Education and Culture of the European Commission (Eurydice, 2001) shows that the teacher shortages in various European countries are increasing. Policy makers are developing several plans to respond to these shortages. One of the possible solutions is the recruitment of second-career teachers and the development of alternative certification programmes. We suggest and hope that the development of these programmes in Europe will soon be sustained by more empirical research.

This review revealed a great heterogeneity in the experiences that second-career teachers bring to teaching. This heterogeneity is, amongst other things, related to their different, previous work experiences. For example, second-career teachers come from backgrounds in human services, business, industry, health, the arts, the military or child rearing. We know that alternative routes can help meet the need for teachers in specific areas of shortage, such as mathematics and science, and in regional shortages in rural and urban schools (Dill, 1996; Shen, 1997; Zeichner & Schulte, 2001). We suggest that the criterion of shared work experience could guide allocation to different kinds of alternative certification programmes, aimed at specific shortages. Further research would contribute to this issue by investigating arrangements tailored to second-career teachers with common working backgrounds. The studies by Jenne (1997), Bolhuis (2002) and Cole White (2002), for example, indicated the relevance of teacher education programmes aimed at second-career teachers with a common background in work experience, such as the military, artisans or paraeducators. Another question worthy of research is, if and what such allocation criteria might contribute to pinpointing relevant predictors of success in teacher education and in teaching (cf. Ackley, Fallon, & Brouwer, 2007)?In this respect, this review also revealed another issue worthy of examination, i.e., the possible relationship between age and conceptual change. Perhaps younger second-career teachers need specific, tailor-made training approaches that are different to those for older candidates.

Finally, a relatively large amount of research has been done on the motives and expectations that second-career teachers bring to teaching. Less is known about the expectations of career changers and how to support them to build up realistic images of the teaching profession at the beginning of the teacher education programme. The body of knowledge about career development and career change (cf. Dietrich & Panton, 1996) could provide interesting starting points for further research on this topic.

Appendix A.

Nr	Studies	Purpose of the study	Participants	Major findings
1	Bendixen-Noe and Redick (1995). Teacher development theory: A comparison. . .	To examine the career development of non traditional-aged new secondary teachers and traditional-aged new secondary teachers.	Non-traditional new secondary teachers ($N = 430$, aged 28–57) and traditional new secondary teachers ($N = 430$, age 22–25).	There appeared to be quite different patterns in how these two groups acquired the appropriate education to enter the teaching field.
2	Bennett (1991). The teacher as decision maker programme: An alternative. . .	To describe research and programme development of a graduate teacher education programme for career changers.	A sample of six participants were selected from two cohorts ($N = 12$, age 23–50).	Participants developed schematic pedagogical conceptions of teaching that integrated work schemata developed in previous careers.

Appendix A (*Continued*)

Nr	Studies	Purpose of the study	Participants	Major findings
3	Bolhuis (2002). At Alternative routes to teaching in secondary education in the Netherlands.	To distinguish the characteristics of the students in a three alternative certification routes and the adaptive characteristics of the alternative programmes.	Re-entry Route: Employment career changers ($N = 11$, age above 30). Side-entry Route: Applying candidates ($N = 872$, age above 30) including students ($N = 102$) Side-Entry Route for employed artisans: Employers ($N = 15$, age above 30) recruited by the Trade Union.	Participants of the Side-Entry Route for artisans were less heterogeneous. The teacher educators in the artisans' route worked closely together with the school mentors. The teacher educators in the re- and side-entry routes seemed more worried about their career changers' lack of competencies, while the artisans' programme seems to take the competencies that career changers had as a starting point.
4	Bullough and Knowles (1990). Becoming a teacher; Struggles of a second-career beginning teacher.	To explore how second-career teachers come to terms with the teacher role during the first year of teaching.	A case study of a male second-career teacher ($N = 1$, age 37).	Participant entered teaching with a very limited understanding of teaching and a weak sense of himself as a teacher. He encountered a hostile situation and teaching assignments incompatible with his desired teaching role. He was not helped in determining what kind of a teacher he would become.
5	Bullough and Knowles (1991). Teaching and nurturing: Changing conceptions . . .	To explore the thinking of a second-career teacher in the struggle of coming to terms with the role and the responsibilities of a teacher.	A case-study of a female second-career teacher ($N = 1$, age 34).	Participants' teacher education had very little impact on the images she brought. Only as she faced serious problems, did a conceptual change take place.
6	Chambers (2002). The real world and the classroom: Second-career teachers.	To find out more about the reasons that draw career changers into teaching and to explore the effects of a previous successful career on their development as teachers.	Preservice and in-service secondary teachers working in suburban settings outside Chicago ($N = 10$, age 33–59).	The motivations were complex and personal. What second-career teachers brought to their schools: transferable skills; the introduction of expert knowledge; a less traditional perspective on schools.
7	Chin and Young (2007). At A person-orientated approach to characterizing beginning teachers in alternative certification programmes.	To develop typological profiles of interns who choose to enter teaching through ACPs, by using an ecological model of development.	Data were collected from interns ($N = 1.862$) enrolled in 30 of California's more than 94 teacher internship programmes during 2001–2004.	Six profiles were distinguished: compatible life stylists (23%), mean age: 31.3; working-class activists (18%) on average, 34.0 years of age; romantic idealists (17%), mean age 30.5; Followers in the family tradition (16%), mean age 34; Second-career seekers (14%), mean age 47.5; career explorers (12%), mean age 34 years.
8	Cole White (2002). Making the transition from paraeducator to professional educator: five minority teachers share their stories.	To explore the experiences of new minority teachers who have made the transition within the classroom from paraeducators to qualified teachers.	African American female teachers ($N = 5$, age 24–42).	Four elements emerged as beneficial in supporting the attainment of professional goals of the participants: leadership support; financial support; family support and personal power.

Appendix A (*Continued*)

Nr	Studies	Purpose of the study	Participants	Major findings
9	Crow, Levine, and Nager (1990). No more business as usual: Career changers who become teachers.	To discover the meanings of the career change to teaching for those who are undertaking it.	Matriculated students in a one-year pre-service teacher education programme (*N* = 15, age 24–43).	Three profiles of career changers were distinguished: home comers, converted and unconverted.
10	Dickar (2005). When they are good… A comparison of career changers and recent college graduates in an alternative certification programme.	To compare the levels of success of career-changers and recent college graduates in the same Alternative Certification programme and teaching in the same schools.	Career changers (*N* = 26, age above 30). Recent college graduates (*N* = 30, age unknown), the majority graduated in the last year.	Career changers struggled with adapting to school cultures and relating to children. Other group struggled with taking on a teaching identity or with authority. Indicators of successful career changers: strong motivation to teach and previous professional success.
11	Dietrich and Panton (1996). Motivations of post-baccalaureate students seeking teacher certification…	To identify the factors that motivate post-baccalaureate students in a public institution of higher education who self select teaching as a career.	Participants (*N* = 90, aged 22–54): students with at least a bachelor's degree in a field other than teaching requesting admission to teacher education during a five year period.	Fourteen categories (internal and external) of reasons for a career change to teaching. Internal reasons were mentioned most frequently.
12	Freidus and Krasnow (1991). Second-career teachers: Themes and variations.	To characterize the qualities and the perceptions of second-career teachers.	Career changers (*N* = 20, aged up to 26), graduates of a programme specifically designed to recruit and meet the needs of those who enter teaching from other careers.	Second-career teachers understand their professional roles quickly; bring valuable knowledge and skills; care a great deal about children; are aware of social issues and have utilized research and reflection in deciding to become a teacher.
13	Gomez, Walker, and Page (2000). Personal experience as a guide to teaching.	To investigate if greater work and life experiences made second-career teacher candidates more responsive and resilient to teaching challenges than their younger peers.	Two portraits were constructed of a group of prospective teachers (*N* = 7, age 24–39) from an elementary school and its adjacent middle school.	Through their stories, both respondents simultaneously developed retrospective explanations and justifications for teaching practices. The narratives did not support self and peer critique.
14	Gonzales Rodriguez and Sjostrom (1998). Critical reflection for professional development: A comparative study…	To compare the professional beliefs and teaching behaviours of traditional and non-traditional adult teacher candidates.	Elementary education preservice teacher candidates (*N* = 45). Among them non-traditional adult teacher candidates (*N* = 18, age above 25).	Marked differences were shown in the developmental process of becoming a teacher. Most of the non-traditional students were convinced they wanted to teach after a week, whereas the majority of the traditional candidates expressed doubts.
15	Greenwood (2003). Factors influencing the development of career-change…	To describe the science teaching practices of three individuals who have entered teaching as a second career.	Second-career teachers (*N* = 3, age above 40).	Different conceptions of science are to be expected from career-change science teachers who have worked in other science-related professions.
16	Haggard, Slostad, and Winterton (2006). Transition to the school as workplace: Challenges of second-career teachers.	To update and revise a large post-baccalaureate teacher certification programme.	Post-baccalaureate certification student teaching candidates at the beginning of the student teaching experience. All had previous careers (*N* = 24 elementary education; *N* = 16 secondary education).	The main needs of second-career teachers: increasing field experiences, providing classroom management and time management strategies.
17	Jenne (1997). Conserving the status quo in social studies teaching: The case of second career military teachers.	To examine the educational perspectives and careers attractions of second-career teachers with prior military experience.	The participants (*N* = 4, age 34–40) were prototypes of people with prior military career experience who were interested in teaching.	Career changers relied on personal life experiences, rather than content or professional education preparation as a primary knowledge base. Assumptions concerning desirable traits they bring were misleading.

Appendix A (*Continued*)

Nr	Studies	Purpose of the study	Participants	Major findings
18	Jorissen (2002). Retaining alternate route teachers: The power of professional integration in teacher preparation . . .	To explore the factors, which contribute to second-career teachers' feelings of support and satisfaction in their jobs during their first two years of teaching.	The participants in the study were second-year teachers (*N* = 7, age 28–44).	Main sources of support, mentioned by participants were: cohort, mentors and principals.
19	Jorissen (2003). Successful career transitions: lessons from urban alternate route teachers who stayed.	To investigate the perceptions that alternate-route teachers held of their preparation, six years after they received their initial teaching qualifications.	Sixth year elementary teachers (*N* = 6, age 28–44) who had completed their preparation together in an alternate route programme.	The relationships with mentors and with other members of the cohort were reported as most critical in developing professional skills and a professional identity.
20	Koballa et al. (2005). Conceptions of teaching science held by novice teachers in an ACP.	To determine how participants' conceptions of teaching science influence their classroom practice.	Participants (*N* = 3, age 23, 41 and 48) enrolled in an alternative science teacher education programme from 2001 to 2003.	The conceptions of teaching science served as referents for their classroom practice. The conceptions of teaching science did not noticeably change during the period of investigation.
21	Koballa et al. (2006). Conceptions of mentoring and mentoring practice in alternative secondary science teacher education.	To explore the conceptions of mentoring held by mentors and new science teachers in an alternative certification programme.	From a cohort of new teachers (*N* = 18, age 35–49) case studies were conducted of mentoring pairs (*N* = 6), with each consisting of a new science teacher and a mentor.	Three conceptions of mentoring functioned as referent for mentoring practice. Science teacher mentoring as personal support, as apprenticeship and as co-learning. The conception of mentoring as apprenticeship pre-dominated.
22	Madfes, T.J. (1991). The Chevron Encore midcareer programme and the mid-life career change to teaching science and mathematics study.	To investigate if mid-life career changers are really viable candidates and if special programmes are having an impact on teacher quality and quantity.	Mid-life career changers, Encore recruits (*N* = 18).	Retraining programmes are costly and do not train enough teachers to fill empty teaching slots. The career transition seemed to be too hard and the status and pay of teaching too low to make teaching attractive.
23	Madfes (1989). Second careers-second challenges: Meeting the needs of the older teacher education student.	To explore what alterations to teacher programmes are needed to better accommodate the older, second-career person.	A group of mid-life career changers (*N* = 16) who had been recruited from industry into a special science/mathematics teacher preparation programme.	Studying the induction year revealed many areas, which need to be addressed, in order better to prepare the career transition of each individual. They need support.
24	Madfes (1990). Second career, second challenge: What do career switchers say about the work of teaching?	To compare the transition into teaching of three groups of first year teachers.	A group of mid-career teachers recruited into the Encore project, a group of mid-career teachers not in the Encore project, and a group of first-career teachers (*N* unknown).	First-career teachers (lack of experience) made an easier transition to teaching. They were viewed as newcomers. Second-career teachers (expectations and career baggage) struggled; they were viewed as new, but not as newcomers in the profession. Both groups needed support.
25	Mayotte (2003). Stepping stones to success: previously developed . . .	To examine the influence of a previous career on classroom practice.	Second-career teachers (*N* = 4, age 25–48) were followed in a case study during their novice year of teaching.	Competencies developed through one organization were readily available and were used in another.

Appendix A (*Continued*)

Nr	Studies	Purpose of the study	Participants	Major findings
26	Novak and Knowles (1992). Life histories and the transition to teaching as a second career.	To investigate computer use among new elementary teachers.	New elementary teachers ($N = 4$, age 27–42); with a previous career in computer technology ($N = 3$).	There was found to be less of a relationship between using the computer in previous career and current career. To a small extent participants felt they were able to handle some of the demands of teaching by drawing on skills developed during their previous careers.
27	Powell (1992). The influence of prior experiences on pedagogical constructs of traditional and non-traditional preservice teachers.	To examine the influence of prior experiences on traditional and non-traditional preservice teachers' constructs of planning and teaching.	Traditional preservice teachers ($N = 17$, average age 22.8) and non traditional preservice teachers ($N = 25$, average age, 35.5).	The cognitive complexity of teaching is grounded in prior schooling experiences, personal features and life experiences. Traditional preservice teachers differ in important ways from non-traditional preservice teachers.
28	Powell (1994). Case studies of second-career secondary student teachers.	To explore a second-career teacher's development as he moved from being a field hydro geologist to becoming a secondary science teacher.	A second-career teacher ($N = 1$, age 31).	Dan's initial preoccupation with the content and his strong commitment to his beliefs of science, led to assumptions that, in the end, created uncertainty about his decision to become a science teacher.
29	Powell (1996). Epistemological antecedents to culturally relevant and constructivist classroom curricula: a longitudinal study . . .	To explore the professional development of two second-career teachers who differed in their world views of teaching.	Second-career teachers ($N = 2$, having 6–10 year work experience in a previous career).	Dan viewed the content as a central organizing factor for learning (a body of knowledge apart from the students' own realities). Amy viewed students as a central organizing factor for learning.
30	Powell (1997). Teaching alike: a cross-case analysis of first-career and second-career . . .	To understand the nature of teachers' classroom curricula as they were constructed and implemented.	Second-career teacher ($N = 1$, age 31) and a first-career teacher ($N = 1$, age 26).	The results of this study suggest that the science lesson of Dan and Jill became similar by the end of the school year; that their classroom curricula emerged as textbook-centred.
31	Powers (2002). Second-career teachers: perceptions and mission in their new careers.	To explore why middle-aged individuals left successful careers and entered the field of education.	Second-career teachers ($N = 7$, age 35–55).	Four themes were reported: life-changing events; differences between prior occupations and teaching; challenges; personal mission.
32	Proweller and Mitchener (2004). Building teacher identity with urban youth: Voices of . . .	To examine how new teacher interns, who are part of an alternative route to teacher certification, construct a professional identity as science educators in response to the needs and interests of urban youth.	Participants of the Middle-Grades Science programme (MGS) ($N = 15$, age 24–57).	Out of varied professional experiences the teacher interns began to craft linkages between their own experiences and interactions with their students that helped them begin to shape a visionary orientation towards science learning.
33	Richardson and Watt (2005). "I've decided to become a teacher": Influences on career change.	To identify the factors that prompted career changers to undertake teacher education by asking participants to indicate their reasons and motives for deciding on this career change.	Two cohorts of students entering an ACP for secondary teachers. One cohort from distance education ($N = 119$) and a cohort of a fulltime on-campus programme ($N = 33$). 33% aged 20-29, 47% aged 30-39, 20% aged 40+.	Five factors to choosing teaching as a second career: personal and social status; career fit; prior considerations; financial reward; time for family. Social status appeared to be a less important factor.
34	Rintell and Pierce (2003). Becoming maestra Latina: Paraprofessionals as teacher candidates. . .	To investigate the experiences of participants in Title VII Project Para-Educators to Teachers (PET).	Latina paraprofessionals ($N = 15$, age 30–55).	Key issues influencing participants' success were two groups of people: family and the Project PET cohort.

Appendix A (*Continued*)

Nr	Studies	Purpose of the study	Participants	Major findings
35	Schwab (2002). Examining the new layers of teacher education; a cross-case analysis of the high school induction process for ACTs.	To explore the patterns of practice, which support the induction process of Alternatively Certified Teachers (ACTs), in the total educational environment of a large suburban school district.	ACTs (N = 12, age 25 or older) instructional supervisors (N = 7); teacher educators (N = 2) having five or more years experience working with ACTs.	Patterns of supportive practice to ACTs: practices blending theory and practice and infusing university expertise into the school; practices promoting formal and informal mentoring; practices differentiating support to meet the special needs of ACTs.
36	Serow and Forrest (1994). Motives and circumstances: Occupational-change experiences of . . .	To report results from a study of late-entrants who were attracted in to teaching.	Adult students (N = 40, age 23–50) enrolled in a preservice teacher education programme at one university.	Participants reported being drawn primarily by teaching's intrinsic rewards. With the exception of only four participants, most viewed themselves as having a deep, longstanding desire to teach.

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