Review

Student teachers’ team teaching: Models, effects, and conditions for implementation

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HIGHLIGHTS

• Team teaching models differ in the amount of collaboration expected from teachers.
• Student teachers’ team teaching has several benefits for all actors involved.
• When implementing team teaching, several conditions should be taken into account.

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ABSTRACT

In an attempt to provide alternative models of field experience in teacher education, this study elaborates the concept of team teaching. A literature review was conducted, which resulted into a narrative review. Five models of team teaching were distinguished: the observation, coaching, assistant teaching, equal status and teaming model. Several benefits of team teaching for student teachers (e.g., increased support, professional growth), their mentors (e.g., decreased workload, learning gains), and the learners in their classroom (e.g., increased support, rich lessons) were found. However, disadvantages were recognised as well. Further, several conditions for the successful implementation of team teaching were listed.

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1. Introduction

Traditionally, field experiences in teacher education have been characterised by student teachers observing lessons before receiving the responsibility to teach individually (Bacharach, Heck, & Dahlberg, 2010; Henderson, Beach, & Famiano, 2009). Nowadays, there is a growing need to develop alternative models of field experience (Bullough et al., 2003; Nokes, Bullough, Egan, Birrell, & Hansen, 2008), for instance models inspired by collaborative learning (Gardiner & Robinson, 2009; Nokes et al., 2008) such as team teaching.

The roots of team teaching can be theoretically framed by the socio-constructivist view on learning. According to this view, learners actively construct knowledge and social interactions with others (teachers, students, ...) contribute to the knowledge construction process (Loyens, Rikers, & Schmidt, 2007; Tynjälä, 1999). During team teaching, teachers learn through participating and engaging in a joint activity. By sharing ideas, providing alternative perspectives and receiving advice, they negotiate meaning and
learn from each other’s knowledge and skills. In this way, they achieve more than in case they would work individually (Gardiner, 2010; Wenger, 1998). Moreover, during a team teaching activity, teachers operate in — what has been called by Vygotsky — each other’s zone of proximal development. By collaborating with their peers or by receiving peer support, teachers can come to higher levels of performance (Smith, 2004; Walsh & Elmslie, 2005). What they manage to do with support first, they will be able to do individually later on (Gardiner & Robinson, 2010).

Implementing team teaching of student teachers during field experiences may provide an answer to the difficulty of finding school placements (Bullough et al., 2002; Nokes et al., 2008), but, more importantly, it may help student teachers to be better prepared for the transition to practice, which is often experienced as a reality shock (Brouwer & Korthagen, 2005; Murphy, Carlisle, & Beggs, 2009). Two main reasons for teachers leaving the profession are a lack of support and feelings of isolation (Kurtts & Levin, 2000). Therefore, it seems necessary to provide sufficient support to teachers (Casey, Dunlap, Brister, Davidson, & Starrett, 2011), already during teacher education, since beginning teachers’ experiences influence their retention in the profession (Anthony & Ord, 2008). This support can be provided by a mentor (Carter & Francis, 2001) or a peer (Kurtts & Levin, 2000). In this respect, the research of Hsu (2005) shows that student teachers seek more frequently help from their peers than from their mentor. They seek help from their peers with regard to lesson planning and teaching, evaluation and job preparation, and personal issues. Hence, it is considered to be worthwhile to implement team teaching of peers (i.e., student teachers) during field experiences.

In the literature, many definitions of team teaching can be found. As Anderson and Speck (1998, p. 672) state: “The disparate definitions of team teaching are a cacophony of voices.” Common to these definitions is that team teaching refers to two or more teachers in some level of collaboration in the planning, delivery, and/or evaluation of a course (Carpenter, Crawford, & Walden, 2007; Crow & Smith, 2005; Davis, 1995; Hatcher, Hinton, & Swartz, 1996; Murata, 2002; Sandholtz, 2000). Central to team teaching is the sharing of teaching expertise and reflective dialoguing (Chang & Lee, 2010; Jang, 2008). According to Wassell and LaVan (2009), it is by sharing field experiences and through social interaction that student teachers have the opportunity to look critically at their own practices and learn to teach.

Synonyms of team teaching are co-teaching, collaborative teaching and collaborative learning (Carpenter et al., 2007; Dugan & Letterman, 2008; Welch, 2002). For clarity reasons, we consistently use the term ‘team teaching’ in this paper.

While team teaching already has been advocated in the late 1950s and 1960s (Joyce, 2004), individual teaching is still the main teaching practice in schools nowadays. Only in the special education domain, it has been regularly applied (Bacharach et al., 2010). Also the practice of student teachers’ team teaching is in its infancy (Bacharach et al., 2010; Stairs et al., 2009). The present review study aims to provide an overview of the recent research on this topic. First, the literature will be explored in order to search for team teaching models that can be used during field experiences in teacher education. Next, empirical research assessing student teachers’ team teaching will be studied in order to look for advantages and disadvantages, and for guidelines to implement it. Three research questions are central to this review study:

RQ1: Which models of team teaching can be found in the literature?
RQ2: What are the advantages and disadvantages of student teachers’ team teaching?
RQ3: What are the conditions for a successful implementation of student teachers’ team teaching?

Before answering these research questions, the methodology used to search the literature will be presented.

2. Methodology

In order to answer the research questions, a literature search was conducted. Five electronic databases were included in the search: ERIC, FRANCIS, PsycInfo, Scopus, and Web of Science. The search terms were “team teaching”, “co-teaching”, “cooperative teaching”, “collaborative teaching” and “paired placement” combined with “teacher education”, “teacher training”, “pre-service teacher” and “student teacher”. By reading the abstracts of the retrieved manuscripts, relevant manuscripts were identified. In addition, the reference lists of these manuscripts were explored in order to search for other relevant manuscripts. Criteria for inclusion of manuscripts were threefold:

(1) In order to grasp an overview of the recent literature, the literature search was limited to the years 2000—2013. To answer RQ1, one publication before the period 2000—2013, i.e. Cook and Friend (1995), was included because of its significant value to the literature on team teaching. This significant value became clear since several manuscripts included in this review study referred to Cook and Friend (1995).

(2) In order to ensure the quality of the review study, manuscripts had to be peer reviewed.

(3) With respect to RQ2 and RQ3, manuscripts had to address team teaching of student teachers during school placements. Regarding RQ1, this limitation was not present since manuscripts about team teaching in other contexts (e.g., inclusive education) could be helpful to answer this question.

As a result, 50 manuscripts were included in the review study: 18 to answer RQ1, 33 to answer RQ2, and 22 to answer RQ3. These manuscripts were read thoroughly in order to search for patterns in the results. Information on team teaching models, (dis)advantages of team teaching and conditions for implementation were coded into themes. This coding process was data-driven, based on our reading of the literature. The themes were further explored in the manuscripts and incorporated into a narrative review providing “qualitative descriptions of the findings from literature” (Dochy, Segers, & Buehl, 1999, p. 150).

The results of RQ1 (Section 3.1.) are applicable to teachers in general. Therefore, we use the term ‘teacher’ to describe these actors in the team teaching models. To answer RQ2 and RQ3, studies had to focus on student teachers’ team teaching. Subsequently, in Sections 3.2. and 3.3., we use the term ‘student teacher’ to describe the actors in team teaching.

3. Results

3.1. Models of team teaching

In the literature, different models of team teaching can be found. Several of them have been retrieved from the literature on inclusive education, in which general educators co-teach with special educators (e.g., Austin, 2001; Cook & Friend, 1995). However, these models can also be applied to team teaching between general educators, between mentor and student teacher, and between student teachers (Murphy et al., 2009). The latter is central to this review study.
In exploring the literature, many differently labelled team teaching models have been found. Investigating the characteristics of these models indicates similarities and differences, which makes a categorization along a continuum from low to high levels of collaboration possible. Based on the literature study, we distinguished five team teaching models and labelled them as follows, i.e. the observation model, the coaching model, the assistant teaching model, the equal status model and the teaming model.

3.1. The observation model

The observation model has also been referred to as the ‘one teaching, one observing’ model (Graziano & Navarette, 2012) or the ‘participant—observer’ model (Helms, Alvis, & Willis, 2005). One teacher watches the other teacher at work. In this way, the observer collects information on effective teaching behaviour, interaction with learners, etc. (Badiali & Titus, 2010). Generally, the observer holds a passive position and does not interact actively during the course, only when asked questions (Dugan & Letterman, 2008; Helms et al., 2005). Regularly, both teachers agree in advance what types of observational information to collect (Graziano & Navarette, 2012). Important in this model is that the teachers analyse and discuss this information afterwards (Badiali & Titus, 2010; Graziano & Navarette, 2012).

3.1.1. The observation model

In the observation and coaching model, one teacher has full responsibility for the delivery of the course. In the assistant teaching model, one teacher still takes the lead, while the other teacher becomes an assistant who, for instance, circulates through the classroom providing support to learners when necessary (Al-Saaideh, 2010; Badiali & Titus, 2010; Cook & Friend, 1995; Nevin et al., 2009). This model may require some collaborative planning in advance so that the assistant teacher can anticipate on potential difficulties experienced by the learners (Badiali & Titus, 2010). Instead of ‘assistant’, Smith (2004) talks about ‘back-up’ teacher. Tasks of the ‘back-up’ teacher are assisting learners with their work and keeping them attentive, assisting with in-class marking of work, helping to manage resources, etc.

3.1.2. The coaching model

In the coaching model, the observer gets more responsibility. Besides observing, the coach is expected to provide suggestions, assistance and support (Austin, 2001; Bowman & McCormick, 2000; Goker, 2006), for instance, proposing alternative solutions to experienced problems (Wynn & Kromrey, 2000). Teachers can coach or mentor one another (Nokes et al., 2008) or the coach can be a teacher with a particular expertise (e.g., content knowledge, pedagogical knowledge), who serves as a consultant to the other teacher. In this respect, the coaching model has been referred to as ‘consultant’ model (Austin, 2001) or ‘collaborative consultation’ (Nevin, Thousand, & Villa, 2009).

3.1.3. The assistant teaching model

In the observation and coaching model, one teacher has full responsibility for the delivery of the course. In the assistant teaching model, one teacher still takes the lead, while the other teacher becomes an assistant who, for instance, circulates through the classroom providing support to learners when necessary (Al-Saaideh, 2010; Badiali & Titus, 2010; Cook & Friend, 1995; Nevin et al., 2009). This model may require some collaborative planning in advance so that the assistant teacher can anticipate on potential difficulties experienced by the learners (Badiali & Titus, 2010). Instead of ‘assistant’, Smith (2004) talks about ‘back-up’ teacher. Tasks of the ‘back-up’ teacher are assisting learners with their work and keeping them attentive, assisting with in-class marking of work, helping to manage resources, etc.

3.1.4. The equal status model

Instead of a hierarchical model consisting of a leading and assisting teacher, this model refers to team teaching in which both teachers have an equal status. Within the equal status model, a distinction is made into three groups: (a) sequential teaching, (b) parallel teaching, and (c) station teaching.

3.1.4.1. Sequential teaching. In sequential teaching, teachers divide the learning contents or activities. They teach the same lesson/course to the same group of learners, but each teacher takes responsibility for different phases of the lesson/course (Carpenter et al., 2007; Dugan & Letterman, 2008). When one teacher is teaching, the other teacher is not necessarily present in the classroom (Helms et al., 2005). Synonyms of sequential teaching are ‘alternate teaching’ (Dugan & Letterman, 2008), ‘serial arrangement’ (Carpenter et al., 2007), and the ‘rotational team-teaching model’ (Helms et al., 2005).

3.1.4.2. Parallel teaching. In parallel teaching, teachers divide the class group into subgroups and each teacher teaches the same information to a subgroup (Al-Saaideh, 2010; Cook & Friend, 1995; Graziano & Navarette, 2012; Nevin et al., 2009) in order to adapt to the learners’ pace, learning style, or prior achievement (Al-Saaideh, 2010; Badiali & Titus, 2010). The instruction is generally planned by both teachers (Cook & Friend, 1995) and they may rotate between the subgroups (Thousand et al., 2006).

Closely related to parallel teaching, is ‘alternative teaching’. In alternative teaching, the class group is divided into subgroups, but one large group, who receives the main instruction, and one small group, who receives instruction adapted to their learning needs (Badiali & Titus, 2010; Cook & Friend, 1995). Instruction in the small group allows for re-teaching and tutoring (Badiali & Titus, 2010). Parallel teaching and alternative teaching are sometimes called ‘split class’ teaching (Al-Saaideh, 2010).

3.1.4.3. Station teaching. In station teaching, teachers divide the learning contents or activities, and the class group, with each teacher working on a specific learning content or activity with a subgroup of learners (Cook & Friend, 1995). The learners (or teachers) move alternately to the different stations in the classroom (Gurgur & Uzuner, 2011). All stations are generally centred around a theme (Badiali & Titus, 2010). As with parallel teaching, the instruction is generally planned by both teachers (Cook & Friend, 1995).

3.1.5. The teaming model

In the equal status model, the teachers cooperate, but there is no full collaboration on the three domains listed up above, i.e. the planning, delivery, and evaluation of the course. In the teaming model, however, both teachers share these tasks equitably (Austin, 2001; Carpenter et al., 2007; Goodnough, Osmond, Dibbon, Glassman, & Stevens, 2009; Nevin et al., 2009; Thousand et al., 2006) and work collaboratively (Carpenter et al., 2007). They are both in front of the entire class group and there is a lot of interaction and dialogue between them (Al-Saaideh, 2010; Helms et al., 2005). For instance, they exchange and discuss ideas and theories in front of the learners (Al-Saaideh, 2010), take turns leading a discussion, speak while the other demonstrates a concept or models.
note taking (Cook & Friend, 1995). This model is often implemented in the later stages of team teaching because it takes time to learn about each other’s teaching styles (Badiali & Titus, 2010).

The teaming model has been referred to as the most collaborative model of team teaching (Nevin et al., 2009) as it demands the greatest amount of shared responsibility (Badiali & Titus, 2010). It is considered as true team teaching (Helms et al., 2005). Synonyms are ‘synchronous team teaching’ (Badiali & Titus, 2010), the ‘simultaneously taught two-person course’ (Dugan & Letterman, 2008) and the ‘interactive team-teaching approach’ (Helms et al., 2005).

In conclusion, this overview shows that there exist a wide variety of team teaching models. We have categorised these into five models, which are visualised in Fig. 1. In practice, however, variations on these models may be present, for instance, the combination of the observation model with shared planning.

3.2. Advantages and disadvantages of student teachers’ team teaching

23 out of 33 studies retrieved to answer RQ2 took place in the US (Appendix A). Since 2000, the US — in contrast to other countries — seem to have a tradition in implementing, investigating and publishing about student teachers’ team teaching. Other studies included in this review are from Europe (North Cyprus and UK), Asia (Israel, Taiwan, Vietnam) and Canada.

Most studies investigate student teachers’ team teaching by means of self-report measures (e.g., questionnaires, interviews, reflective journals), which have been analysed qualitatively (Appendix A). The focus is on the perceptions of student teachers, mentors (i.e. the classroom teachers in whose classes the student teachers conduct their internship) and learners in the classroom (i.e. the pupils who are taught by the student teachers). The studies show that these three actors are generally positive about student teachers’ team teaching. However, besides advantages, some disadvantages have been acknowledged as well. Below, both advantages and disadvantages are listed for each of the three actors. Of the retrieved manuscripts, eleven focus on the coaching model, six on the assistant teaching model, and eight on the teaming model, with no manuscripts explicitly focussing on the observation and equal status model. Thirteen manuscripts do not specify the team teaching model they focused on (Appendix A). In some of these manuscripts, student teachers and mentors were given freedom in how they handled the team teaching situation (e.g., coaching, assisting, teaming).

3.2.1. Student teachers

3.2.1.1. Advantages. The advantages of implementing team teaching during student teachers’ placement are fourfold: (1) increased support, (2) increased dialogue about learning and teaching, (3) professional growth (in teaching, collaboration, and reflection), and (4) personal growth.

As stated in the introduction, it was expected that team teaching would provide support to student teachers. The results of empirical studies confirm this hypothesis. Team teaching of student teachers provides increased support for them. During team teaching, they experience both emotional and professional support from their peer (Bullough et al., 2002, 2003; Dee, 2012; Gardiner, 2010; Gardiner & Robinson, 2009; Goodnough et al., 2009; Jang, 2008; Kamens, 2007; King, 2006; Smith, 2002, 2004; Tobin, Roth, & Zimmermann, 2001). The great support can be explained by the fact that the team teaching partner, a peer, is at the same level (Shin, Wilkins, & Ainsworth, 2007). This makes it easier to share ‘ups and downs’: successes, questions, fears, and frustrations (Goodnough et al., 2009; Kamens, 2007; Stairs et al., 2009). Since there is always someone to back up, the teaching experience is less stressful (Birrell & Bullough, 2005; Dee, 2012). Moreover, the peer is a source of information, from who the student teacher receives input, for instance, during planning or teaching a lesson (Birrell & Bullough, 2005; Kamens, 2007).

Because student teachers are in the same situation and share experiences, they feel a sense of togetherness and shared responsibility (King, 2006; Kurtts & Levin, 2000; Roth & Tobin, 2001; Vaciotto & Cummings, 2007). Different backgrounds and teaching experiences, on the other hand, allow them to complement each other’s strengths and weaknesses (Vaciotto & Cummings, 2007). Since student teachers get support from their peer, the formal relationship with the mentor was perceived less troubling (Bullough et al., 2002). Moreover, team teaching may enhance friendship and deepen the relationship among student teachers (Dee, 2012; Gardiner & Robinson, 2010; Jang, 2008). By experiencing team teaching, they recognise the importance of building collegiality (Kurtts & Levin, 2000).

In team teaching, there is frequent dialogue between student teachers, for instance, talking about successes and failures or sharing ideas, sources, and knowledge (Birrell & Bullough, 2005;
of ideas (Kamens, 2007; Kurtts & Levin, 2000; Vacilotto & Cummings, 2007), which come faster in case of team teaching (Birrell & Bullough, 2005; Gardiner, 2010), and bring them into the classroom (Stairs et al., 2009). In this respect, Bullough et al. (2002) concluded that partnered teachers were more engaged in planning than did solo teachers because they spent 30% more time for planning. Within the classroom, partnered teachers learnt to adopt a greater variety of roles than solo teachers, i.e. direct instruction in front of the whole classroom, working with small groups of students, and assisting individual students (Bullough et al., 2002).

Through the presence of a peer in the classroom, student teachers feel more comfortable and confident, and, as a consequence, they are more likely to take pedagogical risks, for instance, experimenting with unfamiliar or innovative teaching approaches, knowing that their peer is close at hand to provide support and intervene when needed (Birrell & Bullough, 2005; Dee, 2012; Gardiner, 2010; Gardiner & Robinson, 2009; Nokes et al., 2008; Smith, 2002, 2004; Sorensen, 2004; Vacilotto & Cummings, 2007). As a result, the lessons are richer, more varied and of higher quality than in case of individual teaching (Bullough et al., 2002; Gardiner & Robinson, 2010).

The abovementioned benefits were mainly found through self-report research. Research by Bowman and McCormick (2000) and Goker (2006) using direct measures, i.e. analyses of video- and/or audiotaped material, and a control group confirmed these results. They found that student teachers that had been peer coached developed more clarity skills (e.g., stating objectives, repeating points, and using examples) (Bowman & McCormick, 2000; Goker, 2006) and scored higher on pedagogical reasoning and actions (e.g., comprehension, instruction, and evaluation) (Bowman & McCormick, 2000) than student teachers that had been coached exclusively by a mentor and teacher educator.

As far as the development of collaboration skills is concerned, fewer studies have been conducted. Nevertheless, these studies show that student teachers learn to collaborate during team teaching (Baker & Milner, 2006; Bashan & Holshtat, 2012; Bullough et al., 2003; Dee, 2012; Gardiner & Robinson, 2009, 2011; Goodnough et al., 2009; Jang, 2008; Jenkins & Veal, 2002; King, 2006; Kurtts & Levin, 2000; Nguyen & Baldauf, 2010; Shin et al., 2007; Stairs et al., 2009; Vacilotto & Cummings, 2007).

Through observing different teaching styles, student teachers learn much from their peers (Anderson et al., 2005; Tobin et al., 2001), either by imitating or modifying their teaching (Stairs et al., 2009). They function as a model for each other (Birrell & Bullough, 2005). They consider it to be easier to observe a peer and learn from his/her mistakes than to observe an experienced teacher (Jenkins & Veal, 2002; Smith, 2002, 2004), who feels comfortable in front of the class and possesses a repertoire of strategies (Stairs et al., 2009).

Peer feedback is considered valuable (Dee, 2012) since peers provide another perspective than mentors (Shin et al., 2007) and give feedback that is more specific (Gardiner & Robinson, 2009; Jenkins & Veal, 2002), candid, straightforward and honest (Goodnough et al., 2009; Shin et al., 2007). In addition, peer feedback is experienced as stress-free (Britton & Anderson, 2010) and less threatening than the feedback of a mentor and teacher educator (Sorensen, 2004). In the relationships with peers, student teachers feel free to ask questions and express personal opinions (Goker, 2006). They value their peers’ compliments and accept their constructive criticism (Shin et al., 2007). Permitting others to provide criticism and assess their teaching practice helps them to improve teaching (Tobin et al., 2001). Moreover, through peer feedback, they feel better prepared for meetings with the mentor and teacher educator (Sorensen, 2004). However, in the study of Anderson and Radench (2001), student teachers considered the feedback of the mentor and teacher educator as more valuable than that of their peer because of the greater expertise of the mentor and teacher educator.

In planning and teaching a lesson with a peer, peers learn from each other (Goodnough et al., 2009). They exchange a large number of ideas (Kamens, 2007; Kurtts & Levin, 2000; Vacilotto & Cummings, 2007), which come faster in case of team teaching (Birrell & Bullough, 2005; Gardiner, 2010), and bring them into the classroom (Stairs et al., 2009). In this respect, Bullough et al. (2002) concluded that partnered teachers were more engaged in planning than did solo teachers because they spent 30% more time for planning. Within the classroom, partnered teachers learnt to adopt a greater variety of roles than solo teachers, i.e. direct instruction in front of the whole classroom, working with small groups of students, and assisting individual students (Bullough et al., 2002).

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Besides growth in teaching and collaboration skills, team teaching enhances reflection, for instance, reflecting on what works and does not work, and reflecting on alternatives and consequences (Anderson et al., 2005; Bullough et al., 2002; Gardiner, 2010; Kamens, 2007; Kurtts & Levin, 2000; Vacilotto & Cummings, 2007). Through reflection, student teachers gain deeper understanding of their professional development (Parsons & Stephenson, 2005). While observing a peer, they are inclined to reflect on what they observe (e.g., specific didactic methods) (Anderson et al., 2005; Shin et al., 2007) and, as a consequence, may make changes to their teaching behaviour (Anderson et al., 2005). Also, providing and receiving peer feedback can increase reflection (Shin et al., 2007). Furthermore, having a peer in the classroom generates questions and discussions more frequently as compared to being alone in the classroom. These informal dialogues encourage reflection on their teaching practice (Birrell & Bullough, 2005; Stairs et al., 2009). Not only do team teaching student teachers learn from each other but they also report to learn more from their mentors than student teachers in a single placement (Baker & Milner, 2006).
Personal growth becomes apparent through the increased self-confidence (Birrell & Bullough, 2005; Bullough et al., 2002; Kamens, 2007; King, 2006; Kurttis & Levin, 2000; Smith, 2002, 2004) and self-efficacy (Gardiner, 2010; Goker, 2006) of student teachers in team teaching. They feel more self-confident in teaching, trying new approaches (Tobin et al., 2001) and presenting ideas to their mentor (Goodnough et al., 2009). Moreover, they feel less intimidated when being observed (Kurttis & Levin, 2000). The increased self-confidence and self-efficacy has been made possible through the fact that they experience not to be the only one who is feeling afraid and unsure (Kamens, 2007; Kurttis & Levin, 2000) or who has difficulties with teaching (Gardiner, 2010). As a result of their increased self-confidence, they are more open to criticism and suggestions (Tobin et al., 2001; Vaciotti & Cummings, 2007). Besides self-confidence, student teachers show an increase in their level of responsibility (Vaciotti & Cummings, 2007). They experience a greater control over how and what to teach as compared to solo teachers, who feel that they have to fit into the mentor’s programme with minimal disruption (Bullough et al., 2002). As such, team teaching helps them to assume greater classroom responsibility (Gardiner & Robinson, 2011).

3.2.1.2. Disadvantages. Despite advantages, student teachers’ team teaching has some disadvantages for student teachers as well, i.e. (1) the lack of compatibility of the peers, (2) the comparison between peers, (3) the difficulty of providing constructive feedback, (4) increased workload, and (5) less individual teaching.

One disadvantage is the lack of compatibility of the peers. If there are fundamental differences between peers, this can interrupt the effectiveness of team teaching (Stairs et al., 2009) or limit the peers in their freedom to design a course (Tobin et al., 2001). For instance, conflicting personalities (Bashan & Holsblat, 2012; Sorensen, 2004), differences in opinions (Bashan & Holsblat, 2012), differences in conceptions of teaching (Bullough et al., 2002), a weaker peer relying too much on his partner (Parsons & Stephenson, 2005), a lack of parity and mutual accountability (Gardiner & Robinson, 2011) and an unfair workload division (Parsons & Stephenson, 2005) may hinder effective team work. Especially during the start of team teaching, fundamental differences between peers may lead to poor lessons (Gardiner, 2010). For many student teachers, who are used to work alone, collaborating with a peer is an unfamiliar situation and it may be fearful or difficult (Bashan & Holsblat, 2012).

When student teachers are assigned in pair or small group to a mentor or school, a second disadvantage is the comparison between peers, for instance, student teachers being nervous that one would outperform the other (Kamens, 2007) or the mentor having a favourite student teacher who receives more attention than the other (Bashan & Holsblat, 2012; King, 2006). Such a comparison induces competition and anxiety (Baker & Milner, 2006; Goodnough et al., 2009; Stairs et al., 2009). Sometimes, student teachers compete with each other for the approval of the mentor, the teacher educator or the learners. In this way, there are fewer opportunities to collaborate and reflect with each other (Stairs et al., 2009). Moreover, by comparing themselves with a peer, student teachers may discover personal weaknesses (Anderson & Radencich, 2001).

As indicated above, student teachers value peer feedback. However, it is difficult for them to provide constructive peer feedback. While Goodnough et al. (2009) and Shin et al. (2007) indicate that peer feedback is candid, straightforward and honest, Parsons and Stephenson (2005) show that it is difficult for student teachers to be honest with their peers, for instance, in case they do not know their partner well and do not have the time to build up mutual respect and trust. They are afraid of offending their peer (Sorensen, 2004). Therefore, they often give positive feedback, which strengthens the confidence in teaching, instead of feedback on weaknesses (Shin et al., 2007). Moreover, student teachers experience a lack of knowledge to give constructive feedback (Kurttis & Levin, 2000). The feedback mainly focuses on what is happening instead of why it is happening. The latter would encourage reflection (Shin et al., 2007).

Another disadvantage is the increased workload experienced during team teaching as the lesson planning and reflection with a peer is time-intensive (Gardiner & Robinson, 2011; Nokes et al., 2008; Vaciotti & Cummings, 2007). However, this is mainly due to the increased dialogue among the peers, which is essential for team teaching (Jang, 2008).

Finally, due to team teaching, student teachers argue that they have less experience with the practice of individual teaching (Gardiner & Robinson, 2009). Therefore, they, but also their mentors, doubt whether team teaching is a good preparation for their future job of individual teaching (Bullough et al., 2002; Gardiner & Robinson, 2011; Kamens, 2007) because it does not let them know whether they could teach independently (Gardiner & Robinson, 2011). Through team teaching, they fear that they become too dependent on their peer, which may hinder their professional growth (Gardiner & Robinson, 2011; Goodnough et al., 2009). As opposite to individual teaching, in team teaching there is always someone who may help when necessary (Goodnough et al., 2009). The study of Birrell and Bullough (2005), on the other hand, indicates that team teaching prepares student teachers well for the role of solo teacher.

3.2.2. Mentors

3.2.2.1. Advantages. Student teachers’ team teaching does not only have advantages for the student teachers, but also for their mentors, i.e. (1) decreased workload, (2) learning gains, and (3) increased collaboration at school.

First of all, mentors experience decreased workload in the supervision of team teaching. Mentoring two student teachers instead of one does not double the workload (Dee, 2012) because student teachers support each other and, therefore, rely less on their mentor (King, 2006; Sorensen, 2004). Since they help each other in case of difficulties, the mentor has to adopt a less directive role (Bullough et al., 2002). Moreover, through frequent dialogue with peers, student teachers are better prepared for meetings with the mentor, which makes the mentor’s job easier (Sorensen, 2004). In addition, the presence of multiple student teachers encourages the mentors to distribute responsibilities in order to have more individual time for feedback and coaching. For instance, one student teacher can teach a lesson while the mentor has individual time with the other (Gardiner, 2010).

Secondly, mentors report learning gains from supervising two or more student teachers. For instance, student teachers bring new ideas and alternative approaches into the classroom (Goodnough et al., 2009), have more recent knowledge about topics, and are more technically equipped (Scantlebury, Gallo-Fox, & Wassell, 2008). However, some of these learning gains may also arise during single placements. Nevertheless, the fact that there are two student teachers makes that mentors also learn from the feedback that student teachers give each other (Dee, 2012).

Finally, the collaboration between student teachers may produce increased collaboration between teachers at the placement school (Sorensen, 2004). Mentors see themselves as members of a student teachers’ team and as advisors rather than as supervisors (Bullough et al., 2002).

3.2.2.2. Disadvantages. The disadvantages for mentors are twofold: (1) increased workload and (2) weaker relationships with student teachers. Although decreased workload for mentors is identified as an advantage (King, 2006; Sorensen, 2004), other studies find an increased workload for mentors in supervising team teaching (Baker...
& Milner, 2006; Bullough et al., 2002; Gardiner, 2010; Scantlebury et al., 2008) as mentors have to supervise more student teachers (more planning, observing, reflecting, ...) (Scantlebury et al., 2008). In addition to group feedback, mentors have to conduct individual feedback moments as well, certainly in case of sensitive feedback (Baker & Milner, 2006; Scantlebury et al., 2008). They consider it to be difficult and time-intensive to give individual instead of general feedback to each student teacher separately (Bullough et al., 2002). Despite increased workload, several mentors argue that all the workload is worth it (Baker & Milner, 2006; Gardiner, 2010).

Another disadvantage is the development of weaker relationships between mentors and student teachers. This can be explained by the fact that student teachers, as they collaborate with their peer, rely primarily on their peer and less on their mentor (Goodnough et al., 2009). Baker and Milner (2006), on the other hand, indicate that, although paired student teachers receive less responses from their mentor compared to single placed students, paired student teachers develop a more intense professional relationship with their mentor. They talk more about important teaching and pedagogical matters rather than about school policy and personal matters.

3.2.3. Learners

3.2.3.1. Advantages. The presence of multiple student teachers has several advantages for the learners in the classroom, i.e. (1) increased support, (2) rich and varied lessons and (3) learning gains.

When there is an additional student teacher in the classroom, learners receive increased support and individual attention (Birrell & Bullough, 2005; Dee, 2012; Kamens, 2007) and there is less waiting time for assistance (Gardiner, 2010). The additional teacher can help learners with difficulties or can create opportunities for differentiation (Bullough et al., 2003; Gardiner, 2010; Goodnough et al., 2009; Nokes et al., 2008; Smith, 2002, 2004; Sorensen, 2004). The presence of multiple teachers in the classroom also provides additional observational information (e.g., on learning problems), which is helpful for assessment (Gardiner, 2010; Goodnough et al., 2009; Jenkins & Veal, 2002) and class management (Birrell & Bullough, 2005; Bullough et al., 2002).

As student teachers are more likely to take pedagogical risks, knowing that their peer is close at hand to provide support, the lessons become richer and more varied (Bullough et al., 2002, 2003; Gardiner, 2010; Goodnough et al., 2009; Nokes et al., 2008; Smith, 2002, 2004). Moreover, the learners are confronted with a variety of teaching styles (Tobin et al., 2001) and appreciate hearing multiple perspectives on the topics presented (Nokes et al., 2008).

Not only was team teaching valued positively by the learners but it also resulted in learning gains. Learners reported obtaining higher test scores (Nokes et al., 2008). Also, student teachers and mentors reported a higher quality of the learners’ school work (Sorensen, 2004).

3.2.3.2. Disadvantages. One disadvantage for learners was recognised. It can be confusing when being confronted with multiple teachers in the classroom. For instance, multiple teachers telling what to do and giving different responses to the same question may confuse the learners, or learners may be confused about who to go with questions (Bullough et al., 2003; Goodnough et al., 2009; Kamens, 2007).

3.3. Conditions for the successful implementation of student teachers’ team teaching

Several of the studies retrieved to answer RQ2 contain guidelines for the implementation of student teachers’ team teaching, which is the focus of RQ3. Furthermore, additional studies are retrieved to answer RQ3. The conditions for implementation are grouped around four themes: (1) combining team teaching and individual teaching, (2) preparing for the new roles, (3) composing team teaching groups, and (4) conditions for successful collaboration.

3.3.1. Combining team teaching and individual teaching

To encounter disadvantages of student teachers’ team teaching, it has been advised to combine team teaching with individual teaching (Goodnough et al., 2009). Some studies included in 3.2. make use of such combination, e.g. Gardiner and Robinson (2010) and Nokes et al. (2008).

Team teaching seems especially appropriate in early field experiences. In later phases, individual teaching seems more suitable to prepare teachers for their future job of individual teaching (Gardiner & Robinson, 2010; King, 2006). Regularly, teachers start with team teaching models that involve less structured coordination among the team members (Thousand et al., 2006), for instance, the coaching or assistant teaching model. As the team teaching skills and relationships among the team members strengthen, models that require more time, coordination, and trust can be implemented (Thousand et al., 2006), for instance, the teaching model. Also, in case student teachers have specific learning needs, individual teaching may be more appropriate than team teaching (Vliclott & Cummings, 2007). In order to allow the student teachers to experiment together, it has been advised not to assess team teaching, only individual teaching (Murphy et al., 2009).

Most studies included in this review assign pairs of student teachers to a mentor. However, Shin et al. (2007) suggest to place student teachers in groups of three in a placement school. In this way, there are more opportunities for peer observation.

3.3.2. Preparing for the new roles

In order to implement team teaching successfully, student teachers and mentors should be prepared for their new roles (Sorensen, 2004; Walsh & Elmslie, 2005). With respect to student teachers, a training in observation, coaching, and collaboration skills seems advisable (Britton & Anderson, 2010). As they have to collaborate to some extent, a clear division of their roles and activities is indispensable (Sorensen, 2004).

Moreover, student teachers should already meet before the start of the field experience in order to build a good professional relationship (Walsh & Elmslie, 2005). Furthermore, it is important that they know in advance that conflicts may arise, but that this is normal and valued (Nokes et al., 2008). Therefore, it may be advisable that mentors or teacher educators provide a demonstration of a team-taught lesson to the student teachers and tell them about their own difficulties. In this way, student teachers understand how a team-taught lesson could be and learn that differences in opinion are legitimate (Bashan & Holsblat, 2012). Based on the roles modelled by mentors or teacher educators, student teachers will create their own patterns of interaction as they get to know their team member (Kamens, 2007).

In order to avoid competition and comparison, which is a concern expressed by student teachers (see 3.2.1.), they should start their internship together at the same moment. Consequently, they may feel treated more equally and they can collaborate from the start so that they may have positive shared teaching experiences early in the partnership (Walsh & Elmslie, 2005).

Besides the student teacher, the mentor has to be prepared for his new role (Britton & Anderson, 2010; Nokes et al., 2008). For instance, encouraging good professional relationships between the student teachers, emphasising differences in their teaching approaches, and offering personalised tasks with individual learning
3.3.3. Composing team teaching groups

Often, team teaching groups are composed randomly (Parsons & Stephenson, 2005) or based on geographical proximity (Walsh & Elmslie, 2005). Nevertheless, considerable attention should be paid to group composition since a certain amount of compatibility concerning knowledge, skills, attitude, ability, academic achievement, personality, experience, age, and domicile is desirable (Kamens, 2007; Smith, 2002, 2004; Walsh & Elmslie, 2005). In this way, student teachers would not feel intimidated or frustrated. One way to form compatible groups is by taking into account the team teaching partner they would like to team up with (Shin et al., 2007). Brouwer and Korthagen (2005) investigate the effects of indicating these preferences using a non-public (a discrete ballot procedure) versus a public procedure (discussing preferences publicly with each other). However, no significant effects of procedure are found on how positively/negatively student teachers value the procedure and cooperation; the amount of cooperation benefits they experience in preparing lessons, and their starting competence at the end of the pre-service programme (Brouwer & Korthagen, 2005). By taking into account their preferences, student teachers will face fewer challenges developing a good relationship because they have a choice in the group composition. When groups are composed randomly, student teachers are initially less involved in the partnership since they have no choice in composing it. Nevertheless, composing groups randomly is more closely related to a real professional setting and could therefore enrich the team teaching experience (Stairs et al., 2009).

Besides similarities between the teaching partners, differences should be valued too. In this way, student teachers can learn from each other. In addition, differences add richness to the supervision because the mentor has to take into account individual strengths and weaknesses and has to adapt his supervision to these individual needs (Walsh & Elmslie, 2005).

3.3.4. Conditions for successful collaboration

There are conditions for successful collaboration inherent to the team teaching group (i.e., a strong relationship and a co-generative dialogue between the peers), whereas others are external to the team teaching group (i.e., supervision, school culture, and location).

While team teaching provides a model for collaboration, implementing this model does not guarantee a successful collaboration (Gardiner & Robinson, 2011). In order for a team teaching experience to be successful, there should be mutual trust, respect and support between the team members (Copping, 2012) and a high level of care and personal investment in each other (Vacilotto & Cummings, 2007). If this is not the case, time should be spent to relationship-building activities (Britton & Anderson, 2010). Further, among the team members, a co-generative dialogue should be stimulated. A co-generative dialogue is an open discussion among the team members based on shared experiences (e.g., a lesson, an assessment) with the aim of changing and improving teaching and learning (Copping, 2012; Scantlebury et al., 2008). The strength of a co-generative dialogue is that all members (team teachers but regularly also a selection of learners) reflect on common objects, often replayed using videotapes of the lesson, and that the views of all participants are valued. In this respect, ideas for improvement (what worked and what did not work) are co-generated (Tobin & Roth, 2005).

As to supervision, it seems advisable to limit the number of mentors per student teacher (Scantlebury et al., 2008) and to provide individual besides common feedback sessions with both student teachers, for instance, to provide sensitive feedback and avoid competition (Walsh & Elmslie, 2005). Further, it is important that mentors have positive dispositions towards collaboration (Gardiner, 2010). When team teaching takes place in a school with a collaborative culture, its implementation becomes easier. In a collaborative school culture, concerns such as offending each other and the belief that they learn more on their own disappear (Sorensen, 2004). Finally, the classrooms should be large enough to give room to multiple student teachers (Walsh & Elmslie, 2005).

4. Conclusions and discussion

In an attempt to provide alternative models of field experience in teacher education, this review study elaborates team teaching. The study categorises the wide variety of team teaching models into five models, which differ in the degree of collaboration, i.e. the observation, coaching, assistant teaching, equal status, and teaming model. These models can act as a guide when implementing student teachers’ team teaching during field experiences.

Empirical research on student teachers’ team teaching shows its advantages and disadvantages for the student teachers, their mentors and the learners in their classroom. An overview of these (dis)advantages is provided in Fig. 2.

The results of the empirical studies generally lie in line with each other. For student teachers, team teaching encourages emotional and professional support, dialogue about learning and teaching and professional and personal growth. A lack of compatibility between student teachers may limit the benefits of team teaching. Therefore, it may be advisable to use peer assessment (e.g., on effort and ability to work together). Nevertheless, collaborating with peers with different personalities, abilities, etc. can also be perceived as a learning opportunity. It may allow student teachers to complement each other’s strengths and weaknesses (Vacilotto & Cummings, 2007). Moreover, in their future job, teachers have to collaborate with colleagues with different personalities, experiences, etc. as well. Similar to the lack of compatibility, the disadvantage of comparing student teachers can be considered a learning opportunity. Discovering professional and personal weaknesses through the comparison with a peer may be perceived as a starting point for change and growth.

Concerning the value of peer feedback, research mainly is positive (e.g., Goodnough et al., 2009). In general, student teachers value peer feedback because it is specific, candid, straightforward, honest and less threatening than the feedback of the mentor and teacher educator. However, in the study of Anderson and Radenich (2001), student teachers considered the feedback of the mentor and teacher educator as more valuable because of their greater expertise. Despite the value of peer feedback, several studies indicated the difficulty for student teachers to provide honest and constructive peer feedback (e.g., Kurtts & Levin, 2000). Guiding them in providing constructive feedback, for instance through a workshop, may help them to develop these skills.

With respect to mentors, the supervision of team teaching students brings along learning gains for them and may lead to increased collaboration at school. Regarding workload, studies show diverging results. Whereas several aspects of student teachers’ team teaching increase the mentor’s workload (e.g., more planning and more observation), other aspects have the potential to decrease the workload (e.g., little reliance on the mentor because of peer support). Despite these contrasting findings, mentors generally are in favour of team teaching, certainly if it is combined with individual teaching later on.
Also concerning the relationships built between mentors and team teaching students, contrasting findings have been reported. Goodnough et al. (2009) show that mentors develop weaker relationships with team teaching students. Baker and Milner (2006) support this finding to a certain amount. They state that paired student teachers receive less responses from their mentor compared to single placed students, but the quality of the responses differ. Paired student teachers develop an intense professional relationship with their mentor since they talk more about important teaching and pedagogical matters.

Next to student teachers and mentors, team teaching has benefits for learners, i.e. increased support and individual attention, rich and varied lesson, and learning gains. Yet, several studies (e.g., Bullough et al., 2003; Kamens, 2007) indicate that multiple student teachers in the classroom may confuse the learners.

While team teaching provides a model for collaboration, implementing this model does not guarantee a successful collaboration (Gardiner & Robinson, 2011). In order to anticipate the disadvantages, the review study formulates several conditions for implementation. An important condition, mentioned in several studies, is the combination of team teaching with individual teaching in order to prepare student teachers for their future job of individual teaching. Nevertheless, it can be questioned whether this individualistic view on a teacher’s job is still desirable. Should there be a movement towards more collaborative teaching in schools? Currently, collaboration within schools gains importance, e.g., collaborating in subject specific communities. Moreover, teacher shortages may urge teachers to team teach. In this way, the experience of isolation in education can be transcended (Tobin & Roth, 2005). In addition, the lack of mentors for beginning teachers may be solved by implementing student teachers’ team teaching. Given the various benefits of team teaching as presented in this review study, this seems a considered step to take.

By offering a framework of team teaching models, indicating (dis)advantages and synthesise research-supported guidelines for the placement, preparation, mentoring, and evaluation of paired student teachers, the present review study contributes to the literature on student teachers’ team teaching and may inspire teacher educators to implement team teaching during field experiences in teacher education.

Despite the added value of this study to the team teaching literature, some limitations can be acknowledged. Firstly, the effects of student teachers’ team teaching have been studied in general, and not for each of the five models separately, because in the retrieved empirical studies, researchers regularly did not clarify the model being used. Based on the descriptions provided by the researchers, we tried to label these team teaching models (Appendix A). However, this was not always possible. Secondly, the perspective of the teacher educator has been neglected since the empirical studies mainly focused on student teachers, mentors and learners. This may be explained by the fact that the teacher educators are not directly implicated in student teachers’ team teaching. Thirdly, only full text manuscripts were included in the review. Therefore, it could be that our literature search omitted some studies because there was no access to the full text manuscripts. Finally, since a narrative review is based on the reviewers’ intuitive process, it is possible that our own views may have influenced our interpretations of the literature. Nevertheless, a narrative review makes it possible to give in-depth information about a topic (Dochy et al., 1999).

Based on the results of this review study, several directions for further research can be formulated. The research on team teaching has been mainly qualitative in nature and focused on the perceptions of student teachers, mentors and learners by means of self-report measures. Although self-report measures are of significant value in education, these measures should be complemented with direct measures which go into the classroom and observe team teachers at work during instruction or planning. In this way, we learn what actually happens during team teaching. Further, the research mainly took place on a small scale. Conducting a large-scale study could strengthen our findings. Moreover, the studies generally focus on the implementation of team teaching without comparing with a control group. Consequently, there is a need for more quasi-experimental research on the effectiveness of team teaching (Carpenter et al., 2007; Murawski & Swanson, 2001; Welch, Brownell, & Sheridan, 1999), for instance, comparing team teaching and individual teaching or comparing team teaching models. In this respect, the models presented in this study may be compared (e.g., the equal status models, which are under-represented in empirical research), or, different group compositions may be compared (e.g., teaming a weaker and stronger peer versus teaming two stronger peers, or teaming peers with different teaching styles) (Wynn & Kromrey, 2000). Furthermore, there is a need for research focussing on the collaboration process during student teachers’ team teaching (Dang, 2013) and on the conditions that influence the learning process of student teachers during team teaching (Dang, 2013; Gardiner & Robinson, 2009). In addition, longitudinal research investigating the effects of team teaching on the future teaching career (Nokes et al., 2008) may be interesting. Finally, while the present study focused on student teachers’ team teaching, it might be interesting to explore team teaching between mentor and student teacher.

<table>
<thead>
<tr>
<th>ADVANTAGES</th>
<th>DISADVANTAGES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Student teachers</strong></td>
<td><strong>Student teachers</strong></td>
</tr>
<tr>
<td>- Increased emotional and professional support</td>
<td>- Lack of compatibility</td>
</tr>
<tr>
<td>- Increased dialogue</td>
<td>- Comparison</td>
</tr>
<tr>
<td>- Professional growth</td>
<td>- Difficulty of providing constructive feedback</td>
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<td>- Personal growth</td>
<td>- Increased workload</td>
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<td></td>
<td>- Less individual teaching</td>
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<tr>
<td><strong>Mentors</strong></td>
<td><strong>Mentors</strong></td>
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<tr>
<td>- Decreased workload</td>
<td>- Increased workload</td>
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<tr>
<td>- Learning gains</td>
<td>- Weaker relationships with student teachers</td>
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<tr>
<td>- Increased collaboration at school</td>
<td></td>
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<tr>
<td><strong>Learners</strong></td>
<td><strong>Learners</strong></td>
</tr>
<tr>
<td>- Increased support</td>
<td>- Confusion</td>
</tr>
<tr>
<td>- Rich and varied lessons</td>
<td></td>
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<tr>
<td>- Learning gains</td>
<td></td>
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</tbody>
</table>

Fig. 2. Overview of (dis)advantages of student teachers’ team teaching.
Appendix A. Empirical studies included in the review study in order to answer RQ2.

<table>
<thead>
<tr>
<th>Author</th>
<th>Model*</th>
<th>Aim/research questions</th>
<th>Subjects</th>
<th>Data collection</th>
<th>Data analysis</th>
<th>Control group?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anderson et al. (2005)</td>
<td>Coaching</td>
<td>- What was the value of observing cooperating teachers in the early field experience?</td>
<td>- 34 final-year student teachers (university)</td>
<td>- Dialogue journals</td>
<td>Qualitative</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- What was the value of observing peers in the early field experience?</td>
<td>- Pairs</td>
<td>- Peer coaching data forms</td>
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<tr>
<td></td>
<td></td>
<td>- What behaviours did pre-service teachers ask their peer observers to target?</td>
<td>- Primary education</td>
<td></td>
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<td></td>
<td></td>
<td>- What was the nature of pre-service teachers’ reflections on the experience of observing cooperating teachers and peers?</td>
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<tr>
<td>Anderson and Radencich (2001)</td>
<td>Coaching</td>
<td>- Investigating the value of feedback to pre-service teachers in an early field experience</td>
<td>- 34 final-year student teachers (university)</td>
<td>- Dialogue journals</td>
<td>Qualitative &amp; quantitative</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Pairs</td>
<td>- Peer coaching data forms</td>
<td></td>
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<tr>
<td>Baker and Milner (2006)</td>
<td>No model specified</td>
<td>- Do teacher candidates who work in paired placements learn as much from their mentors as do those in single placements?</td>
<td>- 9 student teachers (university) and their mentors</td>
<td>- Questionnaires</td>
<td>Qualitative &amp; quantitative</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Pairs</td>
<td>- Questionnaires (student teachers and mentors)</td>
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<td></td>
<td></td>
<td></td>
<td>- Secondary education</td>
<td>- Observations (student teachers and mentors)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>- Interviews (student teachers and mentors)</td>
<td></td>
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<tr>
<td>Bashan and Holsblät (2012)</td>
<td>Teaming</td>
<td>- Evaluating the teacher training program and obtain insights from the process that the students experienced</td>
<td>- 48 third-year student teachers (college) and their mentors</td>
<td>- Pedagogical-reflecting journals of student teachers</td>
<td>Qualitative</td>
<td>No</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>- Pairs: one general education, one special education</td>
<td>- Journals of mentors</td>
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<td></td>
<td>- Primary education</td>
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<tr>
<td>Author</td>
<td>Model*</td>
<td>Aim/research questions</td>
<td>Subjects</td>
<td>Data collection</td>
<td>Data analysis</td>
<td>Control group</td>
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<tr>
<td>Birrell and Bullough</td>
<td>No model specified</td>
<td>- During their 1st year of teaching were the student teachers who participated in the peer-teaching model in any way advantaged or disadvantaged by the experience of having student taught with a partner?</td>
<td>8 first-year student teachers, mentors and principals - Pairs - Primary education</td>
<td>- Interviews (student teachers, mentors, principals) - Observations</td>
<td></td>
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<tr>
<td>(2005) US</td>
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<tr>
<td>Bowman and McCormick</td>
<td>Coaching model</td>
<td>- Investigating the effectiveness of the supervision models on the development of clarity skills, pedagogical reasoning and actions, and attitudes towards the field experience</td>
<td>32 junior and senior years' student teachers (university) - Pairs vs. traditional supervision - Primary education</td>
<td>- Videotaping of lessons - Audiotaping of post-conferences - Questionnaires</td>
<td>Quantitative</td>
<td>Yes</td>
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<tr>
<td>(2000) US</td>
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<tr>
<td>Britton and Anderson</td>
<td>Coaching model</td>
<td>- Exploring the effects of peer coaching on the classroom practices of pre-service teachers</td>
<td>4 student teachers (university) - Pairs - Secondary education</td>
<td>- Interviews</td>
<td>Qualitative</td>
<td>No</td>
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<tr>
<td>(2010) US</td>
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<tr>
<td>Bullough et al.</td>
<td>No model specified</td>
<td>- Experiences on a partnership and a single-placement model of early field experience</td>
<td>21 student teachers (university), 18 mentors - Pairs - Primary education</td>
<td>- Interviews (mentor and student teachers) - Student teachers’ time logs - Transcripts of planning sessions</td>
<td>Qualitative &amp; quantitative</td>
<td>Yes</td>
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<tr>
<td>(2002) US</td>
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<td>Bullough et al.</td>
<td>No model specified</td>
<td>- What are the benefits and possible short-comings of partnered student teaching as an alternative model of practice teaching?</td>
<td>10 student teachers (university) and their mentors - Pairs - Primary education</td>
<td>- Interviews (mentor and student teachers) - Student teachers’ time logs - Transcripts of planning sessions - Focus group interviews with learners</td>
<td>Qualitative &amp; quantitative</td>
<td>Yes</td>
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<tr>
<td>(2003) US</td>
<td></td>
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<td>Study</td>
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<td>Research Question(s)</td>
<td>Participants</td>
<td>Data Collection Methods</td>
<td>Research Design</td>
<td>Findings</td>
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<td>Dee (2012)</td>
<td>Coaching model, assistant teaching model, teaming model</td>
<td>- How does a collaborative paired placement during the clinical practice component of a pre-service teacher education program affect candidate learning and development?</td>
<td>- 12 student teachers (university), their mentors and teacher educators - Pairs - Primary (8 student teachers) and secondary education (4 student teachers)</td>
<td>- Discussions and informal interviews - Digital file with notes and comments (researcher) - Questionnaire (student teachers, mentors, teacher educators)</td>
<td>Qualitative &amp; Quantitative</td>
<td>No</td>
</tr>
<tr>
<td>Gardiner (2010)</td>
<td>No model specified</td>
<td>- How do mentors perceive and experience the benefits and drawbacks of peer placements?</td>
<td>- 7 mentors - Primary education</td>
<td>- Individual and focus group interviews with mentors - Observations - Field notes - Document review</td>
<td>Qualitative</td>
<td>No</td>
</tr>
<tr>
<td>Gardiner and Robinson (2009)</td>
<td>Assistant teaching model, teaming model</td>
<td>- Would pre-service teachers collaborate in ways that contributed to their professional development and if so why, how, and to what end?</td>
<td>- 8 junior-year student teachers (college) - Pairs - Preschool and primary education</td>
<td>- Observations - Interviews - Questionnaires - Field notes - Journal entries - Work samples</td>
<td>Qualitative</td>
<td>No</td>
</tr>
<tr>
<td>Gardiner and Robinson (2010)</td>
<td>Assistant teaching model, teaming model</td>
<td>- How six preservice teachers (paired together in a pre-student teaching placement) experience and perceive the value of collaboration with a peer and cooperating teacher? - What facilitates or inhibits collaboration?</td>
<td>- 6 student teachers and their mentors - Pairs - Preschool education</td>
<td>- Observations - Field notes - Reflective journals, lesson plans, and unit plans (student teachers) - Surveys - Individual interviews with student teachers - Informal interviews with mentors</td>
<td>Qualitative</td>
<td>No</td>
</tr>
<tr>
<td>Gardiner and Robinson (2011)</td>
<td>Assistant teaching model, teaming model</td>
<td>- The purpose of this qualitative study is to extend the extant research by understanding and identifying the challenges that student teachers face during their practical training.</td>
<td>- 24 student teachers (college) and their mentors - Pairs - Preschool education</td>
<td>- Observations - Documents (lesson plans, journal entries, units of study, mentors' evaluations of student teachers)</td>
<td>Qualitative</td>
<td>No</td>
</tr>
<tr>
<td>Author</td>
<td>Model</td>
<td>Aim/research questions</td>
<td>Subjects</td>
<td>Data collection</td>
<td>Data analysis</td>
<td>Control group?</td>
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</tbody>
</table>
| Goker (2006) North Cyprus | Coaching model            | - To what extent can peer coaching develop self-efficacy of peer-coached student teachers?  
- Which supervision model is more effective in increasing demonstrations and instructional skills?  
- What are the levels of satisfaction with the peer coaching program implemented among student teachers in each group as compared to those of a traditional supervision model? | - 32 final-year student teachers (university)  
- Pairs  
- Secondary education | teacher’s performance)  
- Interviews (student teachers and mentors)  
- Questionnaires  
- Videotaping of lessons  
- Audiotaping of post-conferences | Qualitative & quantitative                         | Yes                        |
| Goodnough et al. (2009) Canada | No model specified         | - What types of co-teaching models will emerge during the triad field experience?  
- What are the advantages for pre-service teachers and cooperating teachers who participate in a triad model?  
- What are the disadvantages for pre-service teachers and cooperating teachers who participate in a triad model? | - 8 student teachers (university), 4 mentors  
- Pairs  
- Primary education | - Interviews (student teachers & mentors)  
- Observations  
- Electronic journal entries (student teachers & mentors)  
- Videotaping of planning sessions | Qualitative                               | No                          |
| Jang (2008) Taiwan       | Teaming model             | - Exploring the effects of an integration of technology and team-education                  | - 42 student teachers (university)  
- Triads and quartets | - Questionnaires  
- Online data  
- Interviews | Qualitative & quantitative | Yes                        |
<table>
<thead>
<tr>
<th>Study</th>
<th>Model</th>
<th>Country</th>
<th>Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jenkins and Veal (2002)</td>
<td>Coaching model</td>
<td>US</td>
<td>- Describing the kinds of teacher knowledge exhibited by student teachers during peer coaching activities, and how the roles of teacher and coach in the peer coaching experience contribute to the development of teacher knowledge during an elementary physical education field-based methods course</td>
</tr>
</tbody>
</table>
| Kamens (2007)          | No model specified | US      | - What did the pre-service teachers learn from participating in a co-taught student teaching experience?  
- What are the perspectives of their cooperating teachers about the co-taught student teaching experience?  
- What are the challenges and benefits of implementing this type of experience during student teaching? |
| King (2006)            | Teaming model  | UK      | - Identifying key benefits and issues regarding paired placements  
- Providing guidance on how paired placements can be made to work more effectively |

- Secondary education

- The coach’s audio-taped comments during observation  
- Audiotaped post-lesson conferences  
- Daily written reports  
- Individual and group interviews  
- Interview with the course professor  
- The researcher’s journal  
- Course related documents such as course syllabus, assessment forms, etc.

- 8 student teachers (university)  
- Pairs  
- Pre-school and primary education

- 4 student teachers and their mentors  
- Pairs  
- Primary education

- Student teacher journals  
- Interviews with student teachers and mentors  
- Student teaching observation notes (of mentors and university supervisors)  
- E-mail communication between participants

- 76/35/50 student teachers (university) and their mentors  
- Pairs  
- Secondary education

- Questionnaires (student teachers)  
- Interviews (student teachers & mentors)

Qualitative No

(continued on next page)
<table>
<thead>
<tr>
<th>Author</th>
<th>Model*</th>
<th>Aim/research questions</th>
<th>Subjects</th>
<th>Data collection</th>
<th>Data analysis</th>
<th>Control group?</th>
</tr>
</thead>
</table>
| Kurtts and Levin (2000) US    | Coaching model  | - Does structured peer coaching aid in the development of reflective practices among pre-service teachers?  
- Does structured peer coaching enhance pre-service teachers' perceptions of support? | - 27 student teachers (university) and their mentors  
- Pairs  
- Primary education | - PQP forms  
- Reflective summaries  
- Open-ended questionnaires (student teachers and mentors)  
- Audiotaping of debriefing conferences | Qualitative & quantitative | No |
| Nguyen and Baldauf (2010) Vietnam | Coaching model  | - Investigating whether participation in a formal peer mentoring intervention had an effect on the participants' instruction practice in the classroom during their practicum | - 65 fourth-year student teachers (university), their mentors and teacher educators  
- Pairs  
- Secondary education | - Questionnaires (student teachers, mentors, teacher educators) | Quantitative | Yes |
| Nokes et al. (2008) US        | No model specified | - In what ways does the secondary setting open or close opportunities for beginning teacher learning through the paired teaching model?  
- Given the chance to develop their own styles of collaboration, what patterns would develop between student teaching teams?  
- What are the costs and benefits of the paired-placement of student teachers in secondary settings? | - 23 fourth-year student teachers (university), 7 mentors and 29 learners  
- Pairs  
- Secondary education | - Interviews (student teachers, mentors)  
- Focus group interviews (learners) | Qualitative | No |
| Parsons and Stephenson (2005) UK | No model specified | - Does collaboration, with both peers and more experienced colleagues, help | - 22 student teachers (university), 22 mentors | - Questionnaires (student teachers, mentors)  
- Interviews | Qualitative | No |
<table>
<thead>
<tr>
<th>Study</th>
<th>Model Type</th>
<th>Students</th>
<th>Research Questions</th>
</tr>
</thead>
</table>
| Roth and Tobin (2001) US                  | No model specified | Pairs                 | - Does the provision of a structure help student teachers to develop abilities in this area? 
- Developing co-teaching as praxis and conceptual framework |
| Scantlebury et al. (2008) US              | Teaming model    | 6/9 senior-year student teachers (university), mentors, teacher educators | - What were the model's characteristics that afforded or hindered co-teaching? 
- Are these characteristics aligned? If so, what are their relationships in practice? 
- How can teacher educators support the successful implementation of the co-teaching model? |
| Shin et al. (2007) US                     | Coaching model   | 64 first-semester student teachers (university), pairs | - Identifying not only whether peers were providing quality feedback but also whether that feedback was considered useful and appropriate in helping them improve their instruction, become more reflective when using the clinical supervision model, and better meet their developmental needs 
- Peer review reports, interviews, questionnaires |
<table>
<thead>
<tr>
<th>Author</th>
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<th>Aim/research questions</th>
<th>Subjects</th>
<th>Data collection</th>
<th>Data analysis</th>
<th>Control group?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smith (2002, 2004) UK</td>
<td>Assistant teaching model</td>
<td>- Could pair-scaffolding successfully transfer to secondary mathematics teaching?</td>
<td>- 14/8 student teachers (university) and their mentors</td>
<td>- Questionnaires (student teachers &amp; mentors)</td>
<td>Qualitative</td>
<td>No</td>
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<td></td>
<td>- Pairs</td>
<td>- Interviews (student teachers &amp; mentors)</td>
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<td></td>
<td>- Secondary education</td>
<td>- Observations</td>
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<tr>
<td>Sorensen (2004) UK</td>
<td>No model specified</td>
<td>- Evaluation of peer learning through paired placements</td>
<td>- Student teachers, mentors, teacher educators</td>
<td>- Questionnaires (student teachers &amp; mentors)</td>
<td>Qualitative &amp; quantitative</td>
<td>No</td>
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<td></td>
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<td></td>
<td>- Pairs</td>
<td>- Interviews (student teachers, mentors &amp; teacher educators)</td>
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<td>- Secondary education</td>
<td>- Focus group interviews (mentors &amp; teacher educators)</td>
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<td>- Case studies</td>
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<td>- Video work</td>
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<tr>
<td>Stairs et al. (2009) US</td>
<td>No model specified</td>
<td>- Experiences of a partnered student teaching placement</td>
<td>- 5 junior-year student teachers</td>
<td>- Enquiry sessions (talking about their experiences)</td>
<td>Qualitative</td>
<td>No</td>
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<td></td>
<td></td>
<td></td>
<td>- Pairs or triads</td>
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<td></td>
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<td></td>
<td>- Secondary education</td>
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<tr>
<td>Tobin et al. (2001) US</td>
<td>No model specified</td>
<td>- Experiences of a new teacher who had been assigned to an urban high school as field experience</td>
<td>- 2 student teachers and co-teachers (mentors, university supervisors, high school students)</td>
<td>- Video-taping of the analysis session/verbal interactions/cogenerative dialogues</td>
<td>Qualitative</td>
<td>No</td>
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<td></td>
<td>- Pairs, triads, quartet</td>
<td>- Recording debriefings</td>
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<td></td>
<td>- Secondary education</td>
<td>- Reflections in journals</td>
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<td></td>
<td>- Face-to-face and e-mail interactions</td>
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<tr>
<td>Vacilotto and Cummings (2007) US</td>
<td>Coaching model</td>
<td>- Does peer coaching facilitate the exchange of teaching methods and materials? If so, how?</td>
<td>- 16 student teachers (university)</td>
<td>- Questionnaires</td>
<td>Qualitative</td>
<td>No</td>
</tr>
<tr>
<td></td>
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<td>- Does peer coaching foster the development of teaching skills? If so, how?</td>
<td>- Audio recording of lesson plan meetings and debriefing sessions</td>
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<td></td>
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<td>- Does peer coaching make participants</td>
<td>- Reflective teaching journals</td>
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<td>- Interviews</td>
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</tbody>
</table>
rethink any of their own teaching methods or styles? If so, how?

- What are the most effective behaviours that participants think support a successful relationship between peers in a peer coaching programme?

Based on the descriptions of team teaching provided by the authors of each study, we tried to label these team teaching models based on the categorisation in RQ1. However, this was not always possible.


