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# Student teachers' skills in the implementation of collaborative learning: A multilevel approach

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ABSTRACT

This study explores the development of student teachers' skills in implementing collaborative learning (CL) using a multilevel repeated measures design. Participants were 105 pre-service teachers that were trained in CL implementation. The results indicate that student teachers generally perform well in implementing CL. Further, it appears that these skills increase over time, although no linear growth can be found. Student teachers' skills development appears to be positively connected with their general feeling of teaching efficacy. Surprisingly, training and students' pedagogical knowledge have no significant impact.



## 1. Introduction

Collaborative learning (CL) can be defined as a teaching strategy in which two or more learners are expected to depend on and be accountable for their own and one another's learning process (Dillenbourg, 1999). Although this term is often used interchangeably with 'cooperative' learning, we prefer the concept of collaborative learning as a broader, more general concept covering multiple approaches on peer collaboration, amongst which for example cooperative learning, peer tutoring, discussion groups, etcetera (De Wever, 2006; Dillenbourg, 1999; Meloth & Deering, 1999).

### 1.1. The role of the teacher and teacher education in CL

Researchers agree that the use of CL in classroom practice positively affects both the (meta)cognitive performance, social behaviour, and affective perceptions of students (Fawcett & Garton, 2005; Johnson, Johnson, Buckman, & Richards, 2001; Marzano, Pickering, & Pollock, 2001). However, the effectiveness of this teaching strategy largely depends on the role of the teacher guiding the learning process (Gillies, Ashman, & Terwel, 2008; Hornby, 2009; Meloth & Deering, 1999; Oortwijn, Boekaerts, Vedder, & Strijbos, 2008). Although there is consensus on the importance of the teacher role in CL, this is far less studied than the effectiveness for students.

Yet, teachers often report that they are lacking the competences and experience to implement CL effectively in teaching practice (Abrami, Poulsen, & Chambers, 2004; Baines, Blatchford, & Kutnick, 2003; Gillies & Boyle, 2010; Meloth & Deering, 1999; Slavin, 1999). This finding emphasizes the importance of training teachers in integrating CL (Lopata, Miller, & Miller, 2003). In this respect, teacher education functions as a prominent context where student teachers can improve their knowledge and skills regarding applying CL (Cohen, Brody, & Sapon-Shevin, 2004; Ishler, Johnson, & Johnson, 1998; Veenman, van Benthum, Boosma, van Dieren, & van der Kemp, 2002). Therefore, the present study aims to enlighten the skills of student teachers with regard to the implementation of CL and the evolution in these skills during one year of teacher training.

### 1.2. Essential pedagogical knowledge and skills regarding the implementation of CL

It was found that teachers need to have a clear understanding of the basic tenets of CL, and the theoretical and empirical perspectives supporting this practice (Gillies et al., 2008). In the literature, the five CL key components of Johnson and Johnson (1999) are referred to as successful for teaching practice: positive interdependence, individual accountability, direct interaction, social skills, and the evaluation of the process. Positive interdependence refers

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to linking group members in such a way that they cannot succeed unless the others of the group succeed. Individual accountability ensures that each group member has responsibilities for his own learning as well as for helping other group members learn. Further, teachers implementing collaborative learning have to guarantee that students can interact face-to-face. Collaborative learning not only aims at cognitive performance, but also social skills are explicitly part of the learning process and output. Finally, teachers should pay attention to the evaluation of the group process. Teachers often only evaluate the product or the cognitive results of students' teamwork. However, reflecting on the way students collaborated and on how they can improve their learning process is at least equally important. In this respect, the teacher should summarise, evaluate, discuss, and reflect on the collaborative learning process together with the students (Gillies et al., 2008; Jacques, 2004; Meloth & Deering, 1999; Webb, 2009).

Teachers should have insight in how to structure these key components in the classroom, in order to avoid the free-rider effect, conflicts in the group, etc. These concerns are often considered prior to the implementation of CL, and lead to decisions about specifying social goals, determining group size and assigning students to groups, arranging the classroom, assigning roles, setting rules, designing tasks, etc. (e.g. Gillies & Boyle, 2010; Gillies et al., 2008; Jacques, 2004; Meloth & Deering, 1999; Webb, 2009).

In addition to the abovementioned key components, teachers should expressly pay attention to their guiding behaviour and interventions during the collaborative process as well. A teacher needs to know whether, when, and how to intervene. Several authors emphasise the monitoring, intervening, assisting, and praising behaviour of teachers during CL (e.g. Gillies et al., 2008; Jacques, 2004; Meloth & Deering, 1999). De Lièvre, Depover, and Dillenbourg (2006) more specifically distinguish five different guiding roles for a teacher during CL: a cognitive, affective, metacognitive, social, and organisational role. From a cognitive point of view, the teacher focuses on the content of the task and assists students by e.g. linking, structuring, analysing, etcetera. Affective guiding activities deal with feelings arising during CL. It is the task of a teacher to encourage students and make them experience that working together is fun and worthwhile. The metacognitive guidance is aimed at regulating the cognitive and affective learning whereas the social role is focussed on helping students to share their ideas and construct knowledge together. The organisational role has to do with organizing the learning process, including making appointments, distributing materials, etc.

In summary, essential pedagogical knowledge and related skills are delineated during different phases of a lesson with CL, more specifically the introduction, the processing and the consolidation or evaluation phase. Studies on the knowledge base of student teachers in relation to CL yield, however, disappointing results: student teachers are found to have only a limited pedagogical knowledge base about CL as a teaching strategy (Hornby, 2009). Since the pedagogical knowledge base is presumed to form the basis of teaching skills (Hoyle & John, 1995), we can hypothesise that the practical use of CL in teaching practice will be less effective when student teachers are lacking the underlying knowledge.

### 1.3. Additional teacher and contextual characteristics influencing the implementation of CL

In addition to teachers' pedagogical knowledge base and skills, also other personal and contextual features appear to be correlated with teachers' pedagogical behaviour in CL implementation and with their willingness to implement this teaching strategy.

Corresponding to student teachers' limited pedagogical knowledge base regarding CL, they report feeling insufficiently prepared to use CL in practice (Abrami et al., 2004; Shachar & Shmuelevitz, 1999). In this respect, the lack of competence influences their *self-efficacy*, resulting in a lack of courage to put this teaching strategy into practice (Baines et al., 2003). However, other studies also refer to the reverse relationship, that is that the amount of self-efficacy can function as an inhibiting factor in the competency development of teachers. As Tschannen-Moran and Woolfolk Hoy (2001) discovered, student teachers with higher feelings of self-efficacy are more resilient and persistent in putting effort in their professional development process. Since the present study focuses on the skills development process of student teachers as a dependent variable, we will take self-efficacy into account as an explanatory variable.

It might not be surprising that professional development courses, teacher *training*, and practical experiences positively influences both competence and self-efficacy (Gillies & Boyle, 2008; Ishler et al., 1998; Krol-Pot, 2005; Veenman et al., 2002). In addition, Abrami et al. (2004) refer to the strong impact of teacher *conceptions* about CL on the willingness to use CL as a teaching strategy in the classroom.

However, it is widely acknowledged that teachers often have difficulties in applying the theory presented in professional preparation courses into practice (Korthagen, 2001). Therefore, Hoban (2005) and Verloop, Van Driel, and Meijer (2001) emphasise that teacher behaviour in the classroom is also largely influenced by *contextual factors* such as the classroom climate, the curriculum, the teaching subject etc. Therefore, contextual factors have to be taken into account as well when investigating the implementation of CL.

### 1.4. Aim of the present study

The literature provides evidence for both the effectiveness of CL for pupils, as well as for the important role of the teacher in the implementation of this strategy. Given the fact that teachers report a lack of competences in the use of CL, the importance of training in CL for teachers is clearly emphasized. The purpose of the current study is to explore the skills of pre-service student teachers in relation to the implementation of CL. More specifically, the extent to which student teachers succeed in bringing CL into practice in primary school classrooms is studied, as well as their skills development over one year of teacher education. Taking into account the issues about influential teacher and context characteristics, we will also explore the impact of pedagogical knowledge, self-efficacy, conceptions, and contextual variables on the performance and skills development of student teachers.

## 2. Method

### 2.1. Research questions and hypotheses

This study aims to gain insight into the skills of student teachers in pre-service teacher education with regard to the implementation of CL. Three research questions were formulated.

(1) How do student teachers' skills in relation to the implementation of CL develop? We expect skills to improve over successive lessons during their apprenticeship.
(2) What is the relationship between the self-efficacy, the knowledge base, and the conceptions of student teachers on the one hand and their skills development on the other hand? We hypothesise that a higher self-efficacy will be related to better skills regarding the implementation of CL. In addition, we expect students who participated more in training on CL and with a more extensive knowledge base to perform better as to the implementation of CL. Further, we expect that student teachers with less positive conceptions towards CL will be less