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The proof of the pudding is in the eating? Implementation of cooperative learning: differences in teachers' attitudes and beliefs

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ABSTRACT

In the current study differences between primary school teachers classified as high-performing in their implementation of cooperative learning (CL) in their classrooms and teachers who were less successful in implementing cooperative learning were investigated. The levels of implementation of cooperative learning differed significantly between teachers, especially in teaching students the needed cooperative behaviours. Based on semi-structured interviews, it was found that low-performing CL teachers struggle more with student behaviour during cooperative learning, while high-performing CL teachers feel more able to regulate student behaviour. We concluded that teachers who differed in their teacher performance of implementation of cooperative learning also differed in their attitudes and beliefs about this approach. An integrated model on professional development and teacher change is proposed to interpret the results of differences between teachers. This model shows that positive attitudes and beliefs before implementation, but also experiencing positive student outcomes (incl. positive student behaviour) during implementation are important factors in making cooperative learning successful in practice. We suggest that teachers should be prevented from entering a negative spiral in which they experience student behaviour during cooperative learning only as difficult and, therefore, do not succeed in improving students' cognitive and behavioural outcomes.

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Cooperative learning; implementation; teachers' attitudes and beliefs; professional development and teacher change; primary education

Introduction

Cooperative learning has gained much attention in recent decades because of its desirable social and academic effects (e.g., Kyndt et al., 2013). However, it is often emphasised that cooperative learning has limited use in practice (Baines et al., 2003; Buchs et al., 2017; Veenman et al., 2000). It has been found that when cooperative learning is implemented it is often ad hoc and unstructured (Gillies & Boyle, 2011). Moreover, it has been emphasised that levels of cooperative learning implementation differ significantly between teachers (Jolliffe & Snaith, 2017). Even when teachers are willing to implement cooperative learning, many of them experience problems with implementing it in their

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classroom. In the study of Gillies and Boyle (2010) teachers reported several difficulties such as time management issues and problems with preparing students to work together. It is supposed that the problems encountered by teachers lead to decreased use of cooperative learning (Ruys et al., 2014). Thus, although research on cooperative learning emphasises the positive effects it can have on students' academic and social outcomes, it seems that schools and teachers fail to exploit its potential (Christie et al., 2009).

Implementation of cooperative learning

Cooperative learning refers to the instructional use of small groups in which students work together to maximise students' learning (Johnson & Johnson, 1999; Slavin et al., 2009). When teachers implement cooperative learning in their classroom, several aspects related to 1) the classroom and learning context, 2) the tasks and activities, 3) the preparation of students, and 4) the role of the teacher, have to be considered (Blatchford et al., 2003; Gillies & Boyle, 2010; Howe et al., 2007). Before cooperative learning practices are introduced the *classroom and learning context* needs to be prepared. Decisions have to be made about organisation of groups, i.e., seating arrangements, group sizes and number of groups. The *tasks and activities* that students have to perform should fit the purposes of the cooperative learning practices. Tasks need to be clearly structured, have to be challenging, stimulate interaction between students and ask for a common effort. Moreover, simply placing students in groups together does not automatically lead to a cooperative effort. *Students need to be prepared* for cooperative learning through teaching them the required interpersonal and group skills and they will need guidance and support.

The *role of the teacher* changes from 'the sage on the stage' to 'a guide on the side' when teachers implement cooperative learning. Notwithstanding, teachers have a central and active role in implementing cooperative learning practices in their classroom as it includes (Johnson & Johnson, 2008): 1) making pre-instructional decisions, such as formulating both academic and social skills goals and deciding on group composition, 2) explaining the instructional task and the cooperative nature of the task, such as explaining the cooperative behaviours students are expected to use, 3) monitoring students' learning and behaviour and intervening within the groups to provide guidance in making process with the task or using the targeted interpersonal and group skills effectively, 4) evaluating students' learning and helping students to reflect on how well their group functioned. Hence, given the complexity, teachers have to be persistent for effective and sustained use of cooperative learning.

Professional development and teacher change

In several studies it is suggested that the limited use of cooperative learning may be due to teachers' lack of understanding on how to implement it (Hennessey & Dionigi, 2013; Gillies & Boyle, 2010, 2011). It is also recognised that teachers' attitudes and beliefs are key aspects that allow us to explain the decision to implement cooperative learning in the classroom and its effectiveness (Buchs et al., 2017; Saborit et al., 2016; Webb, 2009). Therefore, we suggest that teachers' level of implementation of cooperative learning may be better understood and interpreted by considering theoretical models of the professional development of teachers.

Desimone (2009) described a well-known conceptual framework for investigating the effects of professional development on teachers and their students. According to this model, professional development is focused on increasing teachers' knowledge and skills and changing their attitudes and beliefs. This is expected to result in change in instruction, and thereafter in changes in student outcomes.

Following Guskey's (2002) model on professional development and teacher change, it is not the professional development per se, but the experience of improved student outcomes that changes teachers' attitudes and beliefs. Hence, significant change in teachers' attitudes and beliefs occurs primarily after they see evidence of improvements in the learning outcomes of their students. Teachers believe it works because they have seen it work, and that experience shapes their attitudes and beliefs.

Although the model of Desimone (2009) includes interactive pathways between change in teachers' attitudes and beliefs, change in classroom practices and improved student outcomes, there is no direct relationship from improved student outcomes to change in teachers' attitudes and beliefs, which is the most emphasised relationship in the model of Guskey (2002). Although both Desimone and Guskey state that the process is rather cyclical than linear, the models focus on different paths, i.e., the ways that professional development might shape teachers' practices, teachers' attitudes and beliefs and student outcomes. Therefore, we used both models to interpret the results of the current study. Using these models as frameworks may explain varying degrees to which teachers implemented cooperative learning in their daily practice when all teachers had access to the same professional development sources.

Aim of the current study

To increase and improve implementation of cooperative learning, it is important to gain insight into the challenges teachers are confronted with when implementing it, even after professional training (Ruys et al., 2014). Only a few studies have focused on teachers' reflections on their cooperative learning practices after long-term use (Gillies & Boyle, 2011). Our study focuses on how teachers experience the implementation of cooperative learning in their daily classroom practice after having implemented it for at least one whole school year. The models of Desimone (2009) and Guskey (2002), focusing on professional development and teacher change, are used as frameworks to describe varying degrees to which teachers implement cooperative learning. Differences between teachers classified as high-performing in their implementation of cooperative learning in their classrooms and teachers who were less successful in implementing cooperative learning were investigated, while acknowledging that contextual factors also influence the process of teacher change as also indicated by Desimone (2009) and Guskey (2002). As such, the results of this study provide useful information for teachers to improve their cooperative learning practices and to increase scientific knowledge about effective implementation of cooperative learning. This background leads to the following research question:

To what extent do high-performing and low-performing CL teachers differ in their cooperative learning practices, their attitudes and beliefs about cooperative learning, and the extent to which they experience change in student outcomes because of their cooperative learning practices?

Method

We used a qualitative approach in the current study. Teachers were selected based on a rating of their level of implementation of cooperative learning in videotaped lessons. High-performers in implementing cooperative learning in the classroom were distinguished from teachers who were less successful in their implementation of cooperative learning, to explore to what extent these two groups differed. In semi-structured interviews, the selected teachers were asked to reflect on their experiences with the implementation of cooperative learning and how they felt their attitudes and beliefs may have changed.

Intervention

Teachers implemented cooperative learning in their classrooms as part of a broader intervention, namely the comprehensive school reform programme Success for All (SfA). SfA is described in more detail in for instance, Slavin et al. (2009). The programme has been shown to be effective in the US and the UK (Borman et al., 2007; Tracey et al., 2014), and is currently being adapted for Dutch educational practice. At the moment of the current study, SfA was not yet implemented school wide, but implemented in Grades 1 and 2 in six schools.

Instruction in SfA lessons is characterised by scripted lesson plans that make extensive use of cooperative learning in pairs and small groups. The lessons involve various cooperative learning techniques, such as ‘Think-Pair-Share’, and five cooperative behaviours are introduced: e.g., ‘active listening’. In the SfA lessons, teachers are supposed to use a reward system, aimed at motivating children to work effectively together. Teachers in the SfA programme are taught strategies and given tools to help their students work cooperatively, including modelling for students the kinds of behaviours that lead to effective teamwork and teaching them how to reflect on this. Teachers receive the required materials and manuals containing descriptions of every single SfA lesson.

SfA-NL provides professional training in how to teach SfA lessons, including the use of cooperative learning in these lessons. The focus of the initial training course, which took place right before the start of the school year, was on explaining teaching methods and materials, including on how to use cooperative learning activities. Furthermore, the programme developers visited each classroom, and gave the teachers feedback, in order to support them in their implementation of the programme.

As the SfA-NL programme was in an early development phase, there are some differences with the SfA-US programme. The most important differences are the lack of regrouping, the lack of a stand-alone version of the *Getting Along Together* programme focusing on students’ social emotional skills, and the lack of leadership teams and instructional component teams in the SfA-NL programme. In the SfA-NL programme there is no regrouping based on reading performance level, but students of the same age are placed together in the same grade. The *Getting Along Together* programme of SfA-US involves introductory lessons in the first weeks of the school year targeting on social emotional skills. However, assignments based on the *Getting Along Together* programme were integrated in the SfA-NL lessons. In the SfA-NL schools there were no leadership teams and instructional component teams. Using a model for distributive leadership called ‘*Leading for Success*’ in SfA-US schools, all school staff are engaged in

different teams, in order to assess progress and addressing areas that need improvement. For different components of the instruction programme of SfA instructional component teams meet biweekly to share data, discuss strategies, and identify targets for improvement in SfA-US schools. Although there were no leadership teams and instructional component teams in the SfA-NL schools, the SfA-NL research and development team attempted to have close contact about potential issues that would have been the responsibility of these teams.

Measurement of the level of cooperative learning implementation

From all SfA-NL teachers of the school year 2016–2017 a video of a SfA lesson was observed, except those of teachers who taught only one day a week. Videos were recorded from October to January, i.e., in the second half of the first semester of the school year. In total, 26 lessons were observed: 14 Grade 1 lessons and 12 Grade 2 lessons. Consent for video recordings was obtained from the Ethics Committee Pedagogical and Educational Sciences from the University of Groningen. The category *Role of the teacher* of the S-TOP rating scale instrument (Christie et al., 2009; Howe et al., 2007) was used to evaluate teachers' implementation of cooperative learning practices. The nine items addressing teachers' cooperative learning practices and descriptives are shown in Table 1. The scale of measurement on all items of all categories ranged from 1 (not true) to 3 (very true).¹ The scale was deemed to be reliable with a Cronbach's α of .79. Two researchers independently coded 20% of the videos. Cohen's κ was .83, indicating substantial agreement (Landis & Koch, 1977).

Table 1. Descriptives of observation scores *Role of the teacher*.

Role of the teacher		All observed teachers	High-performing CL teachers	Low-performing CL teachers
		N = 26	N = 4	N = 4
		M(SD)	M(SD)	M(SD)
T1	Students are not dependent on the teacher to execute the task.	2.77(.52)	3.00(.00)	1.75(.50)
T2	The teacher manages the time and/or encourage students to manage their time.	2.65(.57)	2.75(.50)	2.50(.57)
T3	Before the task, the teacher briefs the students about working in a group and/or explains concrete cooperative behaviours.	2.12(.86)	3.00(.00)	1.00(.00)
T4	The teacher encourages the students before and during the task to reflect on good teamwork.	1.62(.90)	2.25(.96)	1.00(.00)
T5	After the task, the teacher evaluates the group work and cooperative behaviours, e.g., using rewards for effective teamwork.	2.00(.85)	3.00(.00)	1.25(.50)
T6	The teacher provided an opportunity for students' to evaluate their group work.	1.62(.80)	3.00(.00)	1.25(.50)
T7	During the task, the teacher encourage students to use their group work skills.	1.92(.74)	2.75(.50)	1.25(.50)
T8	During the task, the teacher monitors the groups.	2.73(.60)	3.00(.00)	2.00(.82)
T9	The teacher is more of a 'guide on the side' than a 'sage on the stage'	2.62(.57)	3.00(.00)	1.75(.50)
T10	The teacher models effective cooperative behaviours.	1.73(.92)	2.50(.57)	1.00(.00)
Total		2.18(.44)	1.47(.05)	2.70(.12)

Participants: selection and background

Based on the observations, the four teachers with the lowest scores (mean score between 1.4 and 1.5) were invited for an interview. Of the six teachers with a high score (mean score between 2.6 and 2.8), two randomly chosen Grade 1 teachers and two randomly chosen Grade 2 teachers were also invited for an interview. All eight teachers agreed to participate in the interviews.

The terms high-performing CL teachers (HP1 to HP4) and low-performing CL teachers (LP1 to LP4) are used to refer to the teachers in the two groups. These terms were deliberately chosen, because they refer to performance on the items of the observation instrument used in this study. It should be noted that they do not indicate the overall quality of a teacher.

The levels of implementation of cooperative learning practices based on observation scores were highly variable. Scores of high-performing CL teachers differed significantly from the scores of low-performing CL teachers ($t = -19.47$, $df = 4$, $p < .001$). High-performing CL teachers scored approximately 1.0 standard deviation above the overall mean, and low-performing CL teachers scored approximately 1.5 standard deviation below the overall mean.

The eight teachers were from five different SfA schools. Four teachers taught Grade 1 and four teachers taught Grade 2. All Grade 1 teachers were teaching cooperative learning in SfA lessons for their second school year. For one Grade 2 teacher it was the first year; the other three teachers already had experience because of pilot SfA lessons or teaching Grade 1 the year before. Seven of the teachers were female and one teacher was male. All interviewed teachers have a degree at a university of applied sciences and are experienced teachers; years of experience varied from 8 years to 36 years of teaching in primary education.

Interviews

Interviews were semi-structured. Interview questions were informed by previous studies undertaken by Gillies and Boyle (2008, 2010, 2011). Teachers were asked about their cooperative learning practices, how they dealt with challenges concerning cooperative learning, what they did to make cooperative learning work and the influence of contextual factors that are closely related to the intervention. They were asked how useful they found various aspects of their training and what they would have found more useful in helping them make cooperative learning work in their classrooms. Furthermore, they were asked about their attitudes and beliefs concerning the implementation and impact of cooperative learning before and during the implementation as well as to explicate how their attitudes and beliefs may have changed over time.

To avoid influencing their answers, teachers were not informed that they were asked to be interviewed because of their observation scores. They were told they would be asked about how they experienced the implementation of cooperative learning. They were aware that researchers of SfA-NL observed the implementation of SfA-specific aspects, including cooperative learning, in the videotaped SfA lessons for the research purposes of SfA-NL. The teachers were assured that their interview answers would be treated anonymously and used only for research purposes.

The teachers were interviewed individually at the end of the school year. Each interview took approximately one hour. Each interview was audiotaped and fully transcribed.

Interviewees were subsequently provided with a copy of their transcript for validation. Prior to the interviews a pilot interview was conducted with a former SfA teacher. Subsequently, the interview scheme was slightly modified. The first author conducted all interviews, including the pilot interview.

Data-analysis

The constant comparative method (Boeije, 2002) was used to identify similarities and differences and to capture recurring patterns in the data. Coding and recoding took place in Atlas.ti (Friese, 2013) using a coding scheme. By using the constant comparative method, the first step was comparison within one interview: every passage of the interview was examined to determine what exactly had been said and to label each passage with an adequate code. A second coder independently coded a selection of fragments of the transcripts, checking both the plausibility and the consistency of the coding. The second coder did not know whether teachers were high- or low-performing. Agreement between the two researchers on coding was high: 98.1%. In the second and third steps of the constant comparative method, interviews from the same group and interviews from the two different groups (high-performing CL teachers vs. low-performing CL teachers) were compared. This was done by the first coder (first author) who, inevitable, did know whether teachers were high- or low-performing. In the analysis process, the codes were thematically categorised to synthesise the results.

Results

Professional development

All teachers thought the training and support were sufficient for effective implementation of cooperative learning. They did not miss specific aspects of training and they found the training meaningful. Moreover, all teachers felt that the conditions for effective implementation, such as a prepared classroom (e.g., organisation of groups) and materials, were present. They all found that the tasks and activities were suitable for the use of cooperative learning and aligned with the curriculum. At the same time, all teachers admitted that they were challenged by the complexity of implementing cooperative learning. Sharing of experiences among teachers appeared to be important to the teachers. LP3: “I really like the meetings with other SfA teachers, because they inspire me with their experiences and ideas; getting to know how other teachers manage it”. Nonetheless, although all teachers had access to the same professional development sources and all were satisfied about the training and support, the level of implementation of cooperative learning differed significantly between teachers.

Teachers' practices

Marked differences between the observed lessons of the high-performing CL teachers and those of the low-performing CL teachers were the explicit instruction in cooperative behaviours, i.e., teaching children the required cooperative behaviours by modelling

good interaction skills and reflecting on, encouraging, and evaluating group work with students before, during, and after the task. All high-performing CL teachers indicated in the interviews that students needed to be taught explicitly to work cooperatively together and they emphasised the importance of modelling these cooperative behaviours. According to them, teachers should model good interaction skills repeatedly. Although we did not find this in the observed lessons, two of the low-performing CL teachers said they do spend time on modelling cooperative behaviours. One low-performing CL teacher indicated that she tried to spend time on modelling, but found it very difficult. None of the low-performing CL teachers managed to provide a concrete explanation of how they (try to) model cooperative behaviours during the interview. Based on the observations as well as the interviews, we found that high-performing CL teacher put more emphasis on how to teach students the needed cooperative behaviours than low-performing CL teachers did.

How teachers value cooperative learning

High-performing CL teachers were more convinced of cooperative learning than low-performing CL teachers were. All high-performing CL teachers said they want to continue to implement cooperative learning in the same way. For example, one teacher said: “I will keep using it [cooperative learning] for the rest of my life” (HP4). This shows that the teachers are convinced of the value to use cooperative learning. Two low-performing CL teachers said they would like to continue using cooperative learning, but they did not know how if their schools would stop the implementation of SfA. The other two low-performing CL teachers said they would want to spend less time using cooperative learning techniques. Moreover, high-performing CL teachers seem to be more convinced of the value of cooperative learning in the sense that they are more positive about the effects of cooperative learning on student outcomes.

Experiencing improved student outcomes

During the interviews, all high-performing CL teachers referred to changes they observed due to the implementation of cooperative learning. The following are exemplary of comments made by the high-performing CL teachers: HP3: “At the beginning I had my doubts about whether it worked, but I think it works. I think you really need to make it your own, and that you have to see the added value of it, that it works”. HP4: “I just see it works out positively, I see that the results go up, I see behaviour problems disappear, I see collaborative skills, I see really good teams, it just works”. Low-performing CL teachers were more reluctant to say whether they thought cooperative learning had an effect on student outcomes. For instance, a low-performing CL teacher mentioned that she has no idea whether the implementation of cooperative learning influenced learning outcomes. Thus, there seems to be a difference in how high-performing versus low-performing CL teachers perceived the effects of cooperative learning: high-performing CL teachers experience more positive student outcomes.

Three high-performing CL teachers supposed that their positive experiences with cooperative learning and seeing that cooperative learning worked reinforced their belief in cooperative learning as a strategy that should be embedded in the curriculum. These

results are in line with Guskey's (2002) model, which proposes that seeing change in student learning outcomes changes teachers' attitudes and beliefs. However, one high-performing CL teacher indicated that seeing the effect of cooperative learning did not reinforce her use of it, because she was already convinced of the positive effects of the strategy. This finding can be considered in the light of Desimone's (2009) model, in which it is captured that changes in teachers' attitudes and beliefs precede use in practice and subsequent effects in learning.

Students' behaviour

In Guskey's (2002) model, learning outcomes are broadly defined to include not only cognitive and achievement indices, but also the wide range of student behaviours and attitudes, e.g., students' classroom behaviour. Generally, low-performing CL teachers indicated to have more trouble with student behaviour during cooperative learning than high-performing CL teachers. Interestingly in the light of Guskey's model, while high-performing CL teachers experienced positive effects of cooperative learning on students' behaviour, low-performing CL teachers experienced cooperative learning as a cause of negative behaviour, which in turn affected cognitive learning outcomes negatively. For example, one low-performing CL teacher said: "Actually, the characters were determining. There were a couple of difficult students in my class. Because of this it sometimes absolutely did not work" (LP1).

We suggest that low-performing CL teachers regard children's behaviour as a determinant of the cooperative learning process, while high-performing CL teachers consider their own behaviour as teacher and their teaching practices as determining the cooperative learning process. Hence, in contrast to high-performing CL teachers, low-performing CL teachers seem to experience that they have little influence on students' behaviour. Low-performing CL teachers emphasised that they took into account students' behaviour in forming groups, so that groups consisted of students who worked well together. In contrast, one high-performing CL teacher remarked that she did not take any social or behavioural aspects into account at all when forming groups, because, she argued, everyone should be able to work together with everyone. This example is considered illustrative of a difference between the high-performing and low-performing CL teachers' attitudes to cooperative learning in relation to students' behaviour.

As the teachers taught in different classrooms and thus had different students, it is possible that low-performing CL teachers found children's behaviour more difficult because their students behaved in a manner which required more effort than the students of the high-performing CL teachers. However, in our study, one of the high-performing teachers taught the same class as a low-performing CL teacher². Therefore, we suggest that the same students may have behaved differently with the two teachers during the cooperative learning practices, related to differences in the teachers' levels of cooperative learning implementation. Considering that the differences between high- and low-performing CL teachers are in particular situated in giving explicit instruction in cooperative behaviours, it can be expected that student behaviour is more positive when high-performing CL teachers use cooperative learning compared to when low-performing CL teachers use cooperative learning. It is supposed this leads to different experiences of teachers, resulting in different attitudes and beliefs about cooperative learning.

Conclusion and discussion

In the present study, differences between high-performing and low-performing CL teachers in their cooperative learning practices and in their attitudes and beliefs about cooperative learning were investigated. High-performing CL teachers differed from low-performing CL teachers in how they explicitly taught students the needed cooperative behaviours for effective group work, and noticeably in modelling these behaviours. We conclude that teachers with different teacher performances in implementing cooperative learning also differed in their attitudes and beliefs about this approach. In general, high-performing CL teachers appeared to be more convinced of the value of cooperative learning. This emphasises that teachers' attitudes and beliefs about the strategy are key factors in implementing cooperative learning and among the main factors determining its effectiveness, as suggested also by others (Saborit et al., 2016; Webb, 2009).

We explored whether Desimone's (2009) model and Guskey's (2002) model would provide suitable frameworks to help understand why teachers vary in their implementation of cooperative learning. According to Guskey's model, demonstrable results in terms of student learning outcomes are key to the sustainability of change in instructional practice. Based on the results of the current study we conclude that teachers who differed in their levels of implementation of cooperative learning also differed in how they experienced the effects of cooperative learning on student outcomes, both cognitive as behavioural student outcomes. Low-performing CL teachers were found to struggle more with children's behaviour during cooperative learning than high-performing CL teachers. High-performing CL teachers believed that they had a more powerful influence on their students' behaviour using cooperative learning. This is in line with the results of a study by Hennessey and Dionigi (2013), where teachers with limited understanding of cooperative learning considered students' behaviour as a negative factor, whereas teachers who had detailed understanding of it were able to identify ways to guide their students' behaviour in a positive manner. In the interviews, high-performing CL teachers emphasised the positive changes they saw in students' behaviour and perceived cognitive learning outcomes because of the implementation of cooperative learning to a much larger extent than did low-performing CL teachers.

However, teachers' attitudes and beliefs about cooperative learning as a successful strategy are not only based on seeing evidence of it in student outcomes. One of the high-performing CL teachers mentioned that seeing the effects of cooperative learning did not reinforce her use of it, as she was already convinced of its positive effects. This result emphasises that the attitudes and beliefs teachers hold before changing their instruction also play an important role in the implementation process. The model of Desimone (2009) captures that teachers' attitudes and beliefs are not only shaped by implementation, but also shape implementation.

Desimone's (2009) model takes into account the beliefs and attitudes teachers held before changing their instruction practices, and thus, emphasises that teachers' attitudes and beliefs shape implementation. On the other hand, Guskey's (2002) model does explain a highly relevant mechanism that occurs in the process of teacher change, which was confirmed by the majority of the teachers' in the present study in the context of cooperative learning implementation. Based on the present findings, it can be concluded that seeing evidence of change in students' learning outcomes (including positive

student behaviour) during implementation of cooperative learning influences teachers' attitudes and beliefs. Hence, Desimone's and Guskey's models are both helpful for understanding differences in teachers' levels of cooperative learning implementation. Based on the results of this study, we propose an integrated model of professional development and teacher change, as shown in Figure 1, as a framework to help understand why teachers vary in their implementation of cooperative learning.

We should note that our goal is not to propose an exhaustive model on professional development and teacher change, but rather to emphasise that both Desimone's and Guskey's models present important paths to consider for understanding the differences in teachers' performances in implementing cooperative learning. The proposed model emphasises the importance of successful improvement of student outcomes (including students' behaviour), which seems to be crucial for sustainable cooperative learning implementation. We recognise, similar to Guskey and Desimone, that the process of teacher change is rather cyclical than linear and can be influenced by a multitude of contextual factors, which is reflected in the model.

Following the integrated model on professional development and teacher change, different patterns occur for the low-performing CL teachers compared to the high-performing CL teachers. We suspect that because of negative attitudes and beliefs about cooperative learning or a deficiency in knowledge and/or skills, teacher performance in implementing cooperative learning is low by the low-performing CL teachers, which results in undesirable student outcomes, such as negative student behaviour. This leads to doubting the approach or reinforcement of disbelief, which in turn leads to less (effective) implementation of cooperative learning. Hence, low-performing CL teachers seem to enter a downward spiral where they only seem to see negative students' behaviour during cooperative learning and they attribute this to the implementation of cooperative learning. According to the low-performing CL teachers, the cooperative learning activities make the students behave worse. This makes the low-performing CL teachers view students' behaviour as an obstacle inhibiting them from fully implementing cooperative learning.

In contrast, high-performing CL teachers seem to view cooperative learning as an opportunity to teach students positive and cooperative behaviours, they give explicit instruction in cooperative behaviours and then they actually see that their instruction works, leading to a reinforcement of their belief in the cooperative learning approach. Thus, high-performing CL teachers seem to enter a positive spiral of making them belief in cooperative learning as a successful approach leading to enhancement of student outcomes, including more positive student behaviour.

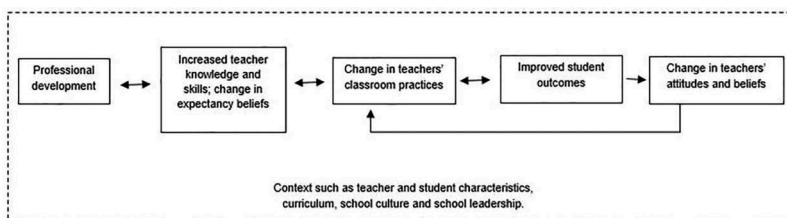


Figure 1. Model of professional development and teacher change.

Limitations and directions for future research

A limitation of this study is that we had no overall teachers' quality measures, which may explain some of the differences between teachers in their implementation of cooperative learning. Future research should examine the relationship between general teaching skills and skills specific to the implementation of cooperative learning. As the implementation of cooperative learning is highly complex, it seems unlikely that high-performing CL teachers have a low level of general teaching skills. However, low-performing CL teaching does not imply poor teaching nor poor student outcomes: it might imply that these teachers use a different pedagogical or instructional approach.

A second limitation concerns the way we investigated teachers' cooperative learning practices and their attitudes and beliefs. First, there is the possibility of teachers having given socially desirable answers to the interview questions, even though they were assured that their answers would be treated anonymously and only used for research purposes. Second, interview questioning was partly retrospective, which may have led to biased information. Measurements of attitudes and beliefs about cooperative learning at different time points, and also measurements of changes in teachers' practices and in student outcomes, were not included. We observed teachers' cooperative learning practices in one lesson and did not take into account teachers' cooperative learning knowledge or skills. We also did not examine whether teachers had a high expectancy of success of cooperative learning before and after their initial training. Furthermore, it should be noted that in this study we investigated how teachers *perceived* improvement of student learning, in contrast to evidence of improved student outcomes in, for instance, the form of student grades. Future research could use multiple measurement designs to investigate changes in teachers cooperative learning practices, their attitudes and student outcomes over time.

Lastly, future research could pay more attention to the influence of contextual factors on teachers' cooperative learning use. Desimone (2009) points to several contextual factors that might influence the process of teacher change: a) student characteristics, b) individual teacher characteristics, c) factors at the classroom, school and district level, and d) policy conditions. In the interviews we focused on contextual factors that are closely related to the intervention, such as teacher support and the quality of the cooperative learning tasks and activities. As the intervention was not implemented school wide, we did not specifically ask about school contextual factors. Nevertheless, some teachers mentioned school contextual factors as important for their cooperative learning implementation. For example, a teacher pointed to the importance of creating a culture in the school wherein the implementation of cooperative learning is an important topic to discuss with each other. This finding highlights the role of an open and stimulating school environment including collegial support for cooperative learning implementation.

Implications for facilitating teachers' implementation of cooperative learning

The results of this study emphasise that implementing cooperative learning is highly complex. Teacher professional development should pay specific attention on how to give explicit instruction in cooperative behaviours when implementing cooperative learning, as teachers struggled with it in the current study; for instance, low-performing CL teachers had problems with modelling these skills. It may be that the role of the teacher

in implementing cooperative learning as a guide on the side can be misinterpreted as a passive role. However, teachers have an essential and very active role in supporting and guiding students in cooperative learning. They have to teach students the required skills and provide the small learning groups with the support and guidance they need in order to make cooperative learning effective.

Another important finding is that it is important to pay attention to the intended results of cooperative learning for students, and to how teachers experience these student outcomes. Not only cognitive student outcomes are relevant, but also student behaviour: low-performing CL teachers struggle more with student behaviour during cooperative learning, while high-performing CL teachers feel more able to regulate student behaviour. Professional development could help teachers to determine what the intended student behaviours and student outcomes of cooperative learning are, so that they can focus on teaching these intended outcomes explicitly. Exploring teachers' specific attitudes and beliefs about cooperative learning seems crucial for sustained use of cooperative learning. It is a different attitude to use cooperative learning to improve student behaviour instead of seeing negative student behaviour as a problem that needs to be solved before implementing cooperative learning. We suggest that it can help to implement cooperative learning step by step, for instance, first implement activities for pairs and later extend the activities to groups. By doing this, both students and teachers can build experiences of success with the use of cooperative learning.

The findings of this study emphasise that teachers should be provided with ongoing professional development in the implementation of cooperative learning in the classroom. We think that careful attention to all elements of the proposed model while teachers implement cooperative learning contributes to the endurance of change, i.e., sustained cooperative learning use. As the saying goes and the model explains, the proof of the pudding is in the eating; thus, teachers need to experience success of cooperative learning in practice. If changes in teachers' attitudes and beliefs occurred only before the implementation of cooperative learning, the quality of the initial training would be crucial. But since such changes also occur during implementation, continued follow-up and support following initial training is of even greater importance. We suggest that coaching based on observed classroom practices is essential. Teachers should be prevented from entering a negative spiral in which they experience student behaviour during cooperative learning only as difficult and, therefore, do not succeed in improving students' cognitive and behavioural outcomes. Through research, including the current study, more insight is and can be gathered to explain how teachers' attitudes and beliefs shape teachers' implementation and vice versa, thus affecting the success of cooperative learning in practice.

Highlights

- Teachers differed significantly in their levels of implementation of CL
- High-performing CL teachers are more convinced of the value of CL
- Low-performing CL teachers struggle more with student behaviour during CL
- High-performing CL teachers feel more able to regulate student behaviour during CL
- High-performing CL teachers experience more positive changes in student outcomes

Notes

1. Note that in the original instrument the scores are used reversed.
2. In the Netherlands it is quite common that two teachers teach the same class part time.

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