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Student teachers' perceptions and evidence of peer learning through co-teaching: improving attitudes and willingness towards co-teaching

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Abstract
Despite the increasing practice and evidence of its potential, co-teaching has not become a widespread practice in schools yet. Research shows the need of helping teachers become aware of co-teaching as a good mechanism for peer learning among teachers. This study focuses on the changes in student teachers' attitudes to use co-teaching through their perceptions as a tool for their own learning. Opting for a mixed-methods sequential explanatory design, 82 student teachers were divided into two groups, one receiving only conceptual training and the other one having the possibility to experience co-teaching in schools. It was hypothesized that the second group would improve their attitudes to use co-teaching more than the first group. A qualitative study was carried out to explore (1) students' learning perceptions, (2) learning episodes in the out-of-class joint activity and (3) comparison between (1) and (2). Results confirm the hypothesis and find evidence from learning episodes to support students' perceptions but show that there is not a clear match between students' perceptions and contents from the learning episodes. Research implications and limitations are discussed.

Keywords Cooperating teachers · Educational psychology · Preservice teaching · Teacher collaboration

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Introduction

Collaboration between teachers is crucial for developing practices that effectively face the challenges set by the educational contexts (Echeita et al. 2014). The direct collaborative model par excellence is co-teaching (Murawski and Dieker 2008), defined as a situation in which teachers—usually two—share responsibility in educating the whole class, within an inclusive classroom, by designing a programme adapted to everyone, implementing the agreements and reviewing the results obtained (Friend et al. 2010).

In recent years, co-teaching has increasingly become a more widely implemented instructional model (Rytivaara and Kershner 2012; Villa et al. 2008). Research has shown the benefits of co-teaching as an effective instructional model for inclusion, educational innovation and teachers' professional development, leading to a radical change in teaching methodologies and the teacher's role (Hang and Rabren 2009; McDuffie et al. 2009; Nevin et al. 2009; Pancsofar and Petroff 2016; Pratt 2014; Rytivaara and Kershner 2012; Villa et al. 2008).

Despite the increasing practice and evidence of its potential, two reasons might explain the difficulties of co-teaching to become widespread in schools. First, the *one-teacher-per-classroom* traditional individualistic culture and the lack of a supportive school culture have forged strong resistance in teachers' attitudes towards co-teaching practices (Friend et al. 2010; Pancsofar and Petroff 2013; Rytivaara and Kershner 2012; Scruggs et al. 2007). Second, research has repeatedly shown a lack of knowledge by teachers and schools that would help them implement co-teaching successfully (OECD 2014; Scruggs et al. 2007).

This second reason makes teacher training—in-service, and especially pre-service—become essential. Baeten and Simons (2014) highlight four main conditions for a successful implementation of co-teaching in pre-service teacher training: combining co-teaching and individual teaching, preparing the roles, studying the team creation and promoting the necessary conditions for the success of collaboration. Some empirical research has analysed the pre-service training for co-teaching in different educational programmes (Goodnough et al. 2009; Cavanagh and McMaster 2015). However, none of these studies seem to directly address what the nature of this co-teaching training should be to have an impact on the prospective teachers' attitudes and willingness to use co-teaching. Although teacher training is required, it might not be enough (Abrami et al. 2004). There is some agreement on the need of using experiential learning (Sharan 2015) and on the necessary 'coordination between what the interns see and do at university and what they see and do in actual classrooms' (Cohen et al. 2004, p. 10).

Teachers who reported more pre-service learning opportunities in co-teaching had more positive attitudes about co-teaching and felt more confident in their practice than those without co-teaching experience (Pancsofar and Petroff 2013). What might explain these more positive attitudes shown by teachers who had co-teaching experiences? Research shows different benefits from giving pre-service teachers opportunities of co-teaching: developing teamwork skills (Cavanagh and McMaster 2015; Guise et al. 2017); increasing the degree of dialogue, observation and critical reflection around teaching and learning processes (Bouck 2007); providing emotional and professional support and increasing teachers' feelings of security, efficacy and confidence (Miquel and Duran 2017; Pancsofar and Petroff 2013); and having a positive impact on teachers' efficacy and on students' performance (Bacharach et al. 2010; Goodnough et al. 2009; Johnson and Johnson 2014).

In addition to these two barriers to the spread of co-teaching practice in schools—the traditional individualistic culture and the need for teacher training—, a third reason could be

added: the need for helping teachers become aware of co-teaching as a good mechanism for peer learning (Pratt 2014), that is, the opportunities of learning from each other when collaborating with other teachers. Constructive discussion acts as a strategy that allows teachers to build knowledge together (McDuffie et al. 2009). In this sense, co-teaching could be a way to foster peer learning among teachers (Duran and Miquel 2019), which offers an added value to the use of this instructional model by teachers. Not only is co-teaching good for pupils but also for teachers themselves, as a mechanism for professional development. Peer learning among teachers is characterized by exchanging ideas, discussing experiences with alternative teaching methods and solving instructional problems, when creating concrete artefacts, such as lesson plans (Meirink et al. 2010).

However, there is a lack of research focusing on analysing the learning situations that emerge in the interaction between co-teachers, probably due to methodological issues when trying to clearly identify learning episodes in the interaction. In research carried out with students from primary education, Staarman et al. (2005), from a sociocultural perspective, developed a coding scheme to analyse the verbal interactions of student dyads, which enables the identification of different types of interventions beneficial for learning: asking complex questions, answering with elaboration, providing elaborated information, referring to earlier remarks/information, summarizing/concluding, accepting with elaboration and rejecting with elaboration.

This study presents the innovations in the Degree in Primary Education at Universitat Autònoma de Barcelona (UAB) based on (1) providing a conceptual training of the bases of co-teaching—to two groups of student teachers—and (2) offering the possibility of experiencing co-teaching in primary school classrooms. Throughout the *Practicum II* course, student teachers from one group received support—in pairs—to design, implement and evaluate lessons and reflect about the process as a mechanism for peer learning.

The aim of this study is to know if student teachers perceive that the co-teaching experience offered them opportunities for learning. At the same time, it aims at identifying possible learning episodes in the joint activity between co-teachers, examining whether the contents of these learning episodes match with their perceptions or not.

Hypothesis and questions

The following hypothesis was formulated: those student teachers who receive conceptual training and the opportunity of co-teaching (Group 2) improve their attitudes and willingness to use co-teaching in a pre/post-test measurement, more than those who only receive the training (Group 1).

Having established the positive relation between the perceptions of improvement in learning as a mechanism to change student teachers' attitudes and willingness towards co-teaching, the following three research questions were posed to explain more clearly the possible quantitative changes of the hypothesis:

(1) How do those student teachers from Group 2, who have experienced co-teaching in the practicum, interpret the repercussions it has had on their own learning?
(2) In the out-of-class joint activity between student co-teachers, is there any evidence of learning episodes—interventions beneficial for learning? What contents are these learning episodes about?

(3) Do the repercussions reported by student teachers on their own learning match the contents of the learning episodes identified in the joint activity?

Methodology

Design

This research opts for a mixed-methods sequential explanatory design (Creswell 2015), combining a pretest/post-test design to detect changes in attitudes and willingness to use co-teaching with a qualitative study to understand the possible quantitative differences. This qualitative study is based on analysing (1) students' learning perceptions at the end of the process and (2) students' interaction as co-teachers during joint activity outside the class.

Sample

The sample, 82 students in the third year of their Degree in Primary Education at UAB, was divided into two groups: Group 1 ($n = 54$), students who received initial conceptual training on co-teaching; Group 2 ($n = 28$), students who not only received this same training but also participated in the innovation of experiencing co-teaching in their practicum in primary education schools.

Instruments

The following instruments were used for the study:

- Adapted questionnaire on co-teaching (CTQ). There is a lack of proposals that suit the approach of this research. Huguet's (2006) proposal was chosen and adapted. The adapted questionnaire has three parts: (a) students' previous experience in co-teaching; (b) attitudes and conceptions they hold on co-teaching; and (c) benefits and difficulties detected in the development of co-teaching. The first part has multiple-choice questions and the third consists of open-ended questions on the benefits and difficulties of co-teaching with respect to three areas: students, teachers and institution. In the second part, there are 36 statements that are evaluated on a Likert scale of 1–5, where 1 means total disagreement and 5 total agreement, with an added no-opinion option for students who may not understand the statement. Twenty of the statements originated from Huguet's questionnaire, and the remaining 16 were designed ad hoc and focused on the following topics: relationship among teachers, provisions made for the participants—co-teachers and pupils—, attention to diversity, innovation and improvement and institution's cultural ethos.
- Final written reports. This activity—to be done at the end of the course—contained two direct questions to be answered freely on students' learning experience in the three stages of co-teaching: planning, intervention and assessment of the joint work.
- One-session recordings from all pairs of co-teachers as a sample of joint work. Students were recorded during one session in which they worked together outside the school class. This recorded session was one of the sessions held at university, led by the teacher

responsible for the subject. There is a total of 14 recordings between 6 and 16 min long—that is, one recording from each pair. This makes a total of 3 h 6 min 32 s for analysis of student co-teachers' interaction.

Collecting and analysing the data

After informing the participants and obtaining their consent, at the beginning of the first term—before co-teaching began—, the CTQ questionnaire was administered to all students in a pretest format, and then conceptual co-teaching training was discussed in the subjects *Learning Processes and Development II* and *Language and Learning* over two sessions, lasting 6 h in total. Extra reading material was provided.

At the beginning of the second term, in *Practicum II*, students from Group 2 designed and co-taught in schools with another fellow student teacher. They were helped by the learning guidelines, supervised by the teachers responsible for the subject and had the approval of the class teacher. Activities were developed for 7 weeks, 3 h per week—1 h of teacher-guided activity and 2 h of autonomous work by the pairs of student teachers. These activities guided student teachers through the different moments of the teaching and learning process: planning the lessons, implementing them in class and assessing the implementation. Key aspects of co-teaching, role distribution and decision making were considered throughout the process. As mentioned previously, students were asked to record themselves during a session where they worked together preparing and reflecting on their joint activity in classroom. The 14 recordings were analysed. The coding scheme created by Staarman et al. (2005) was adapted to the purpose and context of this study. Seven categories were included, which were considered to represent types of interventions beneficial for learning: asking complex questions, answering with elaboration, providing elaborated information, referring to earlier remarks/information, summarizing/concluding, accepting with elaboration and rejecting with elaboration. After validating the coding system, each recording was analysed, measuring both the frequency (f) and the time of each category and calculating the percentages over the total.

At the end of the course, students were asked to write the final reports. The collected data were analysed qualitatively with the Grounded Theory and by means of the qualitative data analysis software Atlas-ti. An ad hoc category coding system was developed. After validating the coding system, each student's report ($n = 28$) was analysed, taking the frequency (f) of the answers into account, that is to say how many comments referred to the dimension/category. The frequencies were complimented with percentages and quotes to clarify the meanings of the dimensions and categories. This ad hoc category system was then used to analyse the recordings as follows. The interventions that had been coded as beneficial for learning in the interaction analysis were coded again by means of the category system emerging from students' reports. After validating the coding system, each recording was analysed, measuring both the frequency (f) and the time of each category and calculating the percentages over the total of interventions and time considered to be beneficial for learning.

In order to assess the reliability of the three analyses by means of category systems, three previously trained researchers analysed 25% of the total data. The values obtained from Spearman's coefficient—which are close to 1—showed that the category systems are reliable. The few cases of disagreement were discussed until 100% agreement was reached.

The students' replies in the final reports were based on the evidence they collected while co-teaching. They used their personal experience and the work done with their co-teaching

partner. Once all the interventions had finished at the end of the second term, all participants answered the CTQ questionnaire in a post-test format.

SPSS Statistics v.22 software was used to analyse the data obtained in the questionnaires. For all the statistic tests, the nominal significance level applied was 5% ($p < 0.05$). The variables in the questionnaire were summarized using descriptors (mean and standard deviation, quantitative variables). The differences between groups in the pretest and post-test were compared through Student's *t* test for the comparison of two means. Application conditions for that test were contrasted by using the Shapiro-Wilk test for normality and Levene test for equality of variances. Results were not statistically significant, which indicates the suitability of Student's *t* test.

Results

Hypothesis: improving attitudes and willingness to use co-teaching

First, the results of the hypothesis based on the statistical analysis of the questionnaires are presented. The statistical descriptors of the difference between results (pre-post) obtained in the answers to the CTQ show that Group 2 scored higher than Group 1 (Table 1). Likewise, equality of variances is assumed according to the Levene test results, $F(1.81) = 0.22$, $p = 0.64$).

Results show statistically significant differences between Groups 1 and 2 (Table 2). This confirms the hypothesis, which states that changes in attitudes and willingness to use co-teaching are promoted more when students receive conceptual training on co-teaching and they are given the opportunity to practice it, than if they only receive conceptual training.

In order to explain Group 2's changes in attitudes and willingness to use co-teaching, the results obtained in the qualitative analysis are presented below.

Question 1: students' learning perceptions

In the first research question, the students' learning perceptions are analysed based on their answers to the questions in the final written report on their own learning experience when planning co-teaching in pairs. The degree of agreement between raters was 0.897, 0.967 and 0.989—Spearman's coefficient—, which shows that the category system was reliable. The few cases of disagreement were discussed until 100% agreement was reached. The students' replies were based on the different reasoning related to what and why they had learned (Table 3).

Students pointed out that carrying out their intervention together helped them learn especially (1) how to work together (55.21%), (2) how to implement more elaborate lessons (38.02%) and (3) how to improve professionally (6.77%).

Table 1 Statistical descriptors for the two groups

	Group 1 ($n = 54$)	Group 2 ($n = 28$)
M pretest	156.28 (11.15)	155.32 (13.25)
M post-test	164.63 (9.82)	169.68 (8.09)
Difference in CTQ results	8.35 (9.27)	14.36 (10.50)

Mean (standard deviation)

Table 2 CTQ difference post pretest (Student's *t* test)

	N	Dif CTQ	SD	*t*	*gl*	Sig. (bilateral)
Group 1	54	8.35	9.27	− 2.66	80	.01*
Group 2	28	14.36	10.50			

*The mean difference is significant at the 0.05 level

(1) Students claimed that developing co-teaching gave them the opportunity to learn how to work collaboratively and highlighted the different teaching perspectives as a source of learning. They also valued the improvement in constructive dialogue skills. To a lesser extent, they indicated that mutual support and coordination were a source of learning as well.

(2) Students mentioned that co-teaching provided them with opportunities to learn how to plan more elaborate lessons thanks to the new knowledge learned from their colleague. Especially worth mentioning is that most of the contributions refer to techniques and resources they learned. To a lesser extent, they valued the diversity in the way of working, the attention to pupils during the lesson and the opportunities that co-

Table 3 Perception students have of their own learning in the final report

Dimension	Category	Example	*f*	%
Teamwork skills	Teachers' perspectives	'Above all, I've learned new points of view and different ways of facing challenges, because my colleague is very different in her approach'	34	17.71
	Constructive dialogue skills	'I've learned how to work together, agree with, listen to and recognise the other person's ideas and proposals. Even so, we learn through debating'	33	17.19
	Coordination	'I've learned more from the fact that I could talk to my colleagues before and after each intervention'	14	7.29
	Mutual support	'It has helped me to plan better and be more relaxed about planning and being in class'	15	7.81
	Distribution of roles	'I've learned how to share responsibility in the classroom and how to divide the tasks up better for the pupils'	10	5.21
	Total		106	55.21
More elaborate lesson	New techniques and resources	'I've learned a lot of techniques, ideas and discovered materials and resources by sharing the experience with my colleague'	53	27.60
	Different styles of working	'Each teacher has her own teaching style, but if we are flexible and more aware, lessons are more fun and solid'	8	4.17
	Attention to pupils	'I think we were able to help the whole group much better, despite the difference in levels'	6	3.13
	Assessment	'By really observing, we were able to see how the children learned'	6	3.13
	Total		73	38.02
Professional development	Self-reflection	'It helps us become more objective and understand what we like and dislike and what we want to do in the future, when we see other teachers in the classroom'	6	3.13
	Flexibility	'We've also learned to cope with things which crop up unexpectedly' '[...] and that sometimes it's better to continue exploiting an activity rather than change it'	7	3.65
	Total		13	6.77

teaching offers to improve the assessment, especially in terms of tracking students' learning process.

(3) Although less explicitly, students indicated that by developing co-teaching they improved professionally because it forced them to reflect and appreciate the flexibility that a competent teacher must have.

Question 2: learning episodes in the out-of-class joint activity

The degree of agreement between raters was 0.87, 0.972 and 0.961—Spearman's coefficient—, which shows that the category system was reliable. The few cases of disagreement were discussed until reaching 100% agreement. Results show that from the total time of recordings (3 h 6′ 32″), students devoted slightly more than half of the time (1 h 35′ 46.82″, which represents 51.35% of the time) to interventions considered to be beneficial for learning (Table 4). Focusing on each category, the difference between the percentage of frequency of interventions and the percentage of time devoted to that kind of intervention is similar in all the

Table 4 Analysis of students' interventions beneficial for learning

Category	Example	*f*	% *f*	Time	% time
Asking complex questions	'What for?'	36	7.13	0:01:40.52	1.75
Answering with elaboration	'Yes, they are usually the same ones. And then these go and help the person you say, and they have no problem. And I think this is a very good thing. I do not know if the same would happen in other classes, if you say: Go help this student. Because it's likely that many students would say: No, no, I do not want to help this kid because of whatever'	51	10.10	0:12:49.86	13.40
Providing elaborated information	'They promote inclusion but… because they are all together. I mean: if you place a child who is not working, he has five that can help him. The problem is that they are not used to working in groups. Although they are organised like that, almost all the tasks are individual, and we will have to work on that: listening to each other'	138	27.33	0:34:58.59	36.52
Referring to earlier remarks/information	'Yes, it's the same that we said before'	1	0.20	0:00:03.72	0.06
Summarizing/concluding	'We have worked well together, we understood each other really well, and this made all the work much easier'	32	6.34	0:05:31.79	5.77
Accepting with elaboration	'Ok, of course. And then I would not be able to attend to all students. And what we want is that we both interact with all the pupils'	187	37.03	0:31:46.14	33.17
Rejecting with elaboration	'I think it's not necessary. Because on top of that… Maybe paying attention to him a bit yes because... He's a child that easily loses contact and starts playing with anything. But being… I think that being with him all the time, besides the teacher assistant… might be too many people'	60	11.88	0:08:56.20	9.33
Total		505	100	1:35:46.82	100

categories except for *Asking complex questions* and *Providing elaborated information*. This difference is due to the different length of the interventions, *Asking complex questions* being usually the shortest ones (mean of 2.79 s per intervention) and *Providing elaborated information* being usually the longest ones (mean of 15.21 s per intervention).

Focusing on the frequencies, *Providing elaborated information* (27.33%) and *Accepting with elaboration* (37.03%) are the two categories with the highest frequencies (Table 4). While *Providing elaborated information* mainly consists of long interventions (mean of 15.21 s per intervention), *Accepting with elaboration* comprises shorter interventions (mean of 10.19 s per intervention) that usually happen in sequences in which co-teachers accept and progressively elaborate their contributions alternately. The high frequencies of these categories especially illustrate that co-teaching required students to back up and further develop their ideas and proposals in order to build a shared representation and make joint decisions.

In reference to the second part of the second research question, in order to know which contents the interventions beneficial for learning were about, these interventions were coded by means of the category system emerging from students' reports, presented in the first research question (Table 5). The degree of agreement between raters was 0.971, 0.943 and 0.891—Spearman's coefficient—, which shows that the category system was reliable. The few cases of disagreement were discussed until reaching 100% agreement.

The analysis shows that 42.44% of the learning episodes can be classified by means of the category system emerging from students' reports, but 57.56% remain unclassified because the contents do not match students' perceptions. That is why four new categories were added emerging from the learning episodes, to gather contents that were not reported by students in their reports: *Defining what to do in class*, *Justifying or questioning what to do in class*, *Relationship between students and support teacher* and *Learning about the content taught*. Two of these new categories—*Defining what to do in class* (35.64%) and *Justifying or questioning what to do in class* (24.16%)—are the ones with the highest frequencies. Both

Table 5 Analysis of the contents appearing in students' interventions beneficial for learning

Dimension	Category	*f*	% *f*	Time	% time
Teamwork skills	Teachers' perspectives	0	0	0:00:00.00	0
	Constructive dialogue skills	0	0	0:00:00.00	0
	Coordination	37	7.33	0:08:52.56	9.27
	Mutual support	5	0.99	0:00:29.59	0.51
	Distribution of roles	32	6.34	0:05:59.76	6.26
	Total	74	14.66	0:15:21.91	16.04
More elaborate lessons	New techniques and resources	16	3.17	0:04:24.14	4.60
	Different styles of working	0	0	0:00:00.00	0
	Attention to pupils	40	7.92	0:10:12.57	10.66
	Assessment	50	9.90	0:08:38.12	9.02
	Defining what to do in class	180	35.64	0:34:17.47	35.80
	Justifying or questioning what to do in class	122	24.16	0:18:55.08	19.75
	Total	408	80.79	1:16:27.38	79.83
Professional development	Self-reflection	0	0	0:00:00.00	0
	Flexibility	10	1.98	0:01:32.55	1.61
	Learning about the content taught	6	1.19	0:01:12.96	1.27
	Relationship between students and support teacher	3	0.59	0:00:42.69	0.74
	Total	19	3.76	0:03:28.20	3.62
Non-classified		4	0.79	0:00:29.33	0.51
	Total	505	100	1:35:46.82	100

categories belong to the dimension *More elaborate lessons* (79.83%), which clearly exceeds *Teamwork skills* (16.04%) and *Professional development* (3.62%).

Results show that there is no clear match between students' learning perceptions from the final report and the contents identified in the learning episodes. This mismatch will be tackled in the third research question.

Question 3: comparing students' learning perceptions with contents in the learning episodes

When comparing the students' learning perceptions from the final report with the contents identified in the learning episodes in the out-of-class joint activity, results show three possible situations (Table 6): (1) contents that were both reported by students in the final report and identified in the interaction between co-teachers; (2) contents that were reported by students in the final report but were not identified in the interaction between co-teachers; and (3) contents that were not reported by students in the final report but were identified in the interaction between co-teachers.

As far as the contents that were both reported by students in the final report and identified in the interaction between co-teachers is concerned, there are some contents that were both proportionally identified in the two analyses: *Coordination*, *Distribution of roles* and *Flexibility*. Some other contents were proportionally more identified in the final report than in the interaction between co-teachers—*Mutual support* and *New techniques and resources*—, probably due to the implicit nature of these contents, which usually do not appear explicitly in the conversation but as an outcome of the interaction between students throughout the practicum. Some other contents were proportionally more identified in the interaction between co-teachers than in the final report—*Attention to pupils* and *Assessment*—, indicating that

Table 6 Comparison between contents identified in the final reports and in the interaction analysis

Dimension	Category	Final report % *f*	Interaction analysis % *f*
Teamwork skills	Teachers' perspectives	17.71	0
	Constructive dialogue skills	17.19	0
	Coordination	7.29	7.33
	Mutual support	7.81	0.99
	Distribution of roles	5.21	6.34
	Total	55.21	14.66
More elaborate lessons	New techniques and resources	27.60	3,17
	Different styles of working	4.17	0
	Attention to pupils	3.13	7.92
	Assessment	3.13	9.90
	Defining what to do in class	0	35.64
	Justifying or questioning what to do in class	0	24.16
	Total	38.02	80.79
Professional development	Self-reflection	3.13	0
	Flexibility	3.65	1.98
	Learning about the content taught	0	1.19
	Relationship between students and support teacher	0	0.59
	Total	6.77	3.76
Non-classified		0	0.79
	Total	100	100

students were not very aware of the learning opportunities that co-teaching offered when it comes to these two contents.

Regarding the contents that were reported by students in the final report but were not identified in the interaction between co-teachers, these are *Teachers' perspectives*, *Constructive dialogue skills*, *Different styles of working* and *Self-reflection*. This is probably due to the implicit nature of these contents, which do not appear explicitly in the conversation but as an outcome of the interaction between students along the practicum.

In reference to the contents that were not reported by students in the final report but were identified in the interaction between co-teachers, these are *Defining what to do in class*, *Justifying or questioning what to do in class*, *Learning about the content taught* and *Relationship between students and support teacher*. This indicates whether students were not at all aware of the learning opportunities that co-teaching offered when it comes to these contents or they do not consider them an outcome of co-teaching—but maybe of teaching itself.

Discussion

Quantitative results show that offering pre-service teachers opportunities to practice co-teaching positively affects their attitudes and willingness towards co-teaching. These results are in line with previous research (Pancsofar and Petroff 2013). This becomes interesting when it comes to minimizing the difficulties that may emerge when implementing co-teaching (Friend et al. 2010). The possibility of incorporating systematic opportunities for students to practice co-teaching in their pre-service training becomes especially feasible when incorporating co-teaching in the students' internships in schools, as suggested in this study.

Why does experiencing co-teaching change students' attitudes to use co-teaching in the future? In this study, we focused on how students interpret the repercussions of experiencing co-teaching on their own learning. As pointed out in many studies, the use of co-teaching has a positive impact on the attention given to pupils in class by the two teachers (Hang and Rabren 2009). At the same time, the joint activity between co-teachers—in this case, student teachers that practice co-teaching in their internship in schools—can become a mechanism of peer learning (Pancsofar and Petroff 2013). From this perspective, the results of this study show that student teachers report that co-teaching has helped them a) develop teamwork skills—especially learning from different teachers' perspectives and developing constructive dialogue skills, in line with previous research (Bouck 2007; Cavanagh and McMaster 2015; Guise et al. 2017)—, b) plan more elaborate lessons —learning new techniques and resources (Nevin et al. 2009)—, and c) improve professionally. In terms of percentages, developing teamwork skills and planning more elaborate lessons clearly exceed improving professionally. Developing teamwork skills becomes the most cited dimension by student teachers, which is highlighted as essential for building teachers' communities of learning (Duran and Miquel 2019).

Following Staarman et al. (2005), we identified learning episodes in a sample of recordings from the interaction between co-teachers in their out-of-class joint activity. These episodes take up more than half of the time of interaction, which may indicate that social spaces of coordination between co-teachers offer a powerful scenario for peer learning in constructive discussion situations, in line with previous research (McDuffie et al. 2009; Pratt 2014).

This learning time is above the time reported in studies on academic engaged time in school learning, which is at a maximum of 45% of the class time (Gettinger and Walter 2012). Broadly speaking, two different kinds of interventions typical of peer learning situations were

identified (Duran and Monereo 2005): tutorial interventions, linked to explaining by transforming the information—providing elaborated information and answering with elaboration, which take up 49.92% of the time—and collaborative interventions, in which the other's contributions are accepted or rejected with elaboration—which take up 42.50% of the time. Asking questions—which happens frequently but does not take much time over the total due to the short nature of this kind of interventions—, answering and building shared knowledge seem to be the essential interventions that allow co-teachers to learn from each other.

The revision of the contents that appear in these learning episodes confirms the predominance of interventions connected with the preparation of more elaborate lessons, in which students especially define and justify or question what to do in class—which takes up 55.55% of the time. Other contents are identified to a lesser extent: assessment, attention to pupils and distribution of roles or coordination.

When comparing students' learning perceptions with the evidence found in the analysis of the out-of-class joint activity between co-teachers, we found some consistency that supports their perceptions with evidence from the interaction. In line with previous research (Cavanagh and McMaster 2015; Guise et al. 2017; Miquel and Duran 2017; Pancsofar and Petroff 2013), results indicate that co-teaching helps to develop teamwork skills—coordination and distribution of roles—, more elaborate lessons—attention to pupils, assessment and the learning of new techniques and resources—and professional development—flexibility. Moreover, the learning episodes provide strong evidence of the potential of co-teaching when it comes to thoroughly defining and justifying or questioning what to do in class and, to a lesser extent, of the opportunities for professional development, such as learning about the content taught and learning about the relationship between the pupils and the support teacher.

All in all, it seems that students' perceptions of their own learning after experiencing co-teaching are backed up by the evidence gathered from the interaction analysis. However, some of the students' learning perceptions were not identified in the interaction analysis—teachers' perspectives, constructive dialogue skills, different styles of working and self-reflection. Does it mean that these learnings are a fantasy of the teachers? We would rather attribute this mismatch to the limitations of our study. First, we did not find explicit evidence of these contents as topics being discussed between co-teachers, but it is clear that students were implicitly bringing them into play while interacting. Second, it is possible that these learnings reported by students are developed in other scenarios offered by co-teaching that are not analysed in this study: the interaction between co-teachers during the implementation of the lessons in class.

Conclusions

Results indicate that if we want to foster the use of co-teaching in schools, student teachers should have opportunities of using co-teaching in their training programmes. Given the difficulties for spreading the use of co-teaching, finding a way of training teachers to help them value this model of teaching is a current need. Practicing co-teaching in the pre-service training—beyond just acquiring conceptual knowledge on the topic—seems essential not only to help student teachers develop skills to use this instructional model in class but also to help them value their potentialities.

In order to increase the awareness of the potentialities of co-teaching, emphasis should be placed not only on co-teaching as an instructional model that teachers implement to benefit

attention to pupils but also as a way of peer learning among teachers. This study offers evidence that when asking co-teachers about their own learning after their participation in a co-teaching practice, they report what they learnt. This learning—actually, peer learning—is backed up by the learning episodes identified, which take up more than half of the time of interaction. This shows the potentiality of joint-work spaces as peer learning scenarios.

In many cases, the contents of co-teachers' learning perceptions match the contents of the learning episodes. However, this does not always happen. Some contents were only identified in students' learning perceptions, probably because they are not explicitly reflected as a content of students' words in the dialogue but implicitly in their interaction—such as teachers' perspectives, constructive dialogue skills and different styles of working. Some other contents were identified in the learning episodes from co-teachers' interaction but were not reported by them—such as defining, justifying or questioning what to do in class and learning about the content taught. This might indicate that co-teachers learn more than they think. Moreover, this remarks the need to help them reflect on the relevance of learning how to carry out shared analysis of the class and learning about what is being taught.

It is worth mentioning what student teachers highlight about working on and through co-teaching: developing teamwork skills and learning professional and didactic tools through the exchange between colleagues. These two elements might help forge a solid itinerary for building their own professionalism as teachers. Co-teaching is a valuable tool for professional development: teachers can learn in their workplaces in a daily basis working with their colleagues.

One of the limitations of the study was the difficulty to find validated tests to assess students' attitudes towards the use of co-teaching. Further research is needed to complement the research presented in this paper with other studies that analyse the interaction between co-teachers happening not only in out-of-class coordination spaces but also inside the class. This is an interesting research area, which might help shed some light on how teachers can also learn on their job, working with their colleagues, building classrooms where teachers can learn as well—like their students do—to consolidate schools as learning institutions.

Current themes of research Co-teaching. Peer learning. Cooperative learning. Peer tutoring. Inclusive education. Leaning by teaching.

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