Review

A meta-synthesis of co-teaching students with and without disabilities

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A R T I C L E   I N F O

Keywords:
Co-teaching
Students with disabilities
Meta-synthesis
Students without disabilities

A B S T R A C T

A meta-synthesis of qualitative research was conducted on co-teaching by general and special educators working with students with and without disabilities in primary and secondary general education classrooms. We sought to update the Scruggs et al., 2007 meta-synthesis to discern new knowledge, including co-teaching's impact on students and teachers. Although challenges are identified, co-teachers perceive that co-teaching can enhance their and their students' learning. Findings suggest that school personnel, researchers and policymakers can consider co-teaching as a learning context for co-teachers as well as a dynamic framework that can potentially foster effective instruction for all students in the co-taught classroom.

1. Introduction

In response to international and national policies toward educating students with and without disabilities in general classrooms (UNESCO, 1994), co-teaching by special and general educators is an alternative approach to placing students in segregated special education settings (Friend et al., 2010). Co-teaching is one of several inclusive approaches in which co-teachers instruct students with disabilities together with their same-age peers within general education classrooms (Cook and Friend, 1995; Strogilos et al., 2017; Villa et al., 2008). The first research and theoretical articles on co-teaching emerged in the mid-1990s as an alternative to pull-out services for students with disabilities (Boudah et al., 1997; Cook & Friend, 1995). In the past three decades, researchers have investigated co-teaching to understand its nature, process, and impact. These investigations include consideration of co-teaching as a special education approach (Friend et al., 2010), as a provision that combines general educators' content expertise with special educators' pedagogical expertise (Villa et al., 2008), or as an approach that may increase the academic gains for all co-taught students (Bottge et al., 2015; Murawski & Swanson, 2001; Tremblay, 2013).

Cook and Friend (1995) proposed several co-teaching models, which are still used today: two educators share the planning and delivering of instruction by each leading instruction (team teaching), students are divided between the two teachers (parallel or alternative teaching) or in stations (station teaching), and one teacher leads while the other assists or observes (one-teach,

one-assist/observe/circulate). Nevin et al. (2008) noted that both educators "are responsible for instructional planning and delivery, assessment of student achievement, and classroom management" (p. 284). Despite co-teaching's popularity, research has identified several challenges such as co-teachers having sufficient planning time, the extent to which effective instructional strategies are used, and the academic and social progress of students in the co-taught class (Cook et al., 2017; Scruggs et al., 2007). However, other aspects of effective co-teaching, such as pedagogy designed by both educators and parity as equal distribution of responsibilities (Cook & Friend, 1995), are not corroborated in studies (e.g., Bessette, 2008). Conversely, other research confirms effective and shared instruction by co-teachers (e.g., King-Sears et al., 2014).

In the USA, almost 65% of over six million students with disabilities are taught in general classrooms (United States Department of Education, 2022), many of which are instructed by co-teachers. In addition, co-teaching research is international in scope (e.g., Australia, Ireland, Greece, Finland). Most research features qualitative investigations in which researchers seek to understand what happens inside a co-taught classroom (Paulsrud & Nilholm, 2020; Scruggs et al., 2007). Some studies provide rich descriptions and interpretations about co-teaching's implementation as well as perspectives from those involved. Among positive qualitative findings are co-teachers' beliefs that instruction benefits students with and without disabilities (Brusca-Vega et al., 2011/USA; Casserly & Padden, 2018/Ireland; O'Rourke & Houghton, 2009/Australia). Conversely, findings also note lack of co-planning time can negatively impact co-teaching's effectiveness (Stefanidis et al., 2019/U.S; Strogilos & Tragoulia, 2013/Greece).

Although in the past decades qualitative research on co-teaching has grown, an updated systematic examination of these qualitative investigations is missing. The last meta-synthesis of qualitative research on co-teaching was published by Scruggs et al. (2007), and co-teaching advances since 2005, the end date for Scruggs et al. (2007) studies, are difficult to be discerned without a new methodical synthesis.

1.1. Previous systematic reviews and meta-syntheses

Four systematic reviews on co-teaching, which also included other themes such as consultation or inclusion, and one meta-synthesis (Scruggs et al., 2007) have been published. Van Garderen et al. (2012) reviewed 19 studies, published before December 2010, to explore the impact that collaboration between co-teachers has on the social and academic outcomes of students with disabilities. They included studies on co-teaching and consultation but excluded action research and case studies. From the 19 studies, seven supported collaboration, four had both positive and negative results, five did not support collaboration, and three were inconclusive. Although Van Garderen et al. could not make definitive conclusions, they noted the potential of collaboration to positively impact outcomes for students with disabilities, calling for more empirical evidence.

Solis et al. (2012) summarised six syntheses on co-teaching and inclusion, employing research published between 1990 and 2010. They found that "one teach, one assist" was the most common co-teaching model. In some studies, although special educators recommended effective instructional strategies to general educators, instruction remained unchanged. In other studies, students with and without disabilities noted benefits when co-teachers implemented effective instructional practices, such as study guides, hands-on activities, and active involvement. Consequently, Solis et al. suggested that educators capitalise on instruction that benefitted all students and use varied co-teaching models.

Paulsrud and Nilholm (2020) synthesised 25 qualitative observational research studies ($n = 19$) and dissertations ($n = 6$), from 2005 to 2019, regarding cooperation between general and special educators to supports students with disabilities. Co-teaching was used in over two-thirds of the studies. Similar to Solis et al. (2012), the "one teach, one assist" model dominated and parity was not evident, because teaching roles were unequal. Also, the researchers highlighted the importance of positive relationships as important for effective co-teaching.

Iacono et al. (2021) reviewed 21 qualitative, quantitative, and mixed-methods studies published between 2008 and 2019, examining the efficacy of different co-teaching models on students with disabilities. Two models were identified most frequently: team teaching ($n = 11$) and "one-teach, one assist" ($n = 10$). Evidence regarding student learning was reported in only a few studies. However, the primary studies were not exclusively focused on co-teaching models. Hence, meaningful comparisons across the studies could not be discerned.

None of the systematic reviews provide a complete in-depth meta-synthesis of qualitative studies on co-teaching to elicit the multiple features that might influence its process and impact on teachers and students. Moreover, they do not all focus solely on co-teaching. One included both qualitative and quantitative studies on co-teaching and on collaboration (e.g., Van Garderen et al., 2012), one focused on the efficacy of co-teaching models (e.g., Iacono et al., 2021), one merged co-teaching with inclusion (Solis et al., 2012) and one focused on educators' cooperation (Paulsrud & Nilholm, 2020).

The only systematic meta-synthesis of qualitative research focused solely on co-teaching was conducted by Scruggs et al. (2007), who reviewed 32 studies. They found little parity between co-teachers (usually special educators were subordinate to general educators), lack of co-planning time, weak interpersonal skills undermined productive relationships, and confusion about roles and responsibilities. The authors concluded that effective co-teaching could be achieved with more focus on co-teachers' training, use of research-based practices, and administrative support. Recent research has indicated advantages and disadvantages of co-teaching, with several unresolved issues. For example, although the "one teach, one assist" model is still prevalent, there is evidence co-teachers in assist roles do not feel subordinate (King-Sears et al., 2014) and other co-teaching models are used (Bryant Davis et al., 2012; Lindacher, 2020). Some teams need co-planning time (Bešić et al., 2017), while others have that time allocated (Embury & Dinnesen, 2012; Pratt, 2014).

Hence, our qualitative meta-synthesis can contribute to the literature in several ways. First, although knowledge generated by Scruggs et al. (2007) provided valuable guidance for the field, knowledge may have shifted since 2005. Second, an updated synthesis

may inform teacher educators about current developments in practice. Third, a synthesis of how recent qualitative studies have contributed to the development of co-teaching guides researchers in selecting new empirical questions. Fourth, a qualitative meta-synthesis on co-teaching is needed because qualitative research focuses on the features and processes that relate to the development of co-teaching, and researchers' and research participants' interpretations cannot be easily depicted in quantitative reviews and meta-analysis. As King-Sears et al. (2021) noted in their recent meta-analysis of 26 co-taught studies regarding students with disabilities' academic achievement, details on how co-teaching was operationalized was not reported in many studies, and only 19% of their research's eligible studies included co-teachers' actions.

1.2. Aim and research questions

The main aim of this meta-synthesis is to describe the practice of co-teaching and its impact on students and teachers by synthesizing and interpreting findings from qualitative studies to offer new interpretations and insights (Nye et al., 2016). Considering this meta-synthesis an iterative qualitative process, we identified the three research questions in steps. In line with Thomas and Harden's (2008) methodological recommendation, to temporarily put initial questions to one side and think about how to develop research questions based on the findings of the primary studies, we temporarily "retired" our initial question (i.e., "What is the practice of co-teaching and its subsequent impact on students and teachers?") and focused on how we can develop new questions based on the analysis of our findings. As a result, the following questions emerged:

1. How do researchers conceptualise co-teaching in their studies?
2. What are the features that influence teachers' practice in co-taught classrooms?
3. How do researchers and co-teachers describe the impact of co-teaching on the learning of teachers' as well as on the learning of students with and without disabilities?

We finalised the first question after completing the first stage in our analysis (see next, section 2.4), and we formulated the second and third question almost completing a substantial part of the analysis during the second stage of our analysis.

2. Method

2.1. Information sources and search strategy

To identify potential studies, we undertook database searches of EBSCO, ERIC, Academic Search Complete, OmniFile Full Text Select (H.W. Wilson), and PsycINFO. We completed the search in February 2021, with dates between January 2005 and January 2021. We limited the start date to January 2005 to align with when Scruggs et al. (2007) ended in December 2004 (personal communication). We used the search terms of "co-teaching"; "coteach*"; "co-operative teaching"; "cooperative teaching"; "collaborative teaching"; and "team teaching" with the boolean operator "or" between the terms to search related titles, abstracts and keywords. Further, we used three common hand-search strategies in line with other systematic reviews (Van Garderen et al., 2012). First, we identified the major co-teaching authors and researchers to locate theoretical work, then perused references to determine if additional research was cited by them. Second, we hand searched the references in five recent review studies related to co-teaching (Cook et al., 2017; Iacono et al.,
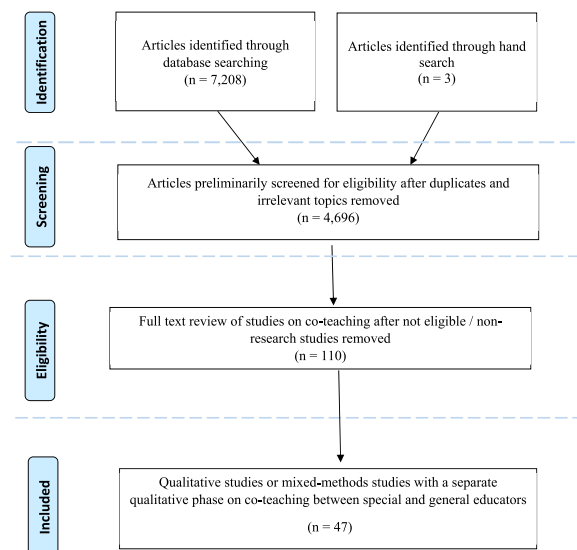

Fig. 1. *PRISMA Flow Diagram Co-Teaching Meta-synthesis.*

2021; Losinski et al., 2019; Paulsrud & Nilholm, 2020; Solis et al., 2012). Third, the references of authors whose studies surfaced three or more times in the eligible studies were examined to determine if they had additional eligible research. We identified three studies in our hand search (Embury & Dinnesen, 2012; O'Rourke & Houghton, 2009; Rimpola, 2014). The first and third authors independently examined all records for relevancy. Titles, abstracts, and full texts were reviewed to determine eligibility. Duplicates were removed. After the calculation of the number of agreements and disagreements of all examined studies, the inter-rater reliability for determining eligible studies was 90%. Following discussions between the authors, the second author scrutinised any further discrepancies to reach 100% consensus.

2.2. Eligibility of studies and search results

We employed six inclusion criteria to identify eligible studies. Included studies: (a) encompassed original qualitative or mixed-methods research with a clear qualitative data collection part (only the qualitative part of the mixed-methods studies was included in the synthesis); (b) were published in a peer-reviewed journal; (c) included general and special educators as co-teachers; (d) focused on K-12 grades; (e) were in English; and (f) presented disaggregated data for co-teachers when other participants were in the study (e. g., administrators). The five exclusion criteria were: (a) research was focused on inclusion, but not on co-teaching; (b) general and special educators worked together as part of a larger team, but they did not co-teach; (c) participants were administrators or pre-service teachers; (d) surveys with a few open-ended questions on co-teaching; and (e) presented data referred to students or parents in co-taught classrooms.

We identified 7,211 articles ($n = 7208$ from e-search and three from hand search; see PRISMA Fig. 1). Having excluded duplicates, ineligible, and irrelevant articles, articles that did not include qualitative data, and having screened the titles and the abstracts of the remaining articles, we reviewed the full text of 110 studies, from which 47 met all inclusion criteria for this meta-synthesis (see Table 1 for study characteristics, the main themes of each study and the research questions that each study contributed toward). Because Scruggs et al. (2007) included two publications that were eventually published in peer-reviewed journals in 2005, we omitted those studies to avoid duplication of Scruggs et al.

2.3. Quality assessment of eligible studies

To enhance the trustworthiness of our synthesis (Maeda et al., 2022), we selected a tool frequently used to discern qualitative study quality, the Critical Appraisal Skills Program (CASP; Lachal et al., 2017), consisting of 10 queries. The first and third authors independently scored each CASP item from 1 to 3 (1: Little to no justification offered for the particular issue; 2: The issue was addressed but did not fully elaborate; 3: Extensive justification and explanation of the issue was provided), as it has been recommended by other researchers (Boshoff et al., 2017; Duggleby et al., 2012). Interrater reliability was 83%. Agreement was reached when the two raters provided the same score (e.g., 1, 2, or 3) in each item when rating the same study. The two researchers further discussed disagreements regarding each item until 100% consensus was attained.

Quality scores for the eligible studies ranged from 11 to 30 for raw scores, with an average number of 23 (77%) per study. Table 2 presents the percentage of 10 quality items met via CASP across 47 studies.

Eligible studies varied in their approach to data collection and quality (see Tables 1 and 2). Overall, studies using only interviews commonly lacked a thorough interpretative contextual analysis. Conversely, in-depth case studies using both interviews or focus groups and observations provided in-depth descriptions and interpretations that promoted understanding of the nuances and processes of the researched settings. Very few researchers trained teachers on co-teaching (e.g., Argyropoulos & Stamouli, 2006; Brusca-Vega et al., 2011), and no studies incorporated a participatory, emancipatory, or inclusive research design (Nind, 2014).

2.4. Analysis

We used a descriptive-interpretative approach as our main epistemological framework to generate new theoretical or conceptual models, identify gaps in research, and generate new questions (Timulak, 2009). Hence, the eligible studies were neither summarised nor re-analysed as in quantitative reviews and meta-analyses respectively, but they were described, synthesised, and critically interpreted. Based on Timulak's (2017) observations on the different approaches to qualitative meta-syntheses (e.g., more naturalistic, more theoretically laden approaches), we did not scrutinise the original studies through a particular theoretical approach as occurs for meta-summaries (Sandelowski & Barroso, 2006), and we did not use theoretical sampling and saturation in selecting studies toward the building of a theory, as in meta-syntheses based on grounded formal theory (Kearney, 1998). We synthesised the studies by combining the voices of the researchers and participants using direct quotations of the original studies. Although we favoured generic summaries, we considered criticisms regarding the highly contextualised nature of qualitative findings, including the counterproductive use of individual insights or diverse qualitative methodologies (Sandelowski et al., 1997). Thus, taking into consideration Thomas and Harden's (2008) question "what counts as findings in qualitative meta-synthesis?" (p. 4), we reported and synthesised some of the researchers' interpretations, some of their storylines (Noblit, 2018), and their descriptive findings. By doing so, we described the primary authors' interpretations alongside our own, considering contextual features described in their studies and interpreting findings based on their interpretations.

Given our familiarity with several of the themes represented in the eligible studies, we employed thematic analysis as the most appropriate synthesis approach. As Braun et al. (2019) note, reflexive thematic analysis "provides a coherent and compelling interpretation of the data, grounded in the data" (p. 848), recognising the theoretical assumptions and ideological commitments of the

Table 1
Characteristics of included studies.

Authors/country	Design/tools	Aim/purpose	Participants	Teacher training on co-teaching	Teacher prior experience	Teacher age	School level or student grade'	Student disability type	Main themes	Corresponding research question (RQ)
Argyropoulos and Stamouli (2006)/Greece	Action research/ school meetings, interviews	Achieve better inclusion for a blind student	1 CT team	No mention	No mention	No mention	6th grade	1 visually impaired	Roles, curriculum adaptations, relationship, student progress	RQ1, RQ2, RQ3
Ashton (2016)/USA	Case study/ Individual & team interviews, observations, video/ meetings	Analyse the discursive interactions of two co-teachers	1 CT team	No mention	Co-taught together for five years	No mention	Middle School (suburban)	Various	Models, relationship, curriculum adaptations, roles	RQ1, RQ2
Beamish et al. (2006)/Australia	Action research	Explore thoughts and feelings about CT and students' being co-taught	6 CT teams	No mention	Average SET: 7.4, GET: 6.6 years	10 teachers: 25–40 y/o,5 over 40 y/o	Primary	Various	Planning, student progress, perceptions	RQ1, RQ2, RQ3
Bešić et al. (2017)/Austria	Interviews	Examine inclusion at teacher/class level highlighting obstacles and best practices	25 Co-teachers	No mention	No mention	No mention	Primary & Secondary	No mention	Planning, perceptions, collaborative groups, volunteerism	RQ1, RQ2
Bessette (2008)/USA	Qualitative/ interviews	Gain insight into the CT environment, to understand the nature of CT and how it is perceived	12 GET & 6 SET (6 elementary schools), 8 GET & 5 SET (2 middle schools)	No mention	Average time CT: Elementary GET: 2 years. Middle grade GET: 1.5 years	No mention	Elementary & Middle grades	Mild and moderate learning difficulties, 1 student with down syndrome	Planning, models	RQ1, RQ2
Bouck (2007)/USA	1,2 Case study/ Individual & team interviews, observations, video/ meetings Classroom observations, interviews	What did CT look, what factors were illustrated and what can be learned	1 CT team	No mention	Both teaching less than 4years	No mention	8th grade history class	No mention	Roles, relationship, effective instruction	RQ1, RQ2
Brusca-Vega et al. (2011)/USA	Mixed- methods/ interviews, observations	Focused on student learning when an inquiry-based/hands-on science curriculum used	2 science GET & 3 SET	PD on implementing CT and inclusive strategies	Teaching experience: 3 to over 20 years	No mention	Middle grade	Mild learning difficulties, autism, intellectual disability, learning difficulties	Curriculum adaptations, models, collaborative groups and peer tutoring, perceptions, student progress	RQ1, RQ2, RQ3
Bryant Davis et al. (2012)//USA	Content analysis/ monthly lessons plans submitted by teams	Provide PD in the area of CT and to analyse current practices across the state	No mention	No mention	No mention	No mention	No mention	No mention	Models, planning, roles, curriculum adaptations	RQ1, RQ2
Carty and Farrell (2018)/Ireland	Evaluative design/ interviews, observations	Examine the use of a range of CT models when teaching mathematics	2 CT teams	No mention	No mention	No mention	1st year post-primary	No mention	Models, learning from each other, curriculum	RQ1, RQ2, RQ3

Table 1 (*continued*)

Authors/country	Design/tools	Aim/purpose	Participants	Teacher training on co-teaching	Teacher prior experience	Teacher age	School level or student grade'	Student disability type	Main themes	Corresponding research question (RQ)
									adaptations, student progress	
Casserly and Padden (2018)/Ireland	Mixed-methods/ interviews	Examine teachers' views of CT approaches in addressing learning needs	2 multi-grade GET and 2 SET	No mention	No mention	No mention	Primary schools	No mention	Roles, models, learning from each other, perceptions, student progress	RQ1, RQ2, RQ3
Cramer and Nevin (2006)/USA	Case study/ interviews and observations	Examine co-teacher actions and behaviours and classroom practices	16 co-teachers	No mention	Experience in CT from 1 to 10 years	Various	Elementary High schools	No mention	Peer tutoring, curriculum adaptations, preparation, planning time, perceptions	RQ1, RQ2
Dev and Haynes (2015)/USA	Interview study	Examine teacher perceptions in inclusive classrooms	11 SET	No mention	Various	No mention	Inclusive classrooms	No mention	Preparation, perceptions, planning time, models	RQ1, RQ2
Embury and Dinnesen (2012)/USA	Case study design/ interviews teachers' planning logs observation	Present the experiences of two co-teachers teaching	1 CT team	No mention	SET taught for 22 years, GET taught for 3 years	No mention	Middle school: 7th grade science class	No mention	Roles, planning, preparation, curriculum adaptations, models	RQ1, RQ2
Gürgür and Uzuner (2010)/Turkey	Action Research/ interviews planning meetings reflective daily data sources	Analyse the opinions of co-teachers regarding the applications they carry out	1 CT team	No mention	GET taught for 18 years	No mention	Middle school	Hearing impairment, cerebral palsy	Models, perceptions, planning, roles, collaborative groups	RQ1, RQ2
Gurgur and Uzuner (2011)/Turkey	Action Research/ Checklist documents researcher's journal	Examine the implementation of two CT models (team teaching and station teaching)	1 CT team	No mention	GET taught for 18 years	No mention	2nd grade elementary	Hearing impaired and physical and learning difficulties	Planning, collaborative groups, models, effective instruction	RQ1, RQ2
Isherwood and Barger-Anderson (2008)/USA	Case study and naturalistic inquiry/ interviews observations document analysis	Examine implementation of CT models, factors affect implementation and examine human, task, structural, and technical subsystems	15 GET & 3 SET	No mention	No teacher had previous CT experience	No mention	Middle school	No mention	Models, planning, voice	RQ1, RQ2
Isherwood et al. (2013)/USA	Case study Ethnographic design/interviews observations document analysis	Examine how a school district used CT as a strategy for transitioning from a special to an inclusive model	15 GET & 15 SET	No mention	All co-teachers were in their 2nd year of CT	No mention	Middle school	No mention	Relationships, planning, models, perceptions	RQ1, RQ2
King-Sears et al. (2014)/USA	Case study/video observations	Ascertain perspectives from teachers about CT during science instruction	1 CT team	Teachers had less than 3 h of PD on CT and one undergad course	Science GET: 9 years of CT SET: 3 years of CT	No mention	High School, 9th and 10th graders	Learning difficulties, health impairment, intellectual disabilities, SpLD,	Roles, perceptions, curriculum adaptations, models, collaborative groups	RQ1, RQ2

Table 1 (*continued*)

Authors/country	Design/tools	Aim/purpose	Participants	Teacher training on co-teaching	Teacher prior experience	Teacher age	School level or student grade'	Student disability type	Main themes	Corresponding research question (RQ)
Lindacher (2020)/Germany	Case study/ interviews	Provide insight into how co-teachers perceive instructional responsibilities	4 CT teams	No mention	At least 1 year in an inclusive classroom	No mention	Secondary community school/grades 5 to 10	traumatic brain injury. Intellectual disability, physical disabilities, emotional and social difficulties	Roles, perceptions, planning, student progress	RQ1, RQ2, RQ3
Magiera et al. (2006)/USA	Interview study	Analyse a CT model implemented	GET, SET (no specific number)	No mention	No mention	No mention	Elementary School	No mention	Relationships, planning, models, preparation, volunteerism	RQ1, RQ2
Meadows and Caniglia (2018)/USA	Case study/videos of classroom instruction, guided video noticing discussions	Improve and enhance co-teachers' practices through noticing	1 CT team	No mention	GET more than 2.5 years SET more than 2 years on CT	No mention	Middle school	Difficulties in math and reading, behaviour difficulties	Preparation, relationships	RQ1, RQ2
Moin et al. (2009)/USA	Observations and interviews	Examine whether co-teachers delivered better type of science education than solo-teaching for students with learning difficulties	10 teams of co-teachers	No mention	CT at least 1 year before the study	No mention	High School	No mention	Models, planning, training, curricular adaptations, relationships, voice, effective instruction	RQ1, RQ2, RQ3
Naraian (2010)/USA	Ethnographic case study/observation interviews	Examine teacher positionality re the enactment of inclusive practice	1 CT team	No mention	No mention	No mention	1st grade elementary	Various	Learning from each other, relationship, curriculum, adaptations, collaborative groups	RQ1, RQ2
Nevin et al. (2008)/USA	Descriptive case study/interviews, observations document analysis	Illuminate the nature of the instruction and teachers' experiences when co-teach	1 CT team	In-service training for CT	CT for 3 years	No mention	3rd and 4th grade	ADHD, SpLD	Planning, roles teachers' perceptions, curriculum, adaptations, types of adaptations, collaborative groups	RQ1, RQ2
O'Rourke and Houghton (2009)/Australia	General qualitative/ interviews	Describe the perceptions of co-teachers for CT	2 GET & 1 SET	No mention	More than 20 years of teaching experience	No mention	Secondary	Mild learning difficulties	Relationships, planning, student progress	RQ1, RQ2, RQ3
Pickl et al. (2016)/Austria	General qualitative/ questionnaires interviews	Describe the competencies that co-teachers consider most important	65 surveyed 12 teams interviewed	No mention	No mention	No mention	Primary Secondary	No mention	Preparation, planning, learning from each other, roles	RQ1, RQ2, RQ3
Pratt (2014)/USA	Grounded theory/ focus groups, questionnaire observation, interviews	Address how effective co-teachers found solutions for common challenges	5 CT teams	No mention	Various	No mention	Secondary	No mention	Learning from each other, planning, relationships, models, roles, volunteerism	RQ1, RQ2, RQ3

Table 1 (*continued*)

Authors/country	Design/tools	Aim/purpose	Participants	Teacher training on co-teaching	Teacher prior experience	Teacher age	School level or student grade'	Student disability type	Main themes	Corresponding research question (RQ)
Rice et al. (2007)/USA	Focus groups, interviews observations	Examine the skills and attributes that aid SET in CT or consultation	18 GET & 13 SET	No mention	No mention	No mention	Primary and Secondary	Learning difficulties, significant cognitive disabilities.	Models, curricular adaptations, student progress	RQ1, RQ2, RQ3
Rimpola (2014)/USA	Mixed methods/ interviews	No research questions for the qualitative data	3 CT teams	No mention	No mention	No mention	Secondary	No mention	Planning	RQ1, RQ2
Rytivaara (2012)/Finland	Narrative case study/	Examine the factors that had led the teachers to initiate CT Interviews	1 CT team	No mention	No mention	30 years and 30+ y/o	Primary	No mention	Learning from each other, perceptions, relationships	RQ1, RQ2, RQ3
Rytivaara et al. (2019)/Finland	Narrative research/ interviews meetings with teachers	Explore how co-teachers developed CT partnerships	3 CT teams	No mention	3–35 years of teaching experience	No mention	Primary	Various	Planning, roles, perceptions	RQ1, RQ 2
Rytivaara and Kershner (2012)/Finland	Narrative case study/ interviews	Examine how co-teachers are involved in a process that we look at as a learning process	1 CT team	No mention	No mention	No mention	Primary	No mention	Learning from each other, relationship, roles	RQ1, RQ2
Shaffer and Thomas-Brown (2015)/USA	Informal conversations self-reports interviews	Investigate the CT PD model in a social studies classroom	2 CT teams	No mention	No mention	No mention	Secondary	No mention	Relationships, roles, curriculum adaptations	RQ1, RQ2
Simmons and Magiera (2007)/USA	Evaluative Research/ observations interviews	Examine CT in action and how are teachers co-planning and making instructional decisions	10 CT teams	No mention	No mention	No mention	Secondary	No mention	Models, roles, planning, preparation, collaborative groups, volunteerism	RQ1, RQ2
Sinclair (2019)/USA	Interview Study	Guide administrators seeking to support quality CT	21 CT teams	No mention	No mention	No mention	Primary	Various	Perceptions, planning, roles, volunteerism, models	RQ1, RQ2
Stelitano et al. (2020)/USA	Case studies/ interviews observations documents	Explore organization for inclusion re service delivery models, special educators, resources and work	15 GET & 8 SET	No mention	Average experience approx. 22 years	No mention	High schools	Various	Models, planning, curriculum adaptations	RQ1, RQ2
Strogilos and Tragoulia (2013)/Greece	Multiple case study/ interviews observations diary	Describe and evaluate the roles and responsibilities of co-teachers	18 CT teams	No training	CT experience: GET 1–3 years, SET 1–2 years	23–50	Primary	Intellectual disability, autism	Roles, relationships, planning, models, Preparation, student progress	RQ1, RQ2, RQ3
Strogilos et al. (2015)/Greece	Multiple case study/ interviews observations	Identify and evaluate the benefits of supportive CT	7 CT teams	No training	CT experience: GET 1–3 years, SET 1–2 years	GET m = 40.7 y/o, SET m = 25.4 y/o	Primary	Intellectual disability	Student progress, models, curriculum adaptations, effective instruction	RQ1, RQ2, RQ3
Strogilos et al. (2016)/Greece	Mixed-methods/ interviews	Identify and explain co-teachers' preferences, to discuss implications for planning, instruction and modifications	5 CT teams	No training	m = 7.1 years of teaching experience	m = 30 y/o	Primary	Various	Planning, models, curriculum adaptations	RQ1, RQ2

Table 1 (*continued*)

Authors/country	Design/tools	Aim/purpose	Participants	Teacher training on co-teaching	Teacher prior experience	Teacher age	School level or student grade'	Student disability type	Main themes	Corresponding research question (RQ)
Strogilos et al. (2017)/Greece	Qualitative/ interviews, observations	Explore how teachers understand "differentiated instruction", to describe factors for implementation	34 CT teams	No training	m = 1.92 years of CT experience	m = 39.20 y/o	Primary	Various	Curriculum adaptations, perceptions, models, effective instruction	RQ1, RQ2
Strogilos and King-Sears (2019)/USA	Interview study	Describe and evaluate the perspectives of co-teachers	2 GETs & 1 SET	No training	CT for over 4 years	No mention	Primary	Various	Models, student progress, relationships, roles	RQ1, RQ2, RQ3
Tiernan (2020)/Ireland	Interview Study	Investigate perceptions of teachers toward the needs of pupils with SEN	27 GET	No mention	No mention	No mention	Primary multigrade classrooms	No mention	Planning, models	RQ1, RQ2
Thomas-Brown and Sepetys (2011)/USA	Participant ethnography/ interviews	Present the CT PD approach and discuss its delivery in social studies to students with SEN	1 CT team	SET: masters and a bachelor degree in special education	Teaching experience: SET: 17 years, GET over 30 years	No mention	Secondary	Cognitive, behaviour, learning difficulties, autism	Learning from each other, relationships, student progress, curriculum adaptations	RQ1, RQ2, RQ3
Van Hover et al. (2012)/USA	Case study/ observations, interviews documents, email journal field notes	Explore how a GET and a SET make sense of working together in a history course	1 CT team	No mention	Teaching experience: 3 years for both educators	no mention	Secondary	No mention	Preparation, relationships, roles, models, perceptions, curriculum adaptations	RQ1, RQ2
Weiss and Rodgers (2020)/USA	Case study/ observations, interviews	Compare the instruction in a co-taught with that of a solo-taught algebra class	1 CT team	SET had training in CT and provided PD on CT	They were CT for 4 months	No mention	High school	Learning difficulties and others	Models, planning, effective instruction	RQ1, RQ2
Weiss et al. (2020)/USA	Multiple case study design	Identify the instructional components of an effective co-taught classroom, to provide role clarity and implementation guide	3 CT teams	No mention	Teaching experience: SET: 1–8 years, GET: 3–17 years	SET: 25–45 y/o, GET: 33–55 y/o	Rural high school spans grades 9–12	Various	Roles, effective instruction	RQ1, RQ2
Zigmond (2006)/USA	Naturalistic observations	Explore the reading and writing in social studies, what is assigned to a diverse set of learners	8 CT teams	No mention	No mention	No mention	Secondary	No mention	Student progress	RQ1, RQ3

SpLD: speech and language difficulties; y/o: years old; PD: professional development; CT: co-teaching; GET: general education teacher; SET: special education teacher.

Table 2
Quality of study items averaged for 47 studies.

Quality Item	% Met Criteria
Was there a clear statement of the aims of the research?	90%
Is a qualitative methodology appropriate?	87%
Was the research design appropriate to address the aims of the research?	80%
Was the recruitment strategy appropriate to the aims of the research?	77%
Were the data collected in a way that addressed the research issue?	82%
Has the relationship between researcher and participants been adequately considered?	72%
Have ethical issues been taken into consideration?	69%
Was the data analysis sufficiently rigorous?	79%
Is there a clear statement of findings?	89%
How valuable is the research?	78%

Source: Critical Appraisal Skills Program (CASP); Lachal et al., 2017.

researcher. Hence, the analysis was a combination of our acquired knowledge from previous projects (e.g., King-Sears et al., 2014; Strogilos & Tragoulia, 2013) and the new themes we generated from the eligible studies.

We performed a two-stage analysis. First, two researchers read all studies and extracted the fundamental characteristics of each study in a "research report." The report included: (a) the country, (b) the school level/class grade, (c) the characteristics of co-teachers (e.g., co-teaching experience), (d) the aim and the research questions, (e) the design, research tools, and analytic method, and (f) a summary of the findings. In addition, we composed personal reflections (i.e., initial interpretations) about the conceptual framework of each study and the contribution of its findings. The two researchers independently read each other's reports and discussed extractions. When extractions varied, dialogue ensued toward concurrence. We subsequently identified the three main conceptual frameworks, which were subsumed within the first research question that referred to how researchers conceptualised co-teaching in their studies. The conceptual frameworks, which can also be identified as dimensions of the conceptions of co-teaching by the primary authors, are: (a) co-teachers learn how to implement co-teaching (b) implementation of co-teaching (e.g., models); and students' progress; and (c) instructional strategies used.

For the second stage, we used NVivo v.12 to complete the analysis, following Braun and Clarke's (2006) steps, which include: generate initial codes, search for themes, review themes, define and name themes, and write the final report. During this stage, we focused only on the findings, the discussion sections, and the primary authors' conclusions. We selected all codes (i.e., small pieces of text) from the primary studies based on open coding which we then generated into themes. Two researchers generated the initial codes independently for the first five studies and, after discussing all codes in detail, one of them generated the codes for the remaining studies, resulting in 34 codes. The two researchers discussed all codes and nineteen themes were initially identified. Following a second review the themes were merged to 16, which fell under the three main conceptual frameworks. For example, one initial theme, "administrative support," was evident within other themes (e.g., "planning" or "volunteerism"), and thus it was not presented separately. The second stage led to the development of two additional research questions which focused on the features influencing co-teachers' practices and the impact of co-teaching on teachers' and students' learning.

We developed descriptive themes that replicated the majority of the themes that the primary authors had generated in their studies but also analytical themes that went beyond the content of the original studies, generating additional concepts (Thomas & Harden, 2008). For example, "the models of co-teaching" was a descriptive theme found in the primary studies, whereas the "contextual features influencing co-teaching" was an analytical theme generated by us. Following this, one researcher wrote the synthesis and invited two co-researchers to review it, which led to merging a few more themes to avoid repetition. The final number of themes was 15. To further check the trustworthiness of the synthesis, we followed Timulak's (2017) recommendation to involve six primary authors, whose study appeared at least three times in the synthesis, to provide comments. Each author received the research report of their study, with our reflections and extracts or paragraphs of the synthesis related to their findings. Four authors agreed with our descriptions and reflections of their study, one sought refinement, and one did not respond.

3. Findings

With regard to the first research question which focused on how researchers conceptualise co-teaching, we identified three main conceptual frameworks used by the primary researchers to describe and interpret co-teaching. The first framework considers how co-teachers learn to implement co-teaching and how this benefits their learning (e.g., Rytivaara, 2012). The second framework describes how co-teachers implement co-teaching (e.g., co-teaching models, planning time) and how this relates to students' academic and social progress (e.g., Naraian, 2010). The third framework highlights instructional strategies, inclusive of modifications and accommodations (e.g., Brusca-Vega et al., 2011; Nevin et al., 2008). Although some themes (e.g., co-teachers' relationship) include elements of all three conceptual frameworks, we discuss them in relation only to the one that they mostly associate with. The themes we developed under the three conceptual frameworks focus on answering research questions two and three which consider the features that influence co-teaching and its impact on teachers and students.

3.1. Co-teachers learn how to implement co-teaching

Learning to collaborate with another co-teacher was conceptualised by some researchers as paramount for effective co-teaching. Researchers explored how teachers learn from each other, or how preparation, a good relationship, volunteerism, and the consideration of teachers' voice can positively contribute to teachers' and students' learning.

3.1.1. Learning from each other

In approximately half of the studies the researchers discussed how co-teachers learn from each other as a form of professional development (PD). For example, in their case study in a post primary school, Carty and Farrell (2018) reported, "Carla, the special educator, noted that the opportunity to observe different ways of explaining mathematical concepts and being exposed to a different teaching style as being useful in terms of her own learning" (p. 110). Similarly, in Pratt's (2014) study on five co-teaching pairs in secondary schools, the participants showed that while differences between co-teachers exist, effective co-teaching partners capitalise on those differences to strengthen their relationship. Pratt noted that "when teachers felt their colleague was compatible or could contribute equally, they anticipated forming a peer mentoring relationship" (p. 7). Pratt contended that when teachers' familiarity increases and they openly communicate, personal and professional growth develop. Similarly, in an ethnographic study in a social studies classroom conducted by Thomas-Brown and Sepetys (2011), a special educator said "I feel like I've learned a lot and it has helped me look at my teaching ideas in different ways. I would like to co-teach again with someone" (p. 118).

Rytivaara and Kershner (2012) in their narrative case study in a primary school described how individuals' knowledge contributions can evolve to "shared knowledge construction" (p. 1007), noting that "if teachers are provided with adequate time for collaboration outside their classroom, it may have an enormous effect on their PD" (p.1007). Another idea advancing co-teachers' learning appeared in Casserly and Padden's (2018) interviews in which some primary co-teachers proposed the creation of "communities of educators who support one another … sharing co-teaching ideas … and sharing experiences … would help develop practices and strengthen relations between co-teachers" (p. 567).

3.1.2. Preparation on co-teaching

A theme that appeared in almost all studies was the lack of preparation on co-teaching and how this can lead to negative impacts, thus hampering learning opportunities. For example, in Strogilos et al.'s (2015) case studies in primary schools, co-teachers indicated that "the inadequate training of the co-teachers greatly affected co-teaching efficacy" (p. 37); a general educator commented: "We had no information at all about what the special educator should do and what I have to do to help the child" (p. 37). Similarly, Moin et al. (2009), after observing and interviewing ten teams of high-school co-teachers, reported that "the lack of coteaching training in pairs affected SETs' [special education teachers] knowledge of science content and GETs' [general education teachers] awareness of special-education curricular adaptations" (p. 693). Many teachers and researchers in the eligible studies described preparation as a requirement that the teacher education programmes, the school, or the school system should provide to teachers (Embury & Dinnesen, 2012; Pickl et al., 2016).

Co-teachers who are prepared for co-teaching have more positive relationships and are more effective co-teachers, as noted in some studies. Meadows and Caniglia (2018) indicated changes in two middle school teachers' beliefs toward collaboration when engaged in critical reflections after viewing videos of themselves co-teaching. The authors proposed that "video as a resource for noticing and reflection can be used to help teachers focus on improving and enhancing teaching and learning …" (p. 1358). In addition, van Hover et al. (2012) indicated that the preparation two secondary history co-teachers, Anna and John, received during the summer "helped 'people get to know their collaborative partner' even better … and plan curriculum" (p. 274). As Anna said, "the Collab camp provided guidelines and suggested that we sit down and talk those [our plans] through with our partner" (p. 274). Subsequently, "they sat down again to revisit what their collaborative relationship would look like" (p. 274). The researchers' notes confirmed that, following preparation, the co-teachers were satisfied with their partnership in this course.

3.1.3. Co-teachers' relationships

A common assumption among researchers was that co-teachers' relationship can enhance both teachers' and students' learning because it can improve co-teachers' collaboration. In certain studies, co-teachers indicated how their social relationship influenced their professional one. For example, Pratt (2014) and Strogilos and King-Sears (2019) found that for certain teachers their good social relationship outside the school hours led to stronger collaboration and learning in the co-taught classroom, subsequently improving instructional experiences and learning for all students. Co-teachers' relationship descriptions varied among studies, from challenging (e.g., Gürgür & Uzuner, 2010) and dysfunctional (Isherwood & Barger-Anderson, 2008) to well-balanced (e.g., Pratt, 2014). Notably, a number of interviewed co-teachers remarked that their relationship improved over time as they realised that they could learn from each other (Bouck, 2007; Strogilos & Tragoulia, 2013).

The most common positive features in strengthening co-teachers' relationship were good communication, flexibility, trust, and parity (Magiera et al., 2006). Two features negatively influenced co-teachers' relationship: the pairing imposed by the administration without considering personalities and teaching approaches (Moin et al., 2009) and the devaluing of roles when, for example, a general educator believed that a special educator did not know the curriculum well (Gurgur & Uzuner, 2011; Isherwood et al., 2013; Lindacher, 2020). Conversely, a number of special educators mentioned the receptiveness of general educators (e.g., acknowledged special educators as effective teachers) as critical for the development of good relationships (Strogilos et al., 2017; Thomas-Brown & Sepetys, 2011).

3.1.4. Volunteerism and teachers' voice

A relatively small number of studies (n = 7) included teachers' views toward willingness to co-teach and how this might affect their relationship. For example, Simmons and Magiera (2007) observed better co-operation in those pairs that had declared their willingness to co-teach during the interviews. The authors suggested that co-teaching pairs be established depending on their interest in the collaborative process and special educators' experience and expertise in the content area. Carty and Farrell (2018) found that teachers who volunteered to co-teach articulated fewer challenges than those who had not. However, in Sinclair et al.'s (2018) interviews of 21 primary co-teaching pairs, some teachers recognised that this might not always be possible due to the small number of special educators per school.

Moin et al. (2009) noted teachers wanted a voice regarding preparation and planning. In another middle school study, a mainstream teacher stated that "They [management team] never asked us what we thought about it or who we wanted to work with … I would like to know if what we are doing is what they want. I would also like to know who I will be working with next year." (p. 126) (Isherwood & Barger-Anderson, 2008). However, three co-teaching pairs, which successfully learned to co-teach in Rytivaara et al.'s (2019) study, challenged "the often-repeated mantra that co-teaching should be voluntary and that teachers should be free to choose their partners" (p. 233). The authors suggested that mismatches may be avoided "if teachers are encouraged to share their thoughts, feelings and expectations about co-teaching" (p. 233).

3.2. Implementation of co-teaching and students' progress

Many studies investigated co-teachers' everyday practices and influences on students' learning. Researchers examined how co-teachers: (a) co-plan, (b) determine which co-teaching models to use, (c) adopt roles, and (d) perceive students' progress.

3.2.1. Planning time

A common finding across the studies was the lack of co-planning time that negatively affected teachers' collaboration and impacted students' progress (Rimpola, 2014; Strogilos et al., 2016; Weiss & Rodgers, 2020). Bešić et al. (2017) reported that "schools do not provide an allotted time for teachers engaged with co-teaching to discuss their goals and lessons" (p. 336). In Bessette's (2008) interviews with co-teachers, a special educator noted that "I like the whole idea of co-teaching … but I don't think I could do this again next year if we don't have time to co-plan" (p. 1390). Dev and Haynes (2015) interviewed 11 special educators who commonly reported to be more enthusiastic about co-teaching when given time to co-plan with co-teachers.

An association between planning and positive changes in teachers' roles appeared in some studies. In their case study in a co-taught science class, Embury and Dinnesen (2012) highlighted that co-planning can improve teachers' roles and status, concluding that "… those roles were only able to change because the teachers were willing to plan for and implement changes long-term" (p.48). Pratt (2014) reported that "formally planning each lesson was another strategy teachers used initially to determine their instructional approach and become comfortable with each other" (p. 8). Similarly, Rytivaara et al. (2019) noted "that an unequal division of work might result if a lesson is not carefully planned" (p.229). Magiera et al. (2006) reported that some teachers were feeling less effective when they could not co-plan and some of them joined the school's scheduling committee to make sure that planning time was available.

3.2.2. Models of co-teaching

The description of the models of co-teaching was the most common theme across the studies. The "one teach, one assist" was the predominant model in the majority of the studies (e.g., Sinclair et al., 2018; Strogilos et al., 2015), but almost never the only one used. For example, Bryant Davies et al. (2012), in a content analysis of 155 lesson plans, reported that the use of "one teach, one assist" dominated the plans but these "school teachers also reportedly utilised a diversity of co-taught models" (p. 219). In their in-depth case study in a science high school class, King-Sears et al. (2014) noted that, although the science teacher was primarily responsible for presenting the content, varied co-teaching models were used. They noted that "team teaching" was evident in that both teachers were observed leading the demonstration of new content at times or clarifying statements made by the other. Lindacher (2020), who interviewed five secondary co-taught teams, reported that co-teachers "seem to have a high level of autonomy in class and share instructional responsibilities spontaneously" (p.147), while Tiernan et al. (2020) reported that out of the 27 general educators who were interviewed, many regarded "station teaching" as particularly beneficial.

Co-teachers' perceptions of models varied among different studies, with discussion frequently centred on the "one teach, one assist" model. For example, Bessette (2008) found that certain special educators felt under-utilised, as if acting in a paraprofessional's role. Conversely, Dev and Haynes (2015) noted that "In general they [special educators] did not seem to feel undervalued or underutilised in their new roles" (p. 60). Carty and Farrell (2018) found the "one teach, one assist" model "to be comfortable, yet effective," because the co-teachers "alternated the roles of lead and assisting teacher" (p. 114). Lastly, Strogilos and King-Sears (2019) found that the two co-teaching teams in their study considered the "one teach, one assist" model as useful positively received by students and teachers.

3.2.3. Contextual features influencing co-teaching

Several researchers provided interpretations concerning contextual features influencing co-teaching. One contextual factor relates to the pressure teachers felt for their students to achieve high scores on states' testing, which occurred one time per year. Ashton (2016), in an in-depth case study of two middle school very experienced co-teachers, noted that this pressure adversely impacted decision making when co-teachers acquiesced to the school system's pacing guide rather than deferring to students' pace of learning. In her own words:

Val and Keith's co-teaching relationship exemplifies how dominant education discourse surrounding No Child Left Behind mandates perpetuates the expectation that successful inclusive educational environments are those in which students with disabilities are able to keep up with and produce assessment results on a par with their peers without disabilities … the administration was pleased with the students' test scores and Val and Keith were held up as role models for other co-teaching teams in the school (p. 15).

Similarly, in van Hover et al.' s (2012) study, the special educator mentioned: "honestly, goal number one for me is to get my students to pass the SOL [Standards of Learning] … and we often leave a lot of stuff by the wayside to accomplish that goal" (p. 277). Thomas-Brown and Sepetys (2011) also found that teachers' focus on standardised tests impeded the development of meaningful differentiated instruction. Similarly, Strogilos et al. (2015) noted that the Greek Ministry of Education primarily promotes the enhancement of the "one teach, one assist" model by allocating one special educator to one student with disabilities in the mainstream classroom.

Finally, co-planning time was a contextual factor influencing co-teaching. Rytivaara et al. (2019) reported that "when the teachers did not have an opportunity to discuss the next lesson and 'divide the work,' their solution was to engage in parallel teaching where … they split the class in half" (p. 229–230). Similarly, many co-teachers in Isherwood et al.'s (2013) study reported in the interviews that the use of "one teach, one assist" was not their preferred choice but a compromised solution due to the lack of planning time with the co-teacher, which was also expressed in Bessette's (2008) interviews.

3.2.4. The evolving roles of co-teachers

Although some researchers remark that special educators have pedagogical expertise, whereas general educators have content expertise, others note the merging of those expertise areas, particularly for teams who stay together across years. For example, in an observational study of eight high school co-taught social studies classrooms, Zigmond (2006) indicated that special educators should bring in the classroom the special instruction that was missing for students with disabilities. Conversely, in Van Hover et al.'s (2012) case study, the co-teachers rejected the "content master" versus "specialist" dichotomy, indicating that they thought it was wrong that in one of their PD lessons the trainers "kept saying that the special educator isn't the content master so shouldn't deal with content" (p. 279). Rytivaara and Kershner (2012) recognised that "not everybody needs to know everything if learning is shared" (p. 1006), reflecting that co-teachers have complementary roles. Pratt (2014) described the complementary relationship of a pair of teachers, noting that "Alex often offers organization and structure, while Bianca clarifies questions or assignments for students" (p. 8).

An important finding was the evolving relationship between students without disabilities with the special educator and between students with disabilities with the general educator. Brusca-Vega et al. (2011) indicated that in their class observations "science and special education teachers consistently spent time with students with and without disabilities and rotated throughout the classroom" (p. 27). Pickl et al. (2016), who interviewed 12 co-teaching pairs, reported that these teachers value differentiation as a skill that they needed to educate all students. In their observations in a science middle school class, Embury and Dinnesen (2012) noted that students were going to "Sheila [special educator] now for more questions, more clarification, whereas before it was just [her] small niche but now any kid will come to [her]" (p. 46). Bešić et al.'s (2017) quoted a special educator who said that "I am also helping in classes without children with SEN [special educational needs] if needed" (p. 336). Similarly, Lindacher (2020) found that the special educator provided support to students without disabilities in three out of the four classes he observed.

3.2.5. Teachers' perspectives on co-teaching

Although co-teachers identified challenges for co-teaching, none maintained that co-teaching itself was not a good approach. As Cramer and Nevin (2006) indicated, "interviewees [16 pairs] were enthusiastic about their co-teaching relationships and the impact of coteaching on their students" (p. 269). Brusca-Vega et al. (2011) reported that the special education teachers were impressed with the co-taught curriculum stating that "they would have been unlikely to reproduce that experience in a self-contained setting" (p. 29). However, in Casserly and Padden's (2018) interviews, primary teachers did not use co-teaching frequently, with special educators noting their preference to more frequently instruct students separate from co-taught to provide supplemental support.

3.2.6. Teachers' perceptions of students' progress

Several co-teachers spoke positively about their perceptions of students' academic and social progress (e.g., O'Rourke & Houghton, 2009; Rice et al., 2007). For example, Carty and Farrell (2018) reported immediate availability of assistance for all students as contributing to academic progress, and Lindacher (2020) noted that "not only pupils with special needs, but also other students benefit substantially from special education expertise, for instance, from step-by-step instructions and clear explanations" (p. 152).

In addition, Casserly and Padden (2018) noted academic benefits of a student with disabilities after observing him learning from peers in the co-taught classroom. Other researchers identified positive connections between teachers' collaboration and students' progress. In an action research study, Argyropoulos and Stamouli (2006) noted that "Nefeli's [blind girl] frustration was reduced when the collaboration between the teachers started" (p. 133). Similarly, Brusca-Vega et al. (2011) reported that co-teachers "were impressed with the level of science learning and appropriate classroom behavior displayed by students with disabilities" (p. 29) which were "most likely the result of the interaction of co-teaching behaviors and the curricular and instructional features of the science classrooms … in the context of a supportive co-teaching environment" (p. 29).

There were also studies noting questionable students' progress, usually due to the lack of changes in the instruction provided by general educators. For example, Zigmond (2006) observed that social studies co-teachers provided few opportunities for students to learn through reading or writing. Ashton (2016) also reported that "Val and Keith are not able to make autonomous decisions about the pacing of their instruction … Keith clearly prioritised pacing over inclusive pedagogy" (p. 14). Subsequently, students' progress was adversely affected by the general educator's pedagogical choices focused on curriculum pace rather than students' learning.

3.3. Instructional strategies used

In other studies, researchers explored co-teachers' instructional strategies. This includes modifications, accommodations, and small grouping arrangements to enhance learning for students with and without disabilities.

3.3.1. Accommodations and modifications for students with disabilities

King-Sears (2021) notes that accommodations "function in ways that do not change the criteria or content for students with disabilities from what all students are expected to achieve … conversely, modifications function in ways that do shift outcomes from what all students achieve, such as minor to major revisions of the criteria and learning outcomes" (p. 3). Some studies reported the absence of accommodations or modifications provided for students with disabilities. For example, Moin et al. (2009) reported the lack of accommodations in co-taught science lessons with only a few teachers implementing hands-on instruction for students with disabilities. Strogilos et al. (2015) found that co-teachers rarely used modifications for primary students with intellectual disabilities, yet when they did, the activities were unrelated to the lesson's topic. This finding was replicated in a follow-up study by these authors on the understanding and development of differentiated instruction in 34 primary co-taught classrooms (Strogilos et al., 2017).

Conversely, Nevin et al. (2008), in a case study of two 4th grade co-teachers who were co-teaching together for three years, found strong evidence of "accommodations, and strategies specified in the respective lessons occurred on a consistent basis with specific attention to accommodations … described in the records for students with IEPs" (p. 289). In Stelitano et al.'s (2020) interviews of two high schools, the co-teacher reported that test accommodations were among the most common types of support provided to students with disabilities.

Some researchers investigated the variations of accommodations or modifications. Analysing co-taught lesson plans, Bryant Davis et al. (2012) observed increased time for assignments and audio-visual accommodations. Strogilos et al. (2017) also found that co-teachers use extra time or support, "whereas the objectives and the teaching content remain the same for all students" (p. 1226). Further, they noted that lack of appropriate learning materials (e.g., different reading texts) for students with disabilities may hinder their progress.

3.3.2. Instruction in small groups and peer-mediated instruction for all students

Beyond the description of co-teaching models that featured small group formats (station teaching or alternative co-teaching models), a few researchers discussed other small-group practices. Bryant Davis et al. (2012) reported that small-group work or peer tutoring were embedded in 104 out of 755 lesson plans. Brusca-Vega et al. (2011) stated that teachers "encouraged participation of students with disabilities working in pairs or small groups in various ways, including having a rule that each student must contribute at least one idea orally during activities that required a written group response and assigning roles to students during group work (e.g., facilitator)" (p. 28). Naraian (2010) observed a special educator who used "to 'spread' students around the room so that students with disabilities were not grouped together" (p. 1681). This special educator was "provoking students to address how they might adjust their responses when working with different partners, enlisting support from students to modify an activity to allow participation of peers with physical disabilities …" (p. 1681). Nevin et al. (2008) observed several instances of successful peer-mediated instruction. A general educator noted: "we try to include all the kids by having peer tutors and the expectation that it is okay to help each other out. For example, some of the kids in special ed will help out with the kids in ESOL [English for Speakers of Other Languages], and some of the general education kids will help out with everyone" (p. 295).

3.3.3. Effective instruction

Several researchers discussed the effective delivery of research-based instruction. Brusca-Vega et al. (2011) described instructional strategies useful for all students' progress such as taking notes and participating in discussions. van Hover et al. (2012) reported that co-teachers chose to support all students' learning through structured teaching "with consistent routines and expectations" (p. 276). Similarly, after providing instruction and coaching to an algebra co-teaching team to improve the quality of their instruction, Weiss and Rodgers (2020) noted an increase in guided practice activities and opportunities for students to participate and to acquire feedback. King-Sears et al. (2014) stated that during team teaching in science "both educators were using strong pedagogical skills, such as reviewing, presenting with visuals and explanation, using analogies, and engaging students by asking questions" (p. 676).

Similarly, van Hover et al. (2012) reported how co-teachers collaboratively revised co-teaching materials. Specifically, the special educator "suggested [revising] the guided notes, changing them from a series of questions into fill-in-the-blanks … added more charts, graphic organisers, mnemonic strategies, and processing activities … created a list of terms for each unit to write on a word wall to be displayed prominently in the classroom" (p. 276).

Conversely, Strogilos et al. (2015) reported lack of systematically designed techniques and expressed concern about the limited use of embedded instruction, student-directed learning, and the absence of symbols or pictures for students with intellectual disabilities. Also, in three secondary co-teaching teams, Weiss et al. (2020) remarked that English and math teachers were over-reliant on whole class instruction and lacked use of explicit instruction, such as modelling and guided practice.

4. Discussion

In this meta-synthesis we aimed to describe and interpret the practice of co-teaching and its perceived impact on students with and without disabilities and on co-teachers. One distinction from prior syntheses is our sole focus on co-teaching rather than on merging co-teaching with other methods of partnering such as consultation (Van Garderen et al., 2012) and inclusion (Solis et al., 2012).

Additionally, we consolidated only qualitative research designs, whereas previous syntheses had merged multiple designs (e.g., Paulsrud & Nilholm, 2020). Finally, by focusing on both students with and without disabilities, this synthesis differs from previous that had concentrated only on students with disabilities (e.g., Iacono et al., 2021).

All three research questions were interrelated. In our first research question about the conceptualization of co-teaching, we identified three conceptual frameworks: co-teachers learn to co-teach, the practicalities of co-teaching and students' progress, and the instructional strategies used. For the second research question about features that influence co-teachers' practices, features included co-teachers' relationships, how they learned from each other, their preparation needs, and the importance of co-planning time. Our last research question related to perceptions about co-teaching's impact on learning for teachers and students. For example, teachers perceived that students benefited in ways that led to academic and social learning, with the co-teachers also learning from each other. Nonetheless, researchers identified challenges that hindered effective co-teaching. Next, we discuss the features that influence co-teaching, and its impact in relation to the emerged conceptual frameworks and subsequent implications to policy and practice. We also highlight similarities and differences comparing our findings to those of past research.

4.1. Co-teachers learn from each other

Scruggs et al. (2007) stated that minimal, if any, preparation to co-teach was an issue in their previous meta-synthesis as well as co-teachers' needs to have strong communication and interpersonal skills. We found that co-teaching can be depicted as a process in which co-teachers initially learn about co-teaching as a team, when possible, then carry that teamwork toward co-planning and implementation beneficial to both teachers and students (van Hover et al., 2012). Co-teaching relationships can be strengthened by co-teachers' flexibility, effective communication, parity, and trust (Magiera et al., 2006). Several researchers captured co-teachers' remarks that their relationship strengthened across their time co-teaching, highlighting their realizations about mutually beneficial learning (Bouck, 2007; Rytivaara et al., 2019; Strogilos & Tragoulia, 2013), a point that aligns with a benefit of co-teaching observed by Scruggs et al. (2007).

Subsequently, one finding is that co-teaching can be an opportunity for teachers to learn from each other, leading to shared knowledge construction (e.g., Carty & Farrell, 2018; Rytivaara & Kershner, 2012). However, when teachers do not have preparation about co-teaching (Meadows & Caniglia, 2018; van Hover et al., 2012), they are disadvantaged. Also, teachers desire a voice on who to co-teach with, indicating that such a choice can affect their relationship and learning (Bešić et al., 2017). Even so, options are limited in individual schools when there are few special educators.

Consequently, co-teachers still need corresponding preparation, whether from coursework or professional development (Rytivaara et al., 2019). Preparation on co-teaching should include its consideration as a developing process, offering strategies on how teachers can improve their relationships through sharing of expectations, views, and feelings. The teachers need to learn to use their individual knowledge to construct a shared one (i.e., planning, teaching and management), putting effort into experimenting and exercising resilience in their collaboration. To this end, we agree with Sailor (2015) that teachers should conceptualise co-teaching as a professional collaboration between two or more educators that exemplifies genuinely inclusive practices. This collaboration should be beyond the pairing of an "expert" in general curriculum content with an "expert" in "special" pedagogies, which cannot guarantee equity and parity within the partnership, frequently making the special educators feel subordinate, as Scruggs et al. (2007) found. Since teachers cannot always choose who to co-teach with, preparation on how to develop a healthy relationship, in which co-teachers learn to develop shared roles for all students and not different roles for different group of students, is paramount. Specifically, teachers can learn to communicate through new technology, to resolve conflicts efficiently, and to express their opinions without feeling intimidated (Pickl et al., 2016). Co-teachers' preparation needs to focus on the development of shared responsibilities to achieve parity in their relationship and not only how to work under the different co-teaching models which is commonly recommended in the literature.

4.2. Co-teaching's evolution: growth and continued challenges

The current synthesis results affirm Scruggs et al.'s (2007) and Iacono et al.'s (2021) finding that the "one teach, one assist" is still the most popular model, yet more models are used (e.g., Bryant Davis et al., 2012; Tiernan et al., 2020), indicating some growth related to instructional configurations afforded by the co-teaching models. Also noted by Scruggs et al. (2007) was the lack of parity. However, we found some evidence of the evolving roles of co-teachers, which highlights co-teaching's development toward more equity and parity (e.g., Bešić et al., 2017; Brusca-Vega et al., 2011; Paulsrud & Nilholm, 2020).

A common discussion in many studies was on the practical arrangements of co-teaching to enhance the physical and instructional inclusion of students. In terms of growth, studies showed co-teachers who have co-planning time also experience more parity and equity between them (Embury & Dinnesen, 2012; Rytivaara et al., 2019). Preparation on co-teaching may inform co-teachers how to avoid fixed roles and, by complementing each other, how they can educate all students. These points were also noted in previous syntheses on co-teaching (Paulsrud & Nilholm, 2020; Solis et al., 2012). The evidence provided regarding the 'evolving role of co-teachers' (e.g., Bešić et al., 2017; Brusca-Vega et al., 2011) encourages policymakers and administrators to craft policies that promote the role of special educator as the second teacher of the class, rather than the one responsible only for students with disabilities.

Among continued challenges are the unequal roles and responsibilities of co-teachers (Scruggs et al., 2007). Based on researchers' interpretations, in a few situations, general education co-teachers adhere to unilateral instruction, via the "one teach, one assist" co-teaching model, to not only dominate instruction but also keep pace with the school system curriculum (e.g., Ashton, 2016). In such

situations, general education co-teachers seem adamant that the curriculum pace will be followed regardless of students' learning pace. The major reason for adhering to the curriculum pace is because students with and without disabilities in some co-taught classes typically need to pass statewide exams on specific content areas, per legislation, a finding that was also reported in Paulsrud and Nilholm's (2020) review. Thus, some aspects of co-teaching (e.g., "one teach, one assist") are interconnected with policies that need to be re-examined. For example, shifting how policies are operationalized can empower co-teachers to make judicious decisions that benefit students with and without disabilities.

Scruggs et al. (2007) also state the importance of co-planning time for co-teachers, which is a continued challenge for those who lack co-planning time. Several researchers noted this remains one of the most important barriers in the development of effective co-teaching (Tiernen et al., 2020; Weiss & Rodgers, 2020), with the value of adequate planning time consistently reported by teachers (e.g., Strogilos et al., 2016; Tiernan et al., 2020). Consequently, school-based administrators should prioritize co-teachers' planning time when developing the school schedule.

Although teachers are positive toward co-teaching, they cited challenges regarding its delivery. Teachers' positive views are in contrast with the challenges they experience in its implementation, reminding to policymakers and administrators that support is needed to help teachers maintain their positive attitudes. The finding regarding the effectiveness of co-teaching for all students concurs with findings in previous reviews (e.g., Scruggs, et al., 2007; Solis et al., 2012) and highlights its contribution as one of several approaches in which educators include students who have disabilities with their same-age peers. Hence, policy and preparation on co-teaching could reconceptualise and promote co-teaching as an approach contributing to the progress of all students, not presenting it as a service delivery model for students with disabilities. This can deter the dichotomization in the roles and feelings of teachers, increasing opportunities for shared learning.

4.3. Instructional strategies used

Scruggs et al. (2007) recommended an increase in the presence of research-based techniques implemented in co-taught settings. Although many studies focused on the models of co-teaching, the roles of co-teachers, and other practical arrangements (e.g., Weiss & Rodgers, 2020), fewer studies reported how co-teachers taught, precluding an examination of research-based techniques. Although in co-taught classrooms a variety of instructional strategies can occur, focusing on those strategies should also encompass what teachers do (i.e., pedagogy) and the extent to which students' learning needs are met.

To that end, some studies did provide rich detail regarding strategies. Among instructional strategies with a research base of effectiveness are note-taking (Brusca-Vega et al., 2011) and consistent routines (van Hover et al., 2012) as well as guided practice opportunities and opportunities for students' engagement during instruction (Weiss et al., 2020). For instance, both the general and special educators in King-Sears et al.'s study (2014) conducted review activities with science middle school students, provided visuals, used analogies, and engaged students by asking questions. van Hover et al. (2012) also used graphic organizers and mnemonic strategies in addition to other engaging instructional strategies. Such instructional strategies have the potential to enhance all students' progress, and preparation programmes should encourage their use in co-taught classrooms.

We found mixed reports regarding the presence or absence of curriculum accommodations or modifications (e.g., Moin et al., 2009; Nevin et al., 2008; Stelitano et al., 2020), and some researchers agreed that accommodations or modifications are necessary for some students (e.g., van Hover et al., 2012). It appears that the decisions about accommodations/modifications are highly associated with the education policy, mandatory state exams/tests and other expectations that are imposed on co-teachers, usually preventing them from making autonomous decisions. As many teachers feel they need to "teach for the tests" (e.g., van Hover et al., 2012), student needs are frequently overlooked. Policymakers and school administrators need to consider that such a practice may impact negatively all students. Since the use of accommodations and modifications tends to improve student learning (e.g., Nevin et al., 2008), their use may consequently improve academic achievement. Therefore, co-teachers' training should encourage the development of customised teaching materials (e.g., reading texts) and instructional processes (e.g., more time, visual cues) to support individual performance in the exams.

Lastly, a limited number of researchers provided descriptions about collaborative groups, peer tutoring, and other instructional arrangements, indicating an area of growth to be capitalized on in the future. A common feature in those studies was the active role of all students including those with disabilities (e.g., Naraian, 2010; Nevin et al., 2008), which has been characterized as an effective instructional strategy (Scruggs et al., 2007; Solis et al., 2012). Given the need for more specific instructional techniques and arrangements that engage students, teacher preparation and professional development programmes need to promote active roles for all students.

5. Conclusions, limitations, and future research

In this meta-synthesis we included studies published in English mainly from U.S. and European settings. Incorporating more research from non-English co-teaching contexts (e.g., Asian countries) may uncover similar or diverse findings. Furthermore, in this synthesis, we did not investigate the views of students, which should be included in a future review. In addition, due to the number of eligible studies ($n = 47$), we did not include all the contextual details of each study in the analysis. However, more details are provided in Table 1 about each study's unique characteristics. Because studies that incorporated forms of action (e.g., preparation on co-teaching) provided positive changes on teachers' roles and increased student engagement (e.g., Embury & Dinnesen, 2012), we need more studies of this kind, especially to evaluate what types of preparation (e.g., focused on practicalities, focused on the relationship of co-teachers) can enhance the development of co-teaching. In addition, studies with transformative elements (e.g., focus

groups) in which challenges can be discussed and acted upon (e.g., Pratt, 2014) should be prioritised. Although among the eligible studies were descriptions of the nuances and contextual features of co-teaching, we recommend the use of in-depth case studies from which researchers may be able to draw richer information, including issues of equity and school culture. Also, incorporating participatory approaches in future research designs would elicit more involvement of teachers and students in the design and implementation of research (Nind, 2014), providing valuable insights about how to improve co-teaching.

Overall, multiple studies in this meta-synthesis demonstrate that co-teaching has progressed from an approach to serve students with disabilities in the general education classroom to an approach that students and teachers can positively enhance their learning. We argue that co-teaching's evolution can be considered by policymakers, researchers, school personnel and students, as a dynamic constructive framework within which effective instruction can be maximized. Such a framework must be preceded by initial and ongoing preparation for co-teachers. Future research should focus more on the relationship between contextual features (e.g., co-planning time) and co-teachers' relationship and practices because such findings can inform preparation programmes and help researchers provide more meaningful recommendations. For example, instead of describing the lack of planning time, researchers should describe how its absence or presence influences the models teachers use to deliver instruction and its positive or negative consequences on students' learning. In addition, beyond the co-teaching models, we need to focus on the instructional strategies that can support all students, such as peer-mediated and collaborative learning as well as research-based effective instruction to understand how students are educated in co-taught classrooms. To this end, research on co-teaching should be conceptualised, planned, and implemented taking into consideration all students included in the co-taught classrooms.

Author credit

● **Vasilis Strogilos:** o Conceptualization, o Data curation, o Methodology, o Formal analysis, o Original draft, o Review and editing, o Project Administration. ● **Margaret King-Sears:** o Conceptualization, o Data curation, o Original draft, o Review and editing, o Project Administration. ● **Eleni Tragoulia:** o Methodology, o Data curation, o Formal analysis, o Review and editing. ● **Anastasia Voulagka:** o Data curation, o Review and editing. ● **Abraham Stefanidis:** o Data curation, o Original draft, o Review and editing.

Funding

Declaration of competing interest

None.

Data availability

Data will be made available on request.

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