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Editorial Preface

Our journal aims to provide a platform for the discourse of cooperative learning in this issue. For over half a century, cooperative learning has represented a significant strand of educational interest. The practical and research outcomes accumulated in the last five decades illustrate how the practical application of this paradigm contributes to enhanced performance for all students, fostering constructive problem-solving, reflective, and critical thinking, as well as the mobilization and development of emotional and social competencies. It's particularly in these areas where cooperative structures stand out convincingly against individualistic, competitive, or traditional learning structures, which are increasingly being spotlighted. This emphasis is further magnified by the cultural shift brought about by the rise of artificial intelligence and machine learning models in our era.

The editors found themselves in both a challenging and fortunate position. Thanks to the dedicated editorial work of Neil Davidson, the pioneers of the cooperative discourse recently published a volume titled *Pioneering perspectives in cooperative learning: Theory, research, and classroom practice for diverse approaches to CL*. In this issue, the foremost representatives and their colleagues of the discourse summarize the outcomes of the most significant cooperative models over the past fifty years. This outstanding work serves as a valuable resource for those familiarizing themselves with the CL discourse or researchers seeking an overview of theoretical foundations, core principles, concrete practices, and evidence-based approaches in cooperative learning. In addition, Neil Davidson with two other editors who have significantly contributed to the discourse, Robin M Gillies and Barbara Millis, have released a contemporary volume this year - *Contemporary global perspectives on cooperative learning: Applications across educational contexts* - focusing on influential and emerging authors in the cooperative discourse. This publication offers substantial assistance to any reader seeking insight into current endeavors. As an Editorial Team, it was clear that we must set the bar high while providing the means for our scientific journal to portray the cooperative learning discourse.

From the submitted papers, we curated a selection for the *Article* section that offers both theoretical overviews and practical solutions. In the *Workshop* section, we chose studies focused on concrete practical implementation. In the *Dairy* section, we provided space for the global networking effort initiated within the CL discourse in 2020. In this section, we also present the two summary books mentioned above, along with a very recent handbook that bridges cooperative learning with reflective practice. This way, alongside the historical overview, contemporary research, and approaches, readers can also gain insights from a fresh practical handbook in our journal.

The first study *(Robyn M. Gillies: Strategies promoting dialogic talk during cooperative learning)* draws attention to a significant segment of cooperative learning, focusing on academic talk unfolding through interaction. The author provides a concise and vivid overview of research concerning student interaction within the contexts of constructivist and cooperative discourses. This sheds light on how the effectiveness, outcomes, and fairness of cooperative learning can be enhanced by intentionally followed constructivist strategies and models that are built upon interaction and employ diverse cognitive repertoires.

In the following article (*Seven ways of constructing knowledge through cooperative learning*), Arató illustrates how cooperative learning and the constructivist educational approach seamlessly intertwine. The author points out that to this day, the practice of cooperative

learning provides the framework for constructivist experiments, research, and established practices. Arató introduces seven modes of knowledge construction that can be easily integrated into everyday teaching within cooperative settings, either in the physical classroom or through online platforms. These modes also offer strategies and approaches that can provide guidance for researchers studying collaborative ways of knowledge construction.

In the third study *(Using cooperative learning to teach the sustainable development goals)*, Jacobs and colleagues (Chenghao Zhu, Meng Huat Chau, Qingli Guo, and Jasper Roe) examine the possibilities of cooperative learning from the perspective of another segment, namely the United Nations' Sustainable Development Goals (SDGs). The authors thoroughly explore the essential characteristics of these goals, briefly introduce the background of cooperative learning, and connect the two areas through the student-centered approach. Using concrete practical models and principles, they demonstrate how the paradigm of cooperative learning can be suitable for supporting all SDG objectives.

In the journal's *Workshop* section, two additional studies find their place. In the first study *(A virtual peer tutoring project to improve communication skills)*, authors Garriga, Gonzales, and Duran present a peer tutoring model that connects students from Scotland and Spain, aiming to enhance their communication skills. Through this intriguing case study, the authors clearly point out pathways towards prominent areas in the cooperative discourse for further exploration. These areas include conscious cognitive and communication skill development, strengthening the tutoring role with collaborative and partnering behavior patterns and strategies.

The other workshop study in the section examines the other side of implementing cooperative learning in practice by focusing on effective and successful teacher training programs. In their study titled "*Teachers' professional development for cooperative learning: A constructive controversy between long-term versus short-term professional development*", authors Liebech-Lien, Hammar Chiriac, and Neil Davidson investigate the effectiveness of teacher training programs with a focus on the time factor. The case studies summarize experiences from two countries' contexts while providing a brief overview of international experiences as well.

In the *Diary* section, a brief introduction is provided about the global network for cooperative learning (*Network of International Cooperative Learning Educators and Enthusiasts, NICLEE*), which continues the work of pioneering and practicing cooperative learning proponents (*International Association for the Study of Cooperation in Education, IASCE,* from 1979 to 2019), initiating collaboration among researchers, theoretical experts, and practitioners once again. It is a pleasure for us that Yael Sharan has taken on the task of sharing her personal impressions about the "*Contemporary…*" book mentioned above and published in 2023, which features contemporary cooperative authors. We can read a review by Arató about the book of the "*Pioneers…*" summarizing fifty years of cooperative learning. Kata Oláh also presents a review of a handbook published in 2022, "*Cooperative Learning through a Reflective Lens*," authored by Jacobs, Li, and Tamah, recommended for language teachers but useful for any educator.

The earlier Hungarian-language issues of our journal consistently provided updates on the discourse surrounding cooperative learning. However, with the international expansion of the Autonomy and Responsibility journal since last year, our aim was to offer a platform for continuous visibility for the representatives of the cooperative paradigm. Through this second thematic issue, we sought to make it clear to both those interested in cooperative learning and those actively contributing to the discourse that we intend to provide ongoing exposure to the cooperative learning within the pages of our journal.

Ferenc Arató, Issue Editor

ROBYN M. GILLIES

Strategies Promoting Dialogic Talk during Cooperative Learning

The role of talk in the construction of knowledge and learning has gathered interest in recent years as studies have been published that demonstrate the importance of social interaction in promoting cognitive development and academic learning. While there is a large volume of research that attests to the benefits that students derive when they work cooperatively together, it is only in the last 30 years that studies have been published that demonstrate how students learn by interacting with others and how teachers can utilise this information to create classroom experiences to ensure these benefits are realised. This article discusses the role of dialogic talk during cooperative learning and its capacity to promote students' thinking and learning. The article provides insights into how one teacher used dialogic talk in her classroom to promote student interactions, thinking and learning. It also provides an example of how students in one small group listened to each other, asked questions, sought clarifications, and provided reasons and justifications for their suggestions as they considered the perspectives of others on how to construct an earthquake proof building.

Keywords: Cooperative Learning; dialogic talk; pedagogical practice; teacher's role

Introduction

Cooperative learning is a pedagogical practice that has been used extensively in classrooms to promote student engagement and learning. When children cooperate, they learn to attend to what others have to say, seek clarification on issues and, in turn, provide explanations for points that need further clarification. In so doing, they learn to develop mutual understandings of the topics that are being discussed (Johnson & Johnson, 1990). In fact, talk is so important that it recognised not only as a means of sharing thoughts but also as a social mode of thinking; essentially a tool for the joint construction of knowledge and the development of new understandings (Mercer, 1996).

Students who cooperate demonstrate increased participation in group discussions, engage in more useful helping behaviours to assist understandings, and demonstrate higher levels of thinking and discourse than students who do not have these experiences (Gillies, 2003; Webb, 2009). The outcome is that students who cooperate on tasks that challenge their thinking tend to perform better academically and are more motivated to achieve than children who have not had these experiences (Johnson & Johnson, 2002).

However, while cooperative learning provides opportunities for students to interact, concern has been expressed about the quality of the discourse that often emerges if students are left to engage in discussions without training in how to interact appropriately. In fact, it is argued that teachers need to be active in challenging students thinking if students

are to learn how to think analytically about what they are learning and relate it to their current understandings (King, 2008). When this happens, students learn to construct new knowledge, solve new problems, and address new issues (Gillies, 2011).

Chinn and Clark (2013) noted that collaborative argumentation is one form of discourse where students learn to make claims and support them with reasons and explore the perspectives of others and evidence for their perspectives before deciding on the best solution to a problem. When students learn to engage in collaborative argumentation, students are more motivated to learn, they develop a better understanding of the content they are learning, they demonstrate more general and specific argumentation skills to solve problems, and, in so doing, they learn to work with others to create new knowledge and understandings.

However, although children do not initially use talk to explore and investigate issues when they work collaboratively together, Rojas-Drummond and Mercer (2003) found that they can be taught to do so and this has a positive effect on their thinking and reasoning. More recent research by Mercer, Hennessy and Warwick (2019) that built on previous research on Exploratory Talk (Mercer, 1996) and the Thinking Together approach (Dawes et al., 2006) have argued that a dialogic pedagogy can be established in classrooms where "teaching is predicated on the active, extended involvement of students as well as teachers in the spoken interaction of the classroom" (p. 189).

Dialogic pedagogy is more likely to emerge when teachers establish conditions that encourage students to share information; be actively involved in the group discussion; listen attentively to what others have to say and consider different suggestions; provide reasons and explanations for ideas; discuss alternative propositions; and work constructively with the group to reach a decision (Mercer et al., 1999). Dialoguing with others is critically important because Meloth and Deering (1999), Webb et al. (2013) and Topping and Trickey (2014) found that the cognitive and metacognitive levels of the groups' discussions are positively correlated with students' cognitive and metacognitive outcomes.

Training teachers in how to teach appropriate interactional skills appears to be critically important if children are to engage in effective dialogic interactions with their peers (Webb, 2009). Gillies (2011) argued that teaching children how to ask and answer questions and provide feedback to their peers during small group discussions required a concerted effort on the part of the teacher to teach and model these skills during dialogic exchanges. Topping and Trickey (2014) found that when teachers engaged in dialogic interactions with their students where they asked open questions, as they did when they used Philosophy for Children (a dialogic approach to learning), students were more likely to participate in classroom dialogues and this, in turn, led to improved student reasoning and justification of opinions. Furthermore, Topping and Trickey found gains in cognition which were maintained from primary school to high school even when the students were in classes where the teachers had not been engaging in dialogic interactions with their students.

Ways in which teachers can promote dialogic interactions in classrooms

One of the key researchers on how to promote dialogic interactions in classrooms is Robin Alexander (2008). Alexander proposed that teachers need a repertoire of approaches which enables them to select what is best for the learner, subject matter, and the context in which learning occurs. In short, pedagogical interaction is dependent on how teachers organise the interaction to occur; the types of talk that they use to teach; and, how the children learn to use different ways of talking when they interact with others.

Organising classroom interaction involves not only engaging in direct teaching, often referred to as authoritative teaching (Scott et al., 2006) where teachers present specific in-

formation and perspectives on a topic while also engaging in dialogic interaction with the class on the topic being discussed. In this type of interaction, teachers tend to maintain control of the dialogue that occurs. Guided group work is another way in which teachers interact with the children to scaffold and guide their thinking. This usually involves teachers interacting with students to ensure that they work towards achieving a specific goal or completing a task that the teacher has set (Gillies, 2013). In contrast, cooperative group work involves children accepting responsibility to work together to accomplish a specific goal or complete a task (Gillies, 2016a). In this type of situation, children tend to exercise more autonomy over how they will interact and manage the group task. Effective teachers tend to organise classroom interactions that involve all three approaches in their teaching.

Teaching talk, the second key element in pedagogical interaction (Alexander, 2008), involves using a variety of different types of talk that are common in many classrooms. These include the more traditional styles of drilling facts and routines through constant repetition and recall to the more contemporary styles involving discussion and dialogue where teachers and students exchange information and ideas to clarify understandings and solve problems together. Alexander maintained that while discussion and dialogue are more likely to occur in classrooms where children work cooperatively together on tasks, discussion and dialogue can also emerge in classrooms where teachers engage in direct teaching and guided group work.

Gillies and Khan (2008, 2009) found that when teachers are taught to use specific questioning strategies that challenge and scaffold children's thinking, this not only leads to students providing more elaborative responses and better help-giving explanations but also demonstrating better reasoning and problem-solving skills. Reznitskaya et al. (2012) noted that students' thinking is enhanced when teachers participate in dialogic exchanges with students, ask questions that are open and explorative, and provide feedback that students perceive as meaningful. When this happens, students examine both the product and processes of their discussions and elaborate on their thinking, and, in so doing, learn to co-construct new knowledge and understandings.

Learning talk is the third key element in pedagogical interaction, proposed by Alexander (2008) which involves children learning to use talk when they interact with others. In classrooms, students listen attentively to how teachers model different ways of talking such as asking questions, seeking additional information, acknowledging students' attempts, and encouraging their contributions to the topic under discussion. In turn, children learn to listen to what others have to say, be receptive to different perspectives, reflect on what they hear, and comment on the topic at hand. In so doing, children learn to appropriate different ways of talking that build their language repertoires, enabling them to participate in interaction with others and learn (Mercer & Littleton, 2007). When this happens, Reznitskaya and Gregory (2013) argue that students take on key responsibilities for the flow of the discussion as they participate in taking turns, asking questions, evaluating other's responses, introducing topics, and suggesting procedural changes. In so doing, they learn to explain their thinking, providing reasons and justifications for their positions on topics under discussion.

Context for the task

The teacher in the interaction below had previously participated in two days of professional learning workshops where she had worked with other Year 6 teachers to discuss how they would teach a unit of work on earthquakes using the 5E approach to teaching inquiry-based science (Bybee, 2006). This approach to teaching inquiry science aims to *en-*

gage students' curiosity, provide opportunities for them to *explore* topics and *explain* the problem under investigation, *elaborate* on possible solutions, and *evaluate* the proposed outcome. In this instance, the children were investigating: How to construct an earthquake-proof building. Issues that they needed to consider were the stability of their design and the budget constraints that operated. In addition, the teacher had also learnt how to engage students' interest in the topic through dialogic teaching where she actively encouraged them to listen to others, share ideas, and consider alternative viewpoints in the context of cooperative group discussions.

Setting up the task to build an earthquake proof building

1. T. It (task) is looking at the possibility of an earthquake in our area. So, we're looking in particular at a project in which to test a building to deal with earthquakes. Why is it important that we do this kind of thing? Why would somebody actually have a job to test this? (**Open question**)

2. Student. So, we can build things to make buildings stronger for earthquakes.

3. Teacher. Wonderful. **(Acknowledgement of students' response**)
   The last couple of lessons we've had a look at what happens to building during earthquakes and how important the building design is to decide if the building is going to survive the earthquake. So, we're looking at this from the builder's point of view to look at how we would go about designing and testing a design. (**Guided inquiry**). Now have a look at the second box which is underneath which has the heading on it 'Rules'. I'm going to give you another minute to read through that box and then I'm going to ask you to actually tell me what the rules are. So, you've got a minute to actually read through that box. (One minute for students to read the information on the task)

4. Teacher. Alright. I'm looking to see if you managed to read all of the rules so I'm going to ask you to give me one rules until we've gone through them. Rhianna, what is one of the rules? (**Open question**)

5. Rhianna. Um, you're not allowed to bring stuff from home and if there's any cheating you get three points from your grade

6. Teacher. Fantastic. **(Acknowledgement of students' response**)
   There's not to be any cheating on the project and you cannot help strengthen your building with materials from home. If you do so you actually get points deducted because we're going to use points to decide which building was in fact the strongest or the best built. What's another rule, Lucas? (**Open question**)

7. Lucas. Um, it has to be three stories high.

8. Teacher. It must be three stories high. (**Affirming student's response**) Back group. you'll need to focus a bit more carefully. It must be three stories high. That means you don't get to try and build a really solid little building and try to get away with everyone else designing a much taller and slightly more vulnerable building. Simone, what's another rule? (**Open question**)

9. Simone. If you waste materials you'll be …[inaudible]

10. Teacher. Absolutely **(Affirming student's response) /** If you waste or break the materials that you are given, you don't just get to say we've accidentally torn this bit or cardboard, can we have another one? You will be charged for any replacement material and the costs are written down on the sheet there. So that will actually be part of your budget for your building and it will cost you points. So, your building has to come in at a certain budget and if you spend above the basics, we'll cost your building's budget and that will come off your total points at the end. Are there any other rules we need to follow, Ben? **(Open question)**

11. Ben. Your building height frame isn't allowed to be over 35cm.

12. Teacher. Very good **(Affirming student's response) /** Your building frame cannot be above 35cm in height. It must be three stories but it cannot be taller. Now there was a question asked earlier. What was your question?

13. Student. What if it's 36cm?
14. Teacher. What if it's 36cm? Who believes they might know what the consequences might be if your building is just a little bit too big? There will be a point deduction. Any of the rules that are exceeded will have a consequence in terms of points. So that's the potential price you pay if you're not careful. Any other rules to follow? Jodie? (**Open question**)

15. Jodie. The building must be made of cardboard.

In the interaction above, it is interesting to note how the teacher is modelling many of the principles of dialogic teaching advocated by Alexander (2008) where the teacher and students address the task together, in this case, how to construct an earthquake proof building. They engage in reciprocal interactions where they listen to each other and share ideas as the teacher plans and steers the classroom talk towards the specific educational goal of constructing the building. She achieves this by asking a series of open questions designed to probe students' thinking on the topic (Turn 1, 4, 6, 8, 10, 14) and affirming their responses (Turn 3, 6, 8, 10, 12), helping them to remain engaged with the discussion at hand as she guides the discussion (Turn 3). In effect, the teacher aims to help the students achieve a common understanding of the issues around constructing an earthquake proof building by asking questions that build on students' previous responses to guide and prompt the interaction.

In the above interaction, the teacher is clearly engaged in dialogic teaching which Alexander (2008) notes occurs when: (a) teachers and students discuss tasks together; (b) they listen to each other, share ideas, and consider alternative perspectives; (c) students voice their opinions freely without the fear of being sanctioned; (d) they build on each other's ideas to establish logical and cogent understandings; and (e) the teacher steers the discussion to ensure students develop an understanding of the purpose of the activity.

The following is an example of the discussion one group had on how to construct an earthquake proof building. This discussion occurred immediately after the interaction above as the students set about discussing how they would undertake the task.

Student interactions as they worked together to construct an earthquake proof building

1. S1: Well, with Indy's idea, if it was in the ground, it would move with the earth which would make the building go like that (moves hands from side to side) and it could split in half which would make it shake even more. (**Makes suggestion on movement of the building**)

2. S2: Yes but if it moved with the earthquake, the earthquake wouldn't be shaking it. It would just be moving it from side to side. (**Elaborates with reason**)

3. S1: It would still be shaking it. (**Makes a statement**)
4. S2: So things would get damaged and possibly collapse with the building so maybe shear walls may not be as good an idea as we first expected (**Suggests possible consequences**)
5. S3:The thing that I've always thought is that triangles are always the strongest structures. (**Makes suggestion**)

6. S1: Whoever said that it had to be an exact rectangular prism? Maybe we could even make it slightly tip (indicates with hands). (**Makes suggestion**)

7. S4: But the thing is that we've only got so much material and we can't go over budget. We've got three levels and we're going to have one there (indicates with hands), one there, and one there and then you're going to have the thing over the top. (**Reminds group that there are limitations to what they can do**)

8. S1: You don't necessarily have to have it go to a point, do you? (**Seeks clarification**)

9. S2: It says here about the shear wall (reading), 'It's reinforced concrete walls positioned perpendicularly to each other to absorb the force that would otherwise crack the building.' (**Makes suggestion with possible consequences**)

10. S3: But you could always do something like have concrete beams. (**Suggests possible structure**)

11. S1: So if this was our triangle, that would be floor one, floor two, floor three and then that would be extra for stability. (**Provides reason why the suggested design would work**)

12. S4: You mean making it go up like that? (drawing a triangular shape). (**Seeks clarification**)

13. S1: Yes. (**Confirms**)

14. S2: But you'd have to have some way of making that even because the floors are all the same size. (**Challenges idea**)

15. S4: You don't have to have a point at the top, do you? (**Seeks clarification**)
16. S1: It would add more stability, wouldn't it? Calise, you're the expert on triangles. (**Acknowledges another student's expertise and seeks information**)

17. S3: Well, in these pictures .....

18. S2: I think this is going to be a little bit more advanced but I'm thinking that if we had the shear walls ....(**Suggestion**)
19. S4: Remember, we can't go over our budget. (**Reminds group of budget constraints**)

It is clear that the students are actively involved with each other in the group as they make suggestions on the building's construction and the consequences that may result, provide reasons as to why a suggested design would work, seek clarifications on the possible design, and acknowledge and affirm the ideas of others. In so doing the children have learnt to appropriate many of the ways of interacting that their teacher has demonstrated. For example, they are listening to each other, asking questions, providing suggestions to help clarify the task, elaborating on ideas and providing reasons for different suggestions, and actively building upon the responses of others. Alexander (2008) noted that when these types of interactions are evident, the children are demonstrating the "learning talk repertoire" (p. 112). This type of learning talk repertoire occurs when teachers provide opportunities for students to interact with others where they are encouraged to listen to each other, be receptive to alternative perspectives, and think about what they hear.

Discussion

The purpose of this article is to discuss some strategies that promote dialogic talk during cooperative learning. An example of one teachers' interaction with her students and a follow-up small group activity were used to illustrate how the teacher engaged in dialogic teaching and how the students, in turn, appropriated some of these strategies in their interactions with each other. There is no doubt that teachers play a critical role in promoting student interactions and discussions in both the classroom and in small, cooperative group activities (Gillies, 2011). They do this by creating an environment where they model how to dialogue with others, so students learn how to listen respectively to what others have to say, to ask for clarification on issues they do not understand, provide reasons and explanations for positions they adopt, and demonstrate a willingness to adapt or accept the information provided by others (Littleton & Mercer, 2013). When this happens, not only do students interact more openly and freely with each other but they learn to ask more probing questions, provide more detailed explanations about the phenomena they are investigating, and work constructively to achieve the group's goal (Boyd, 2016).

In a study of the dialogic interactions of three Year 7 teachers and 17 groups of students (3-5 students per group) in their classes, Gillies (2016b) found that dialogic talk by the teachers or peers had the capacity to stimulate or extend students' thinking and advance their learning. These outcomes are achieved when teachers encourage students to exchange information, explore issues, interrogate ideas, and tackle problems in a cooperative environment that is supportive of these discussions. Webb, Franke, Johnson, Ing and Zimmerman (2021) also reported on the importance of students participating in whole-class and small group discussion to explain their ideas and engage with the ideas of others. When this occurs, students can build new connections between mathematical ideas and representations and extend their problem-solving strategies in ways that are directly associated with their participation.

Boyd, Mykula, and Choi (2019) noted that effective teachers plan, guide and shape students learning experiences, so they anchor academic language in what students already know and work hard with students to help them connect what they currently understand

and know to what they are learning. When this happens, students learn to grapple with new ideas and generate new meanings as they engage in dialogic exchanges with others.

Others who have reported on the importance of dialogic talk in classrooms and small groups include Hargreaves and Garcia-Carrion (2019) who found that when teachers create the time for students to interact with each other, the students are more likely to engage in sustained interactions in which they demonstrate more higher-level cognitive dialogue; they provide more explanations, reasons, and creative ideas than students who did not have this opportunity. Similar findings were reported by Lin et al. (2019) who found that when teachers utilise collaborative reasoning where students work in small groups to resolve a controversial issue, their academic language was more sophisticated as they learnt to provide reasons and justifications for their own positions while being challenged to consider the perspectives of others. "The dialogic properties that learners internalise from CR gradually become the basis for them to construct new ways of thinking and to socialise new ways of acting towards one another" (p.15).

In summary, research by Gillies (2016b), Webb, Franke, Johnson, Ing and Zimmerman (2021), Boyd, Mykula, and Choi (2019), Hargreaves and Garcia-Carrion (2019), and Lin et al. (2019) demonstrate that dialogic talk by teachers or peers has the capacity to stimulate and extend students thinking and advance their learning. Teachers play a key role in steering, encouraging, and arbitrating student discussions so students, in turn, are guided to develop clearer and deeper understandings of the topic they are discussing. It is only when teachers understand the importance of dialogic talk in classroom discussions that the potential it has to promote student thinking and learning will be realised.

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FERENC ARATÓ

Seven Ways of Constructing Knowledge Through Cooperative Learning

This article presents seven ways to construct knowledge through cooperative learning. The first part of the article provides a comprehensive examination of how deeply constructivist and cooperative learning discourses are interconnected and have interfaced with each other over the last five decades. The article highlights how the two concepts have influenced each other and how their combination can lead to a more effective learning experience. The second part of the article is devoted to explaining the seven ways of constructing knowledge in cooperative learning settings. Each of the seven ways - interactive, positively interdependent, synergic, synoptic, multicontextual, interferential, and action-based - is discussed in detail, with specific examples provided to illustrate how each approach works in practice. The overall aim of the article is to assist educators and researchers in understanding the various cooperative learning approaches and their potential benefits in constructing knowledge. The article emphasizes the importance of adopting simple cooperative approaches for efficient knowledge construction, and the importance of educators and researchers adapting these approaches to meet the needs of their students.

Keywords: Cooperative Learning, constructivism, knowledge construction, interactive learning

The Intertwining of Constructivism and the Cooperative Paradigm

In the first part of the study, we will briefly review how cooperative learning has intertwined with constructivist aspirations that have emerged in the educational discourse. Both discourses represent central approaches to cognitive development and learning constructed in social interactions. We will cover the paradigmatically new approach that cooperative learning brings to this field. We will also briefly mention what additional dimensions of social learning conditions have been revealed in the discourse of cooperative learning.

Mutually reinforcing insights in the two discourses: the social determinism of knowledge construction

Interpreting learning and teaching practices from the constructivist perspective, it does not matter whether one learns through lectures or in a collaborative learning environment. In both situations, their mobilized and emerging knowledge constructs are and remain indi-

vidually different. At the same time, thanks to the constructivist discourse, it has also become understandable that these unique knowledge constructs are set in motion through social interactions. The constantly changing, interacting dynamics of learning and cognitive development are formed through the social environment and interactions with peers. Knowledge and cognitive development are fundamentally generated through social influence (Wertsch, 1979, 1980, 1992; John-Steiner & Mahn, 1996; Palincsar, 1986, 1998).

In the 1980s, it became clear that the educational approach and practice of cooperative learning were closely intertwined with socio-constructivism (Graves, 1983; Palincsar & Brown, 1984; Brown & Palincsar, 1989; Damon, 1984; Davidson, 1985; Slavin, 1987; Stevens et al., 1987; Dansereau, 1988). The crucial question in both discourses was whether individual constructs of knowledge are socially determined and how social interactions can be transformed, for example, in schools, so that each student can learn more successfully. If we examine the nature of traditional pedagogical practice based on lectures and individual learning, we can see that only a few students can interact while learning. If all students interact, it's only for a short time and primarily with the teacher. This kind of social interaction benefits those who have a good understanding of the way the teacher performs and instructs individual learning (Aronson, 2021; Kagan, 2021; Jacobs et al., 2022).

The discourse of cooperative learning also examines how the social environment, the organizational frameworks that shape social interactions, should be transformed. How can we create a learning space in which the consolidation of individual knowledge becomes increasingly optimal for all participants? It is no coincidence that in Davidson's edited book featuring pioneers of the cooperative discourse, (including Eliot Aronson, David Johnson & Roger Johnson, Robert Slavin, Yael Sharan & Shlomo Sharan, Spencer Kagan, et al) presenting the last fifty years of the cooperative learning discourse, Davidson identifies constructivism as one of the defining theoretical foundations of cooperative learning (Davidson, 2021b, p. 245). Similarly, twenty years earlier, Slavin, with his fellow authors, identified constructivist educational science as a defining element of the cooperative learning discourse (2003).

Similar foci in both discourses: learning as social interaction

Educational studies based on constructivism draw attention to interaction, specifically the interaction between students and the teacher communicating with them through dialogues aimed at realizing learning at the academic level (Wertsch, 1992; John-Steiner & Mahn, 1996; Palincsar, 1986; Mercer, 2008; Mercer et al., 1999; Alexander, 2001, 2006, 2018). Several approaches focused on social interaction have been developed to promote cognitive development and social knowledge construction, including Reciprocal Teaching (Brown & Palincsar, 1989; Palincsar, 1986; Palincsar & Brown, 1984), Collaborative Reasoning (Anderson et al., 1998, 2019), Instructional Conversation (Goldenberg, 1992), Questioning the Author (Beck et al., 1996), Exploratory Talk (Mercer et al., 1999), Dialogic Classroom (Alexander, 2001, 2008, 2018), and Accountable Talk (Asterhan et al., 2015; Resnick, 2018). The listed models and the associated pedagogical practices and research results demonstrate the constructivist approach's focus on social interactions. These models also exemplify how researchers use scientific narratives and developed models in professional dialogues, while approaching reality through constructs of individual knowledge. Among other constructivist approaches, the above listed models have slowly accumulated scientific justification over the past five decades. In addition, knowledge construction based on conscious constructive interactions understood by both teacher and student have also been developed and researched. It is crucial to follow Alexander's suggestion (2018) that teachers

should have a repertoire of models, so they can choose the most suitable model, process, and practice for a particular group of students and learning situation.

In the same way, the cooperative learning discourse emphasizes the importance of social interactions for learning and cognitive development. The cooperative paradigm assumes that students working together and helping each other in a structured way can result in better learning outcomes (Johnson & Johnson, 1999; Kagan, 1994). The focus is on the social structures and processes that enable effective and productive collaboration, such as positive interdependence, individual accountability, face-to-face interaction, interpersonal and small group skills, and group processing (Johnson & Johnson, 1989). By creating a supportive and collaborative learning environment, together students can construct knowledge and meaning and help each other learn (Davidson, 1996; Slavin, 1995). The goal is to create a learning community in which everyone can contribute and benefit from the social interactions and the collective knowledge that is constructed (Dillenbourg, 1999). The cooperative learning approach is effective in a variety of contexts, including classrooms, universities, and workplace training (Johnson & Johnson, 2009; Slavin, 2014). Like the constructivist approach, cooperative learning recognizes the social nature of learning and emphasizes the importance of social interaction in the process of knowledge construction.

In addition to promoting effective cognitive development and learning performance with equal opportunities, cooperative learning discourse also focuses on developing students' intrapersonal and interpersonal competencies and has proven its effectiveness through hundreds of research studies in recent decades. These include models such as Jigsaw Classroom (Aronson, 1972, 2021), Learning Together (Johnson et al., 1984; Johnson & Johnson, 2021), Group Investigation (Sharan & Sharan, 2021), Structural Approach (Kagan, 1990, 2021), Small Group Discovery (Davidson, 1985, 2021), and Complex Instruction (Cohen, 1986; Cohen & Lotan, 2014; Lotan & Holthuis, 2021). Cooperative learning discourse has also produced several working models that emphasize student interaction and dialogue, with a particular focus on the constructivist approach to learning. Examples of such models include Creative Controversy (Johnson & Johnson, 1992), ThinkTrix (Lyman, 1992), and Brain-Friendly Learning (Kagan, 2014), as well as Group Investigation and Small Group Discovery models, which emphasize joint knowledge construction among students in small groups. Additionally, cooperative learning has been widely adapted to incorporate Bloom's taxonomy (Bloom, 1956; Anderson et al., 2001) and the SOLO taxonomy (Biggs-Collis, 1982; Hooks & Mills, 2011, 2012) into the learning processes of different subjects (see, for example, Gillis, 2021; or Kagan & Kagan, 1998, 2009; Kagan, 2014).

Arató (2013, 2014) argues that different models of cooperative discourse are more comprehensible within a paradigmatic approach (Kuhn, 1970). In such an approach, concrete and simple rules, "symbolic generalizations" (Kuhn, 1970), of a recognizable paradigm are drawn, along which it is possible to distinguish cooperative learning from other small group activities (for example, with the help of cooperative principles – Kagan, 1990, 2021; Arató, 2014; Jacobs et al., 2022). A paradigmatic exemplar (Kuhn, 1970) was also presented in the discourse. This is a practical example that all discourse authors recognize as a good example, and even a model, for implementing cooperative learning. It is the cooperative jigsaw structure, one of the first models developed by Aronson et al. (1978) under the name Jigsaw Classroom (Aronson, 1972, 2021).

The fundamental question of cooperative learning, like the constructivist approach in the seventies, was how to ensure successful education for all in democratic societies and create a pedagogical environment where everyone can access the goods available through knowledge. In the United States of America, for example, not only white middle-class stu-

dents should succeed in the education system, but also learners from diverse backgrounds, such as Blacks, Latinos, and Indigenous people. The desegregation measures launched in the wake of the discoveries of social psychology and human rights movements initially generated interethnic conflicts rather than increased the chances of more successful learning. Aronson and his fellow researchers – one of the discourse-founding cooperative learning workshops – wanted to achieve positive changes in the relationship between learners by changing behavioral frameworks and social behaviors of knowledge construction (Aronson, 1972, 2007, 2021).

Instead of knowledge construction activities traditionally based on lectures and individual work, new learning structures were conceived where students are forced to speak constructively to each other. Representatives of cooperative learning transformed the behavioral framework of the lessons to create new social forms of knowledge construction. They formed behavioral structures that organizationally guaranteed each student's participation in social interactions for learning. To do this, they followed paradigmatically new principles such as parallel interaction or positive interdependence. That is, instead of the solo interaction of the teacher and one student, they allowed the students to talk to each other about what they had learned – for example, arranged in pairs or groups of three or four learners. With this step, they multiplied the number of interactions for learning during a given lesson. They created an interaction-based learning environment for knowledge construction between socially and culturally different peer groups. In the meantime, they also realized that learning tasks should be designed for essential learning interactions so that participants cannot solve them without each other. So, for example, in the Jigsaw Classroom, a particular learning behavior structure associated with Aronson and his colleagues, it is essential that everyone has an individual task, but they finish their learning assignment only when everyone learns from each other what they have learned individually.

Arató (2013, 2014) proves in several of his writings that this approach based on cooperative principles is not simply different from previous pedagogical approaches but also bears the hallmarks of an independent paradigm. On the one hand, parallel interaction is realized when a teacher breaks down the class into pairs or micro-groups. On the other hand, as a cooperative principle, it can also be followed consciously. The aim is for each learner to participate in learning interaction at the same rate as their peers in as much time and quality as possible. In the literature, the principle of parallel interaction has become generally accepted. It is known in several formulations: face-to-face, knee-to-knee, promotive interaction (Johnson et al., 1984, Johnson & Johnson, 1999, 2021), simultaneous interaction (Kagan, 1990, 1992, 2021), inclusive parallel interaction (Arató, 2013, 2014, 2018, 2023), maximum peer interaction (Jacobs et al., 2022).

A similarly paradigmatic principle is the principle of positive interdependence, the essence of which is to design learning tasks in such a way that the learners are dependent on each other for their execution while everyone follows individual tasks. This principle is also known as positive interdependence (Johnson – Johnson, 1984, 1999, 2021, Kagan, 1990, 2021, Cohen, 1984, 1986, Cohan & Lotan, 2014, Lotan & Holthuis, 2021) or mutual interdependence (Aronson, 1972, 2006, Aronson et al., 1978), or constructive and encouraging interdependence (Arató, 2013, 2014, 2017).

Over the past fifty years, it has been shown that, in response to the old interethnic challenges, the paradigmatically new glasses (Kuhn, 1970) of cooperative learning allow the creation of a social knowledge-constructing environment in which interethnic relations are positively formed. Already during the first research results, and then in the decades since, it has been continuously proven (Aronson, 1972, 2006, 2021) that the participants show a higher level of intra- and interpersonal competency, while each student's performance is also higher than that of their peers studying in a classical behavioral framework.

David and Roger Johnson and their colleagues also conducted meta-analyses over several decades (Johnson & Johnson, 1989, 2009; Johnson et al., 2000), comparing the effectiveness of competitive, individual, and cooperative learning structures. Meanwhile, it became clear that the learning performance of each learner also increases in a cooperatively structured interactive learning environment, examining the effectiveness of learning in any discipline. For example, over the past fifty years, Davidson (Davidson, 1985; Davidson & Kroll, 1991; Davidson & Worsham, 1992; Davidson, 2021) and his colleagues in the field of mathematics and Slavin and his colleagues (Slavin, 1987; Stevens et al., 1987, Slavin & Madden, 2021) have demonstrated the higher effectiveness of cooperative structures specifically in the field of literacy.

Like the cooperative paradigm, there are decades of evidence in the constructivist tradition of peer interaction and, to that end, of the teacher's task differently, for example, in the field of literacy (Anderson et al., 1997; Chinn & Anderson, 1998; Lin et al., 2018) or in learning mathematics (Forman, 1987,1989, 2020).

The different social dimensions of knowledge construction

With the multiplication of learning interactions, attention has also shifted to the social nature of these interactions and the socially determined conditions for knowledge construction in cooperative discourse. For example, one trend based on the cooperative paradigm investigated the extent to which the realized interactions in learning processes organized in heterogeneous micro-groups are influenced by behavioral patterns, beliefs, views, and prejudices that govern them. Researchers have explored how power and status relations are inherited even through interpersonal interactions. Elisabeth Cohen (1984, 1986), who created the cooperative model of Complex Instruction, her colleague Rachel Lotan (Cohen & Lotan, 2014), and their colleagues were among the first to draw attention to the need to restructure the framework of interpersonal communication cooperatively (Lotan & Holthuis, 2021). In addition to positive interdependence, they pointed out that complementary, partner-based roles as social behavior patterns help to resolve inherited behaviors and constructively use interpersonal interactions, raising the quality of the learning relationship.

Another approach highlights the importance of involvement from the point of view of more effective knowledge construction. It is necessary to create a learning situation in which participants learn together not only because of the interdependence of tasks but also by tapping into their self-actualizing tendency (Rogers, 1965) during learning (Davidson, 1985, 2021; Sharan & Sharan, 1990; Sharan et al., 2013). That is, learning based on curiosity, mind-challenging questions, and achieving an academic and critical level of thinking became the focus of this approach. To this day, representatives of the cooperative paradigm, including Gillis (2021), constantly emphasize the need to support conscious knowledge construction processes in interpersonal learning interactions. It is worth incorporating elements that contribute to achieving a higher level of knowledge construction into learning tasks. In recent years, Gillis has presented evidence of simple structures and strategies that can be built into dialogic, interpersonal learning interactions and that promote knowledge construction at the academic level (Gillies, 2018, 2021).

From the above, it is evident that the constructivist approach is organically intertwined with the approaches presented by the cooperative paradigm. Furthermore, the paradigmatic discourse of cooperative learning opens up new dimensions of knowledge construction. It rebuilds the social forms of traditional learning interactions and designs communication for learning so that each participant is guaranteed a chance to learn effectively. This

paves the way for each student to develop individually and to mobilize and develop their intra- and interpersonal competencies. At the same time, it allows participants' cognitive abilities to unfold at a higher level.

Arató (2013, 2014) recognizes the paradigmatic significance of cooperative learning, which incorporates aspects of knowledge construction, and strongly focuses on the social environment of learning and the structures that regulate the learning-teaching process. Spencer Kagan (1990, 2021), who comes from situational psychology, highlights the essential importance of the structural approach in capturing the "new glasses" of the cooperative paradigm. Like Aronson (1972, 2021) and David and Roger Johnson (1999, 2021), Kagan's Structural Approach draws attention to the structures that define behavioral frameworks (Kagan, 1990, 2021). Instead of the primarily hierarchical and exclusionary structures that traditionally govern classroom communication and activities, it draws attention to cooperative micro-structures that facilitate the participation of everyone.

The contribution of the cooperative learning paradigm to the constructivist approach in educational science: a post-structural shift

In Arató's (2013, 2014) interpretation, it is possible to understand the paradigmatic shift (Kuhn, 1970) of cooperative learning by examining its structural aspect. In his view, cooperative learning does not follow the classical structural approach (e.g. Moreno, 1934) in its strategy, but it does use inputs that can be extracted by structural means. For example, it also builds on the sociometric characteristics of a given group (e.g. Johnson & Johnson, 1999). By incorporating the results of constructivist educational science, it does not simply focus on individuals' or on groups of students' social knowledge construction – that is, on the framework of the socially structured mind. Instead, cooperative learning also considers the social psychological, sociological, and historical aspects of social determinism in interpersonal interactions. It emphasizes the transformation of the social environment of knowledge construction as part of the constructivist approach. In essence, it investigates ways to structure the process of constructing knowledge in a manner that does not perpetuate exclusionary patterns of interaction between people (Arató, 2015).

The strategy of cooperative learning is to move beyond exclusionary learning-teaching structures as a given condition and replace them with cooperative structures that enable everyone to learn more effectively. This is why Arató (2013, 2014) refers to the discourse of cooperative learning as a post-structural paradigm. By its intervention, it transcends the given, often exclusionary, segregating, and undemocratic social structures of learning, transforming the structure of social interaction itself. From the post-structuralist tradition, the paradigmatic nature of this approach can best be understood through deconstruction. It intervenes in the social framework and social conditions of knowledge construction. It breaks down existing learning structures by recommending the use of cooperative structures as an alternative. That is, it dismantles the undemocratic, exclusionary social environment by organizing cooperative structures in their place - building something new and more effective, thereby eroding previous structures. This approach and process are also described in deconstructivist theoretical discourse in philosophy, epistemology, and literary studies in the 1970s and 90s, which are now part of the constructivist tradition (see, for example, Berger & Luckman, 1966; Gergen & Thatchenkery, 1996).

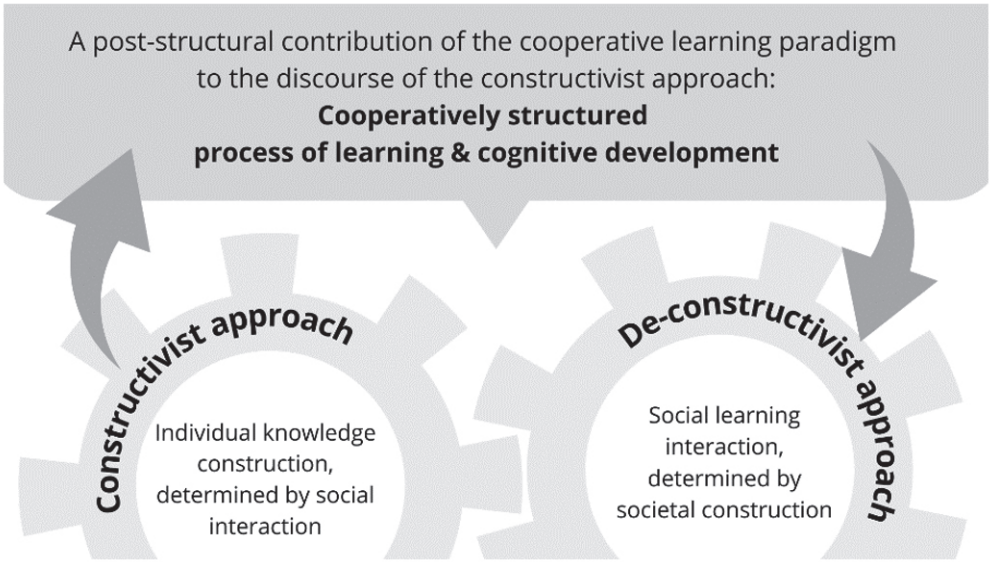

Figure 1: A post-structural contribution of the cooperative learning paradigm to the constructivist discourse of educational sciences

The past half-century has demonstrated the validity of the constructivist approach and the cooperative paradigm built upon it, with thousands of studies in both discourses. Yet, the insights and practical concepts of both constructivism and cooperative learning have only marginally spread in worldwide pedagogical practice (e.g. Gillies, 2018). Thus, it is appropriate to provide a brief overview that presents the possibilities for knowledge construction, making it easier for educators to integrate them into their daily pedagogical practice. These practical strategies can be easily recognized and interpreted by researchers studying knowledge construction methodologies and their effectiveness in their observations.

Cooperative learning has created the structural conditions for more effective learning in any subject. According to the experience of teaching and learning in both discourses, as we have seen above, elements and strategies that help to construct knowledge should be consciously incorporated into the planning, organization, monitoring, and assessment of learning and teaching.

In addition to restructuring the social environment, the cooperative learning discourse presents an essential principle, in accordance with the constructivist tradition, which is the need for the conscious development of cognitive skills (Johnson et al., 1984, 1999, 2021; Kagan, 2014, 2021; Gillies, 2008, 2018; Gillies & Khan, 2008; Arató, 2013, 2014, 2017). This study aims to present several cooperative learning approaches to constructing knowledge, as well as practical pedagogical techniques developed over the past five decades.

Seven meaningful ways of constructing knowledge through cooperative learning

Seven practical approaches that use different tools for constructing meaningful knowledge are presented below. These are concrete strategies that educators can quickly adapt with the help of cooperative learning, not only in public education but also in higher education or workforce training. The first two simple procedures are based on the two cooperative principles mentioned earlier. We have already discussed the principles of parallel interaction and positive interdependence, so we will only briefly touch on them here.

Open, flexible, and interactive construction of knowledge

Just as the development of interactions between students has been an essential element of the social constructivist approach from its beginning to the present day (Wertsch, 1979, 1980, 1992; Palincsar & Brown, 1984; Palincsar, 1986, 1998; Mercer et al., 1999; Mercer, 2008; Froman & Cazden, 1985/2013; Forman, 1987, 1989, 2020; Ford & Forman, 2015), the intention to create a dialogue between students has also been a central, paradigmatic element of cooperative learning for decades. As seen in the first part of the study, interactive, dialogic learning and efforts to examine its effectiveness have emerged as an independent, significant research discourse in recent decades. We have examined how fostering learning dialogues between learners has become a defining feature of cooperative learning that paradigmatically transforms the learning environment.

One of the structural cooperative principles of transforming traditional behavioral frameworks is to ensure that all learners participate in as many learning interactions as possible in the available time. There are several approaches to exploring the importance of interactive, dialogic learning, as can be seen, for example, in the previously cited 2018 volume edited by Gillies. This volume also shows that the discourse of the social constructivist approach and of cooperative learning has become intertwined in past decades, as in the studies of several of the leading authors of the constructivist discourse: Forman (Forman-Sheehan, 2018); Palincsar (Easley & Palincsar, 2018); Anderson (Lin et al., 2018); - and their colleagues were published in the volume, alongside authors representing the cooperative discourse (Thurston & Cockerill, 2018; Gillies, 2018). In the cooperative learning classroom, it is possible to shape the planned tasks and processes openly and flexibly, as the facilitator of learning can easily monitor and scaffold the knowledge construction processes through the learners' interactions and dialogues (Sharan & Sharan, 2021; Johnson & Johnson, 2021; Arató, 2013, 2014). As mentioned before, the teacher needs to have a broad repertoire of cooperative activities to respond appropriately to the given group of students, the given subject context, and the learning environment (Alexander, 2018). Arató (2013, 2014) articulates the need for a cooperative paradigm to create flexible and open structures as an independent principle fundamental in the cooperative discourse. From what we have seen so far, it has become clear to the reader that interactive, inclusive learning dialogues are an essential part of efficient, effective, and equitable knowledge construction processes.

Positively interdependent constructions of knowledge

Another vital principle of the cooperative paradigm is the principle of positive or mutual interdependence (Johnson & Johnson, 1999, 2021; Aronson, 1972, 2021) or the principle of constructive and encouraging interdependence (Arató, 2013, 2017; Huber & Reynolds,

2014). It is advisable to design learning tasks so that group members can carry them out interdependently. Personality traits that are mobilized or preferred by those involved in group learning depend on the task's goal structures.

Several researchers studied the various aspects of the development of cooperative learning processes. Kurt Lewin and his students explored the socially defined but dynamic nature of personality. Similarly, Deutsch (1949, 1962, 1985, 2006), worked on the significance of the goal structure of interdependence, and Deutch's students David and Roger Johnson (1974, 1999, 2009, 2021), who represents another well-known school of cooperative learning, highlight. There is a need to develop learning structures that call for group members to work interdependently, rather than having them compete or learn individually. Aronson, following Lewin's student Festinger as well as Allport (1955), follows a similar approach when he and his colleagues developed the cooperative structure The Jigsaw Classroom (Aronson et al., 1978; Aronson, 1972, 2021). The Jigsaw Classroom was created for desegregated classes to eliminate students' prejudices by designing a cognitively dissonant situation in which [despite their prejudices] enabled them to learn together. Transforming traditional learning interaction through cooperative structures optimizes knowledge construction, as it gives everyone a chance to learn through face-to-face interaction. Cooperative learning allows teachers to provide a learning situation for each student, based on mutual interdependence that encourages students to build knowledge together.

Synergistic knowledge construction

Synergistic knowledge construction is one of the fundamental cooperative learning strategies. The paradigmatic exemplar of the cooperative discourse (Arató, 2013, 2014), the Jigsaw Classroom, cited above, is one of the crucial strategies. It creates interdependent parts of learning material, like a jigsaw puzzle, by teaching each other. "Jigsaw puzzle" is a very perceptive term; it is also expedient to use another metaphor. If we imagine the assembly of puzzle pieces as synergy, then it will be easier to understand how the whole will be more than the sum of its parts. The participants in learning do not stack ready-made building blocks but rather interact back and forth during teaching one another. "Who teaches learns twice!" explains the synergistic relationships in cooperative discourse (Jacobs et al., 2022). While learning and teaching one another, knowledge construction by better prepared and less prepared learners is more malleable during processing, absorbing difficult issues and even connections, practices, and knowledge that heretofore seemed opaque.

The extent to which these components are not separated is further demonstrated by the jigsaw structure in which they must interpret the same text or phenomenon, but each from a different point of view. The goal is for everyone to provide constructive responses to learning challenges from a group of four, all four aspects, meaning that everyone learns to apply all four aspects. Here, understanding the aspects, interpreting them together, and connecting them with the practical elements also turns out differently than simply putting out a puzzle consisting of rigid pieces. Sometimes, it's only one clear aspect that comes out of the aspects. Other times it's someone else's suggestion that makes all the aspects clear to someone until all four of them can apply the learned aspects in a relevant and constructive way at the expected level of performance. The level of performance of the complexity of thinking can be well-tracked in any subject context, for example, using the SOLO taxonomy, which is also used in cooperative discourse (Gillies, 2021), or the Argumentation Rating Tool (Wilkinson et al., 2017; Reznitskaya & Wilkinson, 2021).

It follows from the above that simple, jigsaw structures based on the principle of constructive and encouraging interdependence and parallel interactions - anyone, in any

learning process, can open channels of learning synergy. The term constructive interdependence is intended to refer precisely to the synergistic nature of knowledge construction in the cooperative literature (Arató, 2013, 2014). Teachers design synergistic elements in the learning process that will surely be part of a common horizon of interpretation and learning when coupled with individual responsibility. These can be different parts of material, topics, interconnected tasks, points of view, interpretive frameworks, experimental and practical procedures, etc. Even initial research has shown and has remained so for the past five decades that on-task time in a given time frame increases exponentially with the help of sequential tasks (Johnson & Johnson, 1989, 2021). The learners report that the participants who are ahead of the curve, as well as those who are lagging, are more like to go to school because, with the help of others, they learn more thoroughly and effectively. Even if someone was an excellent student before, their success increases. Even if they have lagged, they start learning more effectively. An essential source of this is the synergistically designed knowledge construction of the peer community of learners guaranteed by cooperative structures.

Synoptic knowledge construction

An essential element of knowledge construction is the use of scientifically proven frameworks. This means that teachers and pupils consider common, scientifically justified thinking frameworks. When the facilitators of learning seek to make learning more effective by broadening the repertoire of thinking abilities set in motion in everyday learning-teaching practice, they can follow clear goals with their students using a common framework. This idea was the basis of Bloom's formative evaluation, a cognitivist or constructivist turn in evaluation (Scriven, 1967), which later spread as a formative assessment, precisely at Bloom's suggestion (1969). In this approach, it is also necessary to develop an assessment methodology linked to performance evaluation that will help students understand how to perform better and what to do differently to be more effective in learning. One such guide was the simple, six-element Bloom's taxonomy (1956; Anderson, 2001), which presents cognitive domains according to the objectives of learning. It can be followed by both the teacher and the students in their questions, learning instructions, or assignments because it is simple and contains only six aspects. In the meantime, they strive to explore what to learn at every step with the help of all six Bloom cognitive domains. If they practice the use of thinking skills in a vast repertoire every day, they can all achieve higher performance, regardless of their sociocultural background (see this in the cooperative discourse Kagan, 2014 or Gillies, 2021, or in significant research independent of the cooperative paradigm, Wenglinsky, 2000, 2002). Synoptically coordinated knowledge construction takes place through the questions, instructions, and specific learning activities formulated based on the Bloom framework.

A similar framework is when they follow the appeal of as wide a range of Gardnerian intelligences as possible (Gardner, 1984) as a common framework in the discourse of cooperative learning (Cohen & Lotan, 2014, Kagan & Kagan, 1998, Jacobs et al., 2022), or when they follow some process design framework (Smith et al., 2005, ByBee, 2014, 2015, Gillies, 2021). Similarly, educators can use a common framework for subject content. For example, when each student uses six important biological aspects describing representatives of the animal kingdom to present their favorite animal of their choice, each child walks their individual learning path and performs a synoptically identical knowledge construct with the others. An essential feature of synoptic constructs is that learning performances can be easily compared, with participants able to help validate fundamental aspects in

contexts other than those they like, in the example above, by helping to describe the animals of others. It is precisely the synoptic knowledge construction that helps to strengthen in the learners a multiperspective and a divergent set of thinking necessary for problem-solving. Synoptic frameworks promote the comparability of diverse content, comparative processing of the content, and the practice of complex thinking skills. The brain needs a clear framework and predictability for effective learning. Frameworks with a small number of items consider that the working memory can effectively process just a small number of inputs at once (Cowan, 2014). If we want to use the brain capable of learning optimally, we will help the working memory with 3-7 elements of synoptic frameworks at each stage of learning activities. The 3-7 element frameworks help construct knowledge in just one lesson, but they can also be a guide for a semester-long period with many learning activities.

Multicontextual knowledge construction

Learning activities that build on each other in parallel interaction and develop positive interdependence are an excellent framework for multicontextual knowledge construction. They help to improve learners' critical and problem-solving skills, not just from a metacognitive perspective but also in terms of long-term memory improvement (Tricot & Sweller, 2014). We have already touched on this issue when discussing synoptically organized learning, where learners think through the same summary in different contexts, for example, when studying about different animals. Multicontextuality is one of the most critical forms of metacognitive knowledge construction. The most striking example is when the same natural phenomenon is simultaneously studied in physical, chemical, mathematical, and geographical-social contexts (e.g., the phenomenon of acid rain). In this case, we use a transdisciplinary strategy to form multicontextual frameworks to construct knowledge, in which various sciences raise a real problem, a stimulating question. The multicontextual learning-teaching practices of STEM or STEAM, for example, are based on this approach (Prince et al., 2020; Fenyvesi et al., 2017).

In a cooperative framework, it is easy to create a structural guarantee for multicontextual learning. As in a Jigsaw structure based on four-member groups, an "expert" will be responsible for each sub-group's area to ensure all four areas are followed understood. Thus, professional frameworks, tasks, data knowledge, procedures-practices, etc., that help with processing can be continuously added to all four areas. It means that learners will constantly scrutinize at least four contexts at every step of learning. Responsibility for contexts is exchanged between group members until each of them can independently look at a learned or even new phenomenon from the point of view of each of the four scientific fields.

Similarly, educators can imagine multicontextual frameworks in the humanities. In history, for example, one of the problems with lecture-based teaching is that it traditionally follows a linear narrative, so students often need help seeing the connections and recognizing events that take place at the same time. A topic organized in the same cooperative Jigsaw framework for groups of four, e.g., WWII, can be understood and learned more deeply and in a meaningful context if students delve into the topics and contexts of a given era with the help of parallel synoptic frameworks. The use of cooperative structures also helps, with emphasis on constructive and encouraging interdependence (everyone needs high-quality knowledge in all parts to perform), as well as the principles of personal responsibility and individual accountability (everyone having their own set of criteria within a specific topic, for which they are responsible, not only in their "home" group but through their group throughout the class).

For example, if each group researches a specific country or social group, the stories of 8-10 of the most important "actors" (countries or social groups) can be processed at once. That is, each student learns the topic from several aspects, in several contexts, even if, in the beginning, they progress only in small steps. Thus, for a specific context of each topic - be it, for example, "the role of France in WWII" or the "position of women in WWII" there will be four experts who form a micro-group. It means that in the micro-group, they can follow four different frameworks on the same topic. For example, they can pursue issues such as political power, socio-economic, cultural-educational aspects, and oral history. If each team follows these aspects in their topic context, they can learn their topic and the topic of others, that is, the entire curriculum, in a multicontextual context. If we measure the performance of the whole student group from the complete material, it will also reveal which experts, or entire expert groups (topic or aspect experts), need to strengthen their topic and professional aspects in the given group or even the whole class in the next stage of learning.

However, the fundamental advantage of multicontextual knowledge construction is that students are to approach a particular issue in a multifaceted, divergent way while at the same time able to follow convergently, scientifically relevant aspects, interpretations, and procedures in these different contexts. One of the components of critical thinking is the ability to engage in metacognitive thinking activities. A critical-reflective exit from a given context is a good example. By stepping out of their context, like in the examples above, examining a topic from different aspects within the same micro-group and in different contexts during the intergroup communication, they can validate and evaluate what they learned in other, broader, or different contexts. The most interesting aspect of multicontextual learning-teaching processes is how to use what has been discovered in different contexts in terms of constructive interpretation and learning, as well as how to deepen understanding by examining the validity of what learners comprehended in other contexts.

Positive interference in knowledge construction

Another metaphor that is worth reconsidering in terms of constructing knowledge is the construction metaphor itself. The problem with this analogy is that it conjures up images of building blocks, whereas in reality, the metaphor of interference seems more accurate. Just as positive interference can amplify waves in physics, collaboration and discussion among learners can amplify the acquisition and retention of knowledge, leading to deeper learning and better outcomes. This phenomenon occurs within the framework of knowledge construction, where multiple waves, each shaping the other, combine to form deep understanding, rather than fitting together like building blocks or jigsaw puzzle pieces.

This is particularly noticeable when it comes to group roles. Even if group members create interdependent, complementary roles that cover the necessary skills for well-oiled group operation, all the skills, aspects, and procedures addressed will not come together. Instead, they arrive in waves, aligning with each other, constructively interfering with others' roles and contributions to the group's work. In knowledge construction, the positive interference of behaviors can amplify the understanding and insights that emerge from collaborative learning experiences.

For instance, the Encourager may be responsible for ensuring equal participation. Initially, the person assigned to this role may not understand its value, such as using Rally Robin, even though they apply this structure repeatedly. However, as the Encourager interacts with other group members, they may realize the value of this tool and use it to promote equal participation. This understanding of how to fulfill the role, for example, by employing Rally Robin, develops through repeated social interactions:

As group members become more proficient in their roles, they change roles to ensure that each member has an opportunity to practice different behaviors and learn new social behavior patterns. Over time, role knowledge constructed through social activity develops into deeper understanding of appropriate social behavior during group work.

Therefore, it is advisable to incorporate functions, patterns of behavior, aspects, procedures, etc., during knowledge construction, which, with their continuous presence, build knowledge through constantly rising waves, showing positive interference with the necessary behaviors, aspects that can be scientifically justified, etc.

Action-based knowledge construction

An additional way to construct knowledge is when group members engage in actual actions. When they step out of the classroom into the real world. This can be achieved through forming a learning community that involves knowledge elements of the social environment of the classroom members like families and neighborhood (McCaleb, 1995). Or by creating a community of practice (Wenger et al., 2002), where learning interactions are carried out specifically for the sake of practice.

Kurt Lewin, who defined the cooperative paradigm, was also the founder of action research (Lewin, 1946, 1947), seeing the future direction of scientific research in collaborative research communities focused on practice. Similarly, knowledge construction takes learning to the next level when a community of students steps outside the classroom and participates actively in reality. Approaches such as project-based learning (Dewey, 1900, 1918; Kilpatrick, 1918), inquiry-based learning (Pedaste et al., 2015; Gillies, 2021), or place-based learning (Davidson-Hunt & O'Flaherty, 2007; Gruenewald & Smith, 2007; Johnson, 2012) follow a similar approach to knowledge construction. This approach also relates to Kolb's discovery of the experimental learning cycle for effective learning (1984), which is easily implemented in cooperatively structured learning processes (Smith et al., 2005; Gillies, 2021).

An essential element of action-based knowledge construction is that it is based on participants' questions. For example, in the above example, when students learn about the phenomenon of acid rain in a multicontextual process, it is easily associated with social learning actions that become real. Learners can formulate leading questions such as "What can we do about the phenomenon of acid rain? What are emitters of harmful substances in our narrower environment doing to prevent this phenomenon? How to draw attention to the phenomenon and what needs to be done?" When participants implement the concrete, creative, social, or experimental activities they plan, they move to a higher level of knowledge construction.

An excellent example of action-based or project-based knowledge construction is the Swiss Ikarus project (http://www.projekt-ikarus.ch), which was born out of 10-year-old students bombarding their teachers with questions about what makes the sky blue. They wanted to fly up to the sky to find out what makes it blue. To this end, for one month they learned a great deal in the fields of physics, geography, astronomy, meteorology, and mathematics, constantly experimenting to directly observe the phenomenon of refraction of light in the atmosphere. At the end of the project, each student sent their favorite Lego figure into space using meteorological balloons, a mini-camera, and a GPS tracker. Together, they analyzed the evidence collected after the balloons reached the stratosphere border and returned to earth with the video footage.

The contribution of cooperative practice to the social transformation of knowledge construction

The following table summarizes the practical concepts and procedures of the cooperative learning paradigm outlined above and how they help optimize the social conditions of knowledge construction. Constructivist educational science and its interactive and dialogue-based ideas have led to several practical approaches, models, and concrete practices for pedagogical practice that positively influence knowledge construction for all learners. Cooperative learning incorporates the results of constructivist approaches into practice (see Kagan, 2021; Gillies, 2019, 2021; Jacobs et al., 2022) and over the past fifty years has confirmed a paradigmatically new practice, transforming the social framework of knowledge construction (Sharan, 1984; Davidson, 2021).

Seven typical paths of knowledge construction in the practice of cooperative learning	**Transforming the social framework of knowledge construction for guaranteed achievement**
Parallel interaction-based knowledge construction	Structurally guaranteed increased personal time, space, and attention for each student in classroom learning interactions
Positive interdependence-based knowledge construction	Structurally guaranteed personal involvement, and constructive participation in heterogeneous micro-groups
Synergistic knowledge construction	Structurally guaranteed integration of synergistically interdependent knowledge elements
Synoptic knowledge construction	Structurally guaranteed conscious, processual, and comparable frameworks based on proven models for everyone
Multicontextual knowledge construction	Structurally guaranteed proficiency in multiperspective, metacognitive, reflective, and critical knowledge acquisition activities
Positive interference of knowledge construction	Structurally guaranteed flow process constructions for all participants
Action-based knowledge construction	Structurally guaranteed equal access and participation in activities and action-based learning processes

Table 1: Seven ways of knowledge construction through cooperative learning

The above practical elements of cooperative knowledge construction procedures ensure that each participant learns effectively. Participants practice and acquire knowledge constructing behavioral patterns and routines through a cooperatively structured learning processes. Educators can construct, not only the elements of knowledge related to scientific approaches but also knowledge related to everyday social interaction, thus shedding their prejudices and approaching the values of a more democratic social existence.

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GEORGE M. JACOBS, CHENGHAO ZHU,
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Using Cooperative Learning to Teach the Sustainable Development Goals

This article advocates for the use of cooperative learning by students and others toward the achievement of the United Nations' Sustainable Development Goals (SDGs). First, the Goals are explained. Second, background is provided on cooperative learning, including explanation of eight cooperative learning principles and exemplification of how one cooperative learning technique might mobilize the eight principles. Third, how cooperative learning fits with student centered learning is explored. Fourth, two cooperative learning techniques are explained for their particular relevance to efforts to achieve the SDGs. These techniques are Group Investigation and Cooperative Debate. Fifth, two cooperative learning principles, positive interdependence and cooperation as a value, and their links to SDGs receive further exploration. Finally, we consider cooperative learning as a Swiss Army Knife and discuss its versatility with SDG examples.

Keywords: Sustainable Development Goals, cooperative learning, positive interdependence, Group Investigation, Cooperative Debate

Introduction

In 2015, the United Nations (UN) proposed 17 Sustainable Development Goals – SDGs - (see Appendix, United Nations, 2022). These goals include ending poverty and hunger, providing everyone with clean water, sanitation, and education, and protecting the environment. Furthermore, each SDG has multiple targets, e.g., one target for SDG 13, Climate Action, is "Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning" (United Nations, 2022). The word "development" in SDGs involves making progress by, for example, building facilities for clean water and sanitation for the two billion plus people lacking either or both of these essential needs. The word "sustainable" involves making this progress in a way that protects the environment such that resources continue to be available for future generations.

The UN has had similar goals before, e.g., in 2000, the UN promulgated eight Millennium Development Goals for ending extreme poverty (United Nations, n.d.). While progress has been made between 2000 and now in some areas, millions of people still die every year from the problems listed in the 17 SDGs, not to mention the many millions more whose bodies, minds, and lives are stunted as the goals lie unmet. Also troubling is the fact that due mostly to resource use by wealthier humans, major detrimental changes are escalating, e.g., deforestation and rising sea levels, perhaps unstoppably, in our planet's ecosystems (Thunberg, 2022).

In the face of this situation, perhaps teachers, students, and other education stakeholders (which actually is everyone) may need to decide that addressing the SDGs should be more than just, for example, an optional afterschool activity for a SDGs club. Maybe the SDGs should have a much greater priority in the education system. However, that decision may well be beyond the purview of most readers of this article. What may be easier, although not easy, to implement would be the use of cooperative learning (CL), both when addressing SDGs, as well as in other elements of the curriculum. The hope is that not only will CL provide a more efficient methodology for achieving cognitive and social impact aims, but that CL will also set a tone in society in which people care about their fellow humans, as well as other animal species.

Now that the SDGs have been briefly explained, the present article next provides background on CL, including one version of CL principles and a small number of the hundreds of CL techniques, before describing how CL can be classified as a student-centered learning methodology and how CL empowers other student-centered methods. It should be noted that, as often happens in Education and other fields, different terms are used in the literature to represent similar concepts and strategies. These differences may reflect very minor or even no differences in emphasis, sometimes due to different contexts, and it should also be noted that students and teachers will each develop their own ways to implement the ideas presented herein. Next, the idea of CL as a tool for striving toward the SDGs is explicated in two particular CL techniques, Group Investigation and Cooperation Debate. Also, the link between the CL principles of positive interdependence and cooperation as a value, on one hand, and concern for others as in the SDGs, on the other hand, is explored. Finally, based on nine purposes of CL, we consider the metaphor of CL as a Swiss Army Knife and discuss CL's versatility in achieving SDGs.

Cooperative Learning Principles

As will no doubt be explained in other articles in this special issue on CL, a very large body of research supports belief in the efficacy of thoughtfully applied CL with cognitive, social, and affective variables and with a wide range of ages and content areas (Johnson et al., 2000; Slavin, 1995). One system of CL principles (Jacobs & Renandya, 2019) includes eight principles. These eight overlap widely with other systems of CL principles and are briefly explained below. Examples will follow.

1. *Positive interdependence* is a feeling among members of groups of usually 2-4 members that their outcomes are positively correlated, i.e., that what helps one helps the rest of their group members, and what hurts one hurts the others. The success of groups is based not on how well the groups do tasks but on how much each individual group member grows as a result of collaborating on the tasks.

2. *Individual accountability* is a feeling among group members that they each need to do their fair share in contributing to the groups' effort to achieve their goal(s). This principle seeks to avoid the problem of what is sometimes called "freeloading," i.e., one or more group members seek to avoid doing their fair share. Please note that "fair share" may not be the same as "equal share."

3. *Equal opportunity to participate* aims to provide openings for each group member to learn and to contribute to the learning of the others. This principle seeks to avoid the

problem of what are sometimes called "takeovers," i.e., one or more group members seek to dominate group discourse and decision-making. While *equal opportunity to participate* seeks to give everyone chances to take part, *individual accountability* encourages everyone to use those opportunities.

4. *Maximum peer interactions* involves both (a) many peer interactions taking place, i.e., maximum *quantity* of peer interactions, and (b) peer interactions in which students utilize thinking skills and cooperative skills, i.e., maximum *quality*. The quality of these many peer interactions is where the magic of CL occurs, where CL goes from being 1 + 1 = 2 to being 1 + 1 = 3 or more.

5. *Group autonomy* promotes groups looking to their own resources first, before seeking help from teachers, thus reinforcing *maximum peer interactions*. A simple slogan to promote group autonomy is Team Then Teacher, i.e., please consult your groupmates before asking the teacher, or 3 + 1 B4 T, i.e., please ask your three, or however many, groupmates and, if necessary, another group before asking the teacher.

6. *Heterogeneous grouping* encourages students to usually learn with people different from themselves. Ideally, groups should embody the diversity which exists in each classroom. At a minimum, groups often combine students of different levels of past achievement.

7. *Learning cooperative skills* highlights a range of skills that promote effective interactions with others. These skills include, just to name a few, checking that others understand, asking for reasons, disagreeing politely, thanking others, and encouraging others to participate.

8. *Cooperation as a value* expands the feeling of *positive interdependence* beyond the small group. This expansion can reach to the entire classroom, the entire school, and all the way to the entire world, including other species.

To provide a better understanding of the eight principles, in the next section, we exemplify how one CL technique, Everyone Can Explain, might mobilize the principles.

An Example of the Eight Principles in Action

Everyone Can Explain is one of more than 100 CL techniques. Plus, each technique has variations, some of which teachers and students can invent for themselves. After Everyone Can Explain is described, Table 1 links the technique to the eight CL principles from the previous section. These principles help optimize the interaction among students as they use the technique.

Everyone Can Explain

Step 1 – Students are in groups of 2, 3, or 4 members. Each group member has a number, e.g., 1, 2, 3, or 4. The group attempts a question, problem, or other task. They first work on it individually.

Step 2 – Everyone has a turn to share their ideas. They discuss and try to reach a consensus on a response, including, crucially, an explanation of their response.

Step 3 – The group checks that everyone in the group can give and explain their group's response or responses, in the case the group did not all agree on the same response.

Step 4 – A number is called, and the group member with that number gives and explains their group's response(s). The group is evaluated based on that person's response, e.g., if #3 is called and group member #3's response is judged to be good, members 1, 2, and 4, not #3, may be praised, for assisting #3.

CL Principle	**How *Everyone Can Explain* Mobilizes the Principle**
Positive Interdependence	The group is evaluated based on the response and explanation given by the one group member who is selected at random. Thus, they "sink or swim together."
Individual Accountability	Each group member may be chosen to represent their group. They cannot pass that responsibility to groupmates. Thus, they feel pressure to be ready to represent their group.
Equal Opportunity to Participate	Groupmates are encouraged to assist all group members to be ready in case they are called upon to represent their group. No one can take the place of the groupmate who is called upon.
Maximum Peer Interactions	If the class consists of 50 students, and they are in groups of 4, 12 groups of 4 and 1 group of 2 exist. Thus, potentially 13 peer interactions take place simultaneously, as groups prepare their responses with explanations. That addresses maximum *quantity* of peer interactions. Also, groups need to not only respond but also explain the thinking behind their responses. The explanations promote maximum *quality* of peer interactions.
Group Autonomy	Groups attempt to develop their responses on their own, but if they encounter difficulties during this attempt, they can seek help first from another group, and, if help is judged to still be needed, they can check with their teacher. Also, groups who finish before other groups can offer to help groups who may be struggling.
Heterogeneous Grouping	When groups are mixed on past achievement, it becomes more likely that they will be able to develop appropriate responses and accompanying explanations for those responses. When groups are mixed on other variables, members may be exposed to more perspectives, as well as having opportunities to develop collegial relationships with people different from themselves.
Learning Cooperative Skills	Among the cooperative skills that might be useful in *Everyone Can Explain* include asking for reasons, praising others, and checking that others understand.
Cooperation as a Value	Whether this CL principle is mobilized depends in part on the topic on which the class is focused and even more on whether that focus is strictly academic or if it has an applied, real-world element. For example, if the topic is how to help older people learn to use IT, a real-world focus might be the students later going to a community center to work with seniors to improve their IT skills, or even just helping family members and neighbors.

Table 1. Linking the CL technique Everyone Can Explain to eight cooperative learning principles

Cooperative Learning and Other Student-Centered Learning Methods

In Education and related fields, a paradigm shift has been taking place toward theories and applications that focus on control being exerted by people generally, rather than by governments, companies, and other large institutions. These theories include Social Constructivism (Brown & Palincsar, 2018), Humanism (Rodgers, 1979), and Socio-Cultural Theory (Vygotsky, 1978). Specifically in Education, student centered learning (SCL) can serve as an umbrella term for many of the changes that have resulted from his paradigm

shift. In SCL, students have more power in areas including choosing what content they study, how they study it, and how and by who their learning is assessed. Teachers' roles change in SCL, from teachers mainly being the dispensers of knowledge and the judges of student learning to instead being facilitators, as students take more control of their own learning, both during their time in formal education, as well as throughout their lives as lifelong learners. Table 2 links characteristics of SCL, CL, and Extensive Reading (Extensive Reading Foundation, 2022), another SCL method. In Extensive Reading (ER), students read in large quantities, often making their own choices about what they will read. Teachers serve as facilitators of ER by: (1) helping students in their reading choices; (2) modeling enjoyment of reading by themselves being readers; (3) developing potential post-reading tasks that motivate further reading.

Characteristics of Student Centered Learning	Links with Cooperative Learning	Links with Extensive Reading
Students are offered more control of their own learning, with the hope that greater agency increases engagement and readiness for lifelong learning.	CL increases student control as there is power in groups, and students play multiple roles in their groups. Many of these roles are typically played by teachers in teacher centered learning.	Students have some control of what they read, e.g., if they are interested in a particular SDG, they can read in large quantity about that.
Students learn how to learn, developing generic strategies useful to many contexts.	Knowing how to work with others, e.g., developing cooperative skills, a CL principle.	Reading strategies include "narrow reading" (Cho et al., 2005), i.e., reading in one topic area to build knowledge of relevant vocabulary.
Students learn with others different from themselves, coming to appreciate that differences in people, learning and assessment methods, and topics can facilitate rather than hinder learning.	The CL principle of heterogeneous grouping encourages students to work toward common goals with people different from themselves, thereby learning the topics studied, as well as the perspectives of the people with whom they study.	Reading provides students a window onto the world, helping students appreciate the wide range of contexts that exist.
SCL seeks to include students' needs and interests in the curriculum, e.g., by connecting the curriculum to students' lives outside of school.	CL gives students opportunities to share about their worlds with groupmates and others.	Students can also write materials that others in their class and beyond can read. Also, although reading is usually done silently, student can discuss what they read and their reactions to their reading with peers.
Teachers as fellow learners: Teachers do not pose as all-knowing sages. Instead, they show students that teachers too need to learn and that they enjoy learning.	Teachers can more easily learn from students when students harness their peer power. Also, teachers should model cooperation by collaborating with fellow teachers and others.	Teachers should model enjoyment of reading, whether or not they read the same materials as students are reading.
Motivation and the self: Learners develop a powerful image of their ideal future and seek to acquire and use strategies and tools to realize their ideal future.	Groups formulate goals, such as what they can do toward a particular SDG target and collaborate toward achieving those goals.	Students, individually and in groups, can set goals for reading. They can motivate and otherwise assist each other to reach their goals.

Table 2. Characteristics of Student Centered Learning and Its Links to Cooperative Learning and Extensive Reading

A multitude of other SCL methods and theories exist, and peer interaction can feature in them all, thus making crucial the insights CL can contribute. Among just some of these methods and theories are Task-Based Language Teaching (Long, 2016), Multiple

Intelligences (Armstrong, 2017), Problem-Based Learning (Ali, 2019), Project Work (Fried-Booth, 2002), Positive Psychology (Kristjánsson, 2012), and Inquiry-Based Learning (Pedaste et al, 2015). In turn, all these offer powerful contributions to progress toward the SDGs.

More Cooperative Learning Techniques for the SDGs

Despite all the momentum in favor of SCL, in the authors' observations, teacher centered instruction still dominates, as does its parallels in the larger society, including top-down governance. More than 100 years ago, Dewey (1916, pp. 43-44) bemoaned a similar lack of progress away from top-down teaching, despite the lip service already being paid to more democratic methods of learning:

> Why is it, in spite of the fact that teaching by pouring in, learning by a passive absorption, are universally condemned, that they are still so entrenched in practice? That education is not an affair of "telling" and being told but an active and constructive process, is a principle almost as generally violated in practice as conceded in theory.

The purpose of the current section of this article is to introduce two cooperative learning techniques with roots in Deweyian Philosophy of Education that can prepare students and teachers for tackling the SDGs: Group Investigation and Cooperative Debate.

Group Investigation

Group Investigation (GI) (Sharan & Sharan, 1990; 1992) was specifically designed to implement Dewey's ideas in the classroom (Dewey, 1897; 1916). With GI, the class is a group of groups. The class decides on a topic, e.g., how to take action toward one of the SDG targets. Then, each group chooses a subtopic to work on. For example, one of the SDGs is Quality Education, and a target under that goal involves inclusion. Each group in the class could take one aspect of inclusion, e.g., inclusion of students from refugee families, learn about that aspect, and think of ways to promote inclusion of related students. (Inclusion obstacles may differ in each context.) Examples of students who might face inclusion obstacles might be those: with low income, without nearby schools, with mental and/or physical challenges, and family issues, as well as females, senior citizens, gender nonbinary, and minority groups.

Once each group has chosen their subtopic, they discuss among themselves how they will go about investigating their subtopic and then divide up the work. Next, after working on their own, members report back to their groups and, with their newly gained information and perspectives, groups review their subtopic, perhaps do more research, make a plan to present to the entire class – including ideas for actions that can be taken individually and collectively – and rehearse their presentation to bring it inline with criteria decided by the class. Everyone has a speaking part in the presentation.

Sharan and Sharan (1990) stated that GI was created to combine democratic processes with academics. This can be seen in how students, not teachers, choose the class' overall topic, as well as their individual group's subtopic. Furthermore, students decide for themselves how they will investigate their topic, and, in a sign of the flexibility of CL principles, students join groups based on their interests, rather than based on the goal of

heterogeneous grouping, as suggested earlier in this paper. Perhaps, GI could be seen as appropriate for students who are more experienced with CL, who feel comfortable working with peers different from themselves, and who are proficient with cooperative skills and with encouraging individual accountability among groupmates.

Another issue, not only with GI but with students learning in support of the SDGs, arises if students do not want to address such serious, often unhappy matters. Perhaps instead, students would rather talk about where to go in their area for weekend fun or which song is the best for dancing. In such cases, in keeping with SCL values, teachers might like to accede to students' wishes. At the same time, teachers can model for students' interest in and action for the SDGs in hopes of sewing seeds for changes in students' interests. Additionally, working together to help others can be very enjoyable, e.g., one of the authors of this article has accompanied groups of students who joined a project (Safe Water Gardens, 2022) to help villagers in rural Indonesia install sanitation systems (SDG 6) and gardens (SDG 3). Additionally, music was part of the adventure.

Dewey (1916) highlighted that the key goal of Education lies not in the advancement of individual students, e.g., earning a degree as a stepping stone for a prestigious and financially secure career. Instead, the main goal should be learning in order to contribute to the advancement of society generally. Similar ideas were espoused by Freire (2000).

When doing GI and with SDG activities generally, students contribute to the greater good, but it may be useful to differentiate actions into two types: those at an individual level and those at a societal level (Jacobs et al., 2022). An example would with SDG 13 Climate Action. As is well-known, use of fossil fuels results in release of greenhouse gases which causes perhaps irreversible impact on ecosystems (Thunberg, 2022). An action at individual level would be to turn off lights when not in use or to use fans instead of air conditioning. A societal level action would be to pressure governments and companies to move toward alternative energies or to persuade universities and other organizations to divest from companies involved with fossil fuels (Chawla, 2022). Of course, actions at individual and societal levels can co-exist.

Cooperative Debate

As noted above, Dewey (1916) rejected rote learning and heavy reliance on teacher talk. Instead, following Rousseau (1769/2010), Pestalozzi (1801/19), and Froebel (1826/1974), and similar to what Piaget (1975) would later espouse, Dewey valued experiential SCL which involves students in constructing their own understandings of the worlds around them. Disagreement, handled properly, i.e., encounters with conflicting ideas, is a key tool in that construction. As Dewey (1916, p. 188) explained, "Conflict is the gadfly of thought. It stirs us to observation and memory. It instigates invention. It shocks us out of sheeplike passivity and sets us at noting and contriving .... Conflict is a sine qua non [essential condition] of reflection and ingenuity."

Debate provides a well-known forum for the conflict of ideas. However, traditional debates evoke an atmosphere of competition and negative interdependence, rather than cooperation and *positive interdependence*. This hostility in traditional debates mirrors what seems to be happening in society generally, where discussions with the goal of learning information and appreciating different perspectives become rare, giving way to verbal attacks, even threats of violence. Fortunately, Johnson and Johnson (1995) designed a very different form of debate based on CL principles and aimed at increasing understanding and empathy. This alternative debate structure goes by such names as Academic Controversy, Constructive Controversy, and Cooperative Debate. The latter name seems

to be the simplest and will be used hereafter, abbreviated as CD. The seven steps in CD are described below, although, as with all CL techniques, variations are possible. Flexible time limits should probably be set for each of the steps. As students become familiar with CD, such structuring may become unnecessary.

Step 1 – The class decides on a debate topic. Students form groups of four divided into pairs. Perhaps, some consideration might be given to balancing the pairs as to past achievement. An alternative to one debate topic per class is for each foursome to choose their own topic. Each pair in the foursomes is assigned to take one side on the issue to be debated, e.g., if the topic is whether public transport should be free in order to encourage people to use public transport instead of cars, Pair A is assigned to argue for free public transport, while Pair B is assigned to argue for normal public transport fares. Pairs have a fixed amount of time to prepare to present their assigned view, and to encourage *individual accountability* and *equal opportunity to participate*, pairs divide their debating points so that each person has about the same amount of speaking time.

Step 2 – Each pair takes turns to present their assigned position for a set amount of time. The other pair take notes and serve as timekeepers.

Step 3 – This is the rebuttal phase. In preparation, the pairs separately discuss what points in the other pair's presentation they might want to rebut and how to rebut it. Then, each person has an opportunity to rebut a point raised by the other pair in Step 2. Next, there is open discussion, with each student sticking to their assigned view.

Steps 4-6 – This step is where CD starts to differentiate itself from traditional debates. Each pair now has to change sides and argue for the view which they had previously argued against. For example, Pair A who favored free public transport now argue against it, whereas Pair B who previously spoke for maintaining normal public transport fares, now must favor no fares. Some students may worry that they will just repeat the arguments raised by the other pair in Steps 1-3; however, perhaps they can be challenged to develop new arguments. Alternatively, foursomes can exchange pairs, e.g., Pair A from one foursome changes places with Pair A from an adjacent foursome. Pairs repeat Steps 1-3 with their new assigned positions. This assigned shift of positions allows students to not just hear/read different perspectives; even more deeply, students represent different positions.

Step 7 – This may be the most important step in CD. Now, students are still in their foursomes, but they no longer belong to a pair; they are on their own. Perhaps most crucially, students no longer have an assigned view. Instead, each student develops their own view on the issue; it might be one of the two assigned views, or it might be a third view. For instance, a third view on public transport fares would be to reduce the need for public transport by setting up more bicycle lanes, perhaps including bicycle taxis, and to subsidize people to buy safety equipment for their bicycles, such as helmets, lights, gloves, and pads.

In Step 7, the foursomes attempt to reach consensus, but more important is that they use cooperative skills while discussing. These skills include asking for reasons, paraphrasing what others have said before possibly disagreeing with them, finding points of agreement, and smiling in a friendly way.

Many disagreements have arisen as to how to address the SDGs and even whether 17 is the correct number (Visseren-Hamakers, 2020). The use of cooperative skills lends hope that discussions aimed at achieving the SDGs can feature the kind of quality peer interactions that lead to 1 + 1 = 3. Note: two possible topics for SDG CDs are; (1) The Climate Crisis Can Be Averted; and (2) Avoiding Food From Animals (e.g., meat, fishes, eggs, and dairy) Can Lead to Zero Hunger (SDG 2).

To conclude this section of the article, while Group Investigation and Cooperative Debate might seem particularly apt for addressing the SDGs, all the many CL techniques are applicable, not only for groups in Education but for groups of two and more in almost any

context. The key lies in understanding and looking to implement CL principles. Lewin (1951), who, along with Deutsch (1949), is often credited with inspiring modern cooperative learning, particularly the concept of *positive interdependence*, is also thought to be responsible for the following quote: "Nothing is as practical as a good theory (p. 169), [or in this case, principle]".

Johnson, Johnson, and Holubec (2013) proposed nine ways to promote positive interdependence. Table 3 presents eight of these along with examples of how each can be expanded beyond small classroom groups.

Ways to Promote Positive Interdependence	**Example in Groups of 2-4 in a Classroom**	**Applications to Cooperation as a Value and the SDGs**
Group goals – Understanding their goal(s) and working to achieve them.	Everyone in the group improves their ability to multiply fractions	The SDGs contain 17 goals and targets for each, e.g., a target under SDG 5, Gender Equality, is "Recognize and value unpaid care and domestic work." Progress is valued.
Identity – Sharing a common identity.	Groups have names, mottos, songs, logos, handshakes, etc.	The multi-colored SDGs posters with a logo for each goal, have become common sights on bags, walls, clothing, etc.
Environmental – Groups are as physically close as is personally comfortable so as to be able to hear each other easily and easily see what each is doing.	Even in virtual learning, where hardware and internet allow, students can share with each other.	SDG 10, Reducing inequalities within and between countries, seeks to provide everyone opportunities to enjoy environmental *positive interdependence*.
Reward / Celebration – if groups achieve their goals, all members receive equal rewards / celebrate together.	A group celebrates after all members improve / attain a designated standard on multiplication of fractions.	The SDGs' targets are monitored. In place of bad news and pessimistic forecasts, progress should be made known and celebrated.
Resource – These can be knowledge resources or materials resources, e.g., different colored markers.	In the CL technique Jigsaw (Aronson, 2022), each group member has different information which they need to teach their partners.	Everyone needs to evaluate what resources they have and can develop to contribute to achieving their chosen SDGs; sometimes, a project can address multiple goals.
Role – Everyone has a role to play in enabling goal attainment.	In a foursome, rotating roles might be facilitator, thanker, questioner, and example giver.	When working with people in different places, in the same country or internationally, roles may be based on resources, e.g., those with access to online databases can find useful articles, and those with more funds can purchase resources, while those closer to a situation can chose what to purchase. At the same time, regular classroom roles remain relevant.
Outside Enemy – Enemies can be people, but they can also be standards or problems.	Last month, a group read a total of 12 books judged to be at approximately their reading level. This month, they aim to read more.	The difficulties involved in achieving the SDGs offer a number of "enemies" that will require cooperation with many friends, old and new, to overcome.
Fantasy – Imagining being different people, in different places, and/or different times	Students imagine they are visited by members of a new species. What will this species look like? What can they do? How can the students communicate with them?	Perhaps people can fantasize about a utopian future in which all the SDGs are accomplished, or conversely, a dystopian future in which humanity falls miserably short of meeting the SDGs. Will either fantasy illuminate or inspire their path?

Table 3. Eight Ways to Promote Positive Interdependence with Applications to Cooperation as a Value and the SDGs

Positive Interdependence and Cooperation as a Value

Indeed, the principle of *positive interdependence* has so many practical applications in so many areas of life. The eighth principle, *cooperation as a value*, seeks to expand the feeling among people of their outcomes being positively correlated, of "All for one and one for all," of "We sink or swim together" from its nurturing home inside small classroom groups outward to encompass everyone, human and otherwise, on the planet.

Working for the SDGs offers one path to applying the CL principle of *cooperation as a value*. For example, SDG 5 calls for gender equality. If people help females, even those living on the other side of the world, develop their potential, we have more people applying their cognitive, affective, and social intelligences to achieving the other 16 SDGs. Similarly, Einstein is said to have talked about people increasing their circles of compassion, i.e., those other beings about whom we care (Popova, n.d.).

The Versatility of Cooperative Learning

The research evidence supporting the use of CL has already been mentioned in this article. More anecdotally, Jacobs (2013) offered a collection of quotations supporting cooperation. One of those quotations that is particularly apt to the quest for the SDGs is the African proverb, "If you want to go quickly, go alone. If you want to go far, go together" Djoghlaf (2008), because many of the problems brought to awareness in the SDGs have plagued humanity for centuries, and although the hope is to achieve the SDGs by 2030, that seems extremely unlikely. Instead, any progress at all on many of the goals may be difficult to achieve. Thus, an effort sustained long after 2030 will certainly be necessary.

Figure 1 uses the metaphor that CL is a Swiss Army Knife. Such a knife has many blades and other features which makes it useful for a wide variety of purposes. The nine purposes of CL highlighted in Figure 1 are the provision of *peer feedback*, feelings of *belonging* and *support*, increased *power* and *social skills*, greater use of *thinking* skills, heightened *concern for others*, and more *motivation* and *learning*. Perhaps the best-known meta-analysis of research on CL was by Johnson, Johnson, and Stanne (2000). More recent meta-analyses include Setiana et al. (2020) and Turgut and Gülşen Turgut (2018).

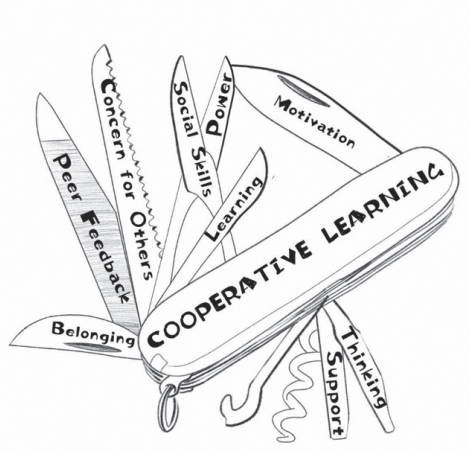

Figure 1. A Swiss Army Knife of Cooperative Learning
** Inspired by Philip Wollen https://www.facebook.com/AnimalActivistCollective/posts/1916974278416451*

Table 4 provides examples of the nine purposes of CL shown in Figure 1, in the context of the SDGs. Of course, other purposes also exist.

Purposes of Cooperative Learning	Examples of These Purposes
Peer Feedback	Students provide groupmates with feedback on their ideas for connecting with governments, NGOs, other students to fulfil SDGs.
Belonging	Maslow's (1968) Hierarchy of Needs highlighted the importance of feeling a part of something larger than oneself. Membership in a CL group can provide that feeling of belonging, and having a group goal, such as taking steps toward an SDG target can increase that feeling.
Support	In CL, students pool their resources and play at variety of roles, thereby supporting their groups as they strive at achieve the SDGs.
Power	By acting as a group, students can speak with a louder voice and, perhaps, have greater impact toward SDG targets.
Social Skills	By interacting with groupmates, students have opportunities to practice social skills and to see how important such skills are as students strive to involve everyone they can in furtherance of the SDGs.
Thinking	As students hold elaborated interactions with peers, they flex their thinking muscles, in line with the CL principle of *maximum peer interactions*. Achieving SDGs, without doubt, requires high levels of thinking.
Concern for Others	When students feel *positively interdependent* with their groupmates, a "one for all, all for one" feeling exists among group members. The next step involves the enlarging of students' circle of compassion.
Motivation	Students learn not just for themselves but also to help others. The hope is that the CL principle of *cooperation as a value* will encourage students to also help others beyond their small classroom group. We hope students will not forget the hundreds of millions of children prevented by poverty from attending school or even living to reach school age.
Learning	For all the above eight reasons, CL can lead to more learning. Having the SDGs as a larger objective for learning may further promote cognitive and affective gains.

Table 4. SDG examples of the nine purposes of Cooperative Learning at displayed in Swiss Army Knife drawing in Figure 1

Conclusion

In Malaysia and Singapore, we have a word *kiasu* which supposedly captures important insights into local culture. *Kiasu* means to be afraid of being left out; it is supposed to show selfishness. According to the terminology of Social Interdependence Theory (Johnson & Johnson, 2009), one of the key theories upon which CL is based, *kiasu* can be seen as representing a feeling not of positive interdependence, i.e., good for you is good for me, and bad for you is bad for me, but a feeling of negative interdependence, i.e., a belief that our outcomes are negatively correlated; if you swim, I sink, and if I swim, you sink. Jacobs and Tai (2022) argued, however, that cooperating is the *kiasu* thing to do.

Why does helping one person succeed boost their helpers' chances of success. Several explanations present themselves. First, Webb and colleagues (2009) did a series of studies leading to the conclusion that by teaching others, people learn. However, teaching does not mean merely giving answers; it must also mean explaining, giving examples, and otherwise elaboration, as in *maximum peer interactions*. Second, those whom we assist may later assist us. Third, when others do well, the standard increases, thus pushing us to improve further.

Something similar can be seen with the SDGs. For example, SDG 1 is No Poverty. Some people in the wealthier world might worry that when people escape poverty, they become competitors for university places, for high-skill jobs, etc. In contrast, from a *positive interdependence*, *cooperation as a value* perspective, when people escape poverty, they become much more able to contribute to accomplishing the other SDGs and other important goals for society.

Another example of how assisting others can be the selfish thing to do can be seen in the headline "Forest fires in Indonesia trigger haze fear in Singapore" (Reyes, 2013). To explain, fires are often used to clear fields, particularly of palm oil trees, in Indonesia, and the winds may direct the resulting haze from the fires to nearby Singapore, resulting in poisonous breathing conditions (SDG 3 – Good Health and Well-Being). Of course, the air is even worse in Indonesia at the point of the fires. Fortunately, by helping Indonesians avoid these fires (SDG 15 – Life on Land), people in Singapore help themselves and people internationally, as the fires can burn for months, pumping large amounts of greenhouse gases into the atmosphere (SDG 13 – Climate Action). Many actions exist, at both individual and societal levels, for people in both countries and beyond to take (PM Haze, n.d.), e.g., choosing haze-free cooking oil or reducing use of oil). Indeed, cooperating with and for others could be seen as the intelligent choice, as a case, not mainly of empathy or compassion, but of enlightened self-interest.

To conclude, this article has attempted to explain cooperative learning and to recommend it in Education and other human endeavors. One such endeavor involves meeting the United Nations' Sustainable Development Goals. The article made suggestions as to how CL techniques and principles can inspire cooperation and achievement of both learning and social goals and can make that learning more efficient in small classroom groups, as well as on larger stages.

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IVET GARRIGA, MARIA GONZÁLEZ AND DAVID DURAN

A Virtual Peer Tutoring Project to Improve Communication Skills

This article exposes an educational proposal of virtual reciprocal peer tutoring that has been devised to improve communication skills between primary school students from Catalonia and Scotland by each developing the role of tutor in their language, and that of tutee in the foreign language based on a virtual exchange. The results of this experience show that offering communication tools and strategies to students during initial training in their role as a tutor can be beneficial to satisfactorily fulfil their role, as well as anticipate future synchronous interaction in the foreign language. For later implementations, it is determined that the degree of participation and involvement of the student tutors in the preparation of the materials for their respective tutoring could increase the learning opportunities of both sides. This experience is easily applicable to different languages and countries.

Keywords: peer tutoring, peer learning, educational innovation, language learning, virtual learning environment.

Introduction

According to Piaget's developmental psychology studies, learning occurs through interactions with others. However, Vygotsky added that learning is generated when these interactions take place in an asymmetric relationship between the components. Based on these theories, peer tutoring was born throughout the 20th century, taking peer interaction as a learning mechanism. As cooperative learning method, peer tutoring consists of creating pairs of students in which one develops the role of tutor -and learns by offering pedagogical aids- and the other, as tutee, learns thanks to the personalised aids offered by the tutor (Topping et al., 2015).

One of the intrinsic concepts in peer tutoring is that of learning by teaching (Duran & Topping, 2017). It is important to pay special attention to the learning of students when taking on the role of the tutor to ensure their learning. Research shows that, under certain conditions, the activity of teaching involves learning opportunities for those who develop it, as it promotes people making their ideas explicit and being grounded in a context to construct different knowledge from what they would use simply as learners. In this regard, the most recent research on peer tutoring highlights the value of the children's initial training the tasks derived from their role in the pairs and the evidence indicates that the key to the success of this cooperation process is the mediating function of the tutor (Duran et al., 2019; Topping et al., 2017).

Peer tutoring has generally been developed in face-to-face environments in schools, but recently there are practices and research in which pairs interact virtually, thanks to the use

of digital resources (Thurston et al., 2009). The educational proposal presented in this article was designed and implemented based on the results of these recent practices and research. It is a reciprocal peer tutoring proposal between students in the upper stages of primary education from a Catalan school and a Scottish one. Its goal was to improve their communication skills in English and Spanish, using digital resources as a means of communication between the students from both schools. In the case of Catalonia, the project was named "*Hablemos con… Scotland!*", and in the case of Scotland, it was named "*Talking to… Catalunya!*" [1].

The project presented below has been built on the theoretical bases of peer tutoring as well as on two other pillars, which are teaching and learning through technological devices and language skills.

On the one hand, the recent technological development, and the incorporation of technologies in schools has brought great benefits as technology is understood and used as an instrument to implement the transformations that formal education needs to respond to the new social demands. In fact, the progressive inclusion of virtual environments opens the possibility of breaking through the spatial and temporal boundaries that delimit a classroom, as well as establishing communication spaces between students from different countries, enhancing the presence of collaborative contexts where authentic communication in a foreign language (L2) and learning from peer interaction can occur.

Previous research on reciprocal and virtual peer tutoring (Thurston et al., 2009) suggested that real-time interaction between students could facilitate more accurate and fine-tuned tutor-to-tutee feedback (Topping et al., 2013). So, in this project, technology plays an important role, because it can make it easier for the student tutor to adjust the aids immediately according to the needs of the tutee; in addition to being the means by which these exchange opportunities can be realised, synchronously. In the same line, Vinagre (2010) already points out that a possible good practice could be the application of a tutorial between students to teach and learn a foreign language, trying to have the students rotate, prepare a topic, and present it to their partners online.

On the other hand, about language learning, Camps et al. (2006) stated that the cognitive processes specific to language acquisition are operations situated in verbal interaction and, furthermore, added that interaction and cognition are inextricably linked through socially situated verbal activity. Therefore, interaction – the main pillar of peer tutoring – can bring considerable benefits to language learning.

One of the linguistic issues that has been addressed in the designed educational proposal has been correcting errors, as during the peer tutoring sessions of this project the students had to give feedback to their partner while performing the tutor role. The correction of oral production entails a greater degree of complexity than the written one, due to the immediacy of decision-making and the impossibility of being able to plan beforehand. In addition, unlike in writing, oral speech allows the recipient of a speech – the tutor student – to detect the self-corrections made by the sender – the tutee student –, since in the written language they are suppressed (Vilà et al., 2002). In this case, the synchronous oral interaction could produce a dichotomy: on one hand, it could encourage the tutors to adjust their corrections to the needs of their partner, but, on the other hand, the fact that the tutors had a limited time to reflect on the detection of errors and the help they offer - contrary to what they would in a written context - made it even more complex and, therefore, required the initial training of the tutor role that has been referred to in previous paragraphs.

Therefore, peer tutoring has the potential of becoming a great pedagogical approach in foreign language teaching, as demonstrated in the *Reading in pairs* program (Duran et al.,

1 To know more, visit https://grupsderecerca.uab.cat/grai/en/node/14531.

2019). This is a peer tutoring program, with family participation, to improve reading comprehension and speaking in English as an L2. The results of the implementation of this program indicate that peer tutoring applied to the teaching and learning of foreign languages encourages students to interact and communicate in that language, also the nature of the interaction makes them feel more secure and confident to do so in a smaller environment than an open class.

Furthermore, apart from specific language skills, peer tutoring can also encourage the development of cross-cutting skills, such as socio-affective, organisational, interaction management, cognitive and reflective skills (McLuckie & Topping, 2004).

In this way, the purpose of the project was that during four virtual exchange sessions, the participating students would improve both in the foreign language, based on the help provided by their peer tutor, and in their own language, offering pedagogical help to the respective tutee. Thus, the proposal sought to address two aspects: firstly, taking advantage of the diversity among students to work on linguistic competence and, secondly, using technology and access to the Internet as instruments to establish spaces for communication between students of different countries, creating collaborative contexts of authentic communication and learning.

Design of the didactic proposal

Justification

The creation of the educational proposal that is exposed in this article is based on the results, already developed in several articles, of another reciprocal and virtual peer tutoring project to improve language skills in Spanish and English (Duran et al., 2010). In that case, learning was done by writing and reviewing written texts. The project was a variant of email dialogue journaling and its results determined that the degree of help provided by the tutor has an impact on the learning opportunities of the tutee. Specifically, it was stated that help by clues promote learning, but at the same time the reflection on how this adjusted help is offered also promotes the tutor's learning (Duran et al., 2010; Blanch et al., 2014). The research articles referring to this innovation concluded that the interaction in real time, in a synchronous way, could be more effective to guarantee accurate and adjusted feedback from tutor to tutee (Topping et al., 2013).

Aims

The project *"Hablemos con... Scotland!"* or *"Talking to... Catalonia!"* targets fifth grade primary school students from Catalonia and Scotland (10-11 years old) and aims to approach and improve their communication skills in English and Spanish, from a communicative and pragmatic approach to the language, based on authentic practices that involve real acts of communication and expression. In this case, the progressive incorporation of virtual environments opens the possibility of breaking with the spatial and temporal limits that define a classroom, as well as establishing spaces for communication between students from different countries.

Bearing in mind that the proposal was to be applied in two schools of different educational systems, both the Catalan and Scottish curricula were considered, and the main elements were delimited to develop a common project. Thus, both curricula agree that the

goal for oral communication within the foreign language subject is for students to be able to make a short presentation about themselves and participate in simple conversations by the end of primary school.

In this way, the general learning intentions that were established in this proposal were: to learn about the basic social and cultural elements of another country; to develop language skills to meet and converse with a foreign language speaker; to interact with people from other social, cultural and linguistic contexts; to reflect on their own learning and that of others that arise from an act of reciprocal teaching and learning; and to develop a positive attitude when interacting and collaborating with the peer group.

Methodological sequence

The development of this educational experience has three phases, exposed in Figure 1: the initial training of the students, the preparation and virtual exchange, and the final evaluation of the experience.

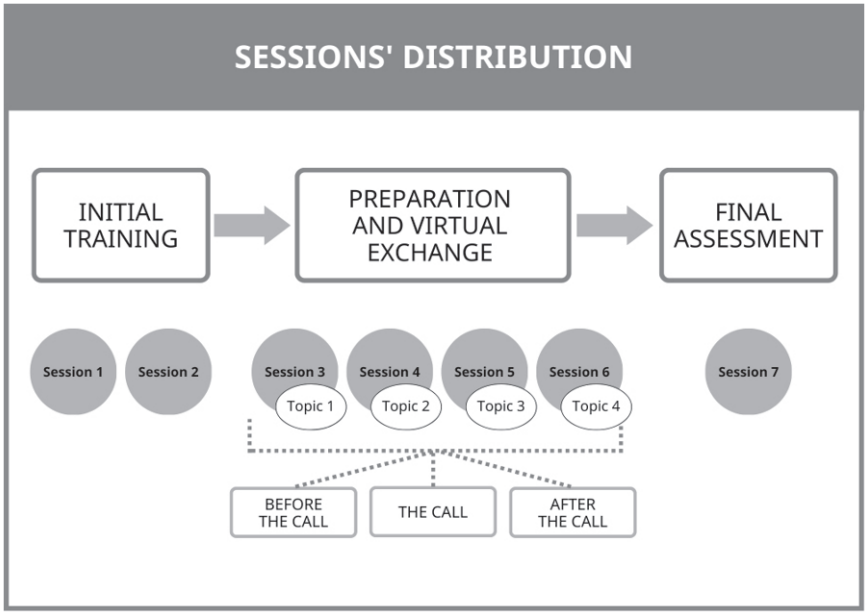

Figure 1. Sessions' distribution of the project (own editing).

In the first phase (initial training of the students), two sessions were dedicated to training the students in the peer tutoring method and the roles that they had to develop in the pair (tutor and tutee). This initial training, as literature underline, is crucial to ensure the proper functioning of the roles in the tutoring, since experienced or trained student tutors develop a metacognitive awareness that allows them to help the tutees in an adjusted way. In addition, it allows to train tutors in strategies to generate challenges in the tutee, instead of only giving explanations or even direct resolution to the error. Evidence indicates that the key to the success of this cooperation process is the mediating role of the tutor (Duran et al. 2010; Blanch et al., 2014; Duran et al., 2016).

In the second phase (preparation and virtual exchange), four sessions were designed to focus on preparing the linguistic content regarding a specific communicative situation, and

conducting a subsequent virtual exchange with their partner from the other country. Each meeting corresponds to a communicative situation or scenario, all of them related to meeting another person (introducing oneself, describing a place, etc.). These sessions were the central part of the proposal since it is where the virtual peer tutoring had to happen.

In the third and last phase of the project (final assessment), a session was devoted to assessing the experience by all the agents that participated in it, (students and teachers).

Assessment Tools

As in any educational experience, the evaluation had to be a key element to be able to assess the entirety of this didactic proposal and to develop an ongoing oversight of the teaching-learning process. In this way, two types of evaluation tools were established: some specific and others continuous, as can be seen in Figure 2.

ASSESSMENT TOOLS	
SPECIFIC	CONTINUING
initial assessment questionnaire final assessment questionnaire	learning diary observation support material review

Figure 2. Assessment tools classification (own editing).

On the one hand, the specific assessment tools were the initial evaluation questionnaire and the final evaluation questionnaire. The former was aimed at identifying the students' previous learning in relation to the contents that would be worked on throughout the project. And the latter intended to find out how the participants –students and teachers– have lived the experience individually and collectively, as well as the possible improvements that could be derived. Both questionnaires had to allow the students, at the end of the experience, to compare their starting and ending points and, therefore, determine what their learning process had been.

On the other hand, the continuous evaluation tools were the learning diary, the review of the support material and the observation. The diary allowed students to record their own learning and what they believed they had produced in their pair. Both the review of the material and the observation had to be measures that would allow the teacher to identify how the learners' process was during the implementation of the didactic sequence and to be able to differentiate, if it was considered that any student required additional support.

Resources

This practice required the collaboration of the class teachers with the foreign language teacher and, if available, the support teachers, who facilitate a set of teaching and learning activities between teachers and students, between students of the same classroom and students from different schools. In this way, the didactic work begins in the classroom and goes beyond its limits using technological devices.

The development of the activity required the use of self-made materials, such as a project dossier and support materials (conversation guides, vocabulary documents and audiovisual pieces) to prepare the linguistic content corresponding to the theme of each call.

In the case of a didactic proposal that focuses on the synchronous virtual exchange between students from different schools through video calls, it is required to have a computer or tablet with access to the network and a set of headphones for each student, in addition to access to a virtual learning environment created for the project.

Development and results of the experience

This experience was carried out in a group of twenty-five students from Escola La Maquinista (Barcelona) and another group of twenty-six students from St. Joseph's R.C. Primary School (Aberdeen). It took place between the months of February, March, and April 2022. Throughout its application, a series of evidence were collected, which are set out below, respecting the phases of the project, and are already mentioned and referenced in Figure 1.

Initial training of students

The first contact with the project included two sessions in which the students were introduced to it. They received training in the roles of reciprocal peer tutoring (tutor and tutee) and the students became familiar with the materials support. Of all the activities carried out, the most relevant are highlighted below:

- *Exploration of the students' previous knowledge*: in the initial evaluation questionnaire the students had to assess from 1 to 5 the level of knowledge they believed they had regarding the foreign language and peer tutoring. In the case of the students in Catalonia, in general they indicated varied responses, without a very marked trend. In contrast, most of the students in Scotland tended to be more optimistic about their responses and rated all items between 3 and 5. The teacher of this group stressed that these answers could be conditioned by the excess of self-confidence widespread in the group. These results, together with the knowledge that the teachers had of their respective students, were used to create the pairs, composed by students with similar levels of linguistic knowledge.
- *Debate on the qualities that a tutor and a tutee should have*: through a group dynamic, the students had to establish what qualities a good tutor and a good tutee should have. The most mentioned qualities in reference to the tutor were "patience", "understanding", "knowledge", "to be able to predict'', "respect", "kindness", and "empathy". On the other hand, among the most mentioned around the tutee, were "patience", "active listening", "resilience" and "acceptance of errors". As the teachers pointed out, the sharing and feedback between the students allowed them to jointly construct what the roles should be during the calls and, in this way, feel more confident and secure when carrying out the tasks during the experience.

- *Practice of some strategies to make a good correction*: building on from the visualisation of audio-visual pieces in which conversation models were shown and a correction orientation was presented, the students put into practice different strategies of how to make a good correction. The audio-visual pieces were used as references and helped them to know how to structure the conversation that they would establish with their pair.

Preparation and virtual exchange

Once the training phase was over and the pairs had been created, the main sessions of the proposal were implemented, in which the virtual exchanges between the students of Catalonia and Scotland were prepared and carried out. Each week a call was held, which was framed by a central scenario or theme. In total, four calls were held. Each of the sessions in this phase was divided into three subparts: before, during and after the call. The development of each of them is detailed below.

Before the call

This part of the process included two parts: a first one focused on working on the linguistic content in a foreign language of one of the scenarios; and a second to prepare the oral discourse that they would present to their pair from the other school during the call.

First, the students at each school were divided into small groups, according to their level of knowledge in the foreign language, and they began to prepare the linguistic content of the week's communicative situation and the conversation itself, based on a video sample, a conversation guide, and a vocabulary document. The use of these resources and the cooperative work between the peer group should allow the students to be more autonomous during the call preparation.

The call

Once the oral presentation was prepared, the video call was made to their partner from the other school. The virtual exchange consisted of three steps. First, a student exposed their part in a foreign language and the other gave the feedback. Then they did the same process but reversed the roles – the student who had given the feedback went on to present their part in a foreign language and the other gave feedback. Finally, some time was offered for the two students to make comments or have an informal conversation.

During the calls, the interactions between the students were carefully observed. In this sense, special attention was paid to analysing two aspects: the structure of the calls and the feedback offered by the tutor. Regarding the first, it was detected that the students followed the structure of the calls. This could be thanks to the conversation guides, which facilitated this organisation of the speech from its preparation. However, in some cases the students relied on this guide excessively and tended to read it directly. This dependence on the guide meant that, in these cases, the speech was less fluid. Regarding the feedback of the tutor, even though it was generally satisfactory, some tutors offered help to unlock some barrier, especially pronunciation, that did not allow the tutee to continue advancing. Some tutors encouraged interaction with their partner by asking questions, which promoted establishing a more spontaneous conversation and less attention to the guide. Even so, despite having prepared on the roles during the initial training, it was detected that

some tutors directly gave the answer, instead of suggesting comments that would lead the tutee to reflect on how to correct the mistake.

An unforeseen situation during this part of the process was that some students from the same physical classroom offered pedagogical help to each other during the calls. This occurred mostly when the adult was busy and could not meet a student's demand. In these cases, the tutor responded to their tutee, providing help based on peer interaction within the same classroom.

After the call

After the call, the students had to reflect on what they thought they had learned, both themselves and their partner, through a learning journal. In general, it was observed that the students tended to describe what they had done, rather than reflect on what they had learned. In most cases, they described very specific aspects of the language that they had learned, especially regarding pronunciation. Therefore, in this regard, the students' attitude was not very reflective and profound regarding the learning of oneself and of others.

Final assessment

The last session of this proposal was intended to complete a final assessment of the experience. First, each student made an individual evaluation of the experience through an online questionnaire and then the initial evaluation questionnaire was recovered to contrast their initial ideas with the subsequent ideas. And, finally, the project was concluded, leaving a space for the students to share as a group what they gained from this experience.

Generally, the students from Catalonia scored higher and more positively than the students from Scotland almost on all the questions on the form. As can be seen in figure 3, most of them valued that they have had both opportunities to learn by teaching, and to learn from a partner. In the case of learning by teaching, that is, when they developed the role of tutor, they indicated that they have had the opportunity to learn because by correcting they have learned new words and have learned how to correct. And in the case of learning from a partner, that is, when they developed the role of tutee, the students indicated that they have learned because the partner has corrected their mistakes and they have provided each other with tools to resolve doubts.

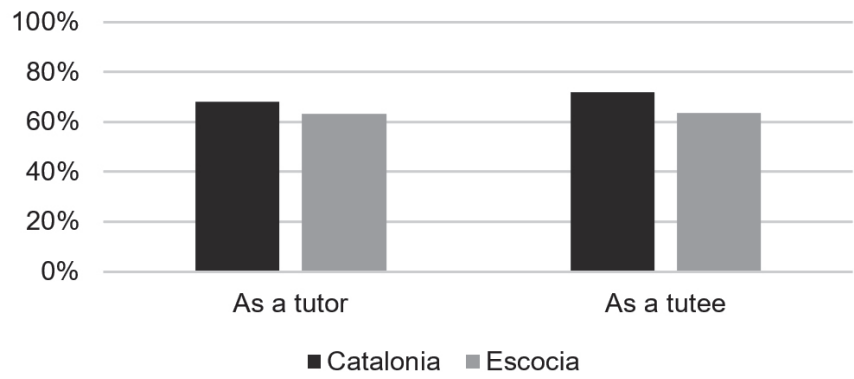

Figure 3. Learning opportunities, according to the students (own editing).

Guidelines for the application of the experience in other countries

Throughout the implementation of the project, evidence was collected that has made it possible to draw up a series of proposals to improve the project and to be able to make it available to teachers and schools. Below are the general considerations, including challenges for the future, which are summarised in four related topics: the feedback of the tutor, the synchronous format, the support materials, and the learning diary.

Firstly, oral communication is dependent between issuer-receiver and intangible. This fact added complexity in the tasks to be carried out by the tutor, one of them being the feedback. Although the initial training was able to provide students with strategies and resources to make a correction that would encourage metalinguistic reflection in the tutorship, some students still directly cleared the error. The preparation of the role of tutor was only contemplated in the initial training and the rest of the sessions, especially those destined to prepare the virtual exchange, were exclusively focused on working on the role of tutee. To improve this aspect, on the one hand, it is proposed that the training of the tutor role be extended to the virtual exchange preparation sessions, before each call; and, on the other hand, that the students, in the position of tutor, can prepare part of the support materials that their respective tutees will use. This could be a way of anticipating and involving the students even more in their role as tutors.

Secondly, the synchronous format was an added difficulty that conditioned the interaction between the students. In a previous experience of this work, it was prescribed that the interaction in real time could be more effective to guarantee a precise and adjusted feedback (Topping et al., 2013). Even so, in the case of this proposal, it has been detected that the lack of skill with the language could lead to the peer interaction not being very fluid. To prevent this possible barrier, a solution could be to record the presentation so that the student tutor can see them and have time to prepare the feedback; in addition to contemplating the use of consultation tools during the call, such as an online dictionary, for example.

Thirdly, the learning diary is a tool that did not quite offer the desired results, because the reflections of the students were too shallow. This may have happened because the students were unaccustomed to this type of dynamic. Hence, to improve the results, one proposal is to structure the learning journal in such a way that it includes a more detailed and sequenced follow-up for each part of the call session. Thus, the journal would have to be filled in after the call preparation (pre-call) is complete and after the call is made (post-call). Also, another proposal for improvement has to do with the active role that teachers should have in this dynamic. For this, it would be convenient to create a guideline that would detail what instructions should be given to the students to suggest the purpose of this resource and encourage them to make a more careful reflection.

Finally, one of the most common situations during the calls, already mentioned, was the students' high dependency towards the support materials, especially the conversation guides, which caused a certain rigidity in the interaction. This fact could be due to the little time they had, in general, to rehearse the speech or to the methodology used during the sessions prior to the call. A first proposal for improvement is to contemplate more sessions to prepare the linguistic content of each conversation. A second proposal is the creation of materials more focused on vocabulary and dynamics that involve more oral interaction; and, in this way, move away from dependence on supporting materials on paper. Thereby, the diversification of materials could facilitate meeting the different learning styles in the classroom.

From all these challenges that arose, the experience that has been described can be sufficiently enriched so that it can be applied in other schools, finding adjustments to maximise the learning opportunities, thanks to the creation of spaces for authentic communica-

tion between students from different countries. As it has been possible to verify, the interaction of the students is crucial to turn the classrooms into learning spaces where they not only learn from the teacher, but also from the help that is offered from each other, using diversity as a learning mechanism.

Conclusions

In this little experience, peer tutoring can become an instrument with high potential for dealing with diversity since it can turn differences into learning opportunities and, thus, encourage offering more differentiation tailored to the students. Indeed, it has been found that this methodology can benefit students in vulnerable situations, especially those with emotional and behavioural disorders, since it leads to improvements due to the additional support that students receive from their peers.

The dialogue between tutor and tutee is undoubtedly one of the fundamental aspects of peer tutoring, since it promotes metacognitive activity, increases knowledge about when and how to use learning and problem-solving strategies, and self-regulates learning. In this case, dialogue and collaborative learning have been essential tools for building knowledge, based on mutual reinforcement.

In this proposal, teaching offers learning opportunities for those who develop it since it encourages people to explain their ideas and establish themselves in a context to build knowledge that is different from what they would use by solely learning. Regarding this, the initial training of students in the tasks arising from their role in pairs is essential to ensure the success of peer tutoring, as the key to the success of this cooperation process is the tutor's mediating role.

In this way, thanks to the development of new technologies, as well as their adjusted use to the needs that each project entails, it can facilitate the creation of spaces of collaborative learning, where diversity, not only between students within a class or year, but between schools and countries, can become a good source of learning.

To sum up, the versatility of this project can allow it to be transferable to other languages, to offer students opportunities to learn a foreign language in authentic contexts and strengthen ties of collaboration between countries.

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BEATHE LIEBECH-LIEN, EVA HAMMAR CHIRIAC AND NEIL DAVIDSON

Teachers' Professional Development for Cooperative Learning: A Constructive Controversy Between Long-Term Versus Short-Term Professional Development

Previous scientific research has recognised the pedagogical model of cooperative learning (CL) as a best-practice pedagogy, which facilitates students' academic and social learning. Teachers are crucial for implementing CL in the classroom. While they value the method, they often find it complex and challenging to use. Thus, it is crucial to support effective CL professional development (PD) for teachers. Various approaches, forms and lengths of PD in CL are available for teachers, and long- and short-term approaches have been debated in the literature. Based on the perspective of constructive controversy, the goal of this study is to examine teachers' PD in CL, with a particular focus on long- and short-term PD. Drawing on our different perspectives and experiences with long- and short-term PD in CL, we aim to contribute knowledge that can support teachers' learning and implementation of CL. To provide insights and reflections along with theoretical findings, we utilise a narrative approach, with one narrative on long-term PD and one on short-term PD. One issue that becomes clear is the lack of a consensus on what counts as PD for teachers, as PD is a holistic multidimensional construct. We propose four common characteristics that should be considered in developing successful PD regardless of the CL approach or the length of the PD: 1) It enables participating teachers to acquire a shared understanding and knowledge of the theoretical framework of CL; 2) It supports teachers in taking ownership of CL; 3) It involves collaboration (in different forms); and 4) It includes support structures. While both long- and short-term PD can support teacher learning, how the time is used is the most important factor for a successful outcome. Hence, short-term PD is better than no PD at all.

Keywords: teachers' learning, professional development, cooperative learning, implementation, constructive controversy.

Introduction

The pedagogical model of cooperative learning (CL) has a long history and an extensive research base. Numerous studies clearly show that CL is beneficial for students' academic learning, but it also has several affective non-academic effects on social skills, communication, peer relationships, attitude toward learning, motivation and well-being (Johnson & Johnson, 1999, Johnson et al., 2014; Kyndt et al., 2013; Liebech-Lien, 2020a; Roseth et al., 2008; Slavin, Hurley & Chamberlain, 2003). Due to the large research base on the benefits of CL, it is recognised as a best-practice pedagogy (Baloche & Brody, 2017). CL facilitates students' academic and social learning, making it a powerful educational tool for providing students with the skills needed in their future professional and personal lives in the 21st century (Johnson & Johnson, 2014).

The teacher is crucial in incorporating and structuring CL in the classroom (Gillies, 2016; Ferguson-Patrik & Jolliffe, 2018). Although teachers value CL, they often find it complex and challenging to use (Ghaith, 2018; Gillies & Boyle, 2010; Surian & Damini, 2015). Even after completing formal training in CL, the method is often abandoned, or its use is noticeably reduced in their practice (Sharan, 2010). Challenges with implementing CL generally relate to limited knowledge of the method and a lack of understanding of how to implement it effectively (Abramcyk & Jurkowski, 2020; Buchs et al., 2017; Gillies & Boyle, 2011; Hennesey & Diongi, 2013; Vollinger et al., 2018), challenges adjusting it to the curriculum (Dyson et al., 2016; Ghaith, 2018), planning and class management (Gillies & Boyle, 2010; Surian & Damini, 2014) and student assessment (Buchs et al., 2017; Surian & Damini, 2014; Hammar Chiriac & Forslund Frykedal, 2022, 2023).

Thus, supporting effective professional development (PD) in CL for teachers is crucial to support teachers' learning and implementation. Various forms and lengths of PD in CL are available for teachers, and there is a debate in the literature regarding whether long-term or short-term approaches can best support teachers' learning. In this article, we examine PD in CL, with a particular focus on long-term and short-term PD and the ways in which they can support teachers' learning and implementation of CL.

CL is a generic term. There are various approaches to CL and PD that researchers and educators have developed since the field of CL began in the late 1960s and early 1970s. The research by Deutsch (1949) on the effects of cooperation versus competition provides a theoretical and empirical base for the field of CL (see Stevahn, 2021). The original developers created an extensive body of theory and research and varied approaches to classroom practice and PD. This is documented in the book *Pioneering Perspectives in Cooperative Learning* (Davidson, 2021). The historical development of CL has been based on the originators' thoughts, reflections and personal stories about their own work, starting from their beginnings and moving forward to 2020. All the approaches to CL have certain common elements. While they are taken into account in PD programmes, they are not necessarily presented as basic principles.

1. A common task or learning activity suitable for group work.
2. Small-group interaction focussed on the learning activity.
3. Norms for cooperative, mutually helpful behaviour among students as they strive together to accomplish the learning task.
4. Individual accountability and responsibility for what students have learned and/or contributed to the learning goal.
5. Positive interdependence in working together—also known as interdependence or mutual interdependence. (Interdependence is the mutual reliance between two or more individuals or groups.)

In addition to these common elements, each approach to CL has unique characteristics. These characteristics are then emphasised in PD targeting the specific approach.

Table 1 presents a selection of the major approaches to CL and PD and their characteristics. This list is not exhaustive, as there are many different approaches and recommendations for CL and PD (e.g. Fergusson-Patrick & Joliffe, 2018; Fohlin et al., 2017; Joliffe, 2007).

CL Models and Developers	Year	Characteristics
Learning together and alone by Johnson & Johnson	1970s	Social interdependence theory, face-to-face promotive interaction, teamwork skills, assigned roles and group processing (see Johnson & Johnson, 2021)
Small-group processes and organisation development by Schmuck	1970s	Concepts from group dynamics and group development, such as communication, friendships, cohesiveness, shared norms, leadership and conflict; also applied in conjunction with organisation development (see Arends, Davidson, & Schmuck 2021)
Small-group CL in mathematics and beyond by Davidson	1970s	Discovery learning, challenging tasks, groups working together at the blackboard or whiteboard, guidelines for cooperation and higher-order thinking skills (see Davidson, 2021)
Group investigation by Sharan & Sharan	1970s	Research groups plan and conduct their investigations and then present their findings to the entire class (see Sharan & Sharan, 2021)
Jigsaw classroom by Aronson	1970s	Sociological emphasis on equity, task division into several parts, expert groups for learning the parts and home groups for presenting the parts (see Aronson, 1978, 2021)
Complex Instruction by Cohen and Lotan	1980s	Sociological emphasis on equity, assigned roles, multiple-ability tasks and status interventions (see Lotan & Holthuis, 2021)
Student team learning and success for all by Slavin & Madden	1970s	Group goals and rewards through bonus points or team recognition and individual accountability, such as the methods of STAD, TGT and CIRC, included in the programme Success for All, a whole-school reform model for disadvantaged schools (see Slavin & Madden, 2021)
The structural approach by Kagan	1980s	Cooperative structures, class building and team building, based on PIES principles, including equal participation and simultaneous interaction (see Kagan, 2021)

Table 1. Major approaches to CL connected to originators and initial time period of publication

PD for teachers' learning and implementation of CL

In order to realise the potential of CL to support students' learning, an important prerequisite is supporting teachers' learning so they develop an understanding of the theory behind CL and how to utilise it in their teaching. Adequate knowledge of CL through training, where they gain experience with CL, is vital for teachers' use of the method. Darling-Hammond et al. (2018) argued that effective PD is needed if teachers are going to learn and refine the pedagogies that address students' learning needs in the 21st century. In their study, they found that effective PD programmes have certain characteristics in common, such as being focussed on content, the use of pedagogical models, active learning, collaboration, reflection, support and being sustained over time.

There are different approaches to PD that is provided for teachers in CL. Some PD follows the originators' specific approach to CL (e.g. Kagan & Stenlev, 2006), while other providers modify and create their own versions inspired by different CL approaches (e.g. Fohlin et al., 2017; Hammar Chiriac & Forslund Frykedal, 2022; Jolliffe, 2007; Liebech-Lien, 2022). Brody and Davidson's (1998) book *Professional Development for Cooperative Learning. Issues and Approaches* includes multiple viewpoints on PD for CL, showing that approaches to PD vary considerably. An important takeaway from their book is that an introductory workshop is necessary but not usually sufficient for teachers to become skilled implementers of CL. The teachers will also need first-hand experience with the method as participants in CL workshops or classes and the opportunity to reflect on their experiences. Although CL is subject-independent, teachers need to see example applications in their own subject areas and think about further applications for their classes. The workshop needs to include some information on the rationale, theory and research about CL and provide a CL experience and opportunity for reflection. Practical implementation questions also need to be addressed, such as group formation, the role of the teacher, student motivation and behaviour, assessment and evaluation.

Long-term and short-term PD

In the field of teacher PD, there is a shift from delivering training models that are short-term, which are often delivered as workshops or courses taught away from school, to approaches that are more long-term, grounded in classroom practice and focussed on developing professional learning communities for teachers. The long-term approach is often advocated by experts in the field (Borko et al., 2010).

The originators of CL employed both long-term and short-term PD approaches for CL. As a large amount of research has shown the effects CL can have on students' academic and social learning, it has become recognised as a best-practice pedagogy (Baloche & Brody, 2017). This has likely contributed to the fact that PD in CL is currently available for teachers from different providers and in different forms and lengths. This includes private providers as well as researchers and school developers, who are providing PD in CL as part of their research and development projects (Hammar Chiriac & Forslund Frykedal, 2022; Liebech-Lien, 2020b). For example in Norway and Sweden, private providers deliver PD in CL in different formats, including one- or two-day workshops in CL for individual teachers, workshops for schools and workshops with continuous follow-ups tailored for individual schools.

Although Borko et al. (2010) advocated for a long-term approach to PD, it is not always possible, and teachers are often provided with short-term PD in CL (e.g. Buchs et al., 2017). A key question is what can be accomplished in a short-term PD programme compared to a long-term programme. In this article, we examine both long-term and short-term PD to explore how they can support teachers' learning and implementation of CL.

We regard short-term PD as having a duration from one workshop to a couple of weeks, while longer-term approaches have a duration from several weeks up to years. Long-term PD often also includes follow-ups, which are usually lacking in shorter interventions.

Long-term PD

The current literature on teachers' learning and implementation of CL indicates that long-term PD supports teachers' use of the method. A recent study examined a long-term PD professional development programme in CL within a large school across several curricu-

lum areas and age groups. The results showed that professional learning sessions involving several workshops, in which teachers planned cooperative CL learning tasks together, implemented and reflected on their implementation with support from the researcher enabled the teachers to implement cooperative CL learning and motivated them to further develop their CL practice (Alansari & Rubie-Davies, 2021).

Goodyear (2016) also described the benefits of long-term PD in the context of a year-long PD programme in physical education. She found that long-term PD supported teachers' CL practice, highlighting the importance of support and collaboration from facilitators and colleagues. The one-year duration allowed adaptation of the PD to meet the needs of the teachers. As a result, the teachers developed a routine CL practice and were able to adapt key elements to address their students' learning needs. This is in line with the results of Dyson et al.'s (2016) study on a year-long PD programme where teachers worked in professional learning groups, which showed that participation in these groups with ongoing support helped the teachers implement CL in their teaching. A larger study of a peer learning CL network model across 20 schools in Spain also demonstrates that long-term PD with teacher collaboration helped teachers adapt the method to their practice (Miquel & Duran, 2017).

Ferguson-Patrick and Jolliffe's (2018) book *Cooperative Learning for Intercultural Classrooms* provides a description of case studies of CL worldwide. Many of the case studies give examples of how long-term PD with workshops and continuous support enables teachers to implement this pedagogy. The case studies describe a variety of approaches to PD and CL implementation. However, important features of many of the long-term PD approaches are teachers getting first-hand experience with CL as learners themselves, experimenting with CL in their own classroom, teacher collaboration and receiving support, such as from the PD professional development provider, researchers and school leadership.

The long-term approach combined with teacher collaboration seems to be particularly beneficial for teacher learning and implementation of CL. Indeed, the literature on teachers' learning and PD highlights the importance of participating and interacting in a community of professionals (Darling-Hammond et al., 2017; Timperley et al., 2007). A growing number of studies show that long-term PD in CL combined with teacher collaboration has a positive impact on the implementation. Jolliffe's (2015) study on long-term PD in CL in a network of schools in England illustrated that the effective implementation of CL requires a sustained and collaborative process. The study emphasised that implementing CL is not a quick fix, nor is the development of a professional learning community (Joliffe, 2015, p. 79). Davidson (2021, p. 219) found that PD in which a team of teachers from a school participate in an ongoing programme over time and then form a support system for one another supports strong CL implementation.

Short-term PD

Much of the previous and current literature and research on teachers' PD related to CL seems to advocate a long-term whole-school approach to bring about effective and sustainable change (Cordingley et al., 2015; Fergusson-Patrick & Jolliffe, 2018). Nevertheless, even short-term PD of moderate duration can have an impact on teachers' practice when focussed on a specific area of teaching and learning (Cordingley et al., 2015). Further, PD over a longer period does not guarantee a better result. As Timperley et al. (2007) concluded, it is what the time is used for that determines the outcome. This notion is further supported by Ha et al. (2015), who argued that a well-designed short-term PD programme 'can achieve significant, meaningful and sustainable impact' (p. 20). Our interpretation is

that this this conclusion applies to teachers' PD in CL. Next, we will give some examples of short-term PD that are described in current research. One example of short-term PD can be found in the classic Australian study by Gilles and Ashman (Ashman & Gillies, 1997; Gillies & Ashman, 1996), who showed that a small educational intervention had a great impact on students' experience and use of CL.

For example, some studies have focussed on teachers' perceived difficulties in introducing CL after shorter periods of PD (Buchs et al., 2017; Malusà, 2020). Buchs et al. (2017) studied 200 Swiss elementary teachers' pedagogical convictions after implementing CL in their classes following a two-day training intervention. Malusà (2020), inspired by Busch et al. (2017), focused on elementary and middle school teachers' perceived self-efficacy after implementing CL following 10–25 hours of experimental in-service training. An overall conclusion from both studies was that a short teacher PD is partially beneficial but not sufficient for a sustainable transition from traditional teaching methods to CL. Decisive for the level of impact of short-term PD seems to be whether teachers have previously used CL or if they have shown a high level of prior interest in CL. Jolliffe and Snaith (2017) confirmed that such previous experience with CL is important to the outcome of short-term PD.

Two other examples of short-term PD were reported by Ferguson-Patrick and Joliffe (2018). First, they described a case study from India of an eight-week PD programme. With help from a CL expert, teachers implemented cooperative activities in their classrooms to enhance inclusive education. In the second case study, one teacher from Singapore decided to implement CL in his classroom after attending a single workshop (unclear duration). According to the case study report, he has now been using CL for two years. Both case studies illustrate the important impact that individuals, both teachers and experts, have on whether short-term PD produces sustainable long-term effects.

Methodology

This article is a result of a collaboration between three researchers from three different countries, all with a particular interest in CL and supporting teachers' learning with PD in CL. Our collaboration came about after getting to know each other's work through a book project where two of the authors contributed to different chapters, and the third author was the editor of the book. It was evident that we shared the same passion for the potential of CL in education and student learning. However, we had different experiences and results in terms of how to support teachers' learning with CL through long-term and short-term PD.

Our different viewpoints and experiences led us to think that it would be fruitful to explore research on long-term versus short-term PD in CL through a review of the literature and drawing on our experiences from research and practice.

In our investigation for our investigation and development of our article, we were inspired to use constructive controversy as a framework to support our research collaboration. Constructive controversy can be seen as inquiry-based advocacy that starts with presenting opposing perspectives and thereafter inquiring into the issue from the different perspectives to gain an increased understanding and reach reasoned judgment to establish the best action or course of action (Johnson, 2015). Johnson (2015) stated that constructive controversy leads to the exchange of expertise, facilitates perspective-taking and promotes creative insights that can lead to new understandings.

For us, the goal was to use the lens of constructive controversy to examine teachers' PD in CL and use our different perspectives and experiences with both long-term and short-term PD in CL to contribute knowledge that can support teachers' learning and implementation of CL.

Narrative method

In this article, we have utilised a narrative approach to provide the reader with insights on our experiences with long-term and short-term PD in CL from research in the practice field. A narrative approach can be a powerful tool to gain insights on professional practice. In particular, when studying educational experience, the narrative approach can give a holistic picture of an issue while also revealing its complexity (Mertova & Webster, 2020). A narrative offers a window into others' experiences that can lead to understanding without having to experience it oneself. In this article, we combine a research review on teachers' learning and implementation of CL with a focus on long-term and short-term PD based on our own research experiences.

A narrative inquiry is the study of experiences as a story (Conelly & Clandinin, 2006). In this article, a narrative based on one of the author's long-term experiences with PD for teachers in CL and a narrative regarding one of the author's short-term PD experiences was developed to inquire into our experiences.

Developing these narratives allowed us to travel back to our experiences in researching PD in CL for teachers and consider how these PD programmes influenced teachers' learning and implementation. In order to develop these narratives, we had to revisit our field texts, data and findings from our teacher PD. Developing narratives is an iterative process that involves moving back and forth between data, the interim narrative and the final narrative (Clandinin & Connelly, 2000). In the process of developing the narratives presented in this paper, the authors shared their interim narratives with each other to get insights and discuss each other's experiences, but also to get feedback on how the narratives captured the meanings of our inquiry to portray meaningful experiences of long-term and short-term teachers' PD in CL. The authors' collaboration in developing the narratives can also be seen as a part of the constructive controversy, as it allowed us to present our experiences to each other, advocating and elaborating positions and rationales. This is in line with how Johnson and Johnson (2014) described the interaction patterns of constructive controversy.

Ethical considerations

The narratives developed are based on research projects that was ethical approved by the Norwegian Centre for Research Data (NSD) and by the regional Research and Ethics Committee at Linköping University, Sweden.

Narratives

Narrative from a long-term PD

This narrative is based on the first author's experience of a long-term PD programme and research in Norway. It explores how teacher collaboration through teacher teams can support teachers' learning and implementation of CL.

In Norway, lower secondary teachers commonly work as part of interdisciplinary teacher teams, each teaching their specialised subject to a shared student group from year 8 to year 10. Three interdisciplinary teacher teams from the same grade level (year 8) participated in the PD programme in this study. I had the role of a developer and facilitator of the PD programme and was situated as a researcher in my own organisation. The PD pro-

gramme was developed in close collaboration with the participating teachers and the school leadership. Altogether, the PD programme had a duration of nine months. The teachers had little knowledge of CL before the PD programme but were interested and motivated to learn about the method. I had only two predetermined criteria for the school: (1) that the teachers would explore a conceptual approach of CL based on the five elements (Johnson & Johnson, 2002) and (2) that learning and exploring CL would mainly take place working together in teacher teams. In this narrative, I will present my experiences and findings from this research project and my reflections on the long-term PD programme and how it influenced the teachers' learning and implementation of CL.

The PD programme can retrospectively be viewed in three stages. The first stage involved a three-day workshop in CL that I facilitated. In the making of the workshop, I used the five elements of CL as a framework to structure the learning activities, and I was specifically inspired by Johnson and Johnson's 'Learning together model'. In addition, I made use of different CL structures (Kagan & Stenlev, 2006) and jigsaw puzzles (Aronson, 1978). The workshop was held at a conference centre for three days, which enabled the teachers to concentrate solely on CL. In the workshop, the teachers learned about the theory behind CL as well as the three main ways of structuring CL: informal CL, formal CL and base groups (Johnson & Johnson, 2002). During these three days, the teachers worked together in groups focussed on the theory of CL, team-building activities and CL structures to give them first-hand experience with CL and with being part of a CL group. In addition, time was allotted for the teachers to plan how they would individually use CL in their subject teaching and how they could incorporate CL as a team in their upcoming lessons. As a facilitator during the workshop, I was amazed by how eager and motivated the teachers were to start using CL in their practice after experiencing with the method. An example of this was a participant on one of the teams planning an upcoming lesson, who spoke about CL and the structures as follows: 'We can use this. We can use that structure, and this one we can use every lesson'. After the workshop was finished, I wrote in my research journal that it was almost too good to be true. I was happy that the workshop had worked so well and motivated the teachers to start incorporating CL in their teaching, but my reflections revealed I was also concerned that it would not last.

To keep the knowledge and experiences after the workshop fresh and to support the teachers in implementing CL in their teaching, we continued the PD programme with two follow-up sessions a couple of weeks later. In these sessions, they were introduced to some new informal CL structures with an assignment to try out at least a couple of them in their lessons and then reflect on their experiences with the team in the second follow-up two weeks later. When I started the first session, I immediately felt that the atmosphere had changed from the teachers being highly motivated. It seemed that coming back to school and a cramped teaching schedule influenced the teachers' motivation to use CL. In the first session, they got their assignment to try out some informal CL structures of choice and write reflection notes on their use of the method to discuss with the teacher team in the second follow-up session. When the second follow-up session came, the atmosphere was awkward, as many of the teachers had not done the assignment we agreed on while others had been motivated to use other and more advanced CL techniques. The motivation and the shared focus on CL of the teacher teams were no longer present. In my research journal, this was clearly a challenging period, representing a setback in the teachers' learning and implementation of CL. Based on my reflections in my journal, I believe that if the PD programme had ended here most of the teachers would have returned to their former teaching practice and not implemented CL in their practice.

This implementation dip in the PD programme resulted in a lot of frustration, causing me to return to the research literature and have ongoing meetings with the school to dis-

cuss how to pursue the PD programme further. In collaboration with the teachers, we decided that continuation would involve an action research project in their teaching team on how to implement CL in their teaching inspired by Schmuck's (2006) proactive action research model. In proactive action research, the participants act first and then study the effects of the action taken.

This resulted in the third stage in the PD programme, a seventh-month proactive action research programme in teacher teams. In many ways, this was the turning point in the teachers' learning and implementation of CL. Their own investigation revitalised the learning from the workshop and led them to customise CL to their own practice and their common student group. Developing a shared action research project allowed the teachers to collaborate on the implementation of CL. During these seven months, the school allocated time for the teachers to examine how to implement CL together, make an action plan for implementation, try out their action plan and research how the implementation had worked for students learning in their class. To support the teachers, I facilitated regular check-ups and meetings to support their process. Being positioned as a researcher in my own organisation also enabled me to provide ongoing support, both in the learning sessions and when the teachers tried out CL in their lessons for the teacher team during the period the PD programme lasted. At the end of the seven months, each of the teacher teams was in charge of one meeting, where they presented their implementation of CL research to the other teacher teams and the school leadership. This created a communicative space for sharing experiences and learning from each other. As a facilitator of the PD programme, I reflected on the last stage as vital for the teachers' learning and implementation of CL. It caused them to take collaborative action and customise CL to their own practice. Their presentation of their action research projects to the other teams also showed me that they had understood the theory behind them and utilised different CL structures. Two of the teams even developed their own formal CL structures based on the five elements of CL to ensure effective student collaboration to support academic and social gains. In my research journal after the teacher teams' presentations, I reflected on how the teachers presented their implementation with ownership, and I felt that their motivation for CL was restored.

As a researcher in my own organisation facilitating and researching the teachers' learning in the PD project, the narrative provides insights into my experiences and shows what supported but also what challenged teacher learning. If the PD had been short-term and ended after the follow-up sessions, based on my experience from the PD programme I doubt that the teachers would have implemented CL in their teaching. The PD programme being longitudinal and including teachers' collaborative inquiry into their implementation of CL became a catalyst for teacher learning and implementation after the workshop.

The findings from this research project exploring teacher collaboration for the implementation of CL show that the workshop alone did not support the teacher's learning and practice with CL, although it did motivate further use of CL and strengthened the social bonds between the teachers. When the PD programme became longitudinal with continuous follow-up with action research, it helped to translate the theory of CL, revitalised the learning experiences from the workshop and supported the teachers' learning and implementation of CL in their teaching. A key finding was that collaborating in teams and inquiring into CL supported by action research led the teachers to collaboratively implement and adapt CL to their classroom context. Data from the students before, during and after the PD programme show that the teachers changed their teaching from lecturing and regular group work to CL practice after the PD programme. It should be noted that there was a decline in the teachers' use of CL a year after the PD programme ended, when they started to prepare for the exam period of lower secondary school. This emphasises the importance of prolonged support for teachers learning and CL implementation.

Narrative from short-term PD

To improve teachers' attitudes toward using CL, they need to master the significant but difficult task of assessing students' knowledge and abilities developed in a joint activity. In 2014, in order to support teachers' use of CL, the second author together with a colleague planned and implemented a short-term PD programme on group-work assessment. The overall goal was to increase the teachers' knowledge and promote their assessment practices related to group-work assessment when using CL, and by extension, to increase their willingness to use CL. An intervention in the form of short educational sessions and the implementation of a CL activity in the classroom was included in the short-term programme. The participants included seven math teachers, five females and two males, between 34 and 48 years of age, with 9–23 years of experience. The teachers came from five different schools in Sweden and taught students in Year 5 and 8, in six classes (children in Sweden begin Year 1 at school in the year they turn seven years old). Five of the teachers were randomly selected to participate in the intervention, and two teachers were included in the control group.

The intervention consisted of training and education on how to work in groups inspired by interdependence theory (Johnson & Johnson, 2002, 2009) and how to perform suitable group-work assessments (Brokkhart, 2004, 2011; Johnson & Johnson, 2004). The intervention was implemented at the university on two separate days with two weeks in between. The choice of carrying out the intervention outside the school gave the teachers an opportunity to meet each other under the same conditions and focus on the PD programme without interference from regular school activities. The first day was theoretical and consisted of theory on group work/CL as a teaching strategy. We prepared three seminars in which we presented a few carefully selected aspects of how to create cooperation and group-worthy tasks (Lotan, 2003, 2014) as well as different types of group-work assessments suitable for group work/CL.

Another important task during this first day was getting to know each other and establishing collaboration between the researchers and the participating teachers as well as between the teachers. During the day, several discussions in which everyone participated arose, which led to the establishment of cooperation in the entire group. The discussion was carried out in an open- climate, and everyone who wanted to speak was allowed to do so. This collaboration was a prerequisite for the second 'applied workshop day' of the intervention, when the teachers jointly produced materials for the forthcoming CL activity in each teacher's classroom. In addition to getting the teachers involved in the study, the objective here was to contribute joint competence to a feasible group-work/CL assignment, including the assessment. From our perspective, the second day was characterised by hard work by the teachers, who showed great commitment and jointly constructed a CL assignment, an educational planning session and a test. The work that the teachers performed was decisive for the study's implementation. Notably, the teachers belonging to the control group received the same training after the short-term PD programme was completed.

Thereafter, all teachers—whether they received an intervention or not—worked with their respective classes for 3–6 weeks on the same mathematics-related CL assignment. The assignment was inspired by the CL jigsaw strategy (Aronson, 1978) and included both individual and collaborative elements. In the assignment '*Our environment – A study that explains and justifies how you can improve life for us*', the students were required to investigate the following areas: (1) travel to and from school; (2) recycling at home; (3) leftover food thrown in the school canteen; and (4) meat consumption. Each area was investigated individually by one of the group members. Then, the group collectively deduced how to justify maintenance of a more sustainable environment. The assignment entailed students developing their knowledge and abilities with respect to core concepts in mathematics

(e.g. probability, statistics and problem-solving), thereby learning about mathematical problem-solving in everyday situations.

The teachers' part in the CL assignment was to give instructions and coach the groups. In addition, the teachers provided formative and summative feedback and conducted group-work assessments on both the individual and group levels. The assessment was conducted by (a) observing students' individual and joint performances and (b) reviewing each student's individually written summary, (c) the group's common product, (e) each individual's and the groups' mutual oral presentations and (f) individual written exams. During the implementation of the CL assignment, both the teacher and one of the researchers were present in the classroom. The researcher's (our) primary task was to collect data via video recording as well as to assist the teacher if necessary. A reflection in hindsight on our task in the classroom is that our role varied between different classrooms, depending on the need for support that the teacher was looking for. In some classrooms, we were only observers who operated the video camera, while in other classrooms we had to take a more active role both in terms of the CL activity itself and as a coach for the teacher. Our interpretation is that whether the teacher made the task his own and adapted it to his own teaching was of great importance. Teachers who 'owned' the CL task needed less support in the classroom.

A core result was that the short-term PD programme had a positive *impact* with respect to teachers' knowledge and their assessment practices on group-work assessment when using CL. The most significant result concerned *teachers' linguistic repertoire*. Overall, the teachers developed their mode of language use. First, they expanded their linguistic repertoire in terms of terminology and concepts concerning group-work assessment. Our interpretation is that the teachers developed a professional language concerning group-work assessment, an important springboard for future collegial cooperation. Further, participating in short-term PD also influenced the teachers' use of language when targeting students, improving their ability to adapt their linguistic repertoire to the pupils' level when giving spoken feedback and written feedback. For instance, some students in year 5 felt that the teachers used too many adult words' and requested a more understandable language. In sum, the teachers' use of language, both spoken and written, posed both opportunities and challenges—depending on whether they 'spoke the same language' as the recipient. Thus, this narrative is one example that supports that short-time PD focusing on a specific area of CL can have an impact on teachers' practice, in this case the teachers' knowledge and assessment practices aligned to group-work assessment when using CL.

Discussion

The goal of this article was to use the lens of constructive controversy to inquire into teachers' long-term and short-term PD in CL. Drawing on the authors' different perspectives and experiences with teachers' PD in CL, we sought to contribute knowledge that could support teachers' learning and implementation of CL. In accordance with constructive controversy, different perspectives and experiences related to long-term and short-term PD in CL have been elaborated. Constructive controversy involves a deliberative discussion between different perspectives aimed at creative problem-solving (Johnson & Jonson, 2014). In this section, we integrate the results of our discussions when working on this article and our different perspectives and experiences related to PD for teachers' learning and implementation of CL. Four common characteristics emerged that should be considered in PD for teachers in CL.

One ambiguity that becomes visible in the text is that there is no consensus on what counts as PD for teachers; rather, it is a holistic, multidimensional construct. For example,

PD in CL can a) be based on different CL approaches (see Table 1); b) involve a whole school or a single teacher (Ferguson-Patrick & Joliffe, 2018; Jolliffe, 2015); c) focus on CL or on a specific area of CL (Cordingley et al., 2015); d) range from a few hours to several months or even years (Ferguson-Patrick & Joliffe, 2018; Goodyear, 2016); e) include predetermined elements (Davidson, 2021; Kagan & Stenlev, 2006); f) allude exclusively to one intervention or to both an intervention and a practical implementation (Ha et al., 2015; Hammar Chiriac & Forslund Frykedal, 2022); and g) include or not include follow-ups (Hammar Chiriac & Forslund Frykedal, 2022; Liebech-Lien, 2021). In line with previous research (Cordingley et al., 2015; Ha et al., 2015), we conclude that the purpose, who is targeted and how the time is used are more important to the outcome than following some predetermined rules for what counts as PD.

In sum, short-term PD is better than no PD at all. This is promising result in today's society, which is characterised by reduced resources within the education system worldwide. This lack of resources (i.e., budget limitations, availability of substitutes to cover classes during PD or different priorities) is a strong incentive for some schools, universities or districts to offer short-term PD.

Based on the literature on PD in CL and the narratives presented in the methodology section we find a number of common characteristics between long-term and short-term approaches to PD that support teacher learning and implementation of the method. These characteristics should be taken into consideration in developing and facilitating effective PD for teachers in CL. This is particularly relevant since, after finishing PD in CL, teachers often abandon or noticeably reduce their use of CL in practice (Sharan, 2010).

The first characteristic is the importance of providing a PD programme that provides a shared understanding and knowledge of the theoretical framework. Focussing solely on CL techniques the teachers can use in their teaching can lead to discontinued use and makes it more difficult for them to adapt to changing conditions in practice (see Johnson et al., 2000). Regardless of the CL approach and the length of the PD programme, it is essential that the participating teachers acquire a shared understanding and knowledge of the theoretical framework for CL (Darling-Hammond et al., 2018). Even if the teachers only participate in a few hours of PD, the acquisition of a linguistic repertoire, including CL terminology and concepts, can light a spark and lay a foundation for future collaboration with colleagues who are also interested in CL (Hammar Chiriac & Forslund Frykedal, 2019). Similarly, an increased understanding of the theoretical framework of CL and a developed mode of languages can be useful in the teacher's implementation of CL in practice. When we understand why we do something, it also becomes easier to explain it in our own words to the students included in the change of practice.

Second, PD needs to facilitate teachers taking ownership of CL. Both narratives provide examples and show the importance of teachers' ownership of the method. Teachers' incorporation of the CL assignment when implementing it in their classroom teaching is an essential part of their PD. In the short-term PD narrative, the importance of the teacher owning the CL assignment and including it in their own teaching was particularly notable in two classrooms where this was lacking. The CL task to be implemented in the classroom 'did not belong to the teachers but to the researchers', who were participating as observers. This approach resulted in a mechanical implementation, and when questions arose in the classroom, the teacher turned to the researcher, who then had to step in as a coach and solve the problem. In classrooms where the teacher owned the task, no such need for coaching arose during the actual implementation or problem-solving in the classroom. It is likely that the teachers who did not take ownership of the method will have challenges in continuing to use CL in their practice when they no longer have support from the researcher.

The long-term narrative also highlights the importance of teacher ownership of CL and how it can be achieved. The narrative shows that gaining first-hand experience with the theory and method in the workshop and follow-up session was not enough to support teachers' learning and implementation of the method. Cooperative learning needed to be adapted and attempted in classroom practice as part of the PD. This involved the teachers trying out CL and inquiring into their own practice with support from a self-developed proactive action research project. Planning, trying out the method in their own practice and reflecting on the implementation are vital components of PD to support teachers' ownership, learning and implementation of CL, as shown in other studies (e.g. Alansari & Rubie-Davies, 2021; Goodyear, 2016).

The third common characteristic of effective support for teachers' learning and implementation of CL is that the PD includes collaboration. An important prerequisite to support students' CL is that the teachers have experienced the benefits of collaboration as learners themselves (Liebech-Lien, 2022). Collaboration in PD in CL can take many forms, such as teachers getting first-hand experiences with CL as learners themselves in CL groups, as described in the long-term narrative. Participation as learners enables reflection on their experiences with peers and can provide them with knowledge and ideas about how they can further implement CL in their practice. Collaboration in PD in CL can also take the form of planning with others how to implement CL in the PD sessions. This can involve teachers across schools, as in the short-term narrative, and within teams in schools, as described in the long-term narrative. Interacting and collaborating while learning and planning how to use CL in the PD programme can enable the participating teachers to form a professional learning community. In fact, participation and interaction in a community of professionals has been shown to support teachers' learning (Darling-Hammond et al., 2017; Timperley et al., 2007). Further, there is a growing body of research that points to whole-school approaches to PD in CL, showing that it is particularly beneficial when the school takes collaborative action to implement CL (Cordingley et al., 2015; Fergusson-Patrick & Joliffe, 2018, Jolliffe, 2015).

The importance of collaboration in PD leads us to the fourth common characteristic we want to accentuate: the importance of support. Through collaboration and participation in a community of professionals, the participating teachers become an important support structure for each other's learning and implementation of CL (Alansari & Rubie-Davies, 2021; Goodyear, 2016). Teachers participating in PD from different schools can become a greater professional learning community. However, it is also important that they develop support structures within their own schools to rely on in the future. Krečič and Grmek (2008) argued that it is important for teachers to have the opportunity to collaborate and receive support in implementing CL in their practice.

Moreover, support from the provider of the PD in CL is vital for teachers' learning. This is in line with the factors facilitating effective PD to support teachers' learning (Darling-Hammond et al., 2017). As seen in both narratives, the researcher functioned as a collaboration partner and support structure throughout the PD programme. In the short-term narrative, the researchers took the time to get to know each other and establish collaboration between the researchers and the teachers as well as between the teachers themselves. The researchers facilitated the PD but were also present when the teachers implemented the CL assignment and provided support if necessary. In the long-term narrative, the author had the role of a researcher in her own organisation, facilitated the PD and also provided ongoing support when the teachers conducted their own action research implementing CL. Collaboration and support from the researchers facilitated collaboration between researchers and teachers, who benefitted from the complementary knowledge and experience, which supported the teachers' learning and implementation of CL.

Concluding remarks

Our study explored long-term and short-term PD in CL for teacher learning and implementation. The results show that PD in CL is a holistic multidimensional construct and that both long-term and short-term PD can support teacher learning. However, how the time is used is the most important factor for a successful outcome. In the development of the article, we adopted constructive controversy as our framework to explore long-term and short-term PD. One conclusion is that regardless of the approach, there are four common characteristics of effective PD in CL: 1) It enables participating teachers to acquire a shared understanding and knowledge of the theoretical framework of CL; 2) It facilities the teachers taking ownership of CL; 3) It involves collaboration (in different forms); and 4) It includes support structures. These four characteristics are in line with current research on effective PD, which emphasises that PD requires active learning, a content focus, collaboration, reflection and support (Darling-Hammond et al., 2017). Moreover, CL is an established pedagogical model that has been shown to be highly effective in classroom practice, which is one of the characteristics highlighted for effective PD.

However, one important difference between long-term and short-term PD that influences teacher learning and implementation is the time frame, which greatly impacts possible content and follow-ups. The literature on effective PD for teachers emphasises that successful PD is sustained over time. Moreover, in short-term PD teachers are not given enough time to plan, try and reflect on their CL practices to support the implementation and development of their CL practice. This is especially true in terms of the conceptual approaches to CL, which include the underlying theory and guidance on how to structure CL to the specific context (see Johnson et al., 2000), which are likely to benefit more from a long-term approach to PD. Another drawback of short-term PD is that providers will not have the opportunity for follow-ups or sustained coaching in the practice. Even so, PD that is focussed on specialised content can also benefit teachers' development, as shown in the short-term narrative. Thus, we highlight the importance of schools and teachers participating in short-term PD to develop support structures for themselves to continue to implement, develop and sustain their CL practice.

While research strongly supports long-term PD to improve teachers' learning and practice, our results show that short-term PD can support teachers' learning as well by identifying common features of effective long-term and short-term PD. The four common characteristics of PD in CL regardless of approach have important implications for developing strong PD and supporting teachers' learning and implementation of CL. Another implication of this research is that constructive controversy can be used as a framework for collaboration between researchers with different perspectives and experiences. Specifically, it can support perspective taking, collaboration and joint reasoning, thereby contributing to new branches of research on how to facilitate teachers' learning and implementation of CL.

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FERENC ARATÓ, NEIL DAVIDSON, LAURIE STEVAHN, AND YAEL SHARAN

Network of International Cooperative Learning Educators and Enthusiasts (NICLEE): Cultivating Global Connections

"My humanity is bound up in yours,
for we can only be human together."
—*Desmond Tutu*

Desmond Tutu speaks to the fundamental truth that the human species relies on cooperation for its survival. While we may see ourselves as individuals, the reality is that we are all interconnected and our fates are intertwined. This is especially true when it comes to learning and education. We cannot learn in isolation; we need teachers, mentors, peers, and a community that supports us. The act of learning itself is a cooperative process, where we share knowledge and ideas with others to construct deeper understanding. In short, the quote reminds us that we are not alone in this world, and that our success and happiness are tied to the success and happiness of others. It is only through cooperation and collaboration that we can achieve great things and create a better future for all.

Being human together is at the heart of cooperative learning (CL) as we recognize people need each other to achieve shared goals that no one person can accomplish alone. In fact, empirical research on CL in education and other disciplines provides an abundance of evidence confirming the numerous ways that people benefit from participating in cooperative endeavors. Specifically, mutual group goals defined by *positive interdependence*—essentially, *"I need you and you need me"*—motivate interpersonal processes that consistently enhance CL outcomes in three broad areas, including (a) achievement and productivity, (b) positive relationships, and (c) psychological well-being. These areas of positive impact encompass a wide variety of benefits such as greater commitment and persistence to achieve, increased academic success and retention of learning, enhanced creativity and problem solving, higher-order reasoning and critical thinking, more time on task and affirmative attitudes toward tasks, enhanced peer relations and liking of teammates, greater ability to engage in social perspective taking and cope with adversity, and enhanced psychosocial development and social-emotional competence that affect personal well-being (Johnson & Johnson, 2017).

Indeed, numerous positive effects of CL have been demonstrated in thousands of research studies around the world. Early extensive research reviews were conducted by Johnson and Johnson (1974, 1989), Sharan (1980, 1990), and Slavin (1980, 1990). Since then, research evidence on a wide variety of factors has continued to accumulate and additional

(more recent) reviews on the effectiveness of CL have been published, such as those by Gillies (2014) and Kyndt et al. (2013). For a comprehensive view of the field of CL, see the volume entitled *Pioneering Perspectives in Cooperative Learning* edited by Davidson (2021). This volume contains chapters on the early originators of CL, most self-written, providing unique perspectives. The book presents each of the original CL approaches along with their theoretical foundations, research bases, and classroom procedures. The historical development of CL emerges as the originators describe their approaches to CL, reflect on developments, reveal personal stories, and share anecdotes about their work.

NICLEE: History, Origin, Purpose

From 1979 through 2019, the International Association for the Study of Cooperation in Education (IASCE) advanced CL globally as the only international nonprofit organization devoted to cultivating, studying, supporting, and advancing CL around the world. Notably, the IASCE "walked its talk" by practicing cooperation in its governance and operations as it co-sponsored conferences with local educational institutions in various countries around the world (23 conferences in 14 countries across four continents over 40 years), conferred awards for outstanding contributions to CL, interacted with CL affiliates, produced a newsletter published regularly, and maintained a website that provided timely information and useful resources related to CL. The conferences in particular provided ongoing opportunities for educators representing different professional roles across diverse cultures to gather face to face, share cooperative strategies, and celebrate cooperative initiatives, programs, innovations, and research. Teachers, curriculum specialists, professional developers, school administrators, university researchers, and so on, consistently expressed appreciation for the many ways that the IASCE enabled meaningful worldwide connections and interactions among those committed to CL in its many forms and applications.

After 4 decades of serving the international CL community, and after intensely thoughtful deliberation, the IASCE made the difficult decision to legally dissolve its nonprofit status that took effect the end of 2019. This created an opportunity to explore new possibilities for connecting globally for continued interaction on interests and issues relevant to CL. As in-person/on-ground gatherings became more challenging (especially during the Covid pandemic) and online options for connecting became more widely available and user-friendly, the Network for Cooperative Learning Educators and Enthusiasts (NICLEE) was born, launching a new virtual forum devoted to CL, readily accessible around the world via its website (https://2020niclee.com/). NICLEE—an acronym pronounced "nicely" in English—is intended to evoke images of people everywhere gathering in this virtual space to enjoy friendly, inclusive, supportive, inquisitive interactions on issues, policies, practices, and resources relevant to CL. Simply expressed, the purpose of NICLEE is to connect, support, and sustain CL efforts worldwide. We envision NICLEE as a promising network for continuing to discuss and share CL innovations globally on a range of topics, including classroom instruction, curriculum development, professional development, institutional leadership, organizational learning, and scholarly research.

NICLEE: Global, Virtual, Inclusive

NICLEE intentionally is a network readily accessible via an electronic platform to globally showcase CL initiatives and innovations, share CL resources and information, and explore

CL practices and applications around the world. Because NICLEE is not an association, participating does not require formal membership. There are no dues, no newsletters, and no sponsored conferences. Instead, NICLEE's virtual space is open to all, easy to access, and invites international participation every day around the clock across all time zones. People immediately can participate in NICLEE's virtual forum, along with inviting colleagues and friends near and far into this community devoted to cooperative approaches to teaching, learning, and leading. NICLEE extends a warm "cooperative" welcome to everyone—those who previously developed lasting friendships through the IASCE, as well as those new to CL and this network!

The NICLEE initiative aimed at building a community of practice (Wenger et al., 2002) among researchers and educators in the field of CL. The network seeks to promote CL as a powerful pedagogical approach that fosters social and academic learning. It recognizes that meaningful learning requires an engaged and interactive community of learners, and that the digital age provides new opportunities to build such communities across geographic and disciplinary boundaries. The ultimate goal of the NICLEE is to build a cooperative learning community in cyberspace (Palloff & Pratt, 1999). To achieve this goal, the network provides a platform for sharing ideas, resources, and best practices related to CL, as well as for engaging in collaborative research and development projects. By connecting researchers and educators from around the world, NICLEE seeks to advance our understanding of CL and its applications in different contexts, and to promote the development of innovative CL practices that can benefit learners of all ages and backgrounds.

Currently NICLEE is forming a cooperative leadership team to embody the values of cooperation and shared decision making at the core of CL. Inspired by the co-presidency and international executive board model of leadership instituted by the IASCE to practice cooperative processes, NICLEE is also adopting a cooperative approach to leading the network. NICLEE's global team of leaders will be able to draw upon each other's diverse experiences and skill sets to guide the network, together identifying possibilities, seeking ideas, discussing options, and reaching consensus on decisions toward advancing NICLEE's purpose.

NICLEE: Website, Content, Goals

The NICLEE website serves several functions, one of the most important being to promote transparency regarding the network's main objectives and to welcome all participants worldwide. Another key role is to provide clarity for those interested in the diverse discourse of CL, showcasing its major branches and models from the past 50 years. The website serves as a platform to provide important information for both experienced researchers and educators in CL, as well as for those who are new to the field. Its fundamental task is to make transparent who has joined the network (About Us), to introduce the most important workshops related to the CL discourse (All CL Branches), to dispel any myths about cooperative learning (Myths About CL), to assist in practical adaptation through the most well-known models (Flow of CL), to report on the latest books and thematic journal issues published by members of the network (Reviews), and to commemorate the defining CL pioneers (Tributes). The aim is to offer visitors a comprehensive overview of different approaches and enable them to easily access their preferred model or workshop through online forums. In addition to highlighting various branches, the website also aims to feature the latest publications related to NICLEE and the broader CL discourse. The goal is to revive the former IASCE newsletter's review section

that enabled those interested to learn about the latest books, publications, resources, and research related to CL, all in one convenient location.

In addition to its current functions, NICLEE aims to notify researchers and educators working in the CL discourse about opportunities for collaborative events, such as conferences, workshops, joint research, and publications. Future plans include launching online forums to initiate these collaborations among network participants.

Another future goal is to create an online map that outlines and makes clear the scientific ideas underlying the CL discourse from its origins to significant approaches formulated in the present day. This would allow interested parties not only to have an overview of the different branches of CL but also of the scientific theories and findings underlying them.

In the future, NICLEE will maintain collaboration with the International Association for Intercultural Education (IAIE). As part of the IAIE's annual conferences, NICLEE will organize a CL conference strand and workshops that are customized to the thematic and contextual focus of each gathering. Along with international collaborations, another key focus for NICLEE in the future will be to highlight the national and international CL discourses by uniting researchers and practitioners working in or across specific regional or country contexts and making their work transparent.

The knowledge base for NICLEE was enhanced by the publication of two new volumes, which could play a crucial role in bringing together researchers and educators interested in cooperative learning. One of these volumes offers a comprehensive overview of the pioneering work of scholars who have been instrumental in shaping the CL discourse over the past 50 years. The other volume provides insights into contemporary approaches and research related to cooperative learning, offering a glimpse into the current state of the field. Each is described in the following paragraphs.

The book, *Pioneering Perspectives in Cooperative Learning: Theory, Research, and Classroom Practice for Diverse Approaches to CL*, edited by Davidson (2021), offers a unique and insightful look into the history and evolution of CL through the eyes of its pioneers. The volume provides a comprehensive account of the development of CL, from its early origins to contemporary research, showcasing personal experiences that have helped inspire and shape CL. Intended for scholars, researchers, and doctoral students interested in learning theory, educational research, and educational and social psychology, the book also benefits practitioners of CL who are interested in small group learning in classroom practice, as well as those interested in the history and sociology of education. The volume provides a vivid picture of the 50 years of work that went into creating the major aspects of cooperative learning, including theory, research base, instructional practices, professional development approaches, and history. Through the personal reflections, stories, and anecdotes shared by the authors, readers gain a deeper understanding of the living history of cooperative learning and how it has transformed the field of education. This text will primarily be of interest to professors, researchers, scholars, and doctoral students with an interest in the theory of learning, educational research, and educational and social psychology more broadly. Practitioners of CL with an interest in small group learning and classroom practice, as well as those interested in the history and sociology of education, will also benefit from the volume.

The newly published book, titled *Contemporary Global Perspectives on Cooperative Learning: Applications Across Educational Contexts*, edited by Gillies, Millis, Davidson (2023), showcases the latest developments and trends in CL across different levels, subjects, and learning settings. With chapters from contributors throughout the Global North and South, this comprehensive volume offers a wide-ranging perspective and addresses a range of CL topics, providing diverse and comprehensive coverage of CL practices such as online, peer, relational, and dialogic learning, as well as established models such as STAD and the

Jigsaw method. Drawing on empirical research and theoretical frameworks, the book highlights the benefits and challenges of CL and emphasizes the crucial role of educators in implementing it effectively to foster students' social, affective, cognitive, and metacognitive learning. The book is an excellent resource for researchers, scholars, and educators who are interested in CL and seek to enhance understanding of its application and impact in various educational contexts.

Conclusion

Ultimately, CL is all about interacting to constructively learn, work, share, grapple, explore, and support each other in achieving mutual goals. The newly launched NICLEE website is a network inviting everyone to do just that—enter into this virtual space to continue cultivating global connections that inspire cooperative innovations.

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YAEL SHARAN

Contemporary Global Perspectives on Cooperative Learning – Personal Reflections

Gilies, R. M., Millis, B. & Davidson, N. (2023).
Contemporary Global Perspectives on Cooperative Learning.
Application Across Educational Contexts. Routledge.

The first thing that struck me about this book was the title, which I had to read twice to fully realize the scope of this impressive volume. After all, the flow of publications based on research and practice of cooperative learning (CL) has not abated since the early 1960s, and I was eager to discover what this new volume has to offer. The names of the three editors were reassuring, as they have been at the forefront of CL research and practice for many years.

On the second reading of the title, the word "global" caught my attention, and reassured me that the multiple chapters by veteran and "new" (for me) researchers and practitioners, from all over the world, would offer readers an adventure. The short introduction on the very first page details the scope of this adventure and creates anticipation of what may be experienced en route.

Turning the page, I was struck, again, this time by the homage to four late leaders in the field: Morton Deutsch, Elizabeth Cohen, Shlomo Sharan and Robert Slavin, people who inspired and enriched the study and practice of CL. Usually, names of people whose work is referred to in a publication are listed at the end in bibliographies. Therefore, it was extremely moving to see these names in the book's forefront.

And now to the contents of this volume. In the first section, appropriately titled "Contents," readers are introduced to the multiple contributors. Obviously, without the 24 authors' contributions there would be no book, and as noted, details about authors are traditionally found at the end of an article or book. This unusual order, in which the editors' introduction, titled: "Cooperative Learning and the State of the Field..." *follows* contributors' names, immediately infers that the editors regard these contributions as valuable as their own.

In the introductory chapter the editors present the purpose of the book: "to capture contemporary global developments in CL and to highlight the factors that contribute to its success, including the effectiveness, benefits, and limitations of CL…" The short (though incomplete) review of CL research that follows, beginning in the 1970s, emphasizes "the success of CL as a pedagogical practice that promotes socialization and learning," and forms the basis for the research reported in this book.

True to the editors' respect for the contributors to this volume, the introductory chapter ends with an overview of each and every one of the subsequent chapters. These are divided into four sections:

Section I – Effectiveness, Benefits, and Limitations of Cooperative Learning
Section II – Achieving Equitable Learning through Cooperative Learning
Section III – Initiating and Deepening Cooperative Learning in Diverse Educational Contexts
Section IV – Cooperative Learning in Action

These titles alone suggest that the articles in each section present a continuation of issues that have always concerned researchers and practitioners of CL. While going over chapter titles it was a pleasant surprise to come across old "friends," such as Think Pair Share, peer assisted learning, group worthy structures, and even CL and philosophy, as well as CL in engineering education. These and many other CL related topics have been discussed, researched, practiced, and published over the years, and form a solid basis for the current research presented in this book, specifically to its relevance to the 'contemporary global' world of CL. For example, Chapter 5 focusses on the contribution of cooperative strategies to the development of intercultural citizenship. Chapter 8 is a study of Syrian refugee teachers in Lebanon and their perception of STAD and Jigsaw. Chapter 15 offers a "shift to the future" involving CL and online practice.

Another welcome feature of the book is the truly global representation of its authors. I counted 13 countries of origin and will not list them all; suffice it to say that in addition to the U.S., England, Italy, Australia, and Catalonia, there are several countries not as widely represented in CL literature, such as Ethiopia, El Salvador, Hungary, and Japan. This, too, is welcome evidence of the 'contemporary global' nature of this volume.

Reading the varied contributions to this intense and important book confirms CL's role in 'contemporary global' efforts to harness CL in the ongoing attempts to improve education for all. As befits veteran CL devotees, the editors have the last word, and offer a concise final chapter that reminds readers of the universal and ongoing value of CL research and practice. Readers are left to look forward to the next volume of applications of CL in global educational contexts.

FERENC ARATÓ

Another Milestone for the Future of Education – A Summary of a Half-Century

Davidson, N. (Ed.) (2021). Pioneering Perspectives in Cooperative Learning - Theory, Research, and Classroom Practice for Diverse Approach to CL. Routledge.

Pioneering Perspectives in Cooperative Learning offers the reader the theories and practice of leading pioneers of cooperative learning (CL). For the past five decades they have had a fundamental role in creating the basic science of the CL discourse. The number of research studies and the models of cooperative learning included in this book present a proven basis for this discourse. The volume consists of a foreword and eleven chapters.

Chapter 1: Introduction to Pioneering Perspectives in Cooperative Learning, by Neil Davidson. In the opening chapter the editor presents cooperative learning from a historical point of view. Also presented are descriptions of varied CL approaches, a set of their common elements, and distinctions between cooperative and collaborative learning.

Chapter 2: The Legacy of Morton Deutsch: Theories of Cooperation, Conflict, and Justice, by Laurie Stevahn. The opening chapter, which starts with a historical aspect of CL, is matched by the second chapter, which precisely and clearly presents Morton Deutsch's contribution to the cooperative discourse. Deutsch's work on constructive conflict resolution, social justice and peace psychology is of great importance. The chapter includes his fundamental theory and research of the effects of cooperation versus competition in groups, a cornerstone of cooperative learning.

Chapter 3. Learning Together and Alone: The History of Our Involvement in Cooperative Learning, by David W. Johnson and Roger T. Johnson. One of the most widely known branches of cooperative learning is the model of Learning Together, based on the theory of social interdependence, its five basic components, and the elaborated practice of academic controversy, as well as how to improve peacemaker competencies. This chapter includes results of meta-analyses, showing the positive effects of CL.

Chapter 4. Complex Instruction for Diverse and Equitable Classrooms: In Loving Memory of Elizabeth G. Cohen, by Rachel A. Lotan and Nicole I. Holthuis. Another approach stems from sociology and became known as Complex Instruction. This chapter presents the essential elements of this unique approach: competence expectations, the importance of considering the status/power relations even within heterogeneous classrooms or in heterogeneous micro-groups.

Chapter 5. The Structural Approach and Kagan Structures, by Spencer Kagan. This chapter presents the basic principles of Kagan's approach of learning structures independent of specific content applicable in any subject. It also clarifies which social, organizational, management, and cognitive competencies are crucial for cooperative learning ("Seven keys to success"). The chapter also presents the difference between non-cooperative practice, practice based on traditional group work, and cooperative learning structures in a step-by-step comparison.

Chapter 6. Student Team Learning and Success for All: A Personal History and Overview, by Robert E. Slavin and Nancy A. Madden. In this chapter, another branch of CL presents its models or cooperative structures for learning, such as STAD, CIRC, TAI, based on the recognition of the importance of group goals, individual accountability, and mutual interdependence, based on a broad meaning of "rewards." Another significant contribution, created by Slavin, Madden and colleagues, is the Success for All program and foundation, of which CL is an essential component.

Chapter 7. The Jigsaw Classroom: A Personal Odyssey into a Systemic National Problem, by Elliot Aronson. One paradigmatic example of the cooperative learning discourse derives from the Jigsaw Classroom model. It is based on the need to restructure the learning process by creating support and cognitive dissonance for learners of different backgrounds, based on the principle of mutual interdependence. Students learn portions of course material in "expert groups" and then present them to their "home groups." The chapter includes a dramatic account of the benefits of applying Jigsaw when "all hell broke loose" in a district facing school desegregation.

Chapter 8. Design for Change: A Teacher Education Project for Cooperative Learning and Group Investigation in Israel, by Yael Sharan and Shlomo Sharan. Another exciting CL approach of the past decades is through the aspects of teacher education. Group investigation has six basic steps for enhancing cooperation and conducting investigations in groups. These are applicable in classrooms and in teacher training programs.

Chapter 9. About Richard Schmuck's Contributions to the Study of Organization Development and Cooperation in Education, by Richard Arends, Neil Davidson, and Richard Schmuck. This chapter draws attention to an element that influenced the thinking and attitude of the scientific community that shaped CL: Richard Schmuck's Organization Development approach, which deals with the dynamics and development of the school as an organization and its relation to the implementation of CL. The chapter concludes with insightful personal reminiscences by Richard Schmuck about major pathways in his own development in his formative years.

*Chapter 10. Cooperative Learning in Mathematics and Beyond***,** by Neil Davidson. In this chapter the author offers insight into the historical development of the concept and practice of the Small-group Discovery branch of cooperative learning, focusing on learning and teaching mathematics in a cooperatively structured way, by placing challenging issues as part of discussion and dialogue on mathematical matters. The second part of the chapter deals with the author's contributions in general to cooperative learning, including theoretical issues, several edited books, and multiple projects applying CL in various settings.

Chapter 11. Synthesis of CL Approaches and a Multifaceted Rationale for CL - Past, Present, and Future, by Neil Davidson. In the final chapter, the editor provides a synthesis, to enable the reader to easily comprehend the different branches of CL presented in this volume. Also presented are a multifaceted rationale for CL, research questions, and a discussion of the future of CL, including online cooperative learning by groups.

Four levels of understanding Cooperative Learning

The opening chapter of this volume presents the framework of the last fifty years of the CL discourse; the closing chapter offers a theoretical synthesis of the same discourse. The editorial opening and closing chapters framing the volume emphasize that the publication provides a wide-ranging insight into the essence of cooperative learning on four levels:

- the volume presents the essential and basic academic disciplines supporting CL, such as social psychology, philosophy, psychology, and educational science.

- the volume presents the different approaches or models of each CL branch, its theory, research, and development.
- the volume provides insight into specific practical applications of each CL model.
- the volume also provides a unique historical perspective of the development of cooperative learning, as viewed by various pioneers.

Scientific underpinnings – cooperative learning as a transdisciplinary discourse

One of the essential virtues of this book is that it becomes apparent to readers, be they researchers or practitioners, that CL is also a scientific approach, not just a methodology, or a humanistic approach to learning. In other words, the theories behind the practice are justified in the light of measurable results. Thanks to the thorough editing, it is also clear to the reader that several disciplines have simultaneously justified the ideas, approaches, and practices of the cooperative discourse. Reading through this volume, we can conclude that CL involves several disciplines that together increase the effectiveness, efficiency, and equity of pedagogical practice, and of the structural conditions of cooperation. In sum, it creates a transdisciplinary discourse.

Chapters 1, 2, 9 and 11 represent the historical-theoretical underpinnings of CL. At the same time, all chapters provide insight into the history of the discourse and its theoretical underpinnings, making the transdisciplinary scientific foundations of CL tangible to the reader.

A fourth promising aspect of the volume is the pioneers' unique historical approach to the development of CL. Authors describe their own personal journey, and philosophy and motivation for developing CL, and who or what inspired them. Many personal anecdotes are provided, some quite moving, and some highly dramatic. The historical development of CL emerges in part through the authors' reflections and personal stories.

The following diagram (Figure 1) shows the connections between various CL approaches and schools of though and associated with them in psychology, sociology, or philosophy, as presented in this volume.

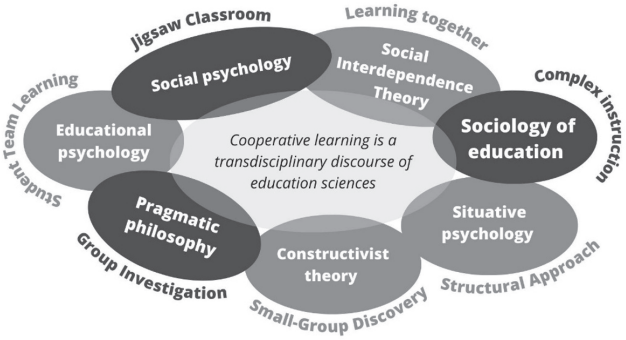

Figure 1: Cooperative learning as a transdisciplinary discourse

A discourse born at the same time as social psychology

Another asset of this volume is that it connects the scientific approaches, insights, and results of the various CL methods and approaches to their philosophical, psychological, sociological, and social psychological foundations, thus enabling interested researchers, developers, and practitioners to trace the specific scientific theories behind CL practice.

At the same time, it becomes clear to the reader how the birth of CL is directly related to the beginnings of social psychology. If we look at the example of Kurt Lewin's chain of disciples, from Morton Deutsch to David Johnson and Roger Johnson, through Leon Festinger to Elliot Aronson, the formation and birth of the two discourses are personally interconnected. This volume provides resources for a broad scientific exploration of the existing theoretical underpinnings and scientific results that support the threads of evidence of the CL discourse. The constructs included in the following diagram (Figure 2) were stated by the authors; they are classified into four categories, as shown below.

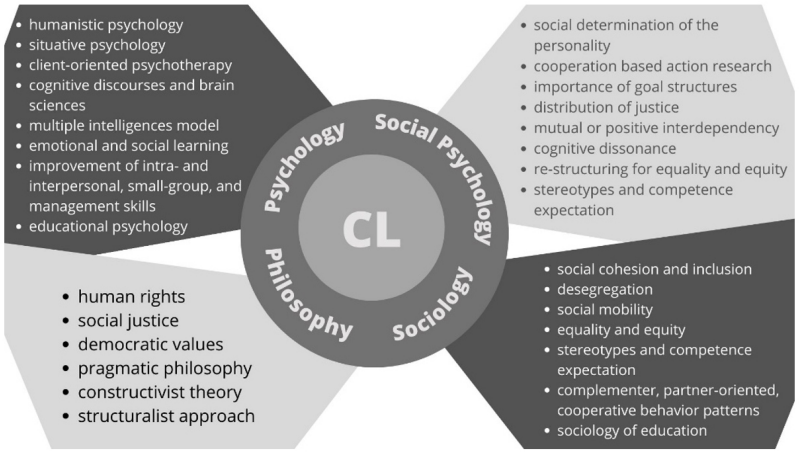

Figure 2: Theoretical Underpinnings and scientific discourses supporting CL

Theory and practice for realized equity – a structural guaranty for social justice

The third promised area of the volume provides an insight into the everyday practice of CL. A common goal guides the founders of CL: to justify and adapt theoretical approaches through practices that effectively promote equity in education. They found their way to this thanks to the basic principles of pragmatic philosophical and close-to-practice social psychological approaches, through collaborative goal structures, CL learning structures, and processes based on positive interdependence.

The editor's introductory and synthesizing chapters, the historical commentary throughout, and the presentation of each CL approach, cover the core components or basic principles that define CL. All authors illustrate these components by concrete examples, such as Aronson's Jigsaw Classroom structure. The chapters that present the different approaches to CL confirm their success with decades of research, adding personal memories that enhance the readers' complete understanding (e.g. Aronson's chapter).

The volume fully satisfies the curiosity of practice-oriented readers, whether reading the examples as a practitioner or as a research and development professional. All can get a detailed idea of the observable practice and the necessary behavioral elements of CL. Readers can also deepen their understanding by the rich references in all chapters, as well as the helpful index. In sum, *Pioneering Perspectives in Cooperative Learning...* offers readers an overview of the cooperative discourse in a single volume. Effective education of the future is unthinkable without considering the cooperative discourse and its scientific insights.

KATALIN OLAH

"Hurray for Reflection!" – A Handbook for Connecting Reflective Practice and Cooperative Learning

Jacobs, M. G., Lie, A. & Tama, S. M. (2022)
Cooperative learning through a cooperative lens.
Bristol CT: Equinox Publishing.

Fortunately, in the discourse of cooperative learning, new handbooks continue to appear. Such as the book titled *Cooperative Learning through a Reflective Lens published* by *Equinos Publishing*. Over the past half-century, numerous cooperative models have been characterized in the discourse of cooperative learning. Among these models are the Jigsaw Classroom (Aronson, 2021; Aronson et al., 1978), Learning Together (Johnson et al., 1984; Johnson & Johnson, 2021a), Group Investigation (Sharan & Sharan, 2021), Structural Approach (Kagan, 1990, 2021), Small Group Discovery (Davidson, 1985, 2021), as well as Complex Instruction (Cohen, 1986; Cohen & Lotan, 2014; Lotan & Holthuis, 2021), or the Paradigmatic Approach (Arató, 2013, 2014a, 2023). One of the authors George Jacobs is also familiar to those well-versed in the CL discourse. Together with co-authors Anita Lie and Siti Minah Tamah, they specifically created their handbook with a focus on language teaching or social studies. The book, as indicated in its title, ties the aspect of reflexivity to the concept of cooperative learning. On the one hand, it provides an opportunity for educators to comprehensively understand the theoretical background, practical principles, and specific applications of cooperative learning, including the importance of peer reflections in learning. On the other hand, it also connects the necessity of collegial reflection to the implementation of cooperative practices. Moreover, they have included Reflective Breaks at the end of each chapter for the reader, which contain specific prompts and questions to facilitate reader's reflection. It aligns well with the spirit of the *Reflective Practice in Language Education* series in which it was published.

The book consists of seven interwoven chapters that can guide readers along the path of implementation. In my interpretation, these seven chapters can be divided into three distinct parts. The first four chapters introduce the reader to the discourse of cooperative learning, starting from the theoretical foundations, moving through the cooperative principles, practical strategies, and exploring alternative assessment practices within cooperative learning. The next section of the book focuses on reflective practice, as promised by the title. In the fifth chapter, two models are used to connect reflective approaches with cooperative learning. While the sixth chapter provides guidance for creating a reflective practice centered on teacher collaboration to facilitate the implementation of cooperative learn-

ing. The final part, the concluding seventh chapter, offers a synthesis of the book's content with the help of five lesson plans that bolster practical implementation.

In the introduction (*Hurray for Cooperation!*), attention is drawn to the societal necessity of cooperation, guiding the reader towards cooperative learning, the central concept of the book. Similarly, in the first chapter (*Background on Cooperative Learning*), the authors start from the broader context of cooperation, shedding light on the recurring idea of learning based on cooperation from ancient times to the present day. From another perspective, they direct the reader's attention to the significance of cooperation in society by highlighting the phenomenon of neighborhood cooperation (such as *gotong royong*, *kampung*, etc.) present in various cultures. The authors present the theories that define the cooperative discourse, starting from Vygotsky's *Sociocultural Theory*, *Humanistic Psychology*, behaviorism, *Social Interdependence Theory*, constructivism, and *Critical Pedagogy*. Considering the book's target audience, they position the cooperative discourse in the context of Second Language Education, incorporating three hypotheses related to cooperative learning: *Input, Interaction*, and *Output Hypotheses*. The authors also delve into approaches that validate the significance of learner diversity and the need for individualization, as well as theoretical foundations that emphasize learner autonomy. The chapter discusses the distinction between cooperative and collaborative discourses, and further delves into the research background of the discourse.

In the second chapter (*Eight Principles of Cooperative Learning*), the authors list the principles of cooperative learning. One representative of the principle-based approach is Kagan (1990, 1992, 2009, 2021), who talks about four basic principles of cooperative learning. Arató (2013, 2014, 2023), on the other hand, discusses eight paradigmatic basic principles. While Jacobs and colleagues provide more flexibility in shaping the list of principles, Kagan and, surpassing him, Arató attach significant importance to certain principles. According to their view, it is precisely through these principles that cooperative learning can be distinguished from any other group learning activity. Arató (2013, 2017, 2023) explicitly claims that by using the basic principles of cooperative learning, it can be determined to what extent any learning process establishes a guarantee for each individual student's effective, successful, and equitable cooperation to enhance their individual learning outcomes.

Most of the principles mentioned in the book coincide with those found in the literature. *Positive interdependence, individual accountability*, parallel promotive *peer interaction*— all of these are present in the cooperative learning discourse (Arató, 2014, 2023; Johnson & Johnson, 2009, 2021b; Johnson & Johnson, 1999; Kagan, 1992, 2021; Slavin, 1983; Slavin & Madden, 2021). Both in Kagan's and Arató's work, ensuring *equal participation* is also emphasized, with Arató focusing on *equal access* as a facet of this principle. This aligns well with Jacobs and colleagues' other principle of *Heterogeneous Grouping*. Arató discusses heterogeneity as a guarantee of equal access. It is essential to ensure the heterogeneity that reflects the diversity of the class for every student because it provides access to personal resources stemming from diversity. Group processing also appears as a distinct component in Johnson's work and can be well correlated with the principle of *Group Autonomy* in the book. Arató links elements of group autonomy, group development and team building to his principle of *Critical Friendly, Reflective, and Supportive Transparency*. Both Johnsons, Kagan, and Arató include the conscious development of interpersonal and small group skills; the authors of the book have highlighted this as the *Teaching Cooperative Skills* principle. The *Cooperation as a Value* principle resonates well with Arató's approach, which promotes the principle of open and flexible structures. Its essence lies in viewing cooperation, the collaboration among students, as a core value that overrides the teacher's possible plans or ideas, placing the successful individual development of each student at the center of collaboration.

The authors highlight the principles that are important for readers who are getting acquainted with cooperative learning, and which also play a defining role in the discourse. Another strength of the chapter lies in the fact that they provide concrete examples to their principles. They bring forth examples of cooperative roles, cooperative skills, and positive interdependence based on Johnson's work. They also provide simple techniques (e.g., Talking chips), or more complex structures (e.g., Jigsaw structure). Drawing on Kuhn (1970), Arató (2014) emphasizes that the Jigsaw Classroom, developed by Aronson and colleagues (1978, 2021), emerges as a paradigmatic exemplar for the defining authors of cooperative learning (Johnson & Johnson, 1999, 2021; Sharan & Sharan, 2021; Kagan, 1992; Cohen & Lotan, 2014; Lotan & Hulthois, 2021). Similarly, Jacobs and colleagues showcase the Jigsaw structure to illustrate how all their eight principles can manifest within a single cooperative structure.

Like Johnson and Holubec's popular book (2007), which has seen multiple editions under the same title, in the *Nuts and Bolts of Cooperative Learning* chapter, the authors share ideas and practical tips for the implementation of cooperative learning. During the discussion of classroom arrangements, they analyze various possible spatial layouts including standard rows, circles, horseshoes, small groups, and student-centered seating. They emphasize the importance of simplicity, routine behavioral patterns, and promoting target language usage. They then delve into several practical tools for fostering group identity. After exploring name-based group identity, they emphasize the significance of cooperative games for strengthening team spirit. Towards the end of the chapter, they briefly highlight the new roles of observing, discussing, and modeling as facilitative and scaffolding elements within the teacher's competencies that support cooperative learning.

In the fourth chapter, the focus shifts to assessment. The authors derive forms of assessment used in cooperative learning from the differentiation between summative and formative assessment. The trichotomous line of thinking, which categorizes diagnostic, formative, and summative assessment, emerged from the formative evaluation concept introduced by Scriven (1967), later referred to as formative assessment following Bloom's (1969) proposal. Black and Wiliam's departure from the "black box" of assessment and the emphasis on formative assessment, along with the efforts of the Assessment Reform Group (2002, 2006), received substantial attention in the international discourse.

The concept of formative assessment has evolved over the years, necessitating the clarification and refinement of its use and interpretation, which has been a central task in this discourse (see, for example, Benett, 2011). The authors use the terms in the classic sense, discussing the two expressions dichotomously, which often leads to misunderstandings. For instance, when a teacher tries to evaluate from non-verbal facial expressions how well the explanation their students could follow, it falls under the dimension of assessment of learning since it attempts to assess comprehension through observing behavior. According to the authors, this is a spontaneous form of formative assessment. They cite this phenomenon as an example of spontaneous formative assessment, even though in this case, it evaluates learning performance, comprehension, rather than the form of learning. In this scenario, spontaneous formative assessment could involve momentarily pausing and asking the Recorders in the small groups to check whether everyone is taking notes on important learning points in their notebooks. While one feedback pertains to the form of learning, the other assesses comprehension or academic performance.

The literature has identified the concept of summative assessment used in the classic sense with the concept of assessment of learning (Crooks, 2004). Yet, it has become clear that a summative judgment can also be relevant within the dimension of formative assessment. For example: "Let's gather the five note-taking methods that worked well for you in following the lectures." This is a summative, or aggregating assessment that relates to the form of learning, hence a summative formative assessment.

Within the cooperative discourse, Arató (Arató, 2017, 2018) points out that classroom assessment needs to occur across four dimensions based on fundamental questions about learning: What are we learning? How are we learning? Why are we learning? For whom are we learning? These questions outline four dimensions in learning and consequently in assessment: performance assessment, formative assessment, metacognitive assessment, and structural assessment uncovered by the cooperative paradigm. Each of these can serve diagnostic, process-following, intervention, or summative assessment functions.

Therefore, the authors, within the interpretive framework of the classic division, provide vivid examples, important attitudinal approaches, and practical instances. They summarize practical ideas supporting the implementation of cooperative learning through eight questions. They address the frequency and actors of assessment, norm-based, criterion-oriented, and ipsative approaches, various grading forms, grade-free assessment, criterion-oriented assessment of cooperative skills, joint creation of assessment rubrics, and different forms of rewards. This reveals a sufficiently broad horizon for educators interested in practice, including those coming from a traditional assessment culture.

Regarding rewards, there are two major schools of thought within the cooperative learning discourse. One is associated with Slavin, who increasingly interpreted the possible place of rewards in a broader sense of individual accountability (Slavin, 1983, 2021). Arató (Arató, 2013, 2014), Arató & Varga, 2005, 2006), referencing humanistic psychology and specifically Rogers' disciples (Gordon, 1989, Rosenberg, 2003), excludes the reward-punishment paradigm from cooperative practice. Arató also points out that Kagan came to a similar realization, and he revised the chapter on group assessment accordingly in the version of his handbook co-authored with his son (Kagan, 1992, Kagan & Kagan, 2009). Despite the criticism, the listed reward practices can contribute to strengthening group spirit and understanding the significance of individual efforts and responsibility, as demonstrated by Slavin's decades of research.

The first four chapters beautifully outline the journey from theoretical foundations through principles, practical techniques, and even to the diverse, complex alternative assessment methods in cooperative learning. This can be seen as the first part of the book. In the following chapter, within the book's second part, they bring out the reflective lenses and contemplate the realm of cooperative learning from a reflective perspective. This approach not only aligns with the interactive and constructivist traditions of the cooperative discourse but also emphasizes the significance of reflection in cooperative practice. Moreover, it fits seamlessly into the reflection-centered approach of the book series.

The next chapter (*Cooperative Learning and Reflective Practice*) primarily present the possibilities of reflective learning and teaching within cooperative learning through two models. Drawing on Palmer's (1998) model and connecting it with the cooperative principles mentioned in the second chapter, they illustrate the reflective practice related to students, language learning as a subject, and teachers. Concerning students, they draw attention to eight crucial factors. Among these, they emphasize the significance of learner autonomy, the social nature of learning, neurodiversity, developing critical thinking, and alternative assessments in shaping reflective learner practices. Regarding the subject, they highlight that language teaching provides an excellent ground for curricular integration and reinforce the teacher's role as a model, partner, and co-learner in language-cultural knowledge acquisition, or language learning. Palmer's third pillar, concerning teachers, again underscores the teacher's reflective role in planning and facilitating, creating a responsive, non-threatening, non-violent environment for all of their learners.

In the second part of the chapter, based on Farrell (2019), they detail six reflective principles within the context of cooperative learning practices. They demonstrate how one can analyze their own practice using holistic, evidence-based, and dialogue-based approaches.

They also show how educators can reflect on the principles underlying their pedagogical practices and maintain a critical attitude toward both their teaching practices and professional life-situations. These six principles are linked to the basic principles of cooperative learning in a detailed and highly useful table. This table essentially becomes the focus of the book. It becomes clear how practicing educators can connect reflective principles essential for language teaching with the foundational principles that shape cooperative learning. Through the table, readers can delve into the connections, as the authors provide examples of synergistic and reflective questions for each area.

In the following chapter (*Teachers Cooperatively Reflecting on Their Students' Use of Cooperative Learning*), the authors introduce another level of reflection. They highlight the importance of collaboration-based reflection among teachers during the practical implementation of cooperative learning. Through parables and stories, they illustrate the significance of openness to knowledge and cooperation. Then, drawing from Farrell and Jacobs (2016), they showcase the benefits of collaboration among teachers. The unique value of this chapter lies in how they interpret the eight foundational principles within the context of collaboration among teachers. They vividly demonstrate how the cooperative paradigm can be applied among educators. This approach particularly aligns with ideas from the cooperative discourse, such as Johnson's Cooperative School (1994) concepts or Arató and colleagues' models for the school and system-wide application of the cooperative paradigm (Arató & Varga, 2005, 2012, Arató, 2013, 2014). As readers progress through the chapters, aligned with the cooperative principles, they can potentially collaborate with their colleagues to design a support system based on cooperative structures, such as introducing cooperative learning into each of their practices.

The last chapter (*Put It All Together: Cooperative Learning and Teacher Reflection in Language Lessons*) serves as a summary of the entire book, encompassing both cooperative and reflective practices. The authors structure the subsequent sub-chapters around five excellent and inherently exciting methodological approaches. Extensive reading, debate, reading non-fiction, learning grammar, and project-based lessons are all discussed by the authors following the same logic. After introducing each approach, a *Lesson plan* is presented, followed by a *Commentary* section that assists in implementation. This is further enhanced by a *Variation* segment. Similar to the rest of the book, each of the five sub-chapters presenting these lessons concludes with *Reflection Break* questions and instructions to encourage reader reflection. This chapter encapsulates the essence of the book's content, guiding readers through a process of summarizing what has been discussed. Additionally, the authors provide ammunition for encouraging reflection, creativity, and reader engagement.

The preface and its reflecting counterpart in the afterword (*Hurray for Cooperative Learning through a Reflective Lens*) aptly symbolize the authors' enthusiasm that permeates the entire book. The *Reflective Breaks*, presented in each subsection throughout the book, continually introduce new contexts for interpreting the content, expanding the context towards social diversity and collaboration. This effectively illuminates how the application of the cooperative paradigm within the classroom or among teachers for practice improvement extends beyond the school walls, potentially impacting societal interactions and collaborations.

Overall, this handbook presents a valuable resource that intricately weaves into the discourse of cooperative learning. With its reader-friendly typography, references, index, and authors sections, clear structure, and a well-crafted logical progression that spans from theoretical underpinnings to complex implementation, the book is an asset not only for English educators but also for other teachers curious about cooperative learning practice. Moreover, it holds relevance for researchers delving into the practical aspects of cooperative learning. Its seamless blend of theory and practice makes it a compelling guide that bridges the gap between educational theory and classroom application.

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