Think Carefully, Let's Bond, and Other Tutoring Strategies: Socio-academic Participation Patterns in Peer Tutoring

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Abstract

CONTEXT. This article investigates how an intervention called SYKL (SYstematiseret Klassekammerathjælp), which used systematized reciprocal peer tutoring in mathematics in the fourth grade, affected student participation and socio-academic inclusion.

APPROACH. In contrast to most international peer tutoring projects, SYKL simultaneously focuses on social relations *and* academic inclusion. Teachers recruited to conduct SYKL lessons attended a four-day course to learn how to apply SYKL peer tutoring techniques, which touch upon social, organizational, and subject matter-related perspectives. Following students are specifically taught how to help each other, and engage in academic conversations when working in pairs. SYKL is specific instruction in how students can become better at helping each other and engaging in academic discussions when working in pairs. Students are assigned one of two positions, either as a tutor or a tutee. To fulfill the role of the tutor, the student receives Scaffold Cards and academic Hints for task completion. The Scaffold Cards remind students to, for example, listen, acknowledge tentative answers, and identify connections. Hints are specific ideas for task completion developed by professionals with the assignment in mind. Based on 15 video-recorded, peer-to-peer conversations, the analysis explores what characterizes the various participation strategies of students who play the role of tutor.

FINDINGS. The analysis identified four typical strategies: 'Let's bond,' 'I'll wait for you,' 'Think carefully,' and 'Let's go.' The study highlights that these strategies are all potentially conducive to inclusion. The current research supports earlier studies indicating that peer relationships significantly contribute to learning and active participation in mathematics classes.

KEY MESSAGE. Teachers can work simultaneously with the social and academic skills of students. The SYKL approach promotes synchronous development of their social and academic skills.

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Points of Interest

- New Danish teaching program in math and science is designed to support student well-being and collaboration in fourth grade.
- Students help each other through peer tutoring.
- Four tutoring strategies typically occur: 'Let's bond,' 'I'll wait for you,' 'Think carefully,' and 'Let's go.'
- Teacher awareness of these strategies allows them to spot inclusion and exclusion processes to better assist students in helping each other.

Introduction

> *Interviewer: What do you think when you see the* [video] *excerpt* [of a teaching situation where you do systematized reciprocal peer tutoring (SYKL) together]*?*
> *Walther: I think you've learned a lot from it, and you've made friends because I've become better friends with Cecilie Mai.* […] *I know what she likes a little better now.* […]
> *Cecilie Mai: I think that SYKL made it more fun because then I could work together with other people besides the ones I had just worked with. Because Walther and I haven't really worked together* [before] […]
> *Walther: So, SYKL has brought us together a bit more.*

Danish primary and lower secondary schools encourage students to collaborate in pairs and small groups, but little experience is available on instructing how groups can be supported in terms of specific subjects. Systematized reciprocal peer tutoring (SYKL) is a teaching program designed to support student well-being in math and science class by helping them learn how to collaborate in a way in which they dare to show they are unsure (Schmidt et al., 2023). SYKL is intended for students in the mainstream classroom, including children with various difficulties and disabilities. Teachers match students in pairs while taking into account the resources and preferences of their students. When working together in pairs, students alternate, taking turns in the role of tutor and tutee. As the above dialogue illustrates, the academic community that arises when working together helps students (re)establish friendships (Rasmussen & Schmidt, 2022), enhancing social ties and, thus, the basis for well-being due to how the learning process is organized.

In Denmark, schools commonly keep the social and academic aspects of learning separate, though the predominant narrative embraces the idea that the social aspects must be established before the academic ones can function well (see, e.g., EMU, 2023; Lauritsen, 2015). This separation is reflected in how schools have focused on creating a structure that promotes inclusion over the last decade in Denmark by employing a variety of resource people, for example, behavior and well-being consultants, inclusion counselors, and educators. Their job is to take care of students who do not thrive in school. At the same time, special learning interventions involving reading and mathematics are being used for students unable to grasp how to work quickly enough academically. All too often, schools fail to consider how their academic and social efforts work in combination (Schmidt et al., 2018, 2021). As this study will show, an integral feature of student participation is that academic aspects are constantly woven into social contexts of significance, as illustrated in the student interview above.

As a member of the UN, Denmark is a signatory of international conventions declaring that all children—including children with disabilities—have the right to education on equal terms with others. This includes the Salamanca Declaration (UNESCO, 1994) and the Convention on the Rights of Persons

with Disabilities (United Nations, 2006), which Denmark ratified in 2009. Throughout the 1990s and 2000s, Danish schools increasingly aimed for inclusive education as the aim was to create learning environments that would provide participation opportunities for all children regardless of functional ability and disabilities (Molbæk et al., 2023).

In 2012 Danish legislation on inclusion redefined special needs education and stipulated that students requiring less than nine hours of weekly support must be included in mainstream education (Danish Ministry of Children and Education, 2012). The purpose was to provide financial flexibility and to supply mainstream schools with more resources as more children were included. The legislative changes initially had a positive effect, but now a new nationwide study (Andreasen et al., 2022) shows that a larger proportion of students in primary school attend special classes or special schools than was the case five years ago. At the same time, the study of Andreasen et al. (2022) points out that students with special needs who are taught in mainstream classes are more likely to pass their final exams when they graduate from primary school and are more likely to complete their secondary education than students who are taught in segregated special programs. The study finds that there is a widespread focus in municipalities on strengthening preventive efforts, with initiatives regularly launched to reinforce classroom management and support differentiated teaching. For this reason, it is crucial to create teaching structures that meet the diverse needs of students in mainstream settings. Working with peer tutoring is an option.

Participation and Socio-Academic Communities

In the following, we present our understanding of two key concepts that are important in our analysis of peer tutoring: participation and socio-academic communities.

Already in 1999, Carrington argues in her article, "Inclusion needs a different school culture," that possibilities for learning are not just about changing attitudes toward students in difficulty but also about reorganizing content, teacher practices, and the school's organization. However, it is still relevant today to "challenge the boundary between inclusion and exclusion to the benefit of all students' opportunities to participate" (Hansen et al., 2020, p. 55).

Inclusion theory describes participation as forms of practice that involve learning with others and in collaboration with others, and where students find themselves involved in academics *and* accepted for who they are (Booth, 2011). As an extension of this, we use the concept of inclusion in its broad sense as a process "whereby all children and young people are included both socially and educationally in an environment where they feel welcomed and where they can thrive and progress" (Lauchlan & Greig, 2015, p. 70). Our understanding of inclusion builds upon previous research that views inclusion as the maximization of the participation of all children in regular schools, and the removal of barriers to participation (Allan, 2008; Ferguson, 2008; Hedegaard-Sørensen, 2010; Tetler & Baltzer, 2011).

One way to create insight into these processes is by examining different forms of participation. In accordance with Wenger (2003), when does legitimate peripheral participation potentially lead to fuller participation, and when is it marginalized non-participation that potentially leads the student to being pushed out of a given community? The point is that the different forms of student participation must be empirically examined to understand what leads to inclusion and exclusion in a community. Our analysis focused on the following questions: Should students *always* participate? Can non-participation be desirable? Is there something that can be defined as non-participation? What may appear as non-participation from a teacher's perspective can be seen as participation from a student's perspective, even if it involves participating in something other than what the teacher intended with a lesson.

Even though our study takes place within the school environment, the concept of a community of practice has been the source of inspiration for our examination of peer tutoring (Lave & Wenger, 1991). Our aim is to understand when a student community comes into existence. This community develops

when students learn through shared engagement within a domain of knowledge (in this context, mathematics), and through experiencing themselves in relation to one another in a manner that signifies that they belong and are recognized as significant within the community.

Whether or not students are included in the academic community is related to the various social strategies they bring into play; in other words, the social capital (Bourdieu & Wacquant, 1992) they possess, which is the sum of their resources linked to being part of a group. Bourdieu and Wacquant (1992), who emphasizes how people acknowledge one another and confirm group membership through rituals, refer to participation in these activities as investment strategies. Using a card game as an analogy, then it is a matter of which cards students play to become legitimate participants in a lesson and which cards are trump.

Research shows that, although students use a variety of strategies to be included, those strategies share a common feature in that they are simultaneously academically and socially grounded (Schmidt, 2015). Thus, there is a close connection between acceptance, participation, and achievement among the students, or what this article calls socio-academic inclusion, which serves as our basis for identifying socio-academic participation patterns among the students using peer tutoring. Socio-academic student communities refers to learning environments where students come together to engage in social interaction and academic activities. In these communities, students not only learn academic content but also develop social relationships, collaborate, and interact with peers. We use the term to highlight the interconnectedness of the social and academic aspects of learning but also the importance of fostering supportive learning environments.

The aim of this article is to explore the opportunities available for expanding inclusive student communities by focusing on the relationship between subject and general didactic practices when students collaborate in school. More precisely, based on our examination of the investment strategies of students in reciprocal peer tutoring, we identified four archetypal tutoring strategies that can occur when the students work together in pairs.

Methods and Context

Derived from a 13-week intervention involving systematized reciprocal peer tutoring, the two main research questions in this study are:
1. What kind of conversational actions characterize the various tutoring strategies of students using SYKL?
2. How do the various tutoring strategies affect the socio-academic communities?

To adequately address the questions, a well-designed intervention was required that allowed participating teachers to apply SYKL in their respective classrooms (Fraser et al., 2009).

Design of Intervention

International intervention programs (Thurston et al., 2007, 2020) provided the inspiration for SYKL, which is also based on a sociocultural perspective of learning (Vygotskij, 1934/1971), and emphasizes the importance of inquiry-based learning (Blomhøj, 2021). As part of the program, students are specifically taught how to help each other, and engage in academic conversations when working in pairs. The students are assigned one of two positions: tutor or tutee. To fulfill the role of coach or helper, tutors are given prompt cards with generic questions and ideas—and academic hints for solving the task at hand (Figs. 1–2). During a lesson, students switch roles to allow both of them to participate in meaning making, and commit to the relationship.

Teachers recruited to conduct SYKL lessons attended a three-day introductory course to learn how to apply SYKL peer tutoring techniques, which touch upon social, organizational, and subject matter-

related perspectives. The course covered how to design math and science tasks (SYKL tasks) that require students to jointly engage in inquiry, including: how to support and scaffold authentic dialogue in math and science; how to frame the tasks to support work in pairs without the constant presence of the teacher; and how to match students in pairs who are near one another's zone of proximal development (Vygotskij, 1934/1971) while taking into account opportunities for students to (re-)establish friendships and their social and subject matter interactions.

After becoming familiar with SYKL during the course, the teachers began the intervention period, which comprised two weekly SYKL lessons in their regular math and science lessons. Ideally, each lesson comprised four sections based on the SYKL task:

1. 5-minute presentation of the topic or context by the teacher.
2. 15 minutes of pair work with the first part of the SYKL task, student A is the tutor and student B the tutee.
3. 15 minutes of pair work with the second part of the SYKL task; now student B is the tutor and student A the tutee.
4. 10-minute class discussion, where the teacher highlights key points in the academic and social collaboration between the students.[2]

Five weeks into the trial period, an additional one-day course was held focusing on supervision of the participating teachers to adjust and qualify the teachers' implementation of SYKL in their own classrooms and to allow them to exchange of experiences.

Data Collection and Analysis

The study involved 25 fourth-grade teachers who agreed to let us video record their students' dialogues during math and science lessons. Informed ethical consent was obtained from all parents in the study. All participants were provided with an information sheet explaining the aims of the study and how data would be stored and used. This article presents the results from our qualitative analysis of observations involving math. As the role of tutor is new to most students in fourth grade the main objective of this study is to create knowledge about student tutoring strategies.

Our colleagues in the project (Falkenberg & Petersen, 2022) conducted a quantitative analysis of all empirical data (2,143 minutes of 173 video observations), which showed students as on task > 90% of the time. To further investigate and illustrate the socio-academic participation patterns, we did a qualitative analysis of 15 student dialogues during math lessons. These specific dialogues were selected for closer examination because the classes had worked with SYKL the most times (> 6 times) during the intervention period. The hypothesis was that students from these classes would have the most experience with the didactics of SYKL, leading us to assume that the participation patterns we observed stemmed from SYKL practices.

Once we began studying the student dialogues, we realized that the students had highly different ways of handling and carrying out the role of tutor. Since the students' various strategies clearly had a strong impact on socio-academic inclusion, we decided to identify and map out their tutoring strategies. As explained in the following, we did this by focusing on the students' conversational actions.

To analyze the data, we watched each dialog multiple times and transcribed them verbatim, keeping in mind that: "No transcription, however fine-grained, is ever complete […] all attention to particulars on a videotape involves processes of sampling that are always influenced by theory, whether explicitly or implicitly" (Erickson, 2006, p. 178). Taking this into consideration, several careful readings of all the observation transcripts were also conducted to identify how the data related to what was expected based

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[2] This four-minute video, https://youtu.be/-E3oOwnf8i0 (Københavns Professionshøjskole, 2022), provides a rich impression of two students collaborating during a typical SYKL lesson. Informed written consent was obtained before the video was made publicly available.

on our theoretical understanding of participation strategies and conversational actions. Our operationalization of the concept of investment strategies was done in accordance with Rasmussen and Schmidt (2022), and their categorization of academic and social conversational actions, where the latter includes non-verbal actions like waiting patiently, facing their partner or being inattentive (Table 1).

Table 1

Academic Conversational Actions (1-3) and Social Conversational Actions (4-6)

Conversational action	Description	Reference
Academic Conversational Actions		
1 Tentative answers	Suggesting possible solutions, partial solutions, hypotheses, guessing, estimating	Komatsu, 2010; Pólya, 1979
2 Explanations	Giving arguments as to how things are or should be done; giving reasons why	Esmonde, 2009; Levenson et al., 2006
3 Meaning making	Expressing a search for connectedness or purpose; making sense of, or interpreting, asking reflective questions	Johansson, 2007; Zack & Graves, 2008
Social Conversational Actions		
4 Processual encouragement	Expressing confidence in another; patiently waiting or suggesting where to find information; keeping track	Alrø & Skovsmose, 2004
5 Procrastination	Jokes, having fun, short off-topic activities or off-topic dialogs with tutee or others	Langer-Osuna, 2018; Topping, 2005
6 Body language	Positive: facing partner, open posture, indications of agreement Negative: inattentive, restless, yawning	Hundeide, 2004; Wahyuni, 2018

We began our analysis using deductive approach that involved coding each transcript to identify each student's participation pattern. We simultaneously analyzed how the student's strategies related to processes of inclusion and exclusion, i.e., to the opportunities available for them to become legitimate participants in SYKL. Table 2 provides an example of a characterization of a student's participation pattern in the role of tutor.

Table 2 shows that the tutor's (M) participation pattern comprises the use of many tentative answers and that M eagerly drives the process, expresses confidence in the tutee (C), waits patiently, keeps track, corrects C, asks reflective questions, and uses highly positive body language and humor.

The second step of our analysis involved mapping student strategies in the role of tutor across the 15 dialog transcriptions to identify any ideal types that encompass central features of student participation strategies (Eneroth, 1987; Weber, 2003). This part of the analysis followed a more inductive approach in accordance with grounded theory method, which involves "discovering, developing and verifying a theory on the basis of empirical data" (Boolsen, 2020, p. 309, our translation) by applying coding techniques that start with an open coding of the data before categorizing and re-categorizing it until it is possible to "formulate hypotheses about relationships" (Boolsen, 2020, p. 320, our translation), and generate theory based on the dataset.

Table 2

Characterization of Student's Participation Pattern

Conversational action	Description of student's strategy[a]	Occurrence (approximate number)
Tentative answers	M frequently and eagerly suggests possible solutions, partial solutions, guesses, estimates, and corrects C Does not use the hints, or artefacts.	36
Explaining	M gives a few explanations, "Well, yes … that's because …"	3
Meaning making	For example: "But is it 12?", and "Is it possible to do it another way?", and asks reflective questions.	7
Processual encouragement	M frequently shows confidence in C, waits patiently and keeps track of time and the process.	24
Procrastination	M makes jokes related to the task, uses lots of humor.	3
Body language	Faces partner, open posture, indications of agreement (nodding), smiling, laughing.	18+

[a] M = student tutor. C = student tutee.

In the final step of our analysis, we developed a typology of student tutoring strategies across the specific (conversational) actions that the students perform in SYKL dialogs. The idea behind selecting specific typical features was to create meaningful units until a coherent figure or ideal types emerged. These ideal types should not be confused with an ideal in the sense of something that should be striven for (Weber, 2003), which is why we will use the term archetypes in the remainder of the article. Since naming figures is a construction or fictionalization of analytical points which serve a communicative purpose (Kofoed & Søndergaard, 2008), naming the tutoring strategies represents a way to make it easier to talk about what happens in the relationship between tutor and tutee. The aim is not to pointing out right and wrong ways of being a student but to create a language for the dynamics that can otherwise go unnoticed in peer tutoring.

Results

In the following, we present the four archetypical tutoring strategies (Table 3) in our typology that relate to patterns in the various ways the students use social and academic conversational actions when taking on the role of tutor.

The first two strategies in Table 3, 'Let's bond' and 'I'll wait for you,' are both characterized by a preference for social conversational actions. These include showing confidence, confirming the partner's ideas, and keeping track of process and time. The other two strategies, 'Think carefully' and 'Let's go,' are both characterized by a preference for academic conversational actions. This involves explaining, arguing, giving tentative answers, and suggesting possible solutions.

The strategy 'I'll wait for you' concerns waiting patiently and engaging in processual encouragement, while students drawing on the strategy 'Let's bond' are oriented towards (re)creating relationships and

Table 3
Overview of Four Archetypical Tutoring Strategies

Tutoring strategy	Description
Let's bond	• Keeping track on process and time • Many off-topic dialogs – with the partner and other peers • Using few tentative answers and explanations
I'll wait for you	• Patiently waiting • Expressing confidence and agreement • Using few tentative answers and explanations
Think carefully	• Patiently waiting – keeping track • Expressing confidence and agreement • Using many tentative answers and reflective questions
Let's go	• Working at a fast pace • Driving the process and collaboration • Using many tentative answers and explanations

having many off-topic dialogs with the tutee and others in the classroom. Finally, the difference between the strategy 'Think carefully' and 'Let's go' is that the latter focuses on getting the team across the finish line quickly, while the former involves students engaging in processual encouragement and asking reflective questions to scaffold their partner's learning process.

It is important to emphasize that these are analytically produced archetypes that do not exist in a pure form in the classroom but represent typical strategies that students draw on in different and various ways, depending on the situation and the relationship. It is also important to stress that the four tutoring strategies can be both conducive to socio-academic inclusion and challenge it, while also potentially being legitimate. The purpose of presenting the typology is to provide a tool for identifying student tutoring strategies to support teacher's work with socio-academic norms and inclusion.

In the following, we analyze specific examples from the video observations to illustrate what characterizes the four strategies. In addition to showing how social and academic conversational actions intertwine in student dialogs, we will show how the various tutoring strategies and the didactic framework that SYKL provides affect student participation opportunities. We will also discuss some of the pedagogical and didactical points of attention that emerged during the analyses. Each section begins with an excerpt from our fieldnotes of a tutor-tutee dialog.

'Let's Bond' and 'I'll Wait for You'

> Dina helps Malte with a math exercise that involves analyzing a fly swatter to see how many holes it has. Malte holds the paper with the exercise and reads it aloud, mumbling. He takes the fly swatter and starts counting. Dina smiles and looks at the fly swatter. She says: "Okay, you can divide it." She uses one of the *hints* (Figure 1) provided by the teacher to help solve the task. Malte does not appear to hear Dina's *hint*. He is busy counting.
> Dina tells Malte that she is going to a birthday party today and that her aunt who cannot speak will be there. Malte looks up at Dina, confused. She continues: "And yesterday I saw two ladies who couldn't hear, and then they

did this." Dina makes some gestures with her hands. Malte looks up and says: "Oh, sign language." He smiles at Dina and briefly explains that he has solved the problem by multiplying. Now he wants to try counting. Dina nods in agreement. Malte gets started and counts for a few minutes.

While Malte is counting, Dina is looking around the classroom. She sits restlessly in her chair. She picks up the prompt cards, collects them in a pile, yawns, and puts the prompt cards down on the table again. She makes eye contact with a classmate who does something that makes her laugh. Dina starts a conversation with the girl about how long it will take to get home from Westerby, the town where the birthday is taking place. Malte looks at the girls and briefly joins the discussion about how far it is to Westerby and then returns to the fly swatter.

Again, Dina looks at Malte, who by now seems to be completely exhausted from counting the many small holes. She points out that there are four minutes left. Her voice sounds encouraging as she says: "Let's count!" Malte is immersed in counting. Dina fiddles with her eraser, turns her chair a little, chats with a boy from the table next to her, and then turns to Malte, who is counting: "76, 77, 78…" and Dina begins to nod in time and mime the numbers simultaneously with Malte.

Dina's way of helping is characterized by waiting patiently, signaling that she is available by facing Malte, and holding the prompt cards, but also by encouraging Malte by smiling and nodding affirmatively, and by using a hint and suggesting that Malte divides it to come up with a tentative answer. In other words, she employs the strategy of 'I'll wait for you.'

Dina also uses a 'Let's bond' strategy when she engages in various procrastination maneuvers throughout the SYKL lesson. While holding the prompt cards and offering a hint, Dina also participates in many off-topic dialogs with Malte and other classmates. Her body language (open pose, smile, laugh, and eye contact) indicates that she is engaged in bonding, establishing (new) relationships, and creating a good atmosphere. She simultaneously invests in keeping track of the process and time when she says, for example, "Four minutes left [...]. Let's count!"

Figure 1
Photo from Fly Swatter Math Exercise and Hints
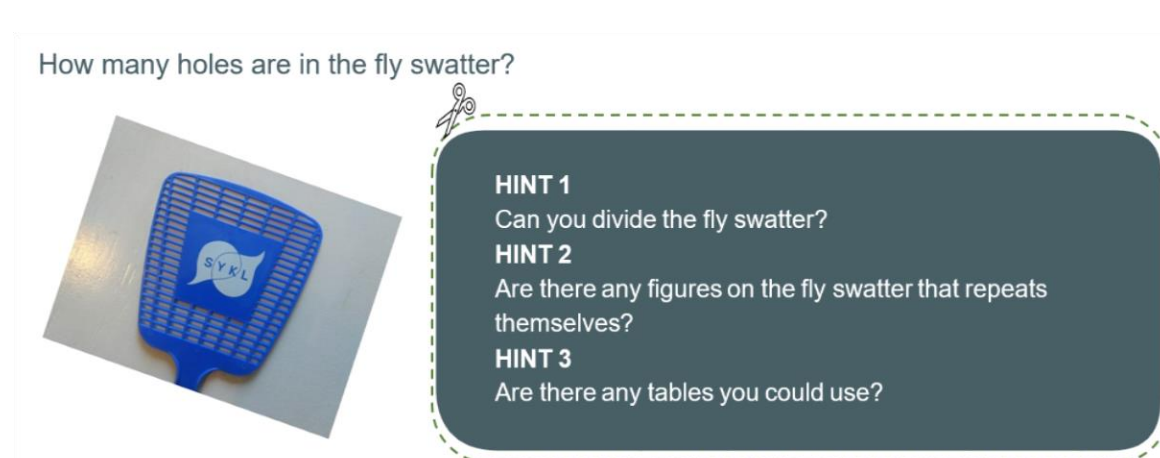
The question is, how do Dina's tutoring strategies—in this specific case—affect the student community? Do the strategies help Dina become a legitimate participant? The first notable aspect is Dina's various and persistent attempts to create openings that could potentially give her access to the student community. Dina's verbal and non-verbal actions show that she is concerned about being a good tutor. She follows the teacher's instructions by listening actively and being available to help with hints and prompt cards. However, she does not really get through to Malte, and it seems to be somewhat unclear to Dina what she must do to fulfill her role as tutor. Another prominent aspect is Dina's way of handling her time while she waits for Malte to count. Our analysis of the video observations of student dialogs shows that tutors spend time waiting in highly diverse ways while tutees are immersed in counting, building, drawing, or calculating. In many cases, the tutors are available and actively listening while simultaneously funneling excess physical energy by fiddling with scissors, paper, or pencils. Dina, in contrast, channels her excess energy by relating, creating a good atmosphere, and bonding with classmates. For instance, she talks about her aunt who speaks sign language, and Malte acknowledges Dina's story before explaining the method he just used to calculate the number of holes. Thus, the 'Let's bond' strategy seems to be an approach that pays off for Dina, as it provides an opening to participate in the socio-academic community.

The observation above shows how Dina constantly alternates between off-topic dialog and bringing herself back on track in her role as (a more academically oriented) tutor. This is especially evident at the end of the dialog, where Dina—somewhat out of nowhere—goes from having an off-topic conversation to directing all her attention to Malte and the fly swatter when she begins counting in unison with him. From the outside, it can be difficult to determine whether Dina feels included in the student community and involved in solving the academic task. On the one hand, her role can be interpreted as peripheral, with her participation consisting of imitating and pretending while Malte does the math exercise. This position can be seen as a marginalized non-participation (Wenger, 2003) if we assume that she is just acting in the shadows, without commitment to the joint academic venture. On the other hand, Dina's way of acting (including her co-thinking attitude when she nods and counts in unison) can be interpreted as legitimate peripheral participation (Wenger, 2003) that has the potential to give her access to the socio-academic community.

This example illustrates how <u>academic</u> conversational actions (in the following highlighted with <u>underlining</u>), and **social** conversational actions (in the following highlighted with **bold**), are constantly intertwined when students learn together. The students seem to switch effortlessly between **talking about sign language**, <u>explaining a calculation method</u>, **discussing how far away Westerby is**, <u>counting</u>, **talking about process and time**. Dina and Malte end up counting in unison, which is difficult to categorize as either an academic or a social act since it is both at the same time.

It is an important didactic point that the social actions of students—including procrastinating, which from an adult perspective is usually considered unproductive trouble making rather than productive relation making—are an essential part of establishing student communities. Research underpinning this point shows that good social relationships have a positive effect on students' academic self-concept, which, in turn, is decisive for the academic outcome (Wouters et al., 2013).

So far, we have analyzed how Dina's tutoring strategies affect her participation opportunities. We will now turn our attention to the didactic framework that SYKL provides. Is Dina sufficiently aware of what a tutor should or can do to help a tutee? Do hints and prompt cards seem meaningful and useful to her?

- Dina uses only one hint (Figure 1). Does she know that there are more than one hints? Or are the remaining hints too difficult for her to use?
- The six prompt cards (Figure 2) contain the following generic questions and ideas to support the tutor's work in guiding the tutee:
  - Read the question together!
  - Get started on the task!

    o   Remember to encourage your partner!
    o   Listen and ask questions!
    o   Think aloud!
    o   Find connections and perspectives!

Dina uses two out of the six prompt cards when she listens and encourages her tutee by smiling, nodding, and confirming his ideas. Is she aware that there are more prompt cards? Addressing this and the other questions in future SYKL research can be used to help improve the use of systematized reciprocal peer tutoring.

The students are assigned the role of tutor and tutee, but the teacher may be required to clarify what is expected of the tutor and tutee—when introducing a lesson or during the lesson. For instance, the teacher could help by:

- Listening to the students' dialog and then pointing to a relevant hint or prompt card for the students to use in the specific situation.
- Saying to the tutor: "You seem to be listening actively and encouraging your partner. This is exactly what tutors are supposed to do."

Figure 2
Examples of Prompt Cards Used in a Math Lesson

'Think Carefully' and 'Let's Go'

> Johan and Agnes are working on a math exercise that involves finding out how many beads it takes to cover a pegboard shaped like a heart (Figure 3). Johan is the tutor, Agnes the tutee. Johan uses a hint and suggests dividing the pegboard into smaller parts. Agnes agrees with the idea. First, she explains that she will count the pegs around the edge and then the ones inside. Johan nods: "You could do that ... Yes, just do that." Agnes starts counting, and then Johan says: "Isn't it difficult to count that many?" Agnes shakes her head as she continues counting. Johan leans over the table: "I have an idea too," he says eagerly, "Agnes, Agnes, Agnes ..." Johan points to the hints, and suggests that they divide the figure into a square and two ears. Agnes says: "Oh! Oh, yes. That's a good idea. Wow."
>
> Agnes now divides the pegboard (on the photocopy) into smaller parts using her pencil. Johan comments that Agnes is drawing on top of the pegs: "No, no, don't draw on the pegs, then you can't see them. You have to [draw the line] right between the pegs." Agnes then corrects her lines, and she counts the pegs in the square and in the ears. Johan follows Agnes' calculations, and comments and questions intensively: "Is it 13? ... Are you sure? ... Then we just have to figure it out ... Yes, 72." Agnes adds up the numbers, and Johan comments and leans over the worksheet more and more: "Try, just try to … you just have to … Can I just try?" He takes the pencil out of her hand, and explains how to add the numbers. Agnes follows attentively, and together they reach the result: 120 beads. Agnes smiles.
>
> When they are about to look at the large pegboard, Johan says: "Can I try to do it? I want to draw a line." He has offered to take over several times, but this time Agnes says: "No, it's my [exercise], okay?" She smiles but keeps her eyes on what she is drawing. "Oh, yeah … You're a tutee ... Sorry," Johan says. He looks thoughtful: "Well, what's the difference between tutor and tutee?" Agnes explains that she, as the tutee, is the one who must solve the task, while Johan, as the tutor, must offer assistance. There is silence for a while. Johan watches how Agnes does the counting. Then he says: "I'll count the ..." Here he interrupts himself and points to the worksheet: "Wouldn't it be a good idea to count how many beads there are here and there?"

The example shows how Johan—as tutor—applies a 'Think carefully' strategy. He agrees with Agnes' proposed solution, and he waits patiently for her to figure out how to count. After that, he carefully invites her to (re)consider her approach. He does so by asking a reflective and leading question: "Isn't it difficult to count that many?" and after that, his way of asking becomes more "lingering" (Johnsen-Høines & Alrø, 2012): "Is it 13? ... Are you sure? ... Then we just have to figure it out ... Yes, 72." In this way, Johan shows how listening is just as important as asking questions.

As the example shows, Johan also uses a 'Let's go' strategy by frequently and increasingly correcting Agnes and making suggestions. He is oriented towards finding a result, preferably quickly and efficiently, which is evidenced by his urge to take control of the pencil.

Agnes and Johan's dialog provides insight into how the 'Think carefully' and 'Let's go' strategies can affect the student community. In this case, the former appears to be fruitful by providing access to participation for both the tutor and the tutee. For example, Johan uses reflexive questions to invite Agnes to think carefully, putting her in a position to realize something new: that the pegboard can be divided

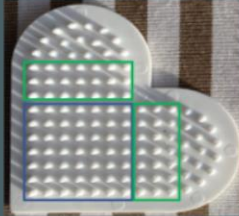**Figure 3**
Photos from Peg Board Math Exercise and Hints

in a smarter way. At the same time, the 'Let's go' strategy seems to create participation for both of them. Johan's many tentative answers and reflective questions function as a baton that is passed on between the two runners on their way to the finish line. However, in the final sprint, Agnes has to remind Johan of their respective roles as tutor and tutee, so he does not take control completely.

However, it must be emphasized that no strategy will lead to participation for every student in every situation. In other student dialogs, similar tutoring strategies lead to the tutor becoming increasingly detached, and ending up in a marginalized, non-participating position. In this situation, Agnes and Johan succeed in establishing a student community in which both are legitimate participants, possibly because Agnes has a secure position in the student community, which enables her to speak up when Johan—with his let's go eagerness—almost takes over to reach the finish line. Agnes puts her foot down and makes it clear to Johan what their respective roles in the collaboration are.

In continuation of this example, we will highlight two didactic features of SYKL. First, matching the tutor and tutee is important in terms of the student's academic strengths and the opportunities they have for establishing or re-establishing a social relationship. Even if the teacher has tried to make a good match—like Agnes and Johan—ongoing observations of student strategies is valuable to gaining insight

into their social and academic participation in specific situations. Sometimes students are excluded and become detached from working with others, even though they may initially appear to be included and involved (Poulsen, 2021). Second, we want to emphasize how important it is that the roles of tutor and tutee are clear to the students. In the example, Johan—who does everything that is expected of a tutor—suddenly steps out of his role but, notably, following Agnes' kind instructions, almost immediately takes back his words, reformulating: "I'll count the …" into: "Wouldn't it be a good idea to count how many beads there are here and there?" Johan's self-correction illustrates how demanding it is for the students to take on the role of tutor.

Discussion

As the above examples show, all four archetypal tutoring roles are important for peer tutoring, and have the potential to lead to opportunities for participation. For example, off-topic dialogs can help create relationships that let students experience that teaching can be fun or let them get to know one another better. This atmosphere can be conducive to, for example, daring to show that something in a task is difficult to understand, and that receiving help is necessary. None of the four archetypal tutoring strategies is more right or wrong than others as all of them can lead to inclusion or exclusion in the student community. But it is necessary that the teacher is aware of which tutoring strategies the students use to be able to help the students help each other even better. This can give students an opportunity to become aware of the tutoring strategy they use most while also supporting them in talking about where and when it can be challenging to give and receive help. In other words, the archetypal tutoring roles can be a way to get the students to talk about how they can best act, and make themselves available for their peer's learning process.

The present study corroborates previous studies showing that peer relationships play a significant role in learning and participation in math classes. For example, a study by Baker et al. (2002) shows that peer support is of decisive importance for improving outcomes in math for students who perform poorly or who teachers see as being at risk of performing poorly. For students to contribute constructively, the teacher must give them careful guidelines about helping peers in terms of how to give each other feedback for each step in the math problems they are studying or attempting to solve. Kunsch et al. (2007) show that, while the clearest effect of peer-mediated intervention is seen in relation to prevention, that is, for students who are at risk of running into difficulty in math rather than for those who already have difficulties. At the same time, the greatest effect is seen within mainstream teaching rather than special needs education. Thurston et al. (2020) point out that there is a connection between how students perceive each other's social status and their mathematical achievement. Likewise, their study shows that after a course with peer tutoring in math, social relationships in and outside school hours are strengthened. At the same time, there are signs that a more inclusive class culture develops through peer tutoring. Finally, Thurston et al. (2020) note that there may be causality between some aspects of the student relationship and the benefits of peer tutoring, but the processes leading to such causal relationships are still under-researched. Niemi and Vehkakoski (2023) study what happens when social inclusion turns into exclusion during collaborative learning between students with and without special education needs. Their study, which underlines the importance of instructing all students to create a supportive learning environment, asserts that teachers "have a responsibility to regularly observe peer learning processes, reactively intervene when needed and proactively teach teamwork and perspective-taking skills to students" (Niemi & Vehkakoski, 2023, p. 16).

In sum, math teachers who work systematically with peers who illustrate and explain math problems to each other create opportunities for improved outcomes and higher levels of participation. To focus student discussion on specific subject content, the students must be explicitly taught how to get started on giving feedback in math to their peers. The aforementioned studies show how the relational aspect

of the teaching of math is important for student learning strategies, and likewise show that the teacher can contribute to a classroom culture in which students are given help and can see the point of challenging and supporting each other.

Our study of the strategies tutees employed contributes to the existing research by closely examining the specific speech acts occurring in student dialogues. Demonstrating how students seamlessly and effortlessly weave in and out of academic and social topics represents a novel approach. The attention our analysis put on the various tutoring strategies students use in systematized reciprocal peer tutoring can serve to support teacher efforts in providing careful instructions on how to help peers in a way that better allows them to contribute constructively to one another's learning trajectories.

One can discuss whether reciprocal peer tutoring with same-age peers is an appropriate method, as Alegre et al. (2019) show that cross-age tutoring has an even better effect. In our view, there are at least two reasons to further develop and explore peer tutoring within the classroom community: (1) it is simpler to implement the intervention when the teacher does not have to coordinate with the schedule of another class, and (2) it can help build and strengthen relationships with students' closest peers in everyday life.

Since our analysis focused on student dialogues, we cannot provide insights into the impact of the mathematics teacher's introductions and summaries on the establishment of socio-academic student communities. There is still significant work ahead in terms of analyzing the teacher's introduction to student collaboration and whether subsequent classroom discussions prioritize reaching the correct answer or assign value and recognition to the (collaborative) process.

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