Educational dialogue among teachers experiencing different levels of self-efficacy

1. Introduction

Educational dialogue refers to reciprocal, cumulative and extended classroom talk, in which the teacher and children together participate in shared knowledge building with the aim of reaching educational learning goals (Alexander, 2008; Mercer & Littleton, 2007; Michaels & O'Connor, 2015). Dialogic practices have been shown to create motivationally supportive learning environments for students (Böheim et al., 2021) and support the actual student learning process (e.g., Alexander, 2018; Muhonen et al., 2018; Howe et al., 2019; Sedova et al., 2019). Despite the benefits of educational dialogue for students' learning, studies have shown that educational dialogue rarely occurs in the classrooms and that teachers rarely use scaffolding strategies that support educational discourse and student participation in it (Howe & Abedin, 2013; Webb et al., 2009). The idealistic approach of dialogue does not seem to find its way to classrooms itself, which is why there is a need to find out which teacher-related factors may be connected with the occurrence and quality of dialogue in the classrooms.

The teacher-related factor of self-efficacy in teaching and learning has interested researchers for decades (Koomen & Zee, 2016). Teachers' self-efficacy has been associated with diverse domains of teacher performance. Prior research has shown that teachers' self-efficacy beliefs foster vital teacher-related outcomes, such as higher work satisfaction (Granziera & Perera, 2019; Klassen & Chiu, 2010) and commitment (Klassen & Chiu, 2011). Teachers' self-efficacy also has an impact on the educational activities and teaching practices that teachers choose to use and invest effort and persistence in (Bandura, 1997; Woolfolk Hoy et al., 2009). In fact, previous research has shown that high self-efficacy teachers can create a more favourable instructional learning environment by utilising, for instance, more student-centred instructional approaches (Nie et al., 2013) and providing greater learning support (Holzberger et al., 2013). Teachers' self-efficacy has also been found to be positively associated with the quality of classroom interactions in terms of emotional support, classroom

organisation, and instructional support (Perera & John, 2020). However, there is a lack of studies investigating how the level of teacher self-efficacy may be linked with the educational dialogue that the teacher and children have in the classroom. The present study aims to contribute to this field by investigating how the occurrence and quality of educational dialogue in classrooms reflects the differing levels of teacher self-efficacy in a sample of primary school teachers.

1.1. Educational dialogue

The idea of the importance of educational dialogue is based on Vygotsky's sociocultural theory (1978), which emphasises the meaning of social interactions for student learning and development, highlighting the vital role of language as both a cultural mediator and tool for thinking. In effective educational dialogue, students have the opportunity to participate actively by sharing their thoughts, elaborating on their views, and building on each other's ideas (Alexander, 2008; Michaels & O'Connor, 2015; Wilkinson et al., 2017). Several concepts and definitions have been used to describe educational dialogue in the classroom. The construing of educational dialogue can vary depending on the focus of attention, whether it is on a whole-class discussion between teacher and students or on peer dialogue. In addition, the educational dialogue can be construed differently if the focus is on the actions and scaffolding of the teacher, student involvement or the whole-class process of dialogic exchanges. The predominant focus of the present study is on whole-class dialogue and the teacher's scaffolding within it. Therefore, the present study relies on Alexander's (2008) concept of *dialogic teaching*, in which the educational dialogue between the teacher and students is defined as exchanges where the participants ask questions, explain their points of view and make comments about each other's ideas, all of which can prompt further questions and elaborations. The concept of dialogic teaching includes five principles (2018, p. 566) that describe and frame

educational dialogue, as follows: '1) collective (the classroom is a site of joint learning and enquiry); 2) reciprocal (participants listen to each other, share ideas and consider alternative viewpoints); 3) supportive (participants feel able to express ideas freely, without the risk of embarrassment over 'wrong' answers); 4) cumulative (participants build on their own and each other's contributions and chain them into coherent lines of thinking and understanding); and 5) purposeful (classroom talk, though open and dialogic, is structured with specific learning goals in view)'. In addition to the five principles from Alexander, Lefstein (2006) has suggested two more criteria as important dialogic features: dialogue should be *critical* (teacher and students identify and investigate points and explore questions together) and *meaningful* (teachers and students relate to the discussion topic and express their personal views).

For educational dialogue to occur, the teacher must play a vital role in enabling opportunities for student participation and conceptual development through scaffolding, which includes strategies such as inquiry, open questions, feedback, negotiating consensus and assisting students in explaining their own thinking (Gillies, 2004; Gillies, 2015; Rojas-Drummond et al., 2013). In well-scaffolded educational dialogue, shared knowledge building is structured through questioning, joint activity and shared conceptions (Alexander, 2000; Rojas-Drummond et al., 2013). Although it is the teachers who typically initiate and manage the educational dialogues (Wells, 2009), they should also be sensitive to students' initiatives by, for example, allowing space for new turns in the discussion based on students' comments, asking authentic questions related to the students' lives and including students' responses into the questions that follow (Nystrand, 1997). Acknowledging these child-centred scaffolding strategies is of high importance because students rarely participate and make initiatives in educational dialogue without the teacher's specific encouragement (Chinn et al., 2000; Myhill, 2006). Extending the work of Rasku-Puttonen et al. (2012), Muhonen et al. (2016) explored the different types of educational dialogues regarding the initiator (either the teacher or student)

and the quality (either moderate or high) of the dialogue and were able to identify four patterns of dialogic teaching: teacher-initiated dialogues of a moderate and high quality and student-initiated dialogues of a moderate and high quality. In the patterns, the quality of the dialogue was found to differ based on the teacher's scaffolding and the students' participation. These four patterns will also be utilised in the present study.

As shown, the research on educational classroom talk has focused on the quality, facilitating structures and outcomes of productive educational dialogues between the teacher and students (Littleton & Howe, 2010). However, less is known about the teacher-related factors that may link with the teacher's ability to conduct educational dialogue in the classroom. A recent study by Muhonen et al. (2020) investigated the teachers' levels of stress on the background of educational dialogue, finding that moderately stressed teachers conducted educational dialogue the most, whereas teachers with low stress conducted dialogue the least. In the present study, the teacher-related factor of self-efficacy is considered when analysing the occurrence and quality of educational dialogue.

1.2. Teacher self-efficacy

The construct of teacher self-efficacy is largely grounded in the social cognitive theory of Bandura (1986), who suggested that people who believe that they will be successful in the given task are more likely to achieve the desired results; these people invest substantial effort, stay persistent in the face of setbacks and develop coping mechanisms for managing the setbacks. Efficacy beliefs are not only the general judgements of a person's skills and abilities but beliefs of what the person can do with whatever skills and abilities the person possesses (Bong & Skaalvik, 2003). In the field of education, teacher self-efficacy is defined as individual teacher beliefs about their own abilities to plan, organise, and carry out the activities required to attain given educational goals (Skaalvik & Skaalvik, 2007; Tschannen-Moran et al., 1998).

This definition of teacher self-efficacy includes both teachers' self-perceptions of personal teaching capability and the judgements about the requirements of specific teaching tasks (including the assessment of external constraints and resources) (Perera et al., 2019).

Prior research has shown that teachers' positive self-efficacy beliefs are linked to their high mental wellbeing, work engagement and job satisfaction (see Zee & Koomen, 2016 for a review). In addition, their sense of efficacy tends to increase with the years of experience in teaching (Soodak & Podell, 1997). On the other hand, teaching experience may also have an effect on how teachers perceive their own abilities and limitations and how they become more aware of them (Egyed & Short, 2006). Teachers with a higher sense of efficacy are more likely to stay in teaching careers (Glickman & Tamashiro, 1982), and the extended teaching experience can increase teachers' repertoire of effective teaching techniques (Egyed & Short, 2006).

Based on the social cognitive process theory of teacher self-efficacy (Tschannen-Moran & Woolfolk Hoy, 2001; Woolfolk Hoy et al., 2009; Zee & Koomen, 2016), teachers with high self-efficacy are expected to include a higher quality of teacher–student interactions in their classrooms (Perera & John, 2020). Teachers who experience a strong sense of self-efficacy are found to be more focused on planning and accomplishing teaching-related goals (Skaalvik & Skaalvik, 2007; Tschannen-Moran & Woolfolk Hoy, 2001), which can be reflected in their classroom behaviour and interactions. For example, efficacious teachers tend to utilise more student-centred teaching strategies to support students' engagement and learning (Künsting et al., 2016; Nie et al., 2013) and are more effective in providing feedback on student performance and taking the time to correct possible misunderstandings (Ashton & Webb, 1986; Gibson & Dembo, 1984). In addition, teachers with high self-efficacy have been shown to conduct high-quality classroom organisation (Künsting et al., 2016, Tsouloupas et al., 2010). Based on these findings, it can be expected that higher teacher self-efficacy is more likely to lead to higher

quality in the teacher–student interaction (Woolfolk Hoy et al., 2009). Supporting this assumption, a recent study by Perera and John (2020) showed that teachers' self-efficacy beliefs for teaching math were positively associated with classroom interaction quality as measured by the domains of emotional support, classroom organisation and instructional support.

Although previous research has been able to show the importance of teacher self-efficacy for teacher–student interactions at a more general classroom interaction level, there are no empirical studies that have investigated the role of teacher self-efficacy in the actual educational dialogue between teacher and students. Because educational dialogue can be considered a form of high-quality interaction between teachers and students, we may expect higher teacher self-efficacy to link with the educational dialogue in the classrooms.

1.3. The present study

There is very little prior research available on the link between teacher-related factors and educational dialogue that can help in understanding the conditions that may favour or restrict educational dialogue and students' learning through it. In the present study, the teacher-related factor of self-efficacy is considered, here exploring the occurrence and quality of educational dialogue among classrooms of teachers experiencing different levels of stress. Because of the qualitative nature of the present study and lack of previous studies on the relation between teacher self-efficacy and educational dialogue, we are not able to set a clear hypothesis for the study. However, based on the findings in previous research on teacher self-efficacy beliefs and classroom interaction, we can expect to find more and higher-quality educational dialogue in the classrooms of teachers with high self-efficacy. The present study investigates the following research questions:

1. How many episodes of educational dialogue can be found within the classrooms of teachers with low, moderate and high self-efficacy?
2. What kinds of patterns of dialogic teaching can be identified among teachers with different self-efficacy levels, and how does the occurrence of these patterns vary among teachers?

2. Method

2.1. Participants and procedure

The present study is part of a larger longitudinal research project focusing on the interaction and wellbeing of teachers and students (Lerkkanen & Pakarinen, 2016–2022). The participants of the present study were Finnish Grade 1 teachers and the students in their classrooms. On average, the teachers (50 female, 4 male) were 44.6 years old and holders of a master's degree, which is required for primary school teachers in Finland. During the data collection, there were, on average, 17.8 students present in the classrooms (minimum 6, maximum 23). This number of students reflects the typical average class sizes in Finnish Grade 1 classrooms. The children (n = 780) were approximately seven years old, 49% of them being girls and 51% being boys. The children's parents (n = 577) reported their educational degree, which varied from no vocational education to a licentiate or doctorate (*Mode* = vocational school degree). The participating teachers and their parents gave their written consent for their or their child's participation. The participants were recruited on a voluntary basis, and they were aware of the possibility of dropping out at any point. The research project received ethical approval from the university's ethics committee in 2017 before the present data were collected.

The teachers filled out a questionnaire regarding their work-related self-efficacy beliefs and teaching experience. Every classroom was also video recorded during one school day, with three to four lessons that typically lasted 45 minutes. The recordings were conducted with two

video cameras that were placed on the opposite corners of the classroom. To avoid the loss of recorded classroom interaction, the teachers were also asked to wear an mp3-recorder that audio-recorded their speech and the speech of the children close to the teacher. The recorded lessons included the subjects of literacy, math, science, religion/social studies and art and crafts. The purpose of the video recordings was to collect authentic data about the classroom interaction between the teacher and children. It should be noted that recordings were conducted during usual school days and during usual lessons. The teachers were not provided with specific training how to conduct educational dialogue and they were not advised to utilise dialogue in their teaching during the recordings.

2.2. Measures and selection of teachers

Teacher self-efficacy beliefs. The teachers' self-efficacy beliefs were measured with the Teachers' Sense of Efficacy Scale (TSES; Tschannen-Moran & Woolfolk Hoy, 2001). The measure includes 24 items that are assessed on a 9-point scale (1—nothing, 3—very little, 5—some influence, 7—quite a bit and 9—a great deal). The TSES measure includes three 8-item subscales: 1) *efficacy for instructional strategies* (e.g., to what extent can you provide an alternative explanation or example when students are confused?), 2) *efficacy for classroom management* (e.g., how much can you do to control disruptive behaviour in the classroom?) and 3) *efficacy for student engagement* (e.g., how much can you do to motivate students who show low interest in schoolwork?). For further analyses, the full scale of the 24 items of the TSES was first standardised and then combined as one mean score to measure the self-efficacy beliefs of the participating teachers. The Cronbach's alpha for the full 24 scale was 0.96.

Teacher work experience. The teachers reported their teaching experience in years. On average, the teachers had 16.1 years of teaching experience (SD = 9.4), which varied from a minimum score of 0.5 years to a maximum score of 39 years.

Identifying and selecting teachers with low, moderate and high self-efficacy. The mean score was used to identify the participating teachers' levels of self-efficacy beliefs. Considering the whole sample, the teachers' standardised average self-efficacy score was .00 (total range from -1.95 to 2.04), and the standard deviation was 1.00. To identify the self-efficacy levels of each teacher, a cut-off criterion' of ±1 standard deviation (e.g., Pelletier, 2006) was utilised. Teachers whose average self-efficacy scores varied from -1.95 to -1.00 (more than -1 standard deviation from the sample average .00) were considered as experiencing the lowest level of self-efficacy (n = 8, M = -1.43). Because the self-efficacy mean scores of these teachers were below the sample average, this teacher group was named *low self-efficacy teachers*. Teachers whose average self-efficacy ratings varied from -1.00 to 1.00 (±1 standard deviation from the sample average .00) were considered as experiencing a moderate level of self-efficacy (n = 34, M = 0.00). Hence, this teacher group was named *moderate self-efficacy teachers.* Teachers whose average self-efficacy ratings varied from 1.00 to 2.04 (above the +1 standard deviation from the sample average .00) were considered as experiencing the highest levels of self-efficacy (n = 12, M = 1.57). Because these teachers' self-efficacy was above the sample average, this teacher group was named *high self-efficacy teachers*.

In addition, the teaching experience of the three teacher groups was considered. The low self-efficacy teachers had the highest teaching experience (M = 21.5 years). The moderate self-efficacy teachers had the lowest teaching experience (M = 13.7 years), and the high self-efficacy teachers had the second highest teaching experience (M = 19.5 years).

After identifying each teacher's level of self-efficacy, a similar number of teachers from each group was selected for further analysis. All eight low self-efficacy teachers were selected to represent their teacher group. In addition, eight teachers from the moderate and high self-efficacy teacher groups were randomly selected to represent their teacher group. Hence, in

total, 24 teachers and their 72 video-recorded classroom lessons (three lessons per teacher) were selected for further analysis.

2.3. Analysis of educational dialogue

Prior to the analysis phase, the selected 24 teachers were given new participant numbers. This was done so that the researcher who was responsible for the analysis would not be aware which recording represented which of the three teacher groups. The analysis strategy included three main phases, which were the following:

1) Identifying episodes of educational dialogue;
2) Categorising the identified episodes within four patterns of dialogic teaching; and
3) Conducting nonparametric tests to compare the educational dialogues between the three teacher groups of self-efficacy.

Episodes of educational dialogue. The first analysis phase focused on identifying episodes of educational dialogue from the video recordings of the selected teachers. One researcher, who is specialised in the analysis of educational dialogue, was responsible for the analysis. However, researcher triangulation within the research team was applied when needed to discuss the interpretations and re-examine the findings. The researcher watched the video recordings carefully to identify the episodes of educational dialogue (i.e. communicative events; see Hymes, 1972) and set their boundaries (starting and ending point) as detailed as possible. The average length of an episode of educational dialogue in the sample was 173 seconds (minimum 39 seconds, maximum 680 seconds). The episodes included continuous verbal exchange between the teacher and children about the same topic. The identification of the episodes of educational dialogue was guided by Alexander's (2008; 2018, p. 566) five principles of dialogic teaching. According to these criteria, dialogic episodes represent educational discussion when they are as follows: 1) collective (teacher and students address

the learning tasks together); 2) reciprocal (teacher and students listen to each other, share ideas and consider alternative viewpoints); 3) supportive (students can express their ideas freely, without the risk of embarrassment over 'wrong' answers); 4) cumulative (teacher and students build on their own and each other's contributions and link them into coherent lines of thinking and understanding); and 5) purposeful (teacher plans and supports classroom talk with specific educational goals in mind). The episode boundaries were determined following a criterion that a change of a topic in the discussion would start a new episode or change in the classroom activity or interaction type that would end the episode (e.g., discussion ends and independent work begins, or discussion ends and teacher begins giving instructions).

Patterns of dialogic teaching. The second, more fine-grained analysis phase, focused on examining the content of the identified episodes of educational dialogue. The content of the dialogues was analysed with respect to separate communicative acts (see Hymes, 1972), statements of the teacher and children, to determine which of the four patterns of dialogic teaching the episodes represented. Each separate communicative act of the teacher and children was analysed as a unit, which could be a single word, a sentence or even several sentences, as long as the communicative act was clearly identifiable. Diverse types of communicative acts were identifiable within the episodes of educational dialogue. The most common communicative acts within the study sample were questions (open or closed, abstract or practical, clarifying or expanding), responses, feedback comments, elaborations, justifications, expansions and summarising comments. Furthermore, it was also determined if it was the teacher or one of the children who initiated the dialogic episode. Based on the analysis of the content of each episode of educational dialogue, the episodes were categorised into the four patterns of dialogic teaching, here guided by Muhonen et al. (2016; see Figure 1). The four pattern types were distinguished from each other based on the initiator of the dialogue (teacher or child) and based on the quality of the dialogue (moderate or high). The moderate-quality

dialogues illustrate discussions in which both the teacher and children utilised mainly short or closed comments and questions and in which the teacher utilised a limited variety of scaffolding strategies to support the children's learning and participation. On the other hand, high-quality dialogues illustrate versatile discussions, in which the children actively contributed to the dialogue and the teacher utilised diverse scaffolding strategies to support the shared knowledge-building process.

Figure 1. Patterns of dialogic teaching (Muhonen et al., 2016)

Teacher-initiated dialogue of moderate quality	**Student-initiated dialogue of moderate quality**
The teacher asks many short/closed questions to keep the dialogue going. The teacher makes expansions and draws together what is being learned. Students do not participate without the teacher's help or encouragement.	The student asks a question or presents an idea, which the teacher broadens at the whole-class level or allows space for more independent discussion among students. The teacher might ask follow-up questions but does not make expansions or draw summaries that would collate what has been learnt.
Teacher-initiated dialogue of high quality	**Student-initiated dialogue of high quality**
The teacher asks fewer but mostly open-ended questions. He/she makes expansions and draws together what is being learnt. With the help of scaffolding, students participate and formulate their own initiatives and questions.	The student asks a question or presents an idea, which the teacher broadens at the whole-class level or allows space for more independent discussion among students. The teacher actively supports the discussion, makes expansions and brings together the main idea of the dialogue.

Comparison of educational dialogues among the three teacher groups of self-efficacy. After identifying the episodes of educational dialogue and categorising them within the patterns of dialogic teaching, the final phase of the analysis was to conduct nonparametric tests to compare the frequencies of the episodes among the three teacher groups. The Kruskal–Wallis H test was utilised to compare the total number of identified episodes and the four patterns of dialogic teaching among the three teacher groups. In addition, pairwise post-hoc comparisons with Dunn's test were utilised to compare the frequency differences of the

episodes of educational dialogue between two teacher groups at a time (low vs. moderate self-efficacy teachers, low vs. high self-efficacy teachers and moderate vs. high self-efficacy teachers). Nonparametric tests were conducted using SPSS Statistics 26.

3. Results

3.1. Occurrence of educational dialogue

Focusing on the first research question, the number of episodes of educational dialogue within the low, moderate and high self-efficacy teachers was explored. In total, 105 episodes of educational dialogue were found among the 24 teachers and their 72 lessons (see Table 1). The Kruskal–Wallis H test showed that there was a statistically significant difference in the total number of identified episodes among the three teacher groups, $\chi^2(2) = 6.116$, $p = 0.047$, with a mean rank score of 7.50 for teachers with low self-efficacy, 14.94 for teachers with moderate self-efficacy and 15.06 for teachers with high self-efficacy.

Most episodes were found within the classrooms of moderate self-efficacy teachers (n = 44 episodes) and within high self-efficacy teachers (n = 43 episodes), whereas fewer episodes were found within the low self-efficacy teachers (n = 18 episodes).

Table 1. Number of episodes representing the patterns of dialogic teaching within classrooms of low, moderate and high self-efficacy teachers.

	Teacher-initiated dialogue of moderate quality	Teacher-initiated dialogue of high quality	Student-initiated dialogue of moderate quality	Student-initiated dialogue of high quality	Episodes in total
Low self-efficacy teachers	8	5	2	3	18
Moderate self-efficacy teachers	9	30	3	2	44
High self-efficacy teachers	8	24	1	10	43

In total	25	59	6	15	105
Kruskal–Wallis test x^2	.220	8.000	1.278	5.36	6.116
(p-value)	(.896)	(.018)	(.528)	(.069)	(.047)

3.2. Quality of educational dialogue: Patterns of dialogic teaching

Based on the second research question, Table 1 represents the frequencies of how the 105 identified episodes of educational dialogue were categorised as representing the patterns of dialogic teaching among the low, moderate and high self-efficacy teachers. Teacher-initiated dialogue of a high quality was the predominant dialogue type (n = 59) in the sample. However, the Kruskal–Wallis H test showed that there was a statistically significant difference in the number of dialogic episodes representing the pattern among the three groups of teachers, $\chi2(2) = 8.00$, $p = 0.018$, with a mean rank score of 7.00 for teachers with low self-efficacy, 16.44 for teachers with moderate self-efficacy and 14.06 for teachers with high self-efficacy. There was also a marginally significant difference in the number of dialogic episodes representing the student-initiated dialogue of a high quality pattern among the three groups of teachers, $\chi2(2) = 5.36$, $p = 0.069$, with a mean rank score of 11.63 for teachers with low self-efficacy, 9.44 for teachers with moderate self-efficacy and 16.44 for teachers with high self-efficacy. Within the patterns of teacher-initiated dialogue of moderate quality (n = 25) and child-initiated dialogue of moderate quality (n = 6) no significant differences among the three groups of teachers were found. The next three sections describe in more detail the educational dialogues found within the classrooms of each teacher group.

3.2.1. Educational dialogue of low self-efficacy teachers

Low self-efficacy teachers were found to utilise educational dialogue the least in the sample. Compared with both moderate self-efficacy teachers ($z = -7.437$, $p = .034$), and high self-efficacy teachers ($z = -7.562$, $p = .031$), the post-hoc test using Dunn's test showed that the

frequency differences in the total number of dialogic episodes were statistically significant. Out of the 18 episodes of educational dialogue identified among the low self-efficacy teachers, teacher-initiated dialogue of moderate quality was the most common pattern (n = 8) (see Table 1). The patterns of teacher-initiated dialogue of high quality n = 5), child-initiated dialogue of moderate quality (n = 2) and child-initiated dialogue of high quality (n = 3) occurred less often in the classrooms of low self-efficacy teachers.

Example 1 presents an extract of a teacher-initiated moderate-quality dialogue, which was the most common pattern of dialogic teaching found in the classrooms of the low self-efficacy teachers. The dialogue was identified during a literacy lesson. The relatively brief dialogue is built around a question to which the teacher is looking for a certain specific explanation (*Do you know what reading with expressions means?*). The children participate in the discussion by suggesting answers to the teacher's questions (*A bedtime story!* ; *So that you try to speak and read with a correct voice*.). The teacher is supportive of the students' answers and provides confirming and expanding feedback (*Well yes, it can be a bedtime story also.* ; *That's right. For example, here in this part, when Annie says 'The rescue is here' she probably does not only say it normally but very is very excitedly 'The rescue is here!!!*). However, in general, the teacher's scaffolding is relatively limited. For instance, the discussion does not include any clarifying or extending questions from the teacher, which could have broadened the dialogue and encourage further elaboration.

Example 1. Teacher-initiated moderate-quality dialogue of a low self-efficacy teacher.

Context: The teacher and children have been reading a homework chapter.	
Teacher:	Do you know what reading with expressions means? Could someone tell what it means?
Child 1:	A bedtime story!
Teacher:	Well yes it can be a bedtime story also. But does it mean when you read it with expressions?

Child 2:	So that you try to speak and read with a correct voice.
Teacher:	That's right. For example, here in this part, when Annie says, 'The rescue is here' she probably does not only say it normally but very excitedly, 'The rescue is here!!!'
Children (excitedly):	'The rescue is here!!!'
Teacher:	Yes just like that. I know you can read it like that.
Child 3:	Yes I always try to read like that. With that different voice.
Teacher:	Good. Would you like to try one more time?
The teacher and children continue reading with expression	

3.2.2. Educational dialogue of moderate self-efficacy teachers

Moderate self-efficacy teachers were found to utilise educational dialogue the most (44 dialogic episodes, see Table 1). The majority of the dialogic episodes represented teacher-initiated dialogue of high quality (30 episodes out of the total of 44). The post-hoc test using Dunn's test showed that the moderate self-efficacy teachers utilised significantly more teacher-initiated dialogue of high quality compared with the low self-efficacy teachers ($z = -9.437$, $p = .007$). The other types of patterns occurred less often in the classrooms of moderate self-efficacy teachers. In particular, the child-initiated dialogues were rare in the moderate self-efficacy teacher sample: child-initiated dialogue of moderate quality ($n = 3$) and child-initiated dialogue of a high quality ($n = 2$). In addition, nine episodes of teacher-initiated dialogue of moderate quality were found.

Example 2 presents an extract of a teacher-initiated high-quality dialogue, which is the predominant pattern of dialogic teaching found in the classrooms of the moderate self-efficacy teachers. The dialogue was identified during a mathematics lesson. In the dialogue, both the teacher and children contribute actively to the discussion and shared knowledge-building process. The teacher initiates the discussion by first asking a short closed question (*So if zero means none then is the number then completely useless?*); after, the students' response expands this by asking open questions (*So why do we need zero then?* ; *Think about it, why do you need*

zero and in which situation have you used zero?). In this way, the teacher encouraged students to explain their opinions and thinking. The students participate actively in the dialogue by sharing their factual knowledge with the teacher's questions (*In phone numbers.* ; *In codes.* ; *So in this year 2017 so there is zero in it.*), but they also share their opinions and views, even without the teacher's specific encouragement (*Yes, we do! For so many things!* ; *It makes a big difference*! ; *Actually, we need zero for everything.*). The teacher provides encouraging feedback for the students' answers (e.g., *Great observation! There in 2017 there is a zero; Yes, we need it. Zero is actually a very useful number.*) and expand on some of the comments (*That's right! We can explore that a bit more. … And if I add this (adds zero after one), how many is it then?*).

Example 2. Teacher-initiated high-quality dialogue of moderate self-efficacy teacher.

Context: The theme of the lesson is the number zero.	
Teacher:	So if zero means none then is the number then completely useless?
Children:	No!
Teacher:	So why do we need zero then?
Child 1:	We don't need it for anything.
Teacher:	Don't we?
Child 2:	Yes we do! For so many things!
Teacher:	Think about it, why do you need zero and in which situation have you used zero?
Child 3:	In phone numbers.
Teacher:	True. In phone numbers, there are often zeros.
Child 4:	In codes.
Teacher:	Yes there are zeros in different codes.
Child 5:	So in this year 2017 so there is zero in it.
Teacher:	Great observation! There in 2017 there is a zero.
Child 6:	In hundreds and tens, there are zeros.
Teacher	That's right! We can explore that a bit more. Please look at here (*goes to the black board*). Could you show me with your finger how many is this (draws number 1). And if I add this (adds zero after one), how many is it then?
Children:	Ten!!!
Child 7:	It makes a big difference!
Child 2:	Actually we need zero for everything.

Teacher: Yes, we need it. Zero is actually a very useful number. *Teacher children continue exploring the number zero.*

3.2.3. Educational dialogue of high self-efficacy teachers

In the classrooms of high self-efficacy teachers, 43 episodes of educational dialogue were identified, and high-quality teacher-initiated dialogues (n=24) prevailed. The post-hoc test using Dunn's test showed that the high self-efficacy teachers utilised significantly more teacher-initiated dialogue of a high quality compared with the low self-efficacy teachers ($z = -7.062$, $p = .043$). After teacher-initiated dialogues of a high quality, the next most frequently used dialogue type was the child-initiated dialogues of a high quality (n = 10). The post-hoc test using Dunn's test showed that the high self-efficacy teachers used child-initiated dialogue of a high quality significantly more compared with the moderate self-efficacy teachers ($z = 7.000$, $p = .024$). The moderate-quality dialogues occurred less frequently in the lessons of high self-efficacy teachers: eight episodes of teacher-initiated dialogue of a moderate quality and one episode of child-initiated dialogue of a moderate quality were found.

Example 3 presents an extract of a child-initiated high-quality dialogue, the pattern type that was found the second most frequently in the classrooms of high self-efficacy teachers. The dialogue was conducted during an art lesson. Starting from the very beginning, the children actively participate in discussion and share their thoughts and experiences (e.g., *I have made animals out of clay in preschool*; *I have seen something in Norway in a glass shop. First, there was only this lump, then they put on a stick and but it on fire and then they could modify and blow it*.) The teacher is open to the children's thoughts and shows interest in them by providing feedback or asking further questions (e.g., *How did you know that this is clay?*; *Yes, that's glassblowing. Glass acts a bit similarly as clay in the kiln*.). The children also participate by asking their own questions (*How did they make that clay that colour?*) and replying to teacher's question (*So that it will get hard, almost like a stone.*). However, during the dialogue, the

teacher asks only a few questions and predominantly shares information to which the children react without specific encouragement (e.g., *I have noticed that quite often the clays that we use in our school come from England. Some clays are also Finnish.* ; *Because if we leave the air bubbles there the clay work will easily explode when we heat it.*). The dialogic exchange is reciprocal and cumulative between the teacher and children.

Example 3. Child-initiated high-quality dialogue of high self-efficacy teacher.

Context: Teacher brings a pile of clay to the table for children to explore and make clay art.

Child 1:	Teacher teacher! I have done clay art before. I have made animals out of clay in preschool.
Child 2:	Yes, but they were grey!
Teacher:	How did you know that this is clay?
Child 3:	You told us!
Teacher:	Did I? I think that the rumours went around already in the morning.
Children:	Yeah!!!!!
Teacher:	I have noticed that quite often the clays that we use in our school come from England. I am not sure from which country this clay is from. Some clays are also Finnish.
Child 4:	Yes! I could guess!
Teacher:	And this clay has been already worked with machine. The machine has already taken air bubbles out of the clay.
Child 5:	And worms!
Teacher:	Yes indeed this clay has been cleaned. There is nothing extra waste in it. But if you took the clay straight from the ground, you should work on it for a while to get the air bubbles out. Because if we leave the air bubbles there the clay work will easily explode when we heat it. Why do I want to heat your clay works at the end? Put them to a really hot kiln.
Child 6:	I have seen something in Norway in a glass shop. First, there was only this lump, then they put on a stick and but it on fire and then they could modify and blow it.
Teacher:	Yes that's glassblowing. Glass acts a bit similarly as clay in the kiln.
Child 7:	So that it will get hard, almost like a stone.
Teacher:	Yes, you are right. The kiln will solidify and harden the clay.
Child 1:	How did they make that clay that colour?
Teacher:	This is red clay. So this is the original colour of this clay when it's on the ground.

The teacher and children continue exploring clay.

4. Discussion

In the present study, we examined educational dialogue in the Grade 1 classrooms of teachers with low, moderate and high self-efficacy beliefs. Episodes of educational dialogue were categorised among the four patterns of dialogic teaching. In terms of the occurrence of the dialogues, the results showed that teachers with low self-efficacy used educational dialogue the least frequently in their classrooms. In terms of the quality of the dialogues, teachers with low self-efficacy utilised less teacher-initiated dialogue of a high quality compared with moderate and high self-efficacy teachers. It was also found that although the moderate and high self-efficacy teachers conducted almost the same amount of dialogic episodes in total, the quality of the dialogues in their lessons varied: high self-efficacy teachers utilised more child-initiated dialogues of a high quality compared with the moderate self-efficacy teachers.

First, we examined the occurrence of episodes of educational dialogue within the classroom interactions of low, moderate and high self-efficacy teachers. Previous research has shown that teachers' high self-efficacy beliefs foster their work commitment (Klassen & Chiu, 2011) and can be linked with the educational practices that they choose to use and invest effort and persistence in (Bandura, 1997; Woolfolk Hoy et al., 2009). The findings of the present study showed that low self-efficacy teachers used educational dialogue the least often in their classrooms, whereas the moderate and high self-efficacy teachers used dialogue significantly more. It is acknowledged here that conducting educational dialogue and scaffolding students' learning through it can be challenging for teachers and requires a high amount of effort (Muhonen et al., 2018; Sorensen & Takle, 2002). It is possible that high and moderate self-efficacy teachers may feel more competent and confident in their teaching and using educational dialogue, whereas low self-efficacy teachers may experience a lack of confidence or knowledge in carrying out and investing time in dialogue.

It is also worth considering that teachers' teaching experiences may be linked with the teachers' self-efficacy and occurrence of educational dialogue. Prior research has shown that teachers' sense of efficacy tends to increase with years of teaching experience (Soodak & Podell, 1997). In the teacher selection phase of the present study, it was interesting to note that teachers' work experience varied among the low, moderate and high self-efficacy teachers although the average score of teaching experience in the total sample was relatively high (16.1 years). On average, the low self-efficacy teachers were found to have the most teaching experience (21.5 years), whereas the moderate self-efficacy teachers had the least teaching experience (13.7 years). Also the high self-efficacy teachers had a high average teaching experience (19.5 years). Though the predominant research suggests that teacher self-efficacy increases with experience (Soodak & Podell, 1997), it has also been suggested that the teaching experience may also have an effect on how teachers perceive their own abilities and limitations and how they then can become more aware of these limitations (Egyed & Short, 2006). The teacher group of high self-efficacy beliefs and high teaching experience can be seen as representing the 'ideal' scenario in which the teachers' self-efficacy growth with years is reflected in their high-quality teaching practices, in this case, in the use of educational dialogue. On the other hand, the teacher group of low self-efficacy beliefs and high teaching experience can be seen as representing a somewhat 'cynical' scenario in which the teachers' decreased self-efficacy over the years and where low perceptions about their abilities and limitations are reflected in their scarce use of educational dialogue in the classroom. The less experienced teachers of the sample with moderate self-efficacy conducted educational dialogue the most in their classrooms. Recently, the importance of classroom interactions and educational dialogue has been acknowledged in Finnish teacher education, and there has been an endeavour to increase teacher students' skills to conduct and scaffold educational dialogue (Muhonen et al., 2016, 2018). Because these teachers received their teacher education more recently, their

higher use of educational dialogue may also reflect the quality of the current teacher education in Finland.

The second research question focused on the quality of educational dialogue by examining the patterns of dialogic teaching among low, moderate and high self-efficacy teachers. Previous studies (Muhonen et al., 2016, 2018, 2020) have shown that teacher-initiated high-quality dialogue is the prevalent dialogue pattern in primary school and preschool classrooms. The findings of the current study are in line with previous studies because teacher-initiated, high-quality dialogues occurred the most frequently in the current sample. However, the findings showed significant variation in the patterns of dialogic teaching between the three teacher groups. Moderate and high self-efficacy teachers utilised teacher-initiated, high-quality dialogue significantly more compared with the low self-efficacy teachers. Especially in the classrooms of moderate self-efficacy teachers, the clear majority of the identified dialogic episodes represented teacher-initiated, high-quality dialogue (33 episodes out of 44 episodes). This indicates that the moderate and high self-efficacy teachers may put more effort into scaffolding dialogue and students' learning through it. The findings support previous research, which suggests that teachers with higher self-efficacy are more likely to provide higher-quality support for students in their classrooms, which can lead to a higher quality in the teacher–student classroom interactions (Perera & John, 2020; Woolfolk Hoy et al., 2009). Indeed, the most frequently found teacher-initiated, high-quality dialogues are characterised by high-quality teacher support and scaffolding. As Alexander (2000) suggested, in well-scaffolded educational dialogue, the shared knowledge building is structured through questioning, joint activity and shared conceptions, which were found in the classrooms of moderate and high self-efficacy teachers. This type of active and versatile scaffolding enables opportunities for student participation and conceptual development (Gillies, 2004: Gillies, 2015), but on the other hand, it is still predominantly led by the teacher.

It is also important to acknowledge that child-initiated dialogues were rare in the current sample of Grade 1 teachers and their classrooms. Similar findings have been found in research on primary school and preschool classrooms (Muhonen et al., 2016, 2018, 2020). However, the findings of the current study added new knowledge by showing that the high self-efficacy teachers allowed and scaffolded child-initiated dialogues the most out of the three teacher groups. Although, in total, the moderate and high self-efficacy teachers were found to have approximately the same amount of dialogic episodes, high self-efficacy teachers conducted significantly more child-initiated, high-quality dialogues compared with the moderate self-efficacy teachers. Prior research has shown that teachers experiencing high self-efficacy typically create a more favourable instructional learning environment for their students by utilising more student-centred educational approaches (Nie et al., 2013) and providing higher learning support (Holzberger et al., 2013). The results of the present study showed that teachers experiencing high self-efficacy may feel more confident about their educational abilities and are willing to invest more time, space and effort to facilitate beneficial learning experiences for students through child-initiated dialogues. Conducting child-initiated dialogues can be demanding for teachers because they cannot necessarily predict where the dialogue may lead, and they might not have a prior plan for the discussion (Muhonen et al., 2016). In this type of situation, high self-efficacy and trust in one's own professional knowledge may support the teacher in allowing an open space for child-initiated talk, being sensitive and flexible during the discussion and still forming and guiding a clear learning goal for the discussion.

4.1. Implications, future directions, and limitations

The present study has both theoretical and practical implications. Because prior research has acknowledged the importance of educational dialogue in terms of students' learning (e.g., Alexander, 2018; Muhonen et al., 2018; Sedova et al., 2019), more effort should

be paid to how to guarantee a sufficient amount and quality of dialogue in the classroom of all teachers. Research has shown that educational dialogue in the classrooms of different school levels often remains scant and unproductive (Howe & Abedin 2013), but little is known about the teacher-related factors that may have an effect on the low amount and quality of dialogue. The present study contributes to this line of previous research by suggesting that the level of teachers' self-efficacy may be linked with the occurrence and quality of educational dialogue in the classrooms. Low self-efficacy teachers utilise less educational dialogue of a lower quality compared with teachers experiencing moderate or high self-efficacy. Based on these findings, we suggest that more attention should be paid to teachers' competence and confidence to conduct productive educational dialogue. It has been suggested that most teachers have only a vague idea about how to utilise dialogue as a teaching method and that teachers lack specific strategies for conducting dialogic teaching (Mercer et al., 2009). Starting already from preservice teacher education, teachers should be provided with the knowledge, tools and practical training on how to scaffold productive educational dialogue as part of their teaching. It is important that teacher education provides sufficient training of educational dialogue, for example, through teaching training, for teachers to feel competent and comfortable about their skills so that they can conduct educational dialogue as an instruction method. For instance, video viewing has been acknowledged as a unique and powerful tool in the education of preservice teachers and the professional development of in-service teachers to raise teachers' quality of instruction and interaction (Gaudin & Chalies, 2015). In training, special attention should be paid to concrete examples and strategies on how to scaffold child-initiated dialogues, which are rarely found in studies investigating the classroom. It is important that teachers become aware of the ways to facilitate children's willingness and ability to actively share their thoughts and ideas.

For future research, it is important to further explore the links between teacher self-efficacy and educational dialogue, especially for students' learning. For example, it would be interesting to investigate the extent to which teacher self-efficacy may mediate the associations between the quality of educational dialogue and student learning. In addition, in future research, various teacher-related factors and their relation to educational dialogue should be considered, which might help us in understanding the conditions that may favour or restrict educational dialogue and students' learning.

The present study also has several limitations that should be considered before making any direct causal inferences based on the results. First, the sample was relatively small, which is why the statistical analyses were conducted utilising nonparametric tests. However, the number of 72 lessons can be considered rich for qualitative analysis (which was the main part of the study). Second, eight teachers from the low, moderate and high self-efficacy groups were randomly selected to represent their self-efficacy group. However, the initial group sizes varied. Eight teachers had low self-efficacy, 34 had moderate self-efficacy, and 12 had high self-efficacy. Therefore, there could be variation in how well the eight randomly selected teachers represented the self-efficacy levels of their teacher groups. Third, the subjects of the lessons were not controlled. Therefore, the sample included diverse subjects (literacy, mathematics, science, religion/social studies and arts and crafts), and it varied which teacher was teaching which subject during the recording. It is important to acknowledge that the lesson subject or topic may influence the teacher's opportunities to utilise educational dialogue. Fourth, the teacher self-efficacy beliefs were measured with one measure and combined as a mean. We acknowledge that the one self-efficacy mean score per teacher does not differentiate between the three domains of TSES: efficacy for instructional strategies, efficacy for classroom management and efficacy for student engagement. However, the three domains of self-efficacy were checked separately before combining the one mean score, and they were found to

correlate significantly with each other. Fifth, the teachers did not receive instruction or extended knowledge regarding how to conduct educational dialogue in the classroom and their previous knowledge on educational dialogue was not mapped (the study did not carry out an intervention). Therefore, it is important to acknowledge that the teachers' basic knowledge on educational dialogue may have varied (for instance depending on the time they received their teacher education) and therefore influenced on the occurrence of dialogue.

4.2. Conclusions

The present study is among the first to explore how teacher self-efficacy might reflect the occurrence and quality of educational dialogue in the classroom. Based on the findings, the level of teachers' self-efficacy seems to be linked with both the quantity and quality of the educational dialogue. Regarding the occurrence of the dialogues, teachers experiencing low self-efficacy tend to conduct less educational dialogue compared with teachers experiencing either moderate or high self-efficacy. Regarding the quality of the dialogues, the findings showed that teachers with low self-efficacy utilised less teacher-initiated dialogue of high quality, and teachers experiencing high self-efficacy conducted more child-initiated high-quality dialogue in their classroom. Based on the findings, we suggest that to increase the quality and occurrence of educational dialogue in the classrooms, resources should be invested to support teachers' educational competence. Because conducting education has been acknowledged as demanding for teachers, they need sufficient training to feel competent and comfortable about their skills to conduct education dialogue as an instruction method.

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