Indicators of student engagement:
What teachers notice during introductory algebra lessons

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ABSTRACT

This article presents results from an empirical study of how student engagement is visible during introductory algebra. Previously, the notion of engagement in mathematics has been studied from students’ and researchers’ perspectives. This study is instead focused on teachers’ perspectives on student engagement. Eight teachers in grade 6-7 have shared video recorded episodes from their own lessons and a model based on those episodes is presented. The outcome of teachers’ discussions shows that engagement is recognised as different types of student participation, indicated by specific student actions in the classroom. This study gives further insights into the notion of engagement as seen by teachers and provides specific examples, such as verbalising thinking, completing peer utterances and active listening.

Key words: Student engagement, introductory algebra, video research, focus group study

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1. INTRODUCTION

Student engagement has been discussed within the field of mathematics education for a long time. While no universally accepted definition of student engagement exists, when discussed on a general level, engagement is described as students investment in and effort directed towards learning (Newmann, 1992; Azevedo, diSessa & Sherin, 2012). Engagement is also a form of active negotiation, which occurs through gestures and speech, based on the assumption that the interplay between students and teachers shapes instructional practice. For example, signs of engagement within instructional practice have been found in forms of minimal-responses, such as mhm, yeah, uh-huh, and right, which a listener utters in response during a speech event. In this form of active listening a student can signal a certain level of engagement with the speaker (Fellegy, 1995; Schegloff, 1999).

In mathematics, the notion of student engagement has been approached in connection to attitudes and motives - from both students’ and researchers’ perspectives (Ainley, 1993; Blumenfeld, 1992; Nyman & Emanuelsson, 2013). However, teachers’ views have been underrepresented in the body of research. Since engaging students in content matter is an essential component of teaching, it is important to characterise the notion from the view of those who teach. Therefore, the aim of this study is to identify student engagement in mathematics as negotiated by teachers and exemplified with episodes from their own teaching.

2. THEORETICAL BACKGROUND

Engagement in theory and practice

Azevedo, diSessa and Sherin (2012) highlight engagement in mathematics and science by defining engagement in mathematics as “the intensity and quality of participation in classroom activities” (p. 270). Their assumption is that engagement can be visible to an observer, for example when “students show excitement and commitment to ideas they generate” (p. 276). Applied to lessons on introductory algebra, this definition could be phrased as the intensity and quality of students’ participation in algebra activities (Nyman & Kilhamn, 2014).

In recent studies, video analysis of lessons in mathematics has been applied to provide evidence of visible student engagement (Blumenfeld, 1992; Helme & Clarke, 2001, 2002; Nyman & Emanuelsson, 2013). For instance, Nyman & Emanuelsson (2013) have observed task specific attention, since what students direct their attention to in certain tasks can reveal
what they are interested and engaged in. In looking at participation within the course of a lesson, the authors approach the concepts of interest and engagement by focusing on the enactment of the mathematical task using the construct of task-related attention. Situated within the interactions during Swedish lessons on mathematical relationships, student interest is approached as task-specific attention, by using the categories of relevance, solution methods, and validation of tasks. Focus is on the learning outcomes that are central for describing student interest, and its relationship to participation in mathematics learning practices. It is for instance shown that interest is constructed when a student focuses attention on task relevance, striving for both solving the task and see the meaning of the task. The conclusion is that the teachers have opportunities to direct students’ attention by for instance clarifying the relevance of a task; thereby engaging them in content matter. Engagement can therefore be enhanced by specific student-teacher interactions that support and acknowledge task-related attention.

Another attempt to provide perspectives on engagement has been made by Helme and Clarke (2002), who propose a model that sheds light on engagement in mathematics as interactive involvement in the process of learning. This specific type of student engagement is referred to as cognitive engagement (CE) in order to separate engagement in mathematics from the engagement in non-mathematical issues (Blumenfeld, 1992; Helme & Clarke, 2002).

Helme and Clarke (2002) provide a fine-grained analysis of engagement in the form of detectible indicators during classroom interaction. The results are engagement indicators during different types of interactions (individual work, group work with and without the teacher, and whole class interaction), focusing on content matter as summarised in Figure 1. CE is identified at a classroom level through analysis of observations and interviews. This specific type of student engagement is an indicator of deliberate, task-specific thinking while participating in an activity, during which students really put their minds to it (Helme & Clarke, 2001).

This model pinpoints how students actively involve themselves in mathematics during the course of a lesson. More specifically, by analysing 54 video recorded lessons Helme and Clarke found that CE includes behaviours such as verbalised thinking, filling in teachers’ utterances and resisting distractions. The study shows that it is empirically possible for an observer or a team of observers to detect at least some indicators of cognitive engagement. Following the video analysis strategy, the researchers conducted a total of 109 interviews with 24 students, who had shown signs of engagement. This study provided a student perspective and additional indicators.
‘These included student claims to have made a genuine attempt to learn something, to resolve uncertainty or to have learned something in the lesson; student discussion, communication or recall of details of lesson content; and the claim to have been engaged during the lesson (e.g. “we really put our minds to it”).’ (Helme & Clarke, 2001, p. 142).

The representation in Figure 1 summarises results from Helme and Clarke’s studies and is helpful when it comes to visualising the way engagement is expressed during mathematics lessons. Such indicators are possible to identify within a set of video sequences.

![Figure 1: Representation of student engagement (Helme & Clarke, 2001)](image)

Factors that have an influence on those indicators are the individual, the learning environment, and construction of the tasks and activities (Ainley, 1993). In particular, it is
emphasised that task characteristics and individual factors should not be neglected as influential on student engagement.

The identification of CE indicators highlights different ways in which student engagement can be expressed in the mathematical classroom, how it can be visible to an observer, and the way it is expressed and detected in the mathematics classroom. However, the studies mentioned above do not deal with teachers’ perspectives on student engagement. This indicates a possibility that there are situations not captured in their data collection. Teachers’ noticing in the mathematics classrooms plays a central role when it comes to the style of teaching as well as the process of teaching and learning mathematics (Sherin, Jacobs & Philipp, 2011). Therefore, in this study the perspective of the teachers’ will be central and indicators in Figure 1 will serve as a reference point for the indicators developed by the teachers in their analysis.

3. METHOD

Participants

The participants consisted of eight teachers in grades 6 and 7, teaching mathematics in four different schools1. The participating teachers all volunteered for an international video study, the VIDEOMAT project (Kilhamn & Röj-Lindberg, 2012) as a part of their professional development. The teachers are of various ages, backgrounds and teaching experience, as shown in Table 1.

Table 1: An overview of the participating teachers

<table>
<thead>
<tr>
<th>School</th>
<th>Teacher</th>
<th>Background (years of experience)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ms T</td>
<td>General teacher, qualified for grades 1-6 (3 years)</td>
</tr>
<tr>
<td></td>
<td>Ms E</td>
<td>General teacher, qualified for grades 4-6 (22 years)</td>
</tr>
<tr>
<td>2</td>
<td>Ms B</td>
<td>General teacher, qualified for grades 1-7 (10 years)</td>
</tr>
<tr>
<td>3</td>
<td>Ms C</td>
<td>General teacher, qualified for grades 1-7 (10 years)</td>
</tr>
<tr>
<td>4</td>
<td>Ms U</td>
<td>Math, qualified for grades 7-9 (5 years)</td>
</tr>
<tr>
<td></td>
<td>Ms K</td>
<td>Math/Natural sciences, qualified for grades 7-9 (38 years)</td>
</tr>
<tr>
<td></td>
<td>Ms M</td>
<td>Math/Social sciences, qualified for grade 7-9 (5 years)</td>
</tr>
<tr>
<td></td>
<td>Mr S</td>
<td>Math/Technology, qualified for grade 7-upper secondary school (14 years)</td>
</tr>
</tbody>
</table>

Data collection

First, classroom video data were collected by a team of researchers (including the author) in

1 Teachers from the same school were placed in different groups.
the VIDEOMAT project (Kilhamn & Röj-Lindberg, 2012) in natural settings using three cameras. One camera was directed towards the teachers, one towards the whole class and one towards a focus group of students. Thereafter the episodes chosen by the teachers themselves were shown and discussed by the teachers in focus groups. The framing of the focus group sessions was based on videos of four introductory algebra lessons in four different Swedish schools. Thereafter each teacher was provided with videos of his/her own four lessons, with the following guidelines:

"Choose an episode where you can see an example of student engagement or interest in the mathematical content. These episodes are to be used as a point of departure for a discussion of the question: How can a teacher engage students in the mathematical content being dealt with?"

The teachers were then given 3 weeks to prepare their episodes of engagement. During 3 weeks they were expected to watch their own lessons and choose sequences of engagement. Finally, the teachers attended two focus group sessions of one-hour duration at the University of Gothenburg. The arrangement for the larger of the two focus groups is shown in Figure 2. The teachers did not view the lessons of the other teachers before the focus group sessions.

Figure 2: The focus group session set up

The focus group sessions were moderated by one of the researchers sitting next to the
teachers, while the other researcher was located next to a camera and took notes. In turn each teacher showed her chosen episodes, explained why the particular episode was chosen and how engagement is visible in the episode. A discussion followed, concerning the episodes in relation to engagement in algebra tasks and the algebraic target knowledge.

The moderator turned the discussion to content related aspects during the sessions, by focusing on the importance of algebra (Nyman & Kilhamn, 2014). The focus group sessions were video documented using two different cameras, showing the chosen episodes and the teachers’ discussions of those episodes.

The data consists of transcripts from Focus Group 1, with the total of 407 utterances from 5 teachers, and from Focus Group 2, with 181 utterances from 3 teachers. Teachers’ discussions focus on video recorded episodes from their own teaching. The episodes provide examples of what the teachers recognise as engagement and how this is identified in classroom situations.

Data analysis

The analysis is based on teachers’ discussions from the two focus group discussions. The notion of engagement was not defined for the participating teachers, since the overall aim was to find out how they negotiate this phenomenon in the context of their own and each other’s mathematics classrooms. This article reports on the first step of teachers’ discussions, which is to characterise the indicators of engagement that teachers chose.

Transcripts representing discussions were analysed by the two researchers, using interaction analysis in an iterative process with the categories developed by Helme and Clarke (2001, 2002) used as a starting point. The analysis focused on how teachers identify student engagement in mathematics in relation to Helme and Clarke’s model. Following Miles and Huberman (1994), indicators of engagement were produced by noticing patterns and themes, making sense of data by using informed intuition, and clustering. Teachers’ utterances were sorted into categories corresponding to the model of Helme and Clarke (2001, 2002). Clustering was done by grouping similar chunks of reasoning and classifying those as indicators of engagement. A separate version of this article with codes after every citation of utterances from the transcript was produced. After every citation a code describing focus group (e.g., F1), number of turn (e.g., 94) and type of interaction (e.g., student-teacher, group or whole class) was written down: [e.g., F1 94 G]. This purpose of the coding was a part of the data analysis in order to keep track of turns and type of interactions where engagement occurred according to the teachers. The coding was not included in the final version of the
The analysis resulted in indicators conceptualising engagement in mathematics, similar to some of those in Helme and Clarke’s model. Those indicators are now presented and exemplified in the results section. Data from the same teachers is found in several categories.

4. RESULTS

Episodes of engagement

In this section episodes of engagement in mathematics chosen by each teacher are presented. The results presented here are based on teachers’ utterances with respect to the episodes shown. Table 2 includes the episodes each teacher chose to show and that were taken as a point of departure for discussions. From the data, indicators were identified and categorised. Since the teachers were provided with only teacher-camera videos, no episodes of student individual work (that is students working alone) were included in the analysis. The teachers Ms M and Ms U taught collaboratively in grade 7, therefore their chosen episodes come from the same set of lessons. They did not present any of their own episodes, which will be discussed further on in section 4.

Table 2: Description of episodes chosen by the teachers

<table>
<thead>
<tr>
<th>Teacher (grade)</th>
<th>Episode</th>
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<tbody>
<tr>
<td>Mr S (7)</td>
<td>Whole class introduction referring to history of algebra. The etymology of the word algebra is discussed, as well as what algebra can consist of.</td>
</tr>
<tr>
<td>Ms M a) (7)</td>
<td>Group interaction discussing student reasoning concerning the expression 2x+6.</td>
</tr>
<tr>
<td>Ms M b) (7)</td>
<td>Group interaction discussing the difference between representations of 4+y and 4y.</td>
</tr>
<tr>
<td>Ms C a) (6)</td>
<td>Group interaction, where a student is asking for help concerning the structure of an algebraic equation.</td>
</tr>
<tr>
<td>Ms C b) (6)</td>
<td>Whole class introduction of variables. The teacher explains the relationships between ages of her family members. Students are asked to represent ages of their own family members in their notebooks.</td>
</tr>
<tr>
<td>Ms E (6)</td>
<td>Group interaction. The teacher is discussing a matchstick pattern task with a pair of students when a third student joins in to elaborate on the answer. He tries to explain the formation of the next pattern to his fellow students and get validation/feedback from the teacher.</td>
</tr>
<tr>
<td>Ms B (6)</td>
<td>Group interaction, where the teacher joins in to discuss student questions concerning homework follow-up.</td>
</tr>
<tr>
<td>Ms U a) (7)</td>
<td>Whole class follow-up of group work, expressions of perimeters of different geometrical shapes presented on the board.</td>
</tr>
<tr>
<td>Ms U b) (7)</td>
<td>Group interaction, where the teacher acknowledges a group of students by sharing their reasoning about the commutative property of multiplication to the class.</td>
</tr>
</tbody>
</table>

Indicator of student engagement
The episodes shared and discussed by the teachers generated specific indicators of engagement, which are summarised and connected to a certain type of classroom interaction in Figure 3.

![Figure 3: Indicators that teachers exemplified in their episodes of student engagement](image)

As it turned out, most of the indicators in this study correspond to previously identified indicators (Helme & Clarke, 2001). All of the indicators are related to visible student behaviour, in particular attention/concentration, asking/answering questions and communication in the form of listening/speaking/making gestures. Each type of indicator will now be further described and exemplified.

1) **Verbalising thinking**

Verbalising thinking was noted as an indicator of engagement, particularly in situations where the student conveyed a wish to share their own ideas about the content with others. An example of verbalised thinking comes from Ms M’s class, when a student “wants to use
mathematical language and tries to express what she knows and ask questions”. Also, in that specific group interaction, a boy helps a girl by verbalised thinking: “she becomes a bit insecure, and he saves her”, says Ms M.

Further, Ms C described how a student shared her ideas: “… and I also noticed it earlier, she starts to explain herself, how she thought before I came, and then it was divided by 3, I will divide by 3, she explained to me when I came”. From the other focus group, Ms U commented on the group work in her class “… after this lesson, and during, students felt that they understood expressions somehow, that they could do something”. They could connect it to “some sort of everyday life and geometry is quite close, with distances and those perimeters”. Ms E chose an episode where a student “turns around and tries to listen and support the reasoning of another student”. Those indicators were connected to the quality of participation, for example by Ms E emphasising: “he had really tried to find solutions, really engaged himself in this”.

2) Concentration
Concentration was visible for the teachers in situations where students appeared to stay focused on an explanation throughout a whole episode. Teachers claimed that they could distinguish between concentration and the lack of it, since distraction was resisted even when it was a class with a lot of “movement” and distraction is usually hard to resist. Concentration was seen by the teachers’ as being expressed as curiosity: “They are curious: what is the answer to that?”. In another episode, concentration was identified by the teachers as a sign of engagement in a sense that some students “in the background groups” took responsibility for their learning during group work. Also concentration was noticed at instances, like when students in Ms B’s class worked on a tasks and then said: “What? Is it lunch already? I usually start to look at the clock when it is quarter past eleven. It was 11 just now.” This student can reach flow and concentrate on tasks better if the emphasis is on “how, why, more suggestions”, the teacher explains.

3) Gestures
Gestures and excitement, such as the way students nod at specific times and follow the teachers’ reasoning with eyes and head movements, were also detected. In one example a student has interacted with a teacher and then goes to his group and explains in his own words what he has understood. Ms S says: “When he has understood, then he is intrigued, wants to describe it in another way”. In this discussion the teachers concluded that knowledge and
mastery enhances engagement: the more you know the more you want to know. Algebra, they say, can be fun and exciting; give “the kick you get out of feeling smart”. All students can feel this, but sometimes they first need to get over a barrier of hard work and understand the basics before they feel self-efficacy.

4) Asking and answering questions
There was a clear consensus in both groups concerning student questions as a central indicator of engagement, and several examples were given. In Ms M’s episode a girl “that thinks mathematics is pretty hard, it was fun to see how she dominates verbally and asks questions and... What happens in the group here”. This girl’s questions affected engagement in the whole group. In Ms C’s episode (a), in a student-teacher interaction, the student asked about something she did not understand and after that she learns, in contrast to other students who asked about something just to get the answer: “Why did I chose this episode? What I think is good here, with student D, is that she herself asks what she does not understand. Some students pretend that they understand and just wait for me to give them the answer, but student D does not give up, she asks about what she does not get. So that situation becomes good, eeh, she learns after it, and that is because she is interested to learn for real.”

Similar cases were also noted in the other focus group, for instance in Ms U’s whole class episode, where she showed “that they pose a question, not a question of what the right answer is, but a new question, sort of, on the problem.” Ms B commented on the same episode and pinpointed that the question posed led to discussion and argumentation. Questions focussing on the target knowledge are signs of engagement: “that it does not generate a lot of side-tracks from [the question], that students want to listen anyway, otherwise some students would take the opportunity, I think, to make side-tracks”. This was a strong indicator of engagement, which indicates that the teachers were valuing the quality of student questions and participation, not only the quantity.

In one of the episodes the question of why an equation was supposed to be written up in a certain way was also pointed out as an indicator of engagement: “That is a sign of engagement, the question why one should write like that. Or at least that one wants to learn.” This student question was an expression of the will to understand. Here it turns out that the teacher can distinguish between this type of engagement and pretending, where the student only says: “ok, ok I understand, he [the student] says so if he is not engaged or if he does not want to”.

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5) Enhancing ideas
As a way of enhancing ideas, active listening to ideas expressed as answers or explanations was recognised by the teachers as an important sign of student engagement. Ms C reflected on how students can listen actively: “some sit and rest under the introduction, and others, I think they learn a lot”, “listening to each other”, or when the student turns around to another group and shows that he has listened. For example, Ms B showed an episode where she takes one student’s solution of a task and then explaining the task to the whole group. Meanwhile, another student in the group listens actively, sustaining his engagement throughout the whole explanation. It is necessary “…that they are good at listening as well, I think, that they don’t just stand there and want to tell what they understood themselves, but that one really sees that they are trying to understand what someone else is saying, too” as well as showing “interest in others’ solutions and answers and questions”.

6) Argumentation and justification
Argumentation and justification were brought up as further indicators of engagement. These indicators were exemplified by Ms B: “if you want something, you show persistence, you want to do something and stand up for your own idea, then suddenly a totally different engagement is necessary […] this type of individual initiative automatically sets off other’s engagement” or “the boy that wanted to explain, or the one who does not let it go. Otherwise it feels like they: yes, I can do it, they put the paper to the side and look at the others, like: yeah yeah, you try”. Here Ms B highlights the role of student engagement on an individual level.

Disengagement
To contrast the indicators of engagement in a mathematical activity, disengagement such as not being able to resist distractions was also detected. In fact, it was the teachers themselves who contrasted the indicators presented in this paper with instances of disengagement. The teachers agreed that a teacher could discern the difference between real and pretended understanding. For example, when one student lost focus when everybody had done their homework except for him. He did not have any content understanding to start with. Ms B explains the situation: “then it suddenly became very hard: oh you have done this and you have done that. He was not following that, mm, exactly; he had nothing to start with. Yes, yes he had lost focus.”
Another example of disengagement was discovered when one of Ms T’s students shifted to a non-mathematical activity, choosing to disengage from the mathematics. “When it [the activity] drifts off to something else, well, like start drawing on the desk”. According to her, students have to be in class and hand in their work, but that does not necessarily mean they are engaged. Again, it was the quality of students’ participation that teachers noticed here.

4. DISCUSSION AND CONCLUSION

This study gives evidence of student engagement indicators as identified by the teachers in their own and each other’s lessons. Most indicators, such as student questions, argumentation/justification/interest in others’ solutions, concentration and gestures (Figure 3) were exemplified in relation to all three types of interactions: student-teacher, group-teacher, and whole class interactions.

Expressing a wish to understand and learn shows engagement in mathematics - several times the teachers described engagement this way. They pointed out indicators that included students’ wish to understand the concept of variables. In particular, the will to make sense of variables drove the students. This is an important result in relation to the topic of algebra, since algebra is predominantly about reasoning and not merely about arriving at a correct answer.

As shown in the results, teachers were aware of the fact that students merely completing the tasks and producing correct answers did not necessarily indicate engagement. Nevertheless, teachers pointed out that engagement was sometimes invisible during classroom interaction, but showed when for instance one of the students approached the teacher after a lesson to share their thoughts.

Another important result is that active listening was one of the most common indicators associated with student engagement by the teachers. Active listening was one of the most challenging indicators to investigate for an independent researcher using a video analysis approach. Active listening was an important sign of student engagement according to the teachers, since it is recognisable as a part of their professional knowledge. Active listening was also an initial step towards student participation. This shows that teachers were able to notice aspects of participation that outside researchers could not detect. A teacher could establish whether the student was listening superficially and gave a minimal response: “yeah, yeah, I got it”, or whether a student was listening actively to the instructions before actively starting off with a task. An outside observer could easily neglect this indicator, since the active listener does not always verbally contribute to the conversation and is therefore
sometimes overlooked as a participator. Hence, the teachers themselves are the ones who best approach this indicator during classroom research. This is a methodologically noteworthy aspect for further research; the voice of the teachers needs to be highlighted as important in the process of analysis, since teachers’ conversance with the conditions in their own classrooms and familiarity with the students are valuable when shedding light on the concept of engagement.

The results support the recognition of student engagement as empirically researchable. The strength of this study is that it adds to Helme and Clarke’s work by adding teachers’ viewpoints on their own and each other’s teaching. It was shown that teachers could identify and agree on how student engagement in algebra is displayed as part of their professional practice. In the beginning of the focus group session, two of the teachers, Ms T and Ms K, claimed not to be able to choose engaging sequences from their own lessons. When they started reasoning with the rest of the group, scrutinising their own and each other’s teaching and trying to justify the reasons for not being able to choose, it started to emerge that neither of them were intentionally working with engagement and therefore did not expect to find it in their own teaching.

Ms K took part in the planning and observation of Mr S’s lesson and was therefore asked to choose an episode from his lesson. However, Ms K was not sure that she could find engaging instances during that lesson. Ms T, on the other hand, was teaching her own lessons, but was primarily focusing on “following one particular student during these lessons, and could not engage the class on a whole class level”. In other words, Ms T and Ms K could not define student engagement on their own. This highlighted the importance of a collective view on the notion of engagement, which became an issue during the analytical process: would Ms K and Ms T be able to identify student engagement in other teachers’ lessons and agree upon a definition? During the discussion they agreed that defining student engagement on their own did not turn out to be as fruitful for them as reading about it or discussing it with their colleagues or researchers. This process is important, since at the end of the session all teachers came to a common agreement that it is possible to identify engagement in various types of interactions to some extent, but that there are advantages in seeing and negotiating students’ engagement in mathematics together with other teachers due to some indicators that are more visible to the teacher in his/her own classroom. Teachers can identify the quality of student participation in their own classrooms in a way that differs from a researcher or an outside observer.

The outcomes of this study support the definition of engagement (Azevedo et al., 2012)
with respect to the quality of participation. The main quality criterion is for the students to engage in mathematics or the specific target knowledge in algebra, rather than shifting focus to non-mathematical activities.

Analysis of the data in this study revealed that teachers’ understanding of the notion of engagement in mathematics is related to signs of student participation visible to a new observer, and, as pointed out in other studies, active involvement in activities. Also, there is latent participation, such as active listening, detected due to teachers’ previous knowledge of their students and professional skills that allow them to distinguish between genuine or pretended engagement.

The majority of the indicators negotiated by the teachers in this study fit well with previous results. Teachers mentioned that several of the indicators could be connected to all forms of classroom interaction. As seen in the results section (Figure 3), teachers’ examples of student engagement coincide with some indicators described in a model from previous research (Helme & Clarke, 2001, 2002). The schemes look different due to the fact that types of interactions in this study differed, with the focus on students’ interaction with the teacher. Also, since some indicators were absent; the teachers in this study did not detect them in their own teaching. However, during the discussions, teachers mentioned some indicators as possible to occur even if they were not illustrated in their video-recorded lessons.

This study presents examples of indicators, which can help recognise student engagement and disengagement in algebra. Teachers in this study pointed out particular situations during introductory algebra lessons that provided instructional opportunities to contribute to student engagement. Those situations can evoke new questions and contribute to further investigations as well as the development of engagement in the field of mathematics education research and in mathematics classrooms. Hopefully these teachers’ perspectives on indicators of engagement will be helpful when making sense of events related to student engagement in instructional settings and for improving teaching.

Student engagement in mathematics is a complex concept, influenced by many factors. In future research it might be fruitful to strengthen the relationship between indicators of engagement and specific algebra teaching and learning outcomes. For instance, in connection to their model Helme and Clarke (2002) stressed that engagement in mathematics classrooms is influenced by individual and social factors as well as task characteristics, and that some task characteristics can contribute to student engagement. What is yet to be investigated is how indicators are related to the specifics of the structure of algebra tasks.
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