Interactional and epistemic challenges in students’ help-seeking in sessions of mathematical homework support: presenting the problem

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ABSTRACT

This article concerns students’ help-seeking in one particular educational setting in Sweden, namely mathematical homework support. It presents in-depth analyses of video-recorded instances of interactions using multimodal conversation analysis. By exploring how tutors and students with no prior interactional history collaboratively establish an agreement upon what constitutes the student’s problem, the study sheds light on the problem presentation and its interactional and epistemic challenges and pitfalls. The results of the study demonstrate the sequential pattern of help-seeking interactions and the crucial role of objects, such as notepads, as epistemic resources for determining the student’s problem. It moreover shows how students put their (mis)understandings on display using verbal, embodied and material resources to describe their problem-solving efforts. Finally, it shows how epistemic framings of the help request are of consequence, in which responsibility for the problem presentation may be transferred from student to tutor.

KEYWORDS

Conversation analysis; multimodal interaction; shadow education; help seeking; problem presentation

1. Introduction

As an educational practice, help-seeking has been proven crucial not only for averting school failure but also for promoting academic engagement (e.g. Du, Xu, and Fan 2016; Karabenick 2004). Additionally, it has been established that help-seeking plays a particularly critical role in relation to mathematical learning, with students who adequately manage to ask for help acquiring a higher degree of mathematical achievement (Ryan, Patrick, and Shim 2005; Ryan and Shim 2012). However, even though the social ability to solicit, obtain, and use help in educational settings has been repeatedly established as an important learning skill, little is still known about how help-seeking is accomplished interactionally. To address that question, therefore, this article investigates the social practices of help-seeking in one particular educational setting, namely mathematical homework support.

Homework support is a growing phenomenon in Sweden, as in many countries, where both private and non-profit forms of out-of-school educational activities have grown in the last decade. In fact, as education has progressively become a more vital asset in society, one that to a large extent also governs the life paths of individuals, such forms of
‘shadow education’ (Bray 2013) have become an ever more present segment of the educational landscape as more and more students expand their academic endeavours into settings outside of ordinary classrooms. In investigating the practices of help-seeking, the setting of homework support is particularly interesting for several reasons. First, it is a rather unexplored educational setup, particularly in terms of studies that take an interest in the everyday educational routines of homework support and the practical challenges they may bring. Second, the interactional circumstances of homework support – in which the participants lack a shared interactional history and tutors have limited insight into students’ mathematical knowledge and the assignments – create particularly fruitful conditions to scrutinise the interactional and epistemic aspects of help-seeking in depth.

Using a multimodal conversation analytic approach (Goodwin 2000; Schegloff 2007) with video-recorded instances of tutor–student interaction, this study provides in-depth analyses of identified practical methods of student help-seeking. In so doing it, aims to illuminate interactional and epistemic challenges incurred by help-seeking within the uncharted context of homework support.

2. Help-seeking in educational settings

Help-seeking can be seen as an alternative to individual problem-solving, and the ability to solicit, obtain, and use help within academic settings has been identified as an important learning skill (Nelson-Le Gall 1981; Murphy and Moriarty 1976; Newman 1995, 2002). Newman (2002, 132) argues in fact, that help-seeking is a crucial condition for learning how to learn, and considers it to be part of any self-regulatory learner’s ‘tool kit’. From such a perspective, help-seeking is categorised as an ‘adaptive strategy of self-regulated learning’ (Newman 1994, 285) that involves more than obtaining the correct answer to a problem; it asks for the help needed in order to be able to learn independently. According to Newman’s (2000, 352) definition, a help request, in order to serve as an adaptive type of strategy, further has to be (i) necessary, i.e. the requested help is needed, (ii) well planned, i.e. a potentially helpful target is chosen and the help request elicits the right type of information, and (iii) well processed, i.e. the request is posed in a socially appropriate way and leads to obtaining the required help.

Since help-seeking is dependent on the social actions of others, it is qualitatively different from many other strategies that students use for self-regulated learning (e.g. Ellis 1997). It involves at least two interactional steps. First, the help-seeker needs to get the attention of the potential helper. Second, s/he needs to formulate questions that request the right type of assistance. Before even getting to that point, however, the help-seeker has to engage in a number of activities, namely (i) identifying that a problem exists, (ii) determining that help is needed, and finally (iii) deciding whether to request help or not (cf. Schenke et al. 2015; Newman 2002). In light of this it is not surprising that research has established that many students tend to be more passive learners who, despite an awareness of academic difficulties, avoid asking for help (e.g. Good et al. 1987) and as a result persist unsuccessfully on their own or simply give up on problem-solving activities (Newman 2000).

Even though there seems to be a consensus among researchers that understanding the adaptive functions of help-seeking would increase our understanding of students’ learning (e.g. Anderson and Messick 1974; Murphy and Moriarty 1976), rather little is still
known about how help-seeking is interactionally accomplished in educational settings, and what its practical implications are. As put forth by Koole (2012, 1902), students who ask for help are faced with ‘the epistemic paradox of having to “know what you don’t know” or “understand what you don’t understand” in order to communicate what help is needed. Moreover, classroom studies have shown that the problem that gets to be explained tends to be the teacher’s and not the student’s, as teachers tailor their explanations to the problems they assume that students have, rather than to the ones the students formulate (Koole 2012). Under such circumstances, seeking and obtaining appropriate help is not always a straightforward task, but may involve interactional and epistemic challenges for both the help-seeker and the presumptive helper. As will be shown, the students’ manner of requesting help in the here focused homework support setting mostly follows variations of the same structural logic. However, their requests also differ in regards to the verbal, embodied, and material resources they use as well as to the epistemic claims they make, which in turn come to affect not only the identification of the students’ problems, but the instructional practices that follow.

3. Epistemic stance taking in multimodal interaction

Building on a multimodal conversation analytic theoretical framework (e.g. Goodwin 2018; Schegloff 2007; Stivers and Sidnell 2013), the present study aims to shed light on the collaborative work of help-seeking along with some interactional and epistemic challenges that such practices may incur. Based on analyses of video-recorded interaction, multimodal conversation analysis considers the sequential and temporal organisation of social interaction collectively organised by co-participants as they mobilise a range of vocal, verbal, and embodied resources that are publicly displayed and monitored in situ (Mondada 2014). Relevant for our analytic scope is the role of bodily conduct and material features of the setting for accomplishing tutor-student intersubjectivity, as well as how objects and artefacts become relevant in the course of particular actions within the focused help-seeking practices (cf. Jakonen 2015). From such a perspective, talk is seen as inextricably intertwined with the bodily conduct of the participants in a material environment (e.g. Goodwin 2007; Mondada 2014). Gestures and visual conduct function within and across utterances to accomplish particular actions, and resources in the immediate environment are used as a way of making sense of the actions of others (Goodwin 2007). These aspects are fundamentally important when seeking and providing help of any kind. Therefore, bodily conduct and the material environment are approached as critical aspects of the production and intelligibility of help-seeking in the setting focused on here.

Another element of meaning-making, and of particular relevance in help-seeking interactions, is the organisation of knowledge in interaction. Participants build shared understanding moment-by-moment through recognising what each knows about the world, and adjusting their actions and understandings in accordance with that recognition (Heritage 2013, 370). For educational settings, arranging the institutional business of teaching and learning includes ‘participants’ epistemic states as knowing and unknowing as well as what one is responsible to know and what one can expect others to know’ (Melander 2012, 233). In the analysis, epistemic access is treated as a publicly observable social phenomenon, as well as an interactional one in terms of how the tutors and students are able to make sense of each other and what they are doing. Epistemic stance concerns the moment-by-moment
expressions of relationships between knowing and unknowing participants, as managed through the design of turns at talk as well as the format of specific actions (Heritage 2012). Turning to someone for help positions the person doing the request as unknowing and the presumptive helper as knowing. Consequently, epistemic status or authority is related to the accomplishment of social categories (Heritage and Raymond 2005), such as tutors and students, and defined by the persons’ rights, responsibilities, and obligations to know (Stivers, Mondada, and Steensig 2011). Category-bound epistemic rights and obligations have been shown to provide the basis for categorisations of students’ epistemic access, regardless of students’ actual epistemic claims and displays (Heller 2017; see also Koole 2012). However, these results are based on long-term relationships between teachers and students, whereas in the homework support setting that is the focus of this study, the participants do not share an interactional history and hence have no previously established common ground to depart from. Consequently, the homework support setting is a perspicuous site for the exploration of how participants manage knowledge in help-seeking interactions.

4. Method: empirical setting, data and analytic approach

This article is part of a larger study of homework support across private, municipal, and non-profit organisations in Sweden. The analyses are based on video-recordings of homework support arranged within a nationwide, non-profit organisation specialised in offering homework support in mathematics. The data were collected on three occasions and resulted in approximately 7 hours of video documentation.

The homework support organisation offered their services several evenings a week in premises provided by local upper secondary schools. The services were open to any students who appeared and no pre-notification was required. Consequently, new students appeared from one week to another, and there was no real consistency in who the user group was. Most of the volunteers working for the organisation were students at university level, while some had commenced their professional careers. They all shared an interest in mathematics, and for some this constituted the core of their own education. However, none of them had any teacher training. When it came to which students utilised the homework support services there were some dissimilarities. For example, there was some variation in age/grade, ranging from lower secondary school to tertiary level, although most students were in upper secondary school. There was also a variety of levels of mathematical knowledge, with some students seeking homework support in order to avoid a failing grade, while others were high-performing students wanting to ensure a high rating.

At the location in which the video recordings were made, the homework support was arranged in a recreational area of a local upper secondary school. During the sessions the students were spread out at different tables, and while some were sitting alone, there were also groups of students who either arrived together or chose to sit at the same table upon arrival. The tutors, of which there were between two and four, had a table at which they sat between helping sessions. The tutors never openly offered their help, nor did they circulate the room to check on the students but waited for them to reach out for help before approaching. The students were therefore always in charge of initiating the help-seeking practices.
The analyses are based on extracts from video recordings of help-seeking interactions and encompass the participants’ use of verbal, embodied and material resources in situated interaction (Goodwin 2018; Mondada 2014). The analytic process started with an unmotivated examination of the video-recordings, which is a common procedure for studies that apply ethnomethodological conversation analysis. Recognising that the opening sequences of the help-seeking interactions, when the students request help and present their problem, were of particular import, we proceeded to scrutinise these initial parts in detail. We identified a recurrent sequential pattern with some variations pertaining to the interactional and epistemic challenges of the specific epistemic circumstances of the homework setting in which the participants meet for the first time. The organisation of problem presentations is analysed focusing on participants’ displayed understanding of what is to be presented, how it is to be presented, and what constitutes a complete problem presentation (cf. Robinson and Heritage 2005). The following questions are addressed: What are the interactional and epistemic resources that the students mobilise to present their problem? When do the participants treat the problem presentation as sufficient in order for the tutor to take the interactional floor and the activity to move into an explanatory phase? What are the challenges and pitfalls in determining when the problem presentation is complete?

The sequences chosen for analysis have been transcribed following conventions developed within CA (see Appendix). Translations into English are included. The translations are not idiomatic but attempt to maintain the Swedish way of expression while remaining comprehensible to the English speaker. Line drawings of video frames are incorporated into the representations in order to highlight analytically relevant embodied actions and the participants’ orientations to the material environment.

5. Analysis: recruiting help in a homework support setting

Before presenting some of the interactional and epistemic challenges the participants of the homework support setting regularly encountered while requesting help, two extracts (1–2) are presented in which the participants rapidly and without obstacles agree on what constitutes the student’s problem and smoothly continue into the instructional phase of the help-seeking. This first section serves as a contrastive comparison point in the three analytic sections that follow, which focus more on the possible challenges that may occur in the initial stage of a help-seeking sequence. The second section focuses on the role played by objects and learning materials in framing the help request, and how they work as epistemic resources when making sense of the problem presentations (Extracts 3–4). The third section explores a strategy for problem presentation that consists of verbal and embodied descriptions of calculations, with the descriptions making the students’ (mis)understandings available for scrutiny and evaluation (Extracts 5–6). The final section centres on how the epistemic framing of a help request makes it more difficult for the tutor to determine what help the student needs (Extract 7).

5.1. Problem presentations: the establishment of a sequential pattern

The first exchange presented here took place between the student Abina and one of the tutors (Extract 1). As Abina makes a call for the tutor’s attention by raising her hand and
making a verbal request for help, the tutor responds by approaching her and taking a seat next to her (see Appendix for descriptions of symbols used).

**Extract 1.**

1. Abina: (raises hand) kan ja få hjälp. 
   can i get some help.
2. Tutor 1: (approaches the table and sits down next to Abina)
3. Abina: +här. ——————
   here.
   +points at assignment —> + l. 4
4. (2.1)+
5. Tutor 1: ja,
   yes,
6. Abina: hur gör ja.
   how do i do it.
7. +(3.0)
8. Tutor 1: +looks at the book —> end of transcript
9. Abina: det handlar om absoluta tal.
   it’s about absolute numbers.
10. Tutor 1: eh: jo,
    uh: yes,
11. (1.0)
12. Tutor 1: ehm,
13. (17.1)
14. Tutor 1: em, (.) jo, (. ) > kolla här. < altså först.
   uhmm, (.) yes, (.) > look here. < like first.

As soon as the tutor is seated, Abina orients his attention towards an assignment by pointing in her maths book (see figure), accompanied by a deictic expression: ‘here’ (line 3). Together this constitutes an ‘environmentally coupled gesture’ linking talk, body, and material environment into a ‘multimodal package of complementary meaning-making practices’ that tie symbolic objects (e.g. mathematical symbols) to their instantiations in the local environment (Goodwin 2007, 55). In response to the establishment of a symbolically rich shared focus of visual orientation, the tutor gives a short affirmative reply: ‘yes’ (line 5), whereupon Abina, without delay, expands on her request: ‘how do I do it’ (line 6). By expressing uncertainty concerning how to approach the assignment, she indicates a problem of procedural rather than conceptual nature (cf. Koole 2012). When the tutor leans in to read her book, Abina adds information about the mathematical area: ‘it’s about absolute numbers’ (line 8). After a silent contemplation (lines 10–13), the tutor takes the interactional floor and starts to provide Abina with the help she needs in order to complete her assignment.
In another example of a help-seeking initiation (Extract 2), the student Niklas has requested help. The encounter starts off in a similar fashion, with the student verbally and through a pointing gesture localising the troublesome assignment (see figure), narrowing it down to a particular question, ‘number seven’ (line 2). After receiving an acknowledgement token from the tutor ‘mm’ (line 3) that acts as a receipt for the information and works as a continuer (Gardner 2001), Niklas announces the mathematical area: ‘functional method’ (line 4), thus orienting the tutor towards a subject-specific content. Another specification is produced by Niklas in line 6, clarifying that the requested mathematical operation is a simplification of the expression.

After a shorter silence, indicating that the tutor is not yet ready to move on to a next step, Niklas provides an additional problem description in which he specifies needing help with ‘both a and b’, consistently highlighting his orientation by pointing at the problem. The response token ‘okay’ in line 9 is here an activity-shift implicative: one conversational action is completed and a move from one phase to another is proposed (Gardner 2001, 52–57). Directly following this, the tutor is able to step in by asking the student to tell him how he has approached the problem so far. What these first two examples have in common is that both students, in a step-wise manner, straightforwardly provide the tutor with relevant information. A sequential pattern is established, where the sequence leading up to the instructional/explanatory phase is composed of the following parts:

1. initiation of help request,
2. localisation of the problematic assignment,
3. problem presentation, and
4. transition into an instructional/explanatory phase.
In both examples, the problem presentation includes (i) a specification of the nature of the problem, and (ii) the mathematical area. Although the information is provided in a different order and with variation, the problem presentations in Extracts 1 and 2 work adequately and efficiently in terms of how the participants are able to move on to an explanatory/instructional phase. The analyses moreover show how the participants mobilise verbal, embodied, and material resources to present their problem and to identify its completion, thus making it possible to transition into the next phase. Noticeable is that the localisation of the problem only occurs once the tutor sits down next to the student and the participants achieve a side-by-side spatial formation of their bodies.

The analyses of exchanges that do not move along as effortlessly are now presented by scrutinising different problem presentations and the challenges and pitfalls that the students and tutors encounter during the initial stages of help-seeking.

5.2. Objects as epistemic resources in problem presentations

Material objects have been shown to be crucial resources in organising participation in the classroom and in constructing and interpreting information requests (Jakonen 2015, 2018). One recurrent challenging circumstance we have found in our data is related to how the material environment may be used as an epistemic resource to render the help request and problem presentation understandable. Often students have a multitude of objects on their tables, in the form of books, tests, notepads, calculators and so on, and some of these are crucial for discerning the type of help the students need. Managing to establish mutual orientation towards relevant parts of these objects is thus important. In the first example, the interaction between the student Kajsa and Tutor 1 (Extract 3) is analysed.

Having already bodily requested help by raising her hand – a successful first turn as the tutor approaches her table – Kajsa adds a verbal request: ‘can I: get some help’ (line 3). The tutor pulls up a chair and takes a seat next to her. Simultaneously, Kajsa reorganises the objects in front of her, putting the maths book on top of her notepad, something that will prove consequential for the intelligibility of her help request. Kajsa localises the troublesome assignment through pointing and with a verbal specification: ‘it’s: number (nineteen)’ and the mathematical area ‘it’s to do with degrees:’ (line 5).

The attempt by the tutor to initiate an instructional activity (lines 7–9) displays that he has interpreted Kajsa’s actions to mean, similar to Extracts 1 and 2, that the student is having trouble starting her calculation. However, as Kajsa delivers an affirmative agreement with his instruction taking a knowing stance: ‘mm¿ (. ) exactly?’ (line 10), it is evident that this is not what she has a problem with. The tutor then formulates a more direct question concerning Kajsa’s problem-solving process: ‘uh: so how far did you get¿’ (line 11). The question can be seen as a display on his part of still not having grasped what kind of help is needed, and serves as a form of ‘epistemic status check’ (Sert 2013) by which to discern what Kajsa already knows or understands.

When Kajsa responds by initiating a candidate problem-solving approach – ‘uh: then I was thinking first that we should integrate (. ) uh the function itself.’ (lines 12–13) – this displays not only that she already has some form of epistemic access to a possible solution, but that she has also come to the conclusion that her approach is wrong. Moreover, she simultaneously lifts up the maths book that she herself recently placed on top of the notepad, revealing a source of information highly relevant for the possibility of gaining
correct help. The student’s pointing to a particular part of a formulation that she has written in her notepad highlights a source of information that makes her problem publicly available to her interlocutor. Moreover, Kajsa produces a verbal description of what she has done, making it possible for the tutor to step in and assist.

**Extract 3.**
In the next example, the tutor responds to the student’s minimal help request that merely localises the problematic assignment – ‘it’s this one’ – in a way that comes to forestall her problem presentation. Extract 4 features Abina from Extract 1 in interaction with a different tutor. Similar to Extract 1, Abina orient the tutor to an assignment in her maths book using a pointing reference accompanied by a deictic expression: ‘it’s this one’ (line 1). Instead of just performing a minimal acknowledgement token and awaiting more information as in previous examples, however, the tutor treats the problem presentation as complete and responds by leaning in closer while making a remark on the type of assignment: ‘a tricky one’. After delivering a decisive “ok” (line 2), he starts reading more thoroughly in the section of the book to which Abina has pointed (see figure, line 3). Directly following this, the tutor produces an instructional directive, namely that Abina should use formulas: ‘then you have to use your (2.0) formulas’ (line 4).

Extract 4.
The tutor’s proposition clearly assumes Abina’s problem is her inability to find the right procedural approach to the assignment, an assumption presumably linked to the lack of further information following Abina’s demonstrative reference. However, Abina challenges the tutor’s assumption, articulating that she has already done what he is proposing: ‘m? that’s what I’ve done’ (line 5). Similar to Extract 3, the student reorients the tutor’s attention by pointing to her notepad, where she has begun a calculation using one of the formulas. While mimicking Abina’s embodied reference, pointing to the same calculation (see figure, line 6), the tutor reinterprets the student’s problem in terms of her having got stuck. The tutor then carefully scrutinises the calculation, after which Abina, following a silence, adds information about the values that she has entered into the function by pointing to a different part of the notepad (see figure, line 8). Slightly discarding the relevance of the added information (line 10), the tutor shortly thereafter shifts into an explanatory phase.

What Extracts 3 and 4 have in common is a lack of fit between the tutor’s initial attempt at providing assistance and the student’s factual problem. In both cases this lack of fit originates from the student’s manner of initiating a demonstrative reference to one source of information while excluding other relevant ones, thus causing the tutor to treat the problem presentation as complete and to draw incorrect assumptions concerning the student’s problems. In turn, this leads to a collaborative negotiation of the problem presentation in which rearranging the material environment proves crucial. The analysis demonstrates how artefacts such as written calculations on a notepad may be conceptualised as part of what constitutes the students’ expanded epistemic domain. The artefacts work as epistemic resources for determining what the student’s problem is, in contrast to the maths book that merely provides information about the assignment. The analysis thus highlights the importance of bringing together diverse semiotic fields (talk, environment, and body) into integrated action packages to construct meaning and relevant action (Goodwin 2007) and, in this particular case, complete problem presentations.

5.3. Displays of (mis)understanding of problem presentations

Another strategy for making problem presentations that we have identified consists of students’ verbal and embodied descriptions of how they have attempted to solve a problem, guiding the tutor through either ongoing or terminated miscalculations. As the students describe their solutions step by step they simultaneously display their (mis)understandings to the tutor. The first example is an exchange between the student Linda and Tutor 2. In Extract 5, the student makes available her understanding of a problem by referring to a calculation that she has already written down in her notepad. However, as the tutor sits down next to the student, the first bit of information he gains is that the student has trouble remembering a specific formula (lines 1–2). Linda’s framing of her help request, in terms of ‘not remembering’ how to use a formula (lines 1–2), indexes issues of epistemic entitlement as well as responsibility, and serves as a form of ‘evasion device’ (Coulter 1985, 132) that enables her to avoid accountability, while upholding a form of epistemic status of someone with prior knowledge on the issue at hand. Her claim of not remembering signals to the tutor that the referred-to formula is the central content of which she needs help. As in the other examples, however, the student subsequently directs the tutor’s focus of attention to the troublesome assignment, both bodily by pointing and in this case also verbally by reading the assignment aloud (lines 6–7).
As soon as the tutor acknowledges having registered the directives of the assignment: ‘mm?’ (line 8), Linda tells him how she has approached it by referring to what she has written: ‘I wrote it like this’ while pointing to a particular calculation in her notepad (see figure, line 13). The complete calculation is thus visually available to both interlocutors and Linda guides the tutor through the different parts of her problem-solving procedure.
(lines 13–14), thus making her understanding available for evaluation. Upon completion of the description of her calculation, she asks the tutor to assess the correctness of her candidate solution: ‘is that correct.’ (line 15). Contemplating the solution for a moment, by first looking at Linda’s notepad and then in the maths book while making some sounds: ‘hmm:?: m: m:’ signalling that there is trouble ahead, the tutor delivers a negative reply: ‘nooo?’ before lowering his epistemic stance: ‘I don’t think so:¿’ (line 20) in overlap.

Of interest is how Linda immediately affiliates with the tutor’s assessment, first by producing a latched aligning: ‘no:’ in line 19 upon hearing the tutor’s negative answer to her question, and second by repeating the second part of the tutor’s assessment, affiliating with it in first person: “I don’t think so either.” (line 21). The brief laughter produced by the tutor in response is in reference to the face-threatening aspects of having to challenge Linda’s epistemic status through his negative assessment (Sert and Jacknick 2015). The interaction becomes even more interesting when Linda produces yet another negative assessment: “cause it came out totally wro: ng’ (line 23), in other words revealing she knew of the incorrectness of her solution all along (due to having checked the key prior to calling for help). What she actually needs help with is figuring out where she went wrong in her execution of the calculation, something that stands in contrast to her initial framing of the help request using a display of not remembering a formula, which would point to a problem of a conceptual nature. Hence, the analysis shows how the student’s not knowing in detail what her problem is poses challenges for both participants: to the student in formulating what it is she needs help with and to the tutor in being able to understand what the student needs help with, something that is particularly challenging in this homework support setting where the participants do not share an interactional history.

The next example is one in which a student produces an indirect problem presentation, in this case by performing the calculation as the tutor watches. In Extract 6, André has solicited help from Tutor 1. André’s help-seeking strategy initially shares several features with the problem presentations in Extracts 1 and 2. He delivers a description of the current type of mathematical problem: ‘here we have an () equation’ and the assignment: ‘that one is suppose to one () differentiates it with.’ (lines 6–7), thus specifying an equation that relates some function to its derivate. His utterance is accompanied by pointing references to relevant sections in the book. André’s use of the inclusive pronoun ‘we’ works as an attempt to construct the problem-solving activity as a shared task. After a short confirmatory response from the tutor signalling continued attention: ‘mm¿’ (line 8), André goes on to suggest a formula for computing the derivative, namely the “chain rule”, as he begins writing down a calculation on his notepad.

So far and in terms of problem presentations, André has oriented the tutor to an assignment and he has identified the mathematical area. However, he has not delivered an account for his help request, nor has he hinted at what kind of help he needs. Instead, he enters directly into a problem-solving phase, again engaging the tutor in his calculation, this time by actively seeking a response from him through gazing at him and inviting him to express agreement with his proposed use of the chain rule by requesting confirmation: ‘right?’ (line 10). Upon receiving an affirmative reply: ‘ye::s ex- exactly’ (line 11), André continues writing and performs the calculation while describing his every move, a kind of ‘online commentary’ (cf. Heritage and Stivers 1999) that makes his understanding of the problem and how it should be solved both aurally and visually available to the tutor. In line 15, the tutor quietly acknowledges the correctness of the progression of the calculation. However, carefully scrutinising what the student is doing, the tutor then intervenes with a warning: ‘hh yes but now you have to be careful.’ The student’s problem is thus gradually exposed and the tutor is able to more actively
step into the problem-solving process only upon discovering a factual error in the student’s procedural approach.

**Extract 6.**

A shared feature of the interactions in Extracts 5 and 6 is that the students’ help-seeking is grounded in their problem-solving efforts having ended up with incorrect solutions. However, neither student makes the tutor aware of this fact and instead involves the tutor in their problem-solving activity. The partial indirectness of the problem presentation forces the tutor into a role of detective, having to guess what the core of the student’s problem is or waiting for the student’s descriptions of their chosen approach to reveal an apparent error. At the same
time, the strategy of making available your understanding both verbally, by telling what you have done, and visually, by writing down the calculation or referring to one that is already written, pre-empt what has led them to end up with a miscalculation (although Linda alludes to not remembering how to use a formula). The analyses thus illustrate both the epistemic dilemma described by Koole (2012, 1902) – regarding the necessity of ‘knowing what you do not know’ or ‘understanding what you do not understand’ in order to communicate what help is needed – and the participants’ practical solutions to this dilemma.

5.4. Epistemic framing of the help request and a transfer of accountability

This final section presents an analysis of a strategy very much the opposite of what occurred in the previous sections in which the students were making their understanding and knowledge available for scrutiny and evaluation. Yet another dimension of help-seeking initiation is investigated, namely one in which an initial student claim of not understanding anything (line 3) makes it more difficult for the tutor to determine what constitutes the student’s problem.

The student’s manner of initiating talk about his problem corresponds with what has been seen in several other examples. By pointing to an assignment in the maths book and simultaneously producing a deictic expression: ‘it’s this question’ (line 1), Omid guides the tutor’s attention in a definite direction. However, when the tutor shifts his gaze in coordination with the pointing, Omid, instead of providing more information, begins to explicate a preferred type of response with an instructional directive and suggests a frame of mind for the tutor: ‘think like this, (.) I understand absolutely <nothing>’ (line 3), underlining his complete lack of knowledge with a stretched-out and emphasised production of the lexical item ‘nothing’ accompanied by a gesture depicting emptiness (see figure, line 3). The extreme case formulation is not only attached to certain expectations regarding the form of help requested, but the initial framing, ‘think like this’ (line 3) creates a hypothetical scenario in which the tutor should treat Omid as a completely unknowledgeable person. Although both participants in some sense know this declaration to be untrue and simply a way for the student to audibly express an extreme position not meant to be taken literally (Edwards 2000), Omid simultaneously renounces any form of epistemic responsibility.

As Omid elaborates on the nature of the requested explanation in terms of it leading him to ‘understand’ (line 5), the tutor chuckles a bit, producing some laughter particles in overlap with the student’s turn, before marking his upcoming turn as a ‘try’ to do what Omid has requested. The tutor thus orients to the accountability indexed by Omid’s instructional directive, indicating how this puts him in a rather precarious position. Interesting is how the tutor’s upcoming actions are unmistakably similar to those of students in previous examples. He initially proceeds by attempting to clarify the type of mathematical problem that the pointed-out assignment is structured around: ‘but it is some chain rule¿ (.) that you’re doing¿’ (line 7). This utterance is related to the current context of homework support, where the tutor does not know the details of what each student is working on. The student confirms that this is what he is working on and the tutor tries to discern how far Omid has come: ‘an’ you’ve done these.’ (line 11) before performing a more direct ‘epistemic status check’ (Sert 2013) formulated with a positive polarity (cf. Koshik 2002): ‘an’ those you understand’ (line 13). So far, the
tutor is the one performing most of the work necessary for establishing a common ground for both formulating and understanding the student’s problem, demonstrating the consequences of the transfer of accountability from the student to the tutor that was occasioned by the student’s epistemic framing of his request for help. However, it is also apparent from the student’s responses that his epistemic access is wider than initially implied.

Extract 7.
At this stage the student becomes more detailed in his problem formulation, seemingly recognising the lack of success of his previous strategy. The use of the phrase ‘the thing is’ prefacing his turn (line 15) not only marks the upcoming explanation as bringing new information but also emphasises its importance. Meanwhile, he makes a part of the maths book accessible that has up until this point been hidden, by withdrawing a piece of paper and then pointing to the lower part of the left page, thus specifying that his problem is more delimited than previously implied (cf. section 5.1). Not only does his demonstrative gesture give the tutor access to a previously unseen source of information (similar to Extract 3), but his utterance moreover renegotiates his previous epistemic position, from someone who understands ‘absolutely <nothing>’ (line 3) to someone who does not ‘really know’ how to apply a particular problem-solving strategy (lines 15–17). The tutor’s response shows, for the first time, a display of recognition of a factual problem: “no:: ok-” (line 18) before a reformulation of Omid’s problem is made in terms of it concerning an uncertainty of how to find ‘which ones to use’. The student also agrees with the tutor’s problem reformulation: ‘exactly’, before making yet another clarification of the problem (line 21). In other words, the participants have come to some form of shared understanding of the student’s problem. An instruction sequence is launched as the tutor again refers to the chain rule, checking that the student understands the first strategy by pointing at it and asking if he has ‘looked at these. too.’, and then providing an initial candidate explanation in lines 20 and 22. Epistemically interesting is that the Swedish adverb ‘ju’ reoccurs at three instances in the launched instruction. In this context, it refers to the utterance as something (possibly) known by both participants (cf. Heinemann, Lindström, and Steensig 2011), with the tutor thus still searching for the boundaries of the student’s epistemic access to the problem. It moreover shows how the tutor is not claiming epistemic authority but is open to the possibility that the student may already know what he is about to tell him. This contrasts with the results of Heller’s (2017) study in which teachers were shown to define the students’ epistemic status in a homogenising way. In this homework support setting, the tutors are instead highly oriented to each student’s knowledge state.

To conclude, this analysis shows how the initial epistemic stance taken by the student and the absence of a problem presentation reverses the responsibility from the student to the tutor for identifying what it is that the student needs help with. The tutor becomes accountable not only for finding out what the student knows in order to design an explanation, something that is in itself challenging in this homework support setting, but also for determining the problem to be explained.

6. Concluding discussion

Even though homework support is a growing phenomenon in the Swedish educational landscape, attracting an increasing amount of interest from both students and their parents, research in this area is still scarce, leading to limited insight into the forms, functions and results of various practices. This study contributes empirically grounded knowledge to this as-yet uncharted field by shedding light on some of the forms that homework support may take, primarily by an account of the interactional organisation of the initial parts of help-seeking when students request help and present their problem.
One particularly interesting feature of the findings in this study is the apparent dependency of the participants on the use of multiple material, social, and linguistic resources to accomplish a functional help-seeking procedure. In fact, without exception the students were shown to first wait for the tutor to sit down, thus reaching a side-by-side formation that provides them with access to the same visual field, before initiating their problem presentation. Moreover, the participants’ use of gesture and other forms of bodily activity to establish mutual orientation to particular objects within the local environment (cf. Goodwin 2007) was shown to be paramount for the intelligibility of the completion of a help request. The analyses thus further our understanding of how, in educational settings, ‘tangible materials are used in sequentially evolving activities’ (Jakonen 2015, 103), with the maths books being oriented to as privileged sources of attention. Students’ calculations, however, were shown to function as more important epistemic resources for determining what the student’s problem was, and whether it was of a conceptual or procedural nature.

In his study exploring the epistemics of student problems in teacher–student interactions in maths classrooms, Koole (2012) demonstrated how the students typically indicated the troublesome assignment, and not the trouble itself, when asking for help, thus leading the teachers to offer explanations in line with what they assumed to be the student’s problem. Similar to Koole’s study, students in the focused homework support setting of this study also displayed a strong initial orientation towards directing the tutors’ attention to the mathematical assignment, sometimes at the expense of epistemically richer sources such as their own calculations. However, as shown, the participants here tended to subsequently embark on a different trajectory, engaging in at times challenging interactional and epistemic work in order to thoroughly identify the source of the student’s problem. One rather obvious explanation for this is that the interactions within the homework support setting are not limited by the same time constraints as are customary in most classrooms. Another, and perhaps more interesting explanation, is connected to the normative expectations that are linked to epistemic rights and obligations of the social category of tutor, and how those can be understood in relation to the category of teacher. As shown, although the tutor is positioned as a knowing participant assumed able to provide the requested help similar to a teacher, in all of the analysed examples the students are oriented to as having full epistemic authority over the problem at hand, with no focus on the tutors evaluating the students’ knowledge or accomplishments beyond the current mathematical problem. As such, the relation between tutor and student is accompanied by more ambiguous rights and obligations, leading their ‘contractual expectations’ (Mondada 2013) to become more vague, but at the same time more symmetrical.

To conclude, the in-depth analyses of this article further our understanding of Newman’s (2000) identified criteria for successful help requests in terms of their being necessary, well planned, and well processed. Primarily, it sheds new light on the interactional accomplishment of the two latter criteria, contributing empirical and analytic detail to an understanding of just what kinds of interactional and epistemic challenges participants may be presented with in situated help-seeking interactions.
Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

This work was supported by the The Swedish Research Council [2015-01754].

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### Appendix. Transcription conventions

Conversations were transcribed according to conventions developed by Gail Jefferson (2004). Translations from Swedish into English are provided line by line, in italics. The following symbols are used:

- \[\] Overlapping talk
- = No break or gap between the lines
- (2.1)(. ) Numbers indicate length in seconds. A dot indicates a micropause less than 5/10 of a second
- ..,¿? Punctuation marks indicate intonation. The period indicates falling intonation, the comma continuing, the inverted question mark slightly rising and the question mark indicates a rising intonation
- :: Colons are used to indicate prolongation or stretching of the immediately prior sound
- - A hyphen indicates self-interruption
- word Underlining indicates stress or emphasis
- ** Degree signs indicate talk that is quieter than surrounding talk
- ↑ The up arrow marks a sharp rise in pitch
- hh, hh Hearable outbreaths and inbreaths
- ( ) Transcriber’s comments or descriptions
- + + Gestures and action descriptions are delimited between these symbols
- -> + l. 13 Gesture or action continues until symbol on indicated line number