Affording Opportunities to Learn in Homework Online

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Abstract

In this paper we report our research into the learning opportunities created (and obstructed) for students in upper secondary education in Denmark through connecting with voluntary homework tutors on the online platform Homework Online (HO). The platform offers an integrated array of synchronic communication tools, comprising chat, video, audio, whiteboard and access to websites, including Google Docs shared between student and tutor. We utilize Harré and van Langenhove's positioning theory and Greeno's learning theoretical development thereof to analyse the interaction between tutors and students. Our research questions are 1) How are students positioned in particular interactions on HO and how does this contribute to the opening and closing of their opportunities to learn (OTL)? 2) How do the different affordances of HO's communication tools affect the positioning process? We identify the primary communication channels as chat and audio, respectively. We find an overall tendency for tutors and students in collaboration to position themselves within a storyline of teacher-student-interaction, but this storyline of teacher-student-interaction plays out in different ways, as 'teacher-explaining-to-student', positioning the student as recipient, and as 'student-prompted-by-teacher-to-think', positioning the student with agency. The latter opens OTL for the student in the form of engaging in the conceptual and disciplinary practices of the curricular subject, i.e. of developing active conceptual understanding as well as necessary disciplinary skills. The former at most opens OTL in the form of 'legitimate peripheral observation' of such practices, but closes the OTL of active participation in them and thereby also the chance (in this situation) of developing active curricular understanding and skills. Our data show that the different affordances of audio and chat do not lead to fundamental differences in basic positioning patterns and evolving storylines, but that audio affords positioning to conceptual agency better than chat. Similarly, the auditory channel affords active dialogue and supports interpretation of interaction much better than chat does. Still our data show that more important than the difference between chat and audio for the positioning of the student as accountable versus as to-be-explained-to is the use made of the whiteboard, especially the question whether the student, the tutor, or both in interaction are in charge of writing on it.

Keywords

Online tutoring, positioning, conceptual and disciplinary agency, Greeno, upper secondary education

Introduction

As stated in the Call for Papers for this 10th anniversary instance of the Networked Learning Conference, the focus of the conference series is research into relational and interactional aspects of learning with an emphasis on dialogical learning. 'Networking', i.e. establishing connections, both technological and communicational, has been central phenomena of investigation. This is borne out in the definition of networked learning, originally supplied by Goodyear et al (2004), and recently supplemented with a phrase by Dohn (2014), to read:

Networked learning is learning in which information and communications technology (ICT) is used to promote connections: between one learner and other learners; between learners and tutors; between a learning community and its learning resources; between the diverse contexts in which the learners participate (p. 30).

In this paper we report our research into the learning opportunities created for students in upper secondary education in Denmark through connecting with voluntary homework tutors on the online platform Homework Online (HO) (http://www.lektieronline.dk/). The platform has an integrated array of synchronic communication tools, comprising chat, video, audio, whiteboard and access to websites, including Google Docs. We utilize positioning theory (Harré & van Langenhove, 1999) to investigate the following research questions:

1 How are students positioned in particular interactions on HO and how does this contribute to the opening and closing of their OTL?
2 How do the different affordances of HO's communication tools affect the positioning process?

In relation to the provided definition of networked learning, the immediate focus of the paper is therefore on the connection between learner and tutor and on the way ICT is used to promote this connection and to establish or hinder OTL. A step removed, the aim of HO is to help students with the curricular tasks of their secondary education courses. The aim thus is to empower the students to participate more adequately in the further learning contexts of individual study at home and of classroom activities. As such, the paper has implications for networked learning, understood as the ICT-mediated connection between "the diverse contexts in which the learners participate". Finally, the tutors are all physically present in the same "call centre" during their tutoring which allows for quite a lot of informal exchange between them of knowledge about the students, communication on the online platform, and ways of supporting the students' learning. Arguably, tutors thus form an informal "learning network" in the sense of Goodyear and Carvalho (Carvalho & Goodyear, 2014).

Theoretical background

Situative approach to opportunities to learn

'Opportunities to learn' concern the possibilities persons are provided with to engage with 'learning content'. This may be conceptualized from an individualist point of view, as the possibilities for each person to cognitively engage with specified curricular material in order to acquire the knowledge, skill, and competence detailed in the learning objectives of a course. It may also be construed in a socio-cultural participationist vein as the possibilities persons are given or allowed of participating in valued practices in ways recognized as 'knowledgeable' by a given community. The issue may be addressed at different societal and institutional levels. At the most general level, OTL concern the overall structure of the educational system and the access each individual has to it, given his or her personal, social, economic etc. background and resources. Historically, research and societal concern with OTL has focused on how to "bring "all children" to a "proficient" level of achievement". HO itself may be regarded as an enhancement of students' OTL, because it supplies a possibility for students to be assisted with their homework in addition to the resources present in their family's educational background. At the most specific level, OTL concerns the support of persons' engagement with learning content in concrete learning settings. Individualist-cognitive approaches will focus on e.g. presentation of material to accommodate to variations in initial knowledge levels and differences in learning styles. Socio-cultural approaches will focus on classroom participation structures and on the way material and informational resources in the learning setting mediate these participation structures.

A chief proponent of this latter approach is Greeno who, furthermore, has done much to bridge between socio-cultural analyses of participation structures and a cognitive focus on students' developing understanding (e.g. Greeno, 2011; Greeno & Gresalfi, 2008). He and Gresalfi define OTL as "affordances for student participation that support trajectories toward stronger valued capabilities and dispositions" (p. 193). The affordances are determined by interrelated factors of an individual cognitive; an interpersonal relational; and an informational and a material nature. Greeno draws on Pickering's distinction between conceptual and disciplinary agency (Greeno, 2011; Greeno & Gresalfi, 2008; Pickering, 1995). Conceptual agency refers to task activities which involve conceptual judgments such as choosing and justifying methods and interpreting concepts, solutions and results. Disciplinary agency refers to task activities which involve following established procedures. We follow Greeno in taking a micro level situative approach to OTL, understanding OTL as possibilities for engaging with learning content; possibilities which develop on moment-to-moment basis in the social interaction between participants; which are mediated and co-constituted by the use made by the participants of artefacts in their

environment; and which fundamentally hinge on the kinds of intellectual activity that participants (each in different ways) are positioned to undertake or contribute with.

The significance of positioning for intellectual activity

The concept of 'positioning' used here refers to the dynamic interactional role that each participant has as regards the other participants, the use of resources in the situation, and the task domain. The way a person is positioned determines the space of possible actions open to him or her. Harré and van Langenhove posit that concrete speech acts (e.g. "I'll show you how to solve this problem") project culturally recognizable storylines (e.g. 'teacher-explaining-to-student') which combine to constitute the positioning of persons in social interaction: A teacher for instance has the right or obligation (is in position) to say things to students which they are not entitled or required (in position) to say to him/her. The process is mutually defining, though, as the speech acts and the storylines themselves are constituted and made intelligible by the positioning process. "I'll show you how to solve this problem" is a different speech act and designates a different cultural storyline (of eager or cheeky student, as the case may be) if said by the student to the teacher instead of vice versa. Harré and van Langenhove accordingly define positioning as

> …the discursive construction of personal stories that make a person's actions intelligible and relatively determinate as social acts and within which the members of the conversation have specific locations. (Harré & van Langenhove, 1999, p. 16)

In his utilization of positioning theory, Greeno distinguishes between systemic and semantic positioning. Systemic positioning is positioning in relation to other people: what is each participant expected and entitled to do. More specifically, in the context of learning, a key question is whether and to which degree students are positioned - in relation to one another and to the teacher - with authority, accountability, and competence in their engagement in classroom activities. Semantic positioning, on the other hand, is positioning with conceptual or disciplinary agency in relation to task concepts and methods. Two modes of non-agency correspond to the two modes of agency. Thus, we may term it 'disciplinary acceptance' when students watch others engage in solving problems but not do so themselves. Similarly, when they attend to others' conceptual interpretations without engaging in conceptualizations themselves, they are positioned with 'conceptual acceptance'. Systemic and semantic positioning intertwine: Systemic positioning of students as competent, accountable authors supports their semantic positioning with conceptual agency whereas a positioning of them as incompetent or as 'listeners to the explanation of others' is closely intertwined with a semantic positioning as non-agent or recipient.

Two further points should be made. First, the triad of speech act-positioning-storyline takes place on the background of participants' former interactions (if any) within a wider institutional, societal context. The situation will often provide an initial positioning to each of the participants, which they then negotiate in their interactions. The teacher entering the classroom has the initial positioning of authority. Second, bodily actions enter into positioning on a par with the uttering of words, underscoring, negating, obscuring or disambiguating what is explicitly said. This frequently leads to a different resulting positioning than the one which words or bodily actions would have affected on their own. If the teacher takes a pen and signals that she is going to write on the whiteboard, this in itself positions her/him as 'in charge' and author. However, if s/he does this whilst saying "How would you solve the problem", the resulting positioning of the student may well be as competent. Still, the force of the speech act would be even stronger, had the teacher not taken the pen.

The concept of affordances

The concept of affordances has a history of use with varying foci, conceptualizations and philosophical underpinnings (Dohn, 2009; McGrenere & Ho, 2000). We follow Dohn in understanding the concept as relational, in line with Gibson's (1986) original articulation of it, i.e. as the interaction possibilities which the environment offers a person, given his or her personally and culturally developed skill and experience. The affordances of an object for an agent are the actionable meanings which it objectively holds, relative to what that person is able to do. Affordances of objects thus differ between cultures and between individuals. They do not depend on the agents' awareness of them, or even of the object itself, nor does acting on an object's affordances necessarily involve reflective awareness of doing so. We do, however, restrict the term 'affordance' to apply only to the environment, its layout and material and virtual resources. We here part company with Greeno and Gresalfi (2008) who understand the concept to refer directly to the practices of a given community, too. We find that this use of the term obscures the central point that material and virtual resources pose distinct interaction possibilities for people and that different resources pose different possibilities. We find it more useful, especially

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for analysing the communication of HO, to consider familiar practices with tools as part of what determines the affordance of the tool for the individual, rather than consider the practice itself an affordance.

Method

Context of the case study: The Homework Online Project

HO is a free service, developed and hosted by The State and University Library in Denmark (SUL), offering homework tutoring on the internet by volunteer university students. It started in 2010 as a service for second generation immigrant students in lower secondary education. This project is still active with around 12.000 sessions per year. It is financed by the Danish government and is free of charge for students and schools. In 2013, HO was extended to cover homework tutoring for students attending upper secondary education (the Danish Gymnasium); the focus of our study. Financing here comes in part from a yearly fee paid by the participating high schools. All students attending a participating school (16 at the time of research) have free access to HO. The three call centres for upper secondary education are situated in the Danish university cities Aarhus, Aalborg, and Odense. They are open 4 days a week, Sunday - Wednesday, from 6 pm - 9 pm. Online help is supplied within the subject categories of Math, Chemistry, Physics, English, Danish and 'Other Subjects'.

When a student logs onto the HO platform, s/he must choose one of these subject categories. She then joins a queue until a tutor is free. A tutor accepts the student's request for help and they go into a 1-1 session with shared communication tools. They have their own 1-1 online room with whiteboard, chat, video, and audio. Several students choose to communicate without video and audio, utilizing only chat, and thus staying anonymous. They have about 30 minutes together to work on the student's assignment.

The tutors are recruited by staff from the HO project team. They attend an obligatory course of 4 hours, where they are introduced to the HO platform and to online pedagogics, including how to tutor specific assignment examples. They volunteer to take at least two shifts per month. Some are motivated by altruistic reasons; others aim at becoming teachers and want to improve their job record. They mainly tutor their own subject of study, i.e. a university student studying math will tutor in math. There are around 110 active tutors in the high school part. Typically, 10-20 tutors are present in the call centres at the same time, making it possible for them to help each other. They can also pass sessions on to each other, if they realize that they cannot help a given student.

Methodological design

We undertook observation at the HO call centre at SUL on four evenings over a period of 2½ months. Data was collected in the form of screen videos which recorded all that was visible and audible to the tutors during online sessions. Thus, websites visited by the tutor during online sessions were recorded, but not websites visited only by the student. As a prerequisite for recording, tutors asked students whether they agreed to participate in the study. Likewise, tutors individually agreed to participate. We observed the sessions during their recording, except when too many were recorded at the same time, to get an initial idea of what went on in each session. A total of 17 sessions were recorded, 2 of which for technical reasons had to be omitted. Of the 15 remaining sessions, 9 were in Math, 3 in Chemistry, 1 in Physics, 1 in Danish, and 1 in Social Science.

The recorded sessions have all been seen through and given an initial categorization in terms of media used, discipline, task, activity level of tutor and student, and overall communicative atmosphere For this article, we have performed an information-oriented selection of sessions (Flyvbjerg, 2006), i.e. sessions have been chosen for analysis based on their ability (individually and in comparison with each other) to inform investigation of our research questions. Thus, we have chosen sessions based on the following criteria:

- Clear examples of the different kinds of positioning developed theoretically - in both of the main communicative forms (chat and audio sessions)
- Clear examples of effects on the positioning process of the affordances and use of the main media (chat, audio, whiteboard, Google Doc).

We have transcribed the chosen sessions, logging actions undertaken on the screen in addition to the linguistic interchanges, e.g. writing on the whiteboard (both tutor and student), visits to webpages as part of the tutoring process (only tutor) and scrolling up and down in a Google Doc. We have then analysed the transcribed sessions (repeatedly re-consulting the recordings), identifying triads of speech acts, positioning, and projected storylines, and characterizing them in terms of systemic and semantic positioning and influence of the specific tool use.

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Results

A media analysis of the online platform

In HO sessions, the main media being used are chat, audio, interactive whiteboard and Google Docs. A session will always be a combination of several media. Chat and audio are the main channels for conveying messages, and the interactive whiteboard and Google Docs are used to share large text bits and to visualise with drawing and pictures. Successful communication in this learning context requires a combination of these media, as chat or audio affords conducting the dialogue, whereas the whiteboard and Google Docs affords unfolding the specific assignment. Both student and tutor are able to draw and write on the whiteboard. In several sessions, Google Docs is used by participants to chat. This allows participants to write simultaneously and where they want on the page. The positive affordances of this are that it is easier to keep thematically related comments together and to comment directly on a text bit supplied by the other person. The negative affordance is that writing need not be done in any specific order, and the chronology is missing. The communication channel is the student's choice, but as these media afford different communication, that choice will in part determine the OTL - the media is part of the message (McLuhan, 1964). It is not the full message, though, as the interaction is constituted by the iterative interpretation by each participant of the other's actions with the media (Suchman, 1999), leading to a positioning of the student with the media. This in turn establishes OTL.

Paradigmatic examples of positioning through HO

Though the context of HO is different from the formal school context, the situation of student-calling-tutor-to-ask-for-help-with-an-assignment initially positions the tutor and student in a storyline of teacher-student. It is an initial systemic positioning given by the situation itself. It is carried forth by both student and tutor in the first speech acts of each session, e.g. in the following transcript excerpt of an audio session (Excerpt 1):

> Tutor: What do you need help for?"
> Student: (giggles) As I said… it's chemistry. It's about this [puts up a picture of the assignment on the whiteboard] isomemes
> Tutor: Isomers?
> Student: Yes, isomers. Well, it is assignment 145 that I need help for.
> Tutor: Yes… I'll just look up so I know what the substances look like [googles the substances listed in the assignment. Student is quiet]
> Tutor: So what do you think of the first one?
> Student: Er… Well, it says [in the task instruction] "In which of the following cases is there a possibility of geometric isomers". Isomers. And geometric that is all about this cis and trans."

The questions of the tutor position the student as student in the teacher-student storyline and the responses of the student (giggling and waiting for the tutor to finish her googling) confirm the asymmetric relationship. But sessions play out the overall storyline of teacher-student in different ways. In Excerpt 1, the tutor's prompt in the last tutor line positions the student systemically as accountable within the more specific storyline of 'student-prompted-by-teacher-to-think'. Semantically, the student is positioned with conceptual agency, because she is queried for her interpretation. The student accepts the positioning in her response by providing the requested interpretation. Contrast this with the storyline of 'teacher-explaining-to-student' as shown e.g. in Excerpt 2:

> Student: I have an assignment I have to hand in tomorrow (giggles) and I haven't understood a thing of it. [Reads aloud the assignment and draws the triangle from the book on the whiteboard]
> Tutor: So we are dealing with some trigonometry. Cosine-sine-tangent.
> Student: (giggles) Yes we are. And the law of sines and all that.
> Tutor: Yes. OK.
> [They exchange some comments about what a median is and the tutor checks it on a website.]
> Tutor: So that means, the median (checks the website again) … the median that is… What the median defines is (writes and gestures with the cursor on the whiteboard) a line from the midpoint of this side, CB. This is the midpoint of this side down to the corner here.
> Student: So these two pieces are actually equal in size
> Tutor: Exactly. Yes.
> Student: OK.
> Tutor: So we can actually write down here, too. This is also equal to 3.6 (writes on the board).

Student: Yes.
Tutor: OK…Er... The thing about trigonometry is that it deals very much in right-angled triangles.
Student: Mmmm
Tutor: So a lot of the … many of the trigonometric functions cannot be used unless one of the angles of the triangle is 90 degrees.

Systemically, the tutor positions himself as the competent, accountable author of conceptualizations and the student as the 'less-knowledgeable-person-to-be-explained-to'. He does this already in the second line where he states his interpretation of what the assignment is about instead of asking the student what she thinks it concerns (as the tutor did in Excerpt 1). He proceeds with this positioning in the latter part of the excerpt by initiating explanations of trigonometric concepts (which the student has not asked for). The student collaborates in the negotiation of these positions, though she takes a somewhat more active part than the tutor positions her to, in her comment about "law of sines" and her deduction of equality of size. Semantically, in this latter comment she attempts disciplinary agency, but does not carry it through by writing on the board. The other comments position her semantically with disciplinary (and to some extent conceptual) acceptance rather than agency.

Similar differences between interchanges establishing storylines of 'teacher-explaining-to-student' and 'student-prompted-by-teacher-to-think' are found in chat sessions. Excerpt 3 below illustrates the former. The student posts the task instruction in a Google Doc and student and tutor chat in this document.

Student: I would like help with the data analysis. I don't really know what to do there to investigate the law of decay which is the point of the experiment I think.
Tutor: That's ok, let me just finish reading (reads the instructions, scrolls up and down between instructions, tables in the instructions and a table made by the student).
Student: Ok ☺
Tutor: (scrolls back to where he wrote before and continues in the same paragraph) I think you just have to fill out a table as shown in 5. Calculation, then you can use that to make a regression.
Student: I have made the regression but have not filled out the table. I'll post it 2 seconds
Tutor: Alright, but you have made the calculations as made in the table?
Student: No, I have not made any calculations have just used time and the difference e.g. 5800-3400 and 8100-5800 etc. Is that wrong?
Tutor: (looks at the posted regression, scrolls between it and the instructions) On the face of it, you have to calculate $dN/dt-Ib$ where it is the difference in amount divided by the difference in time and with the background radiation deducted. Can't really see if that's what you have done.

The tutor starts explaining to the student (and solving the problem) without querying how far the student has got with the assignment himself. He thus positions the student systemically as 'to-be-explained-to' and semantically as recipient. This positioning is carried forth in his telling the student what to do. The tutor's explanations are on the procedural level so that the student is only positioned to take on disciplinary, not conceptual, acceptance.

Excerpt 4 below on the other hand shows a tutor positioning the student as 'student-prompted-by-teacher-to-think'. The student has posted his assignment (an integral to be solved by substitution) on the whiteboard.

Tutor: Do you know how to solve integrals such as the one you are showing here?
Student: Do you start by finding t?
Tutor: Yes, we do integration by substitution. We first find t
Student: Is it 8x+3
Tutor: That's a really good choice ☺ Can you write the integral with t
Student (writes √tdx on the whiteboard) Shouldn't I also calculate dx
Tutor: Yes that's the next step. How do we change dx to dt (adds an integral sign to the student's formula on the whiteboard but does not comment on this)

Here, the tutor is positioning the student systemically as potentially a competent author of calculations. The student takes up this position, though a bit hesitatingly by answering with questions. Their interchange, like the former chat excerpt, is purely procedural and thus the semantic positioning is only for disciplinary agency.

The different affordances of audio and chat thus do not lead to fundamental differences in basic positioning patterns and evolving storylines. Both types of tools allow systemic positioning of students as competent authors

and as less knowledgeable persons to-be-explained-to. Semantically, they both allow positioning with agency and with acceptance. However, in the sessions we have observed, semantic agency is mostly disciplinary in the chat sessions whereas we observe more instances of conceptual agency in the audio sessions. The media's different affordances appear conducive to this difference: The slower communication rate of chat affords focusing on 'what to do to solve the problem' rather than on explaining why, given the half hour time limit.

On the other hand, the slower rate of communication of the chat means that student and tutor sometimes write at the same time. We have observed at least one instance where this actually meant that a student positioned himself with conceptual agency (by offering an explanation), though the tutor was simultaneously positioning him as 'to-be-explained-to'. This is shown in the following Excerpt 5 where the student comment in 5 indicates that the student has not read the tutor comment in 4 before sending off his own comment:

1. Student: And M'(60) that must be more than 0
2. Tutor: No, without knowing the function I think that M'(0) is a larger number than M'(60) (sends line; keeps typing, but student sends his next line before tutor sends his comment)
3. Student: Ooh yes (keeps typing)
4. Tutor: Consider that the substance starts its transformation at t=0. It will transform a lot of substance very fast (sends). But as time passes, the transformation will be slower and slower
5. Student: We start with a lot and then it becomes reduced.
6. Tutor: Yes, but the amount of substance, that's the primitive function (sends) M(t) describes the amount of substance (sends) M'(t) describes how fast it changes (sends) Do you see the difference? ☺
7. Student: Yep

More important than the difference between chat and audio for the positioning of the student as accountable versus as to-be-explained-to is the use made of the whiteboard (when used at all), especially the question whether the student, the tutor, or both in interaction are in charge of writing on it. When the student is (perhaps in conjunction with the tutor), s/he is, by that very fact, positioned with agency, though it need not be conceptual agency. In the first part of Excerpt 4, the student is thus positioned systemically as accountable and semantically with disciplinary agency. On the other hand, when the tutor is alone in writing on the whiteboard, this positions the student as less competent, with less agency. The session from which Excerpt 1 is taken is illustrative. In the first part of the session, student and tutor in conjunction draw, write and point with their cursers on the board, with the student doing somewhat more of the writing than the tutor, though most often prompted or guided by the tutor's questions and explanations. The student is prompted to disciplinary agency (drawing the chemical formula) and to some degree of conceptual agency (interpreting the formula) by the tutor in a typical teacher-asks-questions-student-answers storyline, but with the student positioned as accountable and competent, in large part because she is in charge of writing on the board. However, at one point the student asks the tutor how a chemical formula looks. The tutor reacts by taking over the writing, saying "I'll draw it for you. Because it's… You have to watch your step here." The student has some difficulties understanding the drawing and for the rest of their work on this assignment, the tutor does the explaining (of drawing and of chemistry). The student asks clarifying questions and eventually comments that she understands. The result of the tutor's taking over the writing on the board thus is that for the rest of the assignment, the student is positioned as 'to-be-explained-to'.

The session from which Excerpt 2 is taken is even more intriguing. Writing on the board is almost exclusively done by the tutor, except for the student's initial drawing of the triangle. Most of the time, the tutor explains while writing (as in Excerpt 2), thereby positioning the student as 'to-be-explained-to'. In the latter part of the session, he on several occasions asks the student for suggestions for proceeding. The student supplies directive answers which lead the tutor to further calculations on the board. The student watches and listens (documented by the camera). The very fact that the tutor does the writing positions him as judge of the student's comments, whereas the student is positioned as only competent to offer suggestions for arbitration. The calculations are done with letters, leading to a formula into which the student can insert the actual numbers to calculate the required side length. She asks if she can do so while he waits. He accepts. She does the calculations at home with her pocket calculator and a piece of paper, i.e. not on the whiteboard. Therefore, he cannot see what she is doing. When she has finished, he asks her for the result and asks whether she finds it reasonable. They agree that it is. The student may well choose to act as she does in order for her calculations to be handy for completing the assignment after the online session finishes. Still, these actions support the role of the whiteboard throughout the session as the tutor's medium for explanations to the student, which underlines the overall positioning of the student as 'to-be-explained-to'. She takes on disciplinary agency in her calculations, but since this is done 'in

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private', it does not position her as accountable and competent in the same way as she would have been positioned, had she undertaken the calculations in the common sphere of the online session. Furthermore, the calculations themselves appear less significant because they seem relegated out of the common sphere. This further detracts from the significance of the disciplinary agency with which the student positions herself.

Discussion and concluding remarks

In answer to our first research question, how students are positioned in particular interactions on HO and how this contributes to opening and closing their OTL, there is an evident overall tendency for tutors and students in collaboration to position themselves within a storyline of teacher-student-interaction. One might have hypothesized that the fact that tutoring is provided by an older student (though at a higher educational level) in an informal non-school context, typically accessed from home by the high school student, would have led to more symmetrical positionings in story-lines of peer-to-peer collaboration, opening OTL in the form of joint exploration and conceptualization of the student's assignment. Our data clearly show this not to be the case. However, the storyline of teacher-student-interaction plays out in different ways, mirroring different teaching practices in school. Thus, we find examples, both of the storyline of 'teacher-explaining-to-student', positioning the student as recipient, and of the storyline of 'student-prompted-by-teacher-to-think', positioning the student with agency. The latter opens OTL for the student in the form of engaging in the conceptual and disciplinary practices of the curricular subject, i.e. of developing active conceptual understanding as well as necessary disciplinary skills. In contrast, the former at most opens OTL in the form of modelling (Bandura, 1986) and 'legitimate peripheral observation' of such practices, but closes the OTL of active participation in them and thereby also the chance (in this situation) of developing actively used curricular understanding and skills.

As for the second research question, how the different affordances of HO's communication tools affect the positioning process, our data show that positioning to both acceptance and agency is possible for both primary communication channels (chat and audio). Some differences in the affordances for interaction do exist, though. In the audio contact, hesitation on the part of the student is perceptible and supplies cues for the tutor's interpretation of the interaction; more specifically on the degree of certitude with which the student embraces conceptualizations and disciplinary actions. In several audio sessions, we observe tutors responding with more questions and with motivational encouragement when the student hesitates. It is more difficult for the tutors to interpret messages on chat, where hesitation is at most perceptible in the form of e.g. question marks (as in Excerpt 4) and where an "ok" may mean "ok, I got it now" or "ok, I don't get it, but let's just move on". The tutor risks closing OTL for the student if his/her interpretation is wrong. The audio channel thus affords active dialogue and supports interpretation of interaction much better than chat does.

As noted, the affordances of the whiteboard for being in charge of explaining seemingly affect the positioning process more than the choice of communication channel. There is a tendency across sessions that once the tutor has taken hold of the pen and positioned him/herself as 'explainer', s/he stays in charge for a longer period of time. The student rarely takes the pen back during the same assignment, but instead stays in the position of 'being explained to'. We do, however, observe a (very) few cases (such as the continuation of the Excerpt 4 session) where this happens. This might be contrasted with a physical classroom setting where students are typically not at the whiteboard whilst the teacher is explaining and where the setting therefore does not afford students taking over from the teacher. In this sense, the ease of grabbing the online pen might be seen as better affording student participation and thus of supplying more OTL.

By way of concluding, we wish to point out that further research is necessary to establish what the long-term effects of the OTL opened and closed in the HO sessions are for the students. More specifically, future studies should elucidate how the conceptualizations and disciplinary actions undertaken by the student in the sessions transform as they are brought back into the classroom settings and made part of the student's participation in the curricular practices of the high school.

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