

NEGOTIABILITY AS A QUALITY OF CONVERSATIONS

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This paper considers the concept of negotiability of a conversation. Negotiability is seen as a quality of conversations that arises when all the participants of the conversation have the ability, facility and legitimacy to influence the negotiation of meanings in the conversation. As such it is a modification of the concept of negotiability in Wenger (1998) to conversations. A conversation between three Norwegian eight-grade students is used to exemplify the concept of negotiability of a conversation. The paper presents initial findings in the research project Learning Conversation in Mathematics Practice.

INTRODUCTION

In the on-going research project Learning Conversation in Mathematics Practice (LCMP)[1] we study the relationship between qualities of conversations, learning contexts and learning outcomes. An aim of the project is to develop the notion of *learning conversation* as a didactical concept and tool for describing and facilitating learning processes (Johnsen-Høines, 2010). Part of developing the notion of learning conversation is the identification of qualities inherent in conversations we consider as learning conversations. In this paper I consider one such possible quality of a conversation, namely negotiability.

The concept of "[n]egotiability captures the ability of the participants to influence the process in which they are engaged." (Staples, 2007, p. 168, referring to Dillenbourg, 1999). As such the concept is concerned with the types of contributions participants can make and are allowed to make. In this paper, I introduce the concept of negotiability as a quality of conversations. In the first part, the concept is motivated by earlier research on negotiation of meaning. This is followed by a discussion of negotiability in Wenger (1998). Negotiability is then redefined as a quality of conversations. The theoretical part is followed by a conversation where students coordinate different representations of a measurement. This conversation is used to exemplify the concept of negotiability of a conversation, and to show some aspects of it.

NEGOTIATION OF MEANING AND NEGOTIABILITY

Doing mathematics in a social context involves the coordination of multiple viewpoints (Meira, 1997, p. 238). The processes such coordination entails might be termed negotiation of meaning. Negotiation of meaning as a central part of learning mathematics has been expounded several times, especially in attempts to theorize mathematical learning (e.g., Voigt 1994, 1996; Oers, 1996; Meira, 1997). Though this has been done within different theoretical frameworks and with somewhat

different content ascribed to the term “negotiation of meaning” (Cobb, Jaworski, & Presmeg, 1996), negotiation of meaning is everywhere seen as necessary for taken-as-shared meanings within a community such as the mathematics classroom.

Voigt (1996) argues that “we cannot presume that the learner would ascribe meanings to a topic by themselves – meanings that are compatible with the mathematical meanings the teacher wants the student to learn” (p. 25). There is therefore a “need of negotiation of meaning if the topic of discourse is to be meaningful for the learner” (ibid). Baker (1994) claims three principal roles for negotiation in conversations: coordination of action, establishing mutual understanding and co-construction of solutions.

For Wenger (1998) negotiation of meaning and learning is closely related. In fact, he views learning to be “first and foremost the ability to negotiate new meanings” (p. 226). Negotiation is perceived as a continuous on-going process involving the two dual processes of participation and reification. In conversations the processes of participation and reification are deeply connected. Participation in a conversation is notably explicit, while the words used are reifications “as projections of human meaning” (ibid, p. 62).

Though Wenger considers negotiation of meaning as continuously on-going, the process and productivity of negotiation varies. The types of participation and reification which are possible in a given situation are to a large extent determined by structural factors. In a conversation between students these factors might be internal (e.g., balance of power or knowledge of participants) or external (e.g., determined by a teacher or the task under consideration). Negotiability in a conversation is concerned with the possibilities to negotiate within a conversation, and in so doing to influence the direction of the conversation. Wenger (1998) describes *negotiability* as “the ability, facility, and legitimacy to contribute to, take responsibility for, and shape the meanings that matter within a social configuration” (p. 197).

Wenger connects negotiability to economies of meaning and ownership of meaning. Economies of meaning involve different possible meanings, together with the valuation and ownership of these. Influence on economies of meaning and the ownership of meaning presupposes negotiability. Ownership impacts how students engage in learning and what type of learning they engage in.[2] Several studies conclude that aspects of negotiability are important for mathematics learning.[3]

In a community of practice there might be complicated relations of negotiability between the participants. The *field of negotiability* positions the negotiability of participants, it includes “the control the [participants[4]] ha[ve] over [their] own ability to affect the institutional environment with the meanings that [are produced]” (Wenger, 1998, p. 248). Wenger views the extent of fields of negotiability as essential for learning:

Opening and closing, shrinking and expanding, or tightening and loosening a field of negotiability can have more effect on learning than most other kinds of change or program. (p. 248)

Baker (1994) describes a negotiation as consisting of four features: i) that which is being negotiated, ii) the initial state (goals, conflicts, ...), iii) the negotiation processes, and iv) the final agreement. In a conversation the fields of negotiability may vary between these four features.

By *negotiability of a conversation*, I refer to negotiability for all the participants of the conversation. Then the fields of negotiability of all the participants are significant with respect to the conversation, though not necessarily equal. Negotiability of a conversation is seen as a quality of the conversation that impacts features of the conversation such as the positioning of the participants. Negotiability of a conversation is a spectrum which depends on the fields of negotiability of the participants rather than a dichotomy between presence and absence of negotiability.

Negotiability of a conversation is concerned with the potential of negotiations. Thus, it is not necessary for negotiation of meaning to be explicit for negotiability to be a quality of a conversation.[5]

I will end this section by briefly considering the presence of negotiability in two types of conversations: dialogues and conversations governed by initiative-response-feedback (IRF) patterns. Alrø & Skovsmose (2002) considers a dialogue to be a conversation which involves the qualities of making inquiry, exploring participant perspectives, running a risk and maintaining equality. Such qualities as these seem unattainable without a high degree of negotiability in the conversation. Negotiability is then seen as a quality of dialogues.

However, negotiability is a quality that is not present in all conversations. In conversations between a teacher and students that are regulated strictly by an initiative-response-feedback (IRF) pattern, negotiability of the conversation is largely absent. While the teacher has an extensive field of negotiability, the field of negotiability of the students is constricted. In particular, the IRF pattern gives the teacher control over that which is being negotiated and the final agreement of the negotiation (i and v above). The study of Frid & Malone (1995) shows an instance where the students have a low degree of negotiability: "The role of students within this "negotiation" process was minimal in comparison to that of the teacher" (p. 145).

METHOD

The segment used is part of a larger case study where students' conversations in a mathematics project involving cooperation with a business[6] is the object of study (cf. Rangnes, this volume). Together with Toril Eskeland Rangnes, video and sound was collected of the conversations to two groups of students. The conversation segment below is from one of these groups. The transcription has been translated by

the author from Norwegian. Pn denotes a pause of n seconds, underlined text denotes simultaneous speech, and italics are used to describe non-verbal activity of the students.

The aim of the project for the students was the construction of a spatial model of a *rorbu* (Norwegian, a type of boathouse which may also be used as a vacation house). The *rorbu* consists of a ground floor which is used for storage and first floor living quarters. The segment chosen for this article is from the stage where the students were transferring their plan of the *rorbu* onto cardboard paper. This segment is chosen to exemplify the concept of negotiability of a conversation. It is chosen on the basis of being a segment where negotiability is seen as a quality of the conversation. The following analysis aims only at illustrating some aspects of negotiability in a conversation.

The group of eight grade students making the cardboard model in the segment consisted of three boys and two girls. Only the three boys – here called Arne, Bjarte and Christian – were present during the segment which is studied in this article.

A CONVERSATION SEGMENT

This segment begins when the students are preparing to cut out details – doors and windows – on the outer walls of the *rorbu*. After a discussion of the shape and size of the outer door, they decide that it should be the same size as the entrance door to the school. To determine the size of the entrance door they go and measure its size. The students do this with a yardstick, and find the height to be 206 cm.

The students go back to their workstation and are going to sketch the outline of the door on the wall which is cut out in the scale 1:25. The students have at their disposal an architect's scale which they have used in the project to scale measurements.[7] The architect's scale used metre as the unit of measurement, so the students' measurement had to be converted from centimetres to metres before the scale could be used.

Christian: Two six.

Bjarte: This here is six. [*Bjarte points to the architect's scale.*]

Christian: Two point six. [P3.]

Arne: We have to find the mid. Oh, the door will be taller than the wall. It is two point four.

[*Bjarte measures the height of the wall with the architect's rule and confirm Arne's statement, i.e., the height of the wall is 2.4 m. During this whole segment it is Bjarte who is in control of and uses the architect's rule.*]

Bjarte: We take the height to be.

Christian: But I thought it was one twenty-fifth part. Can't we use one tenth instead?
[*Christian refers here to using the scale 1:10 on the architect's scale instead of the scale 1:25.*]

Arne: One tenth? [P3. *Meanwhile Bjarte is measuring by using the architect's scale.*] But we have to use the same scale on this as it is...

Bjarte: But shall we say two metres then?

Arne: It seems like we have to do that.

Bjarte: Two metres is enough. We don't need more than two metres.

Arne: No. [P1] Two ten? Shall we use...

Bjarte: There is space for two twenty.

Arne: Yes, but. First we do the width.

Bjarte: Then we have to find the middle.

Arne: It is six point five [metres]. It is somewhat difficult to find the middle of that.

Christian: Three point two point five. Three point twenty five.

[*The students spend the next minute making markings for the width and calculating the placement of these before returning to the height.*]

Bjarte: [*Bjarte starts measuring*] And it is to be two twenty.

Christian: No. Two point six.

Bjarte: One moment.

Arne: Do we have to construct it?[8]

Bjarte: Nja.[9]

Arne: Nja?

Bjarte: Yes. [P1.] Christian, do you like to construct?

[*During the next half minute Bjarte constructs the right angle. Christian tries to get the attention of the teacher. Failing this he decides to approach Gert, i.e., myself.*]

Christian: [*addressed to Gert.*] See. The door is taller than the ground floor. How can we solve that?

Gert: How high is the ground floor?

Arne: It is two point four.

Gert: It is two point four. How high is the door?

Arne & Ch.: Two point six.

Gert: Two point six. Was the door outside this high?

Arne: According to the measurement.
Gert: How many centimetres was the door?
Christian: Two point.
Arne: Two hundred and six.
Christian: six.
Gert: Yes. How many centimetres are two point four metres?
Bjarte: It is two metres and forty centimetres.
Gert: Yes.
Arne: It was two point zero six. Two point zero six it was.

This statement is followed by a flippant exchange between the students as to who was responsible for the faulty conversion.

NEGOTIABILITY IN THIS CONVERSATION SEGMENT

The main negotiation in this segment is based on the controversy between the converted height of the door (2.6 m) and the height of the ground floor wall (2.4 m).[10] Part of the initial state is the conflict arising from the discrepancy of a faulty conversion of measurement (206 cm is converted to 2.6 m). This discrepancy is noticed as the converted height (2.6 m) is not possible to use on a wall of height 2.4 m. After noticing the discrepancy, the students decide to pursue it. In terms of negotiability, the students show ability to decide which conflicts to negotiate.

The initial state is also in part determined by external structures such as the task at hand: the construction of the rorbu. These structures serve as a restriction to the field of negotiability. To do the task at hand, the students must place the door somehow on the cardboard wall. This means that the height of the door has to be resolved somehow. At the same time, the task also gives the students opportunities to negotiate. The legitimacy of deciding to negotiate the height of the measurement follows from the task given to the students. The teacher has previously stated that the students themselves have to decide which measurements are necessary for the construction of the rorbu. In this way, she has placed the legitimacy of resolving the conflict with the students.

Negotiability impacts the effect of the conversation, as it affects the ownership of meaning. The problem which is being negotiated has been introduced by the students, as such one may suppose that they are to a large extent interested in its resolution, and take ownership of both the negotiation and its resolution.

Whereas the initial conflict is between two heights (206 cm and 2.6 m), what is being negotiated is the height of the door on the ground floor wall. The goal of the students in the negotiation is related in a larger extent to what is being negotiated than to the initial conflict. Arne and Bjarte quickly leave the initial conflict, and instead

negotiate the height of the door. This negotiation is necessitated by the initial conflict, as they cannot as initially planned measure 2.6 m on the cardboard. Their negotiation deals with resolving the problem of the height of the door on the cardboard wall; a problem which may be resolved without resolving the initial conflict since a door can be placed on the cardboard wall without its measurements being identical to the school entrance door. A high degree of negotiability is shown as the students can legitimately move the negotiation away from the original conflict.

In several instances the students show that they have control over the negotiation. This happens when Arne and Bjarte decides to ignore the actual height of the door and instead focus on how high a door it is necessary and possible to place on the wall. This has consequences for i) what is being negotiated in the ensuing negotiation, ii) the process of negotiation, and iii) the type of resolution one can expect from the negotiation. Control over the negotiation is also shown when they postpone the problem by first finding the vertical placement of the door, and when Christian decides to reinstate the original conflict and to involve a third party in the conversation.

On their own Arne and Bjarte might not have resolved the original problem, as they had decided to ignore the actual height of the door of the school. The presence of Christian in the conversation entailed that the problem was reintroduced. However, Arne and Bjarte ignored Christian when he tried to reintroduce the dilemma of the door being 2.6 m. That Christian was ignored is evidence of the students' fields of negotiability being dissimilar. [11]

The negotiation is concerned with five different representations of the same length: the height of the entrance door of the school being measured with a yardstick, the height of the door given in centimetres, the height of the door given in metres, the height of the door on the 1:25 scale on the architect's scale, and the height of the door on the cardboard wall. The students have to negotiate the transitions between these representations. That the initial resolution of Arne and Bjarte of ignoring the height of the actual door, is not accepted by Christian might be related to the students being concerned with different representations. Arne and Bjarte are concerned with possible heights on the cardboard wall, while Christian is concerned with the height in metres. This difference may be a reason for Arne and Bjarte to not legitimize Christian's contribution of "No. Two point six".

Involving me (Gert) in the conversation changed the fields of negotiability. I was used as an authority to resolve the problem the students faced. This entailed that Christian gave me control of the negotiation process and the final agreement, though it did not entail that no control was left to the students. Arne saw the resolution as his own (even though my questions can be viewed as funnelling). To change the fields of negotiability requires a certain negotiability to start with. Changing the fields of negotiability can have both positive and negative effects. In this case, Christian was able to find a resolution to his goal of resolving: "The door is taller than the ground

floor”. Negotiation of meaning includes the acts of rephrasing and asking for clarification which Christian engaged in when addressing me.

The fields of negotiability impact the conversation. The legitimacy of negotiating meaning is a part of negotiability. Which, whose and what type of contributions are being valued impact the economy of meaning. In this segment, Christian’s contribution was originally devalued by Arne and Bjarte. This places Christian on the sideline of the conversation. When Christian involved me in the conversation the economies of meaning changed. Since I was asked to enter into the problem “The door is taller than the ground floor”, this problem became reevaluated by the students.

The use of artifacts – the yardstick and the architect’s scale – enables participation that is not possible though the sole use of terms such as “measure” and “centimetre”. As such the combination of speech and artifacts allows for a productive distribution of negotiation between reification and participation which is not possible through the use of only speech or only artifacts. Using only speech Bjarte would not have been able to confirm Arne’s statement “It [the wall] is two point four [metres high]”. Using only the available artifacts the students would not have been able to end up resolving the conversion of 206 cm. The negotiability is seen to be influenced by the opportunities of participation and reification available.

CLOSING REMARKS

In this paper I have introduced the concept of negotiability of a conversation, and given an example of a conversation segment where negotiability was seen to have impact on the negotiations entered into. Further study aims to look into negotiability as a quality of learning conversations. This includes the following topics of study: i) How do intentions impact on the negotiability of a conversation? This question is interesting both with respect to students’ intentions-in-learning (Alrø & Skovsmose, 2002) and teachers’ intentions-in-teaching (Hana et al, 2010). The preceding question can also be extended to a consideration of which factors impact on the negotiability of conversations. ii) How does negotiability of a conversation foster inquiry? In Alrø & Skovsmose (2002) ownership is seen to impact on the type of inquiry students engage in. Given the relationship between negotiability and ownership of meaning, it seems natural to expect that negotiability also will have an impact. iii) How does negotiability relate to other qualities of a conversation? Above I maintained that negotiability was essential for the qualities inherent in a dialogue. This relation, and also the relationship with other qualities of a conversation, needs further development. iv) How is the positioning of the participants in a conversations influenced by the negotiability of the conversation?

NOTES

1. The research project Learning Conversation in Mathematics Practice (LCMP, leader: Marit Johnsen-Høines) is financed by the Research Council of Norway (NFR) and Bergen University College. For details on the project see www.hib.no/fou/limp (in Norwegian) and Johnsen-Høines (2010).
2. E.g., “it is difficult to imagine processes of reflection being integrated parts of processes of learning if students are not involved [through an experience of ownership]” (Alrø & Skovsmose, 2002, p. 172).
3. “Students’ participation and the opportunities to negotiate meanings seemed to influence their interpretations and understanding of practices in ways that facilitated their participation.” (Staples, 2007, p. 196) and “The most important didactical point here is that pupils are encouraged to gather their own meanings in discussion with others (including culturally more experienced people)” (Oers, 1996, s. 100).
4. Wenger considers fields of negotiability of communities of practice. As I am interested in the negotiability of conversations and their participants, I consider instead the fields of negotiability of participants. I have altered the citation from Wenger (1998) to reflect this. Wenger himself describes how negotiability may vary within a community of practice (ibid, p. 219).
5. Though it is of course difficult to determine the degree of negotiability in a conversation that does not include explicit negotiation.
6. Much of the LCMP-material is from contexts such as this which include school-industry cooperation (see Hana, Hansen, Johnsen-Høines, Lilland, & Rangnes, 2010).
7. The architect’s scale was introduced to the students by the carpenter in a visit to the business. An architect’s scale is a ruler that is marked with a range of scales. The architect’s scale used by the students was triangular and marked with six different scales, among them the scale 1:25.
8. The student’s had to construct some angles using a compass and ruler earlier in the project to get experience with this method. The teacher has left to the students to decide whether angles at this stage in the project are to be constructed with compass and ruler.
9. “Nja” is an amalgamation of the two Norwegian words “nei” (English, no) and “ja” (English, yes), and is used to give an evasive answer to yes/no-questions. In this instance Bjarte gives the evasive answer “nja” to Arne’s question. Arne then challenges Bjarte to give a direct answer to his original question by rebounding the word “nja” in the tone of a question.
10. In this paper I only have space to consider this main negotiation. Another explicit negotiation in this segment is whether to construct a right angle using compass and ruler.
11. Other reasons can be found in social relations established between the boys that transcend this particular segment. Negotiability is closely tied with the social norms present, but this facet of negotiability is left for another time.

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