DIVERSITY IN MEANINGS AS AN ISSUE IN RESEARCH INTERVIEWS

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Taking the social, political, and ethical dimensions of mathematics education seriously means not only researching these issues, but also designing and assessing research with these dimensions in mind. When designing an interview study about planning in mathematics, diversity in meanings was recognized and participants and their voices were foregrounded. In this paper, the design is related to perspectives on interviews, meaning as both durable and transient, and quality criteria such as reproducibility and bias. Theoretical assumptions had consequences for how meaning was seen, but also for relevance of the chosen quality criteria. Findings suggest that not only design, but also assessment of quality in interview studies have to be discussed in relation to the theoretical assumptions the studies build on.

INTRODUCTION

In times of worldwide crisis, research exploring and problematizing social, political, and ethical dimensions of mathematics education and mathematics education research is of great importance. Such research can be conducted in many ways, but it seems reasonable to say that social, political, and ethical issues should be taken seriously not only when choosing topics for study and formulating research questions, but also when choosing methods and encountering participants. A common concept within the research field is diversity, which can refer to diversity both in terms of language, sexuality, race, or ethnicity, and to diversity in how different groups and individuals understand and use common words or concepts.

When this diversity in meanings is taken into account, certain issues have to be considered. Whether the study is conducted through questionnaires or interviews, it is possible that words central to the research topic are used with different meanings for the researcher and for the respondents. As a researcher, I also need to be aware of the fact that when I enter a field my experiences and values will influence the design and implementation as well as the analysis.

The aim of this paper is to contribute to a theoretical and methodological discussion about interviews in mathematics education research. As a point of departure I use a study about what meaning planning in mathematics has for teachers and what they focus on when talking about their planning. The intention of the research design was to downplay the researcher's own preconceptions and the meaning that planning in mathematics has for her. For the critical discussion of the design I use three aspects: theoretical perspectives on interviews and meaning, Kilpatrick's (1993) quality criteria, and objections to research interviews from "the mainstream of social science" (Kvale, 1993, p. 167). Although the study itself is not directly related to

social, political, and ethical issues, the design and the critical discussion of the design might be valuable for future research in the field.

BACKGROUND

All teachers in mathematics have the task of planning, and thereby the task of somehow deciding upon mathematical content for a specific group of students, in common. Despite this, it seems that the understanding of what planning in mathematics involves varies. Although individual teachers' ways of relating to and understanding this particular part of their work shift, teachers' decisions are made in a context of shared values specific to their culture (Hofstede, Hofstede, & Minkov, 2010), but also with values specific for the subject of mathematics and the specific school (Bishop & Seah, 2008). Thus, what meaning teachers attach to planning can both be described as situated within micro-contexts and in some sense structured and constituted by a larger mathematics education discourse (Alvesson & Karreman, 2000). Since planning has implications for what happens in the mathematics classroom and thereby also for what opportunities students have to learn mathematics (Clark & Yinger in Akyuz, Dixon, & Stephan, 2013), it is relevant to further explore planning in mathematics.

Different countries have different degrees of control in terms of teachers' planning. In the Swedish policy documents, goals and content are formulated not to govern details or restrict pedagogical freedom (U2009/312/S). Teachers in Sweden thus have a high degree of freedom to plan, form, and implement their teaching as they want based on the current curriculum. However, the Swedish National Agency for Education (Skolverket, 2011) has published a collection of advice on how teachers shall organize their planning. These guidelines as well as research models indicate that planning is a several step process (Gómez, 2002; Rusznyak & Walton, 2011), whereas other studies show that activities to be done during the lesson are in focus when teachers plan (Akyuz et al., 2013; Mathematics Learning Study Committee, 2001).

THE STUDY ABOUT PLANNING IN MATHEMATICS

The aim when designing the study was to arrange a situation where the teachers feel comfortable and respectfully treated and where they do not feel the need to think about what they are expected to answer. Asking questions about planning in mathematics could determine what meaning the teachers attach to the concept and what their story is going to be about. Without asking any questions, the conversation tends to be more of a casual conversation without focusing on the topic of interest. To overcome this dilemma, the study was designed as an interview with the support of stimuli (Hurworth, 2012). The inspiration for the stimuli came from studies in various fields where different stimuli have been successfully used (Alsup, 2006; Herbel-Eisenmann & Cirillo, 2009; Hurdley, 2006). In this design, teachers' notebooks served as stimuli.

Research process

The researcher initially met with the teachers individually to give them information, allow for opportunities to ask questions, and to give them their notebook. The participants were asked to write words or phrases or draw pictures of things related to their planning in mathematics for a period of two weeks. If a participant asked for clarification, she got the answer that it was what she thought was important that should be in the notebook. It was also pointed out that how much or how little that was documented was up to the teacher herself. No matter what, or how much or little the teacher had documented, the notebook could be a starting point for the interview.

The interviews were conducted after the two weeks of documentation. After initial small talk, the interviewee was asked to look in the notebook and talk about what was documented. During the conversation, the interviewer was deliberatively active by confirming that she was listening with nods, gestures, and confirmatory small words, by asking for clarification when something was unclear, and by asking follow-up questions on central themes. The activity from the researcher had dual purposes: on the one hand to make the interviewee feel comfortable and listened to, and on the other hand to keep the topic of the interview in focus. During the interview, the researcher was passive in that the interviewee was always the one to introduce new themes for the conversation by choosing topics from the notebook.

REPRODUCIBILITY AND BIAS IN RESEARCH INTERVIEWS

One of the common objections Kvale (1993) emphasizes is that interview results are biased. The biases can be either from the interviewee, who answers what she thinks the interviewer wants, or from the interviewer, whose experiences influence the questions as well as the interpretations of the research material. Interview questions as well as overall research questions determine what kinds of answers may be obtained, which means that questions in interviews to some extent always are leading. According to Kvale (1993), the researcher should make questions explicit so that the reader has a possibility to evaluate the influence questions have on findings and also assess the validity of the findings (Kvale, 1993). Also, Kilpatrick (1993) emphasizes bias and objectivity and argues that absolute objectivity is "an ideal worth working toward" (p. 23), although he also states that it is unattainable. What a researcher can do is try to identify biases and have "enough objectivity to rule out obvious bias" (p. 23) and also be open with how biases may have affected findings.

In this design, interviews were conducted without predetermined questions, which automatically makes it impossible to meet Kvale's desire to make questions explicit. At the same time, the reason for not asking questions was that possible bias had been identified. Instead of assessing the validity of findings based on questions asked, the reader (as well as the researcher) has to be open to the interview's different paths. I argue that validity in findings then becomes even more dependent on how well the analysis is conducted and what questions the researcher poses to the collected

material. With openness in the analysis process, the reader has a possibility to assess validity in findings.

Another objection to qualitative research interviews is that they are person-dependent, that is, that two interviewers will not come up with the same result even if they use the same interview guide (Kvale, 1993). Hence, if an interview study is not reproducible in a traditional way, does this mean that the results are not reliable? And is it of interest to discuss reproducibility in a study conducted within a perspective where the interviewer is part of the context and co-creator of the situation? Kvale (1993) emphasizes that the non-formalized qualitative research interview has virtues and that the various results different researchers find would contribute to a more nuanced and deeper meaning of the research topic. On the other hand, Kilpatrick (1993) argues that not only the procedure of conducting a study, but also the findings of a study ought to be reproducible. Without the possibility of reproducing procedures and findings, it is not possible to draw generalizations from the study, and consequently the research is according to Kilpatrick (1993) of no use. A response to the demand for generalizations could be Kvale's (1993) question, "Why generalize?" (p. 185), and the immediate answer to that question, "in order to predict and control, or because science aims at universal knowledge" (p. 185). However, instead of claiming it to be irrelevant to generalize, one can take note of Kilpatrick's argument of usefulness and discuss what generalization in non-reproducible studies can be. Even when it is not possible to generalize in the formal way Kilpatrick argues for, findings may be transferable and contribute to the knowledge accumulation in a given field (Flyvbjerg, 2011). Eisenhart (2009) argues that the concept of theoretical generalization is useful in research and describes how Becker explains it: "the point of theoretical generalization is not to show that every site with the characteristics of a total institution produces the same results, but rather to show how each new site potentially represents different values of a generic process" (Eisenhart, 2009, p. 16). From these arguments, it becomes clear that findings from what Kilpatrick would call non-reproducible studies might be useful not only to understand the micro-context where they are produced, but also for understanding the larger context of mathematics teaching.

In this design, the teachers' notebooks guided the interview with the purpose of letting the teachers' meaning of planning in mathematics set the agenda. However, viewing it from a point of reproducibility, it can be problematic and has to be further discussed. Using Kilpatrick's (1993) definition of reproducibility, where not only the procedures of conducting the study, but also the findings should be replicable (Kilpatrick, 1993), one needs to think of what it means that "findings of the study—the observations, the patterns of results, though not necessarily the interpretations given them—ought to be reproducible too" (p. 29). In trying to reproduce the study, a researcher can use the same design and conduct the interviews in the same way. After the interview, the researcher would have the same kind of material: notebooks with some documentation and audio recordings of the teachers using that documentation to

talk about planning. In that sense, the observations would be the same. If observations also include how the researcher looks upon the material, I argue with help from Kvale (1993) that observations never can be the same. Different researchers come to interviews with different experiences, which will influence how they make their observations. Either way, this is not unique to an interview with stimuli, but also applies to an interview with traditional research questions. Questions are biased and leading, and responses can be biased in the direction of what the interviewees think the researcher wants. This is, according to Kvale (1993), inevitable and should be addressed by describing the process transparently and thus allowing the reader to determine what importance these biases have for the conclusions. I share the view of transparency being important, but also argue that the design in which the interviewees determine what to talk about within a given topic reduces the impact of bias, which corresponds to Kilpatrick's demand that the researcher shall try to identify and rule out obvious bias.

PERSPECTIVES ON INTERVIEWS

As seen above, there are different positions when it comes to assessing quality in research interviews. Since theoretical assumptions play a key role in how data is treated as well as how the researcher looks upon the interviewee and the interview situation (Alvesson, 2003; Silverman, 2006), it is reasonable to assume that these different theoretical assumptions also play a key role when assessing quality in research interviews. Adopting a positivistic (Silverman, 2006) or a neopositivist perspective (Alvesson, 2003) implies that data are seen as facts, the settings in the interview situation do not matter, and the interviewee is randomly selected. Reality exists "out there," and the interviewee can tell the researcher about it. Hence, it seems reasonable that a study can be designed so that both procedures and findings are the same regardless of who conducts the interview. Consequently, from a positivistic/neopositivist perspective reproducibility is relevant to discuss. From an emotionalist (Silverman, 2006) or a romantic (Alvesson, 2003) perspective, on the other hand, the researcher wants to explore the "inner world" of interviewees. To do that, trust and commitment between the interviewer and the interviewee, particularly in the interview situation, are important. Also, from this perspective, there may be a point in discussing reproducibility. The "inner world" exists independently of the researcher, but since the relation between the interviewer and the interviewee is of importance, one can think that there always will be differences in how the "inner world" is brought out. The requirement that procedure ought to be reproducible thus falls. Still, it is possible that findings are the same, which makes an interview study in this perspective reproducible at least in one dimension.

From a perspective of constructionism, the interviewer and the interviewee are seen as co-creators in creating meaning. A special focus in this perspective is how interviewees construct their stories. Interesting data are *what* is being said, but also *how* it is said. In other words, how stories are constructed within the interview, but also how the stories relate to circumstances of the interviewee's life (Silverman,

2006). Alvesson's (2003) localist perspective has similarities with the constructionist perspective of Silverman. In the localist perspective, the interview is not seen as a method to collect material in order to say something about outside of the interview situation, but "an empirical situation that can be studied as such" (Alvesson, 2003, p. 16). This could correspond to Silverman's constructionist interest in *how*. To meet the interest in *what*, which is included in constructionism, Alvesson (2003) refers to the neopositivist and romantic view in which it is possible to use interviews to explore issues other than the actual interview situation, but with the addition that it is "without falling too deeply into the trap of viewing interview talk as a representation of the interiors of subjects or the exteriors of the social worlds in which they participate" (p. 17). In a perspective where the interviewer and the interviewee co-create meaning, each interview situation must be seen as unique. Each story is unique and the circumstances of each interviewee's life are unique. Hence, to discuss reproducibility and to require that procedures and findings are reproducible are not relevant.

Which perspective researcher has on interviews determines whether reproducibility is a relevant quality criterion. As shown in the table below a positivistic/neopositivist perspective enables reproducibility in terms of both procedures and results, an emotionalist/romantic perspective only in terms of findings, and in a constructionist/localist perspective neither procedures nor findings are reproducible.

Perspective	Procedures reproducible	Findings reproducible
Positivistic/neopositivist	X	X
Emotionalist/romantic	-	X
Constructionist/localist	-	-

Table 1: Reproducibility in relation to different perspectives on interviews.

The study about planning in mathematics would fit into the bottom row of the table. The theoretical assumptions of the study are substantially in line with the constructionist and localist perspectives. The interview situations are unique, and the interviewer and the interviewee co-create situated meaning. At the same time, stories constructed in the interview relate to the circumstances of the teachers' lives, including the mathematics education discourse with its specific shared values.

MEANING

The different perspectives on interviews and what knowledge they may generate also relates to how meaning is seen. From some perspectives, meaning is not an issue and discussions about it are avoided. From other perspectives, meaning is the key issue and what is worth exploring (Bryman, 2008). In this paper, the definition of meaning as "a (collectivity of) subjects' way of relating to—making sense of, interpreting,

valuing, thinking, and feeling about—a specific issue" (Alvesson & Karreman, 2000 p. 1147) is used. Meaning is seen as constructed within contexts and influenced by such factors as politics, gender, economy, and ethnicity. Those who construct meaning are people interacting with each other (Cherryholmes, 1999). Meaning making can be understood and studied as a process, a meeting between the individual dimension of our past experiences, cultural dimension, and the social dimension with its relations (Quennerstedt, Öhman, & Öhman, 2011). Meaning can be described both as durable meaning, including cultural and individual ideas, and a transient meaning that is tightly and temporarily connected to language and emerges in interaction (Alvesson & Karreman, 2000). The durable meaning is stable enough to travel through discourses, whereas the transient meaning is constructed within the discourse of the interview situation. Since meaning emerges through individual interactions (Alvesson & Karreman, 2000), it is reasonable to think that the interaction has to be studied on several occasions to grasp both the durable and the transient meanings. Telling teachers to use the notebook before the interview was one way of letting them interact on several occasions. This adds an element of reflection normally not included in the planning process, but for this study it is a way for teachers to reconnect with previous interactions in the interview situation. This makes it possible to get ahold of durable as well as transient meaning and also streaks of shared values in the mathematics education context.

Since meaning is constructed and influenced by factors outside a person, meaning for each individual varies. Meaning is not only varying on an individual level, but also amongst people. In relation to some issues, there is a fairly large consensus, but regarding other issues, as in the example of planning in mathematics, meaning differs a lot. These positions are important when going back to the discussion about reproducibility and bias. If the diversities in meaning are taken seriously, reproducibility is not relevant to discuss at all. When meanings vary, both for the researcher and the respondents, the procedures as well as the findings will vary. Hence, no study is reproducible. Ruling out obvious bias may imply giving space for various meanings. On the other hand, in adopting a perspective where meaning is not an issue, reproducibility might be an appropriate quality criterion. In this perspective, ruling out obvious bias may imply the exclusion of variations of any kind.

Choosing to study meaning in relation to a concept means recognizing meaning as an issue. In the study described above the aim is to study what meaning planning in mathematics has for teachers. Meaning is understood as varying over time, but also varying among different contexts and individuals. Hence, traditional quality criterion of reproducibility is not relevant. Nevertheless, it is of great importance to rule out obvious bias, including giving space for diversity in meanings, and strive for high quality research. Using stimuli and letting interviewees choose concerns important to them at that point in time is meant to be a way of giving space for diversity in meanings and thereby reduce impact of researcher's meaning.

CONCLUSIONS

Interviews are a commonly used method in qualitative research (Silverman, 2006). However, research quality is often discussed in general terms and seldom in specific connection to interviews. What theoretical assumptions a researcher has when designing and conducting an interview study is of importance for how quality should be discussed. The determinations of what constitutes bias or which quality criteria are relevant differ within different perspectives and also depends on the research questions. A study where teachers' individual notebooks act as stimuli in guided interviews is not reproducible at all since the interviewees themselves choose concerns to talk about. However, this does not mean that the study automatically is of low quality. This method of collecting data is a way to rule out obvious bias and thereby meet quality expectations other than reproducibility, and findings from the study may be used for theoretical generalization (Flyvbjerg, 2011). If clear underlying theoretical assumptions and transparent decision making are communicated by the author, each reader has the possibility to assess the validity of the findings (Kvale, 1993). By broadening the horizons and assessing the quality of research in relation to the theoretical perspective underlying the study, there are opportunities for researchers' different results to contribute to a more nuanced and deeper picture of mathematics education, something that ultimately will benefit the students in mathematics classrooms.

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