WHO ARE "THEY"? STUDENT TEACHERS' BELIEFS

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Student teachers' beliefs about teaching are arguably important to their learning and development as teachers. One aspect of these beliefs is that of a focus on the learners. In the study presented in this paper, we use two approaches to content analysis in order to learn more about student teachers' beliefs from transcripts of focus-group discussions. The analyses reveal that the student teachers focus less on the mathematical content and more on characteristics of pupils in their discussions. These characteristics were mainly related to the pupils' behaviour, their cultural background or their certain needs.

INTRODUCTION

Teacher education is important in many respects. One way, in which it is particularly important, is in relation to the challenge of equipping all teachers for effective teaching in the 21st century (OECD, 2011). Throughout their development—from student teachers to experienced teachers—they are faced with different challenges. Richardson and Placier (2001) conclude that novice teachers focus more on surviving in the classroom than on pupils' learning, and additional research is needed in order to learn more about how teacher education can contribute to a shift in focus in this respect.

There are several interesting issues to focus on in a study of student teachers' development; one among several possible starting points is to study their beliefs about teaching (Fives & Buehl, 2010). Student teachers' beliefs are considered to be important by many, and there are different reasons for this. One reason is that student teachers bring with them strong beliefs about teaching into their teacher education, and these beliefs are important in relation to what the student teachers learn (Richardson, 2003). Tatto and her colleagues (2012) concur that beliefs are important to investigate in their study of teacher preparation in several countries: Teacher Education and Development Study – Mathematics (TEDS-M). One of their conclusions is that: "significant change is unlikely to occur unless teacher-preparation programmes explicitly address beliefs" (ibid., p. 172).

Previous research has identified learner orientation—it is often said that high quality lessons are learner centred—as one of the main attributes of a high-quality learning environment (Bransford, Brown, & Cocking, 2000). The demands on teachers are increasing, and cultural awareness and regard for individual differences and needs are crucial aspects of a teacher's skills (Bransford et al., 2000). It is important to develop a focus on learners' attitudes, skills and understanding, and not least to use this actively when designing and implementing teaching.

Beliefs have been studied in mathematics education research for decades, and throughout these years there has been a development of theories, focus and methods in relation to this area of research (see e.g., Philipp, 2007; Fives & Buehl, 2012). Despite all the efforts that have been made, there are still many unanswered questions regarding beliefs and other aspects of the affective domain (see e.g. Hannula, 2011). In the following we will take a brief look at some of the main issues regarding concepts and categories that have been discussed in beliefs research.

In his handbook chapter, Philipp (2007) provides an overview of some of the more commonly used terms related to beliefs: affect (including emotions, attitudes and beliefs), beliefs systems, conceptions, identity, knowledge and values. All of these concepts have been used with various meanings by different researchers, and, according to Fives and Buehl (2012, p. 471), "the lack of cohesion and clear definitions has limited the explanatory and predictive potential of teachers' beliefs". A clarification of terminology is therefore important for determining research focus. Beswick (2012) provides a categorization of mathematics teachers' beliefs into beliefs about the nature of mathematics, mathematics teaching and mathematics learning (Table 1).

Beliefs about the nature of mathematics (Ernest, 1989)	Beliefs about mathematics teaching (Van Zoest, Jones, & Thornton, 1994)	Beliefs about mathematics learning (Ernest, 1989)
Instrumentalist	Content focused with an emphasis on performance	Skill, mastery, passive reception of knowledge
Platonist	Content focused with an emphasis on understanding	Active construction of understanding
Problem solving	Learner focused	Autonomous exploration of own interests

Table 1: Categories of teachers' beliefs (Beswick, 2012, p. 130)

The choice of methodology when studying beliefs is strongly connected with the researchers' view about the nature of these beliefs. We recognise the connection between teachers' beliefs and practice (e.g. Skott, 2001), and we also recognise the attempts to include social aspects into the study of mathematics teachers' beliefs (e.g. Gates, 2006). Gates (ibid.) focused on how social aspects—for instance relationship between the individual and society—could be used to expand our understanding of beliefs. For the purpose of this study, however, we consider beliefs as being held by individuals (Philipp, 2007), and all the aspects from the table above are relevant to

consider in studies of teachers' beliefs. We analyse data from two semi-structured focus-group interviews with student teachers in order to answer the following research question:

> What can be learned about student teachers' beliefs from content analysis of their focused discussions prior to field practice?

The data material that we analyse and discuss in our attempts to answer this question is part of a larger, cross-disciplinary project entitled Teachers as Students (TasS).

METHODS

The TasS project—which is funded by the Research Council of Norway (project number: 212276/H20)—has a main focus on the field practice, which is part of the teacher education programme. It includes two data collection periods and two groups of participants: a control group (referred to in the project as the "business as usual condition") and an intervention group (referred to as the "lesson study approach condition"). Data collection in the control group was carried out in the Spring of 2012, whereas the data collection for the intervention group is scheduled for the Spring of 2013. For the purpose of this paper, we focus on the control group only.

Norwegian student teachers have 20 weeks of field practice during their four-year teacher education programme. For this research project, students in their second year participated. These students were just about to start their fourth three weeks long field practice. Two groups of student teachers from each of the subject areas: mathematics, science, English as a foreign language, and physical education were selected for participation in the control group condition. The intention was to have four student teachers in each group, but some of the groups ended up with only three student teachers in them. A focus-group interview (FGI) was carried out before (pre-FGI) and after (post-FGI) the field practice period in each of the eight groups. A main purpose with the FGIs was to investigate the student teachers' reflections about the mathematical content (or one of the other content areas involved in the study). Data collection also included video observations from student teachers' planning lessons with their practice teacher (pre-tutoring sessions), from carrying out lessons (two lessons in each group) and from evaluating lessons (post-tutoring sessions). In this paper, we analyse transcripts from the pre-FGIs conducted with the two groups of student teachers in mathematics (3 + 4 student teachers in these two groups).

Instrument

All pre-FGIs were carried out in a similar manner, and they were scheduled to last for approximately an hour and a half. Each interview consisted of the same four parts. The first part (5-10 minutes) contained introductory questions related to why they chose to enter into teacher education, why they decided to study mathematics, and what they anticipated as being the most interesting and/or challenging parts of being a teacher.

The second part of the FGIs (10-15 minutes) had a focus on the field practice they were about to start, and what reflections they had about their preparation for this period. The student teachers were asked to reflect on issues related to pupils, their own background knowledge and skills in the subject area and practical information given from the university.

Next followed a part of the interview where they were presented with the following case from a classroom situation (this part lasted for about half an hour):

Lise is teaching a class of sixth graders in mathematics. One issue she is very concerned about is getting feedback on ways that she can plan and teach which will enable her pupils' learning.

Lise: The pupils in my class are fairly different when it comes to their attitudes to school work, in general, and mathematics, in particular. Some of the pupils are very motivated and hard-working whilst others don't seem to care at all. This is reflected in their educational achievement in mathematics, the effort they put into their school work and their engagement in the learning environment. How can I lift all these pupils to the next level? Some of the pupils are very interested in mathematics and do more homework than they are asked to and in addition they receive a lot of support from home. Other, less motivated pupils don't seem to work at all; neither at school nor at home. And moreover they don't seem to have learned anything from previous classes. In addition I have two pupils with reading difficulties and two minority language pupils who have only lived in Norway for a short time.

Figure 1: Case from the interview guide.

They were then asked to discuss the challenges of the situation presented in the case, and how these challenges were related to the different aspects of teacher knowledge.

In the fourth and final part of the interviews (lasting approximately 30 minutes), the student teachers were asked questions related to the subject area that they were focusing on in their field practice (e.g. mathematics). In this part, they were asked questions about how they would plan a lesson—with a focus on fractions—in the class that was presented in the case from the previous part of the interview. The questions in this part were concerned with important aspects in the planning process, difficulties they believed students would have, ways of organising teaching in such a case, special concerns that they would have to be aware of as teachers, reasonable goals for such a lesson, and how they would assess their students in relation to the set goals.

Data analysis

The transcripts from the FGIs have been analysed by combining two approaches to content analysis. First, the transcripts were analysed by counting words in the text with the purpose of understanding the contextual use of words. This approach is often part of what has been referred to as summative content analysis (Hsieh & Shannon, 2005). Our summative analysis went beyond word count, however, and we tried to discover underlying meanings of the words used by the student teachers. The counting was used to identify patterns in the data and to initiate the process of

developing contextualised codes. The word count was also a starting point for identifying the context associated with the word to try to discover the range of meanings the word had in the interviews.

The summative analysis thus provided insight into how particular words were used. This summative approach is, however, "limited by the inattention to the broader meaning in the data" (Hsieh & Shannon, 2005, p. 1285), and it was followed by a second phase of data analysis. In this phase, we used conventional content analysis to dig deeper into the data. According to Hsieh and Shannon (2005), this analysis is used in studies which aim at describing a phenomenon in order to understand it better—in this case "it" refers to the student teachers' statements. In conventional content analysis "researchers immerse themselves into the data to allow new insights to emerge" (Hsieh & Shannon, 2005, p. 1279) by reading the data word by word. In our study, we combined the use of these two common approaches to content analysis. The summative content analysis thus served as a way of reducing data, and it was then followed by the conventional content analysis where categories were developed as part of the analysis.

RESULTS AND ANALYSIS

In our attempt to study what can be learned about student teachers' beliefs from content analysis of their focused discussions prior to field practice, our combination of summative and conventional content analysis seems promising. In this part we will present results from the summative as well as the conventional content analysis, and we will discuss the results in light of previous research in this area.

"They"—results from the summative content analysis

After an initial reading of the interview transcripts, we realised that the student teachers' reflections had much less focus on the mathematical content than we first anticipated. This impression was strengthened by our initial attempts to analyse the data. As part of our summative content analysis of the transcripts, we generated a concordance in order to learn more about the words that were used in the discussions and the frequencies of those words. We started out with a focus on words related to mathematics.

Frequency	**Word/concept**
88	mathematics
88	fraction
30	task
26	addition

21	calculate
18	denominator/common denominator

Table 1. The most frequently used words related to mathematics

From this initial summative content analysis, it appeared as if the student teachers were discussing fractions quite a lot, and we started out by focusing our analysis on this. When we moved from a quantitative to a more qualitative analysis of the content, however, it became evident that these words were mainly mentioned briefly with little or no reflection. In one of the interviews, for instance, the interviewer asked about their preparation for the field practice. One of the student teachers followed up by saying that they were well prepared. When the interviewer asked about the mathematical topic they were focusing on, the student teacher replied: "It is algebra". The reflections did not go deeper than just stating this.

We then decided to make a more open analysis of the content in order to learn more about what the student teachers were actually discussing in the FGIs. When generating a concordance that was sorted after occurrences of words rather than an alphabetically sorted list of the words that occurred, we observed that the most frequently occurring words were general words.

Frequency	**Word (in Norwegian)**	**In English**
1702	det	it
963	og	and
784	er	am/is/are
737	de	they/them/those
674	så	so

Table 2. The most frequently occurring words in the transcripts

Most of these words (e.g. like "and", "is" and "it") were used in different ways, and it was hard to discover any patterns. When making a more qualitative summative analysis of the most frequently used words, however, we realised that the word "they" was interesting. Throughout the transcripts, the word "they" was used almost exclusively with reference to pupils.

Who are "they?"—results from the conventional content analysis

From the summative content analysis, we followed up with conventional content analysis in order to learn more about how the student teachers talked about pupils—which we hoped might provide us with information about their beliefs about pupils. We started out with analysis of the keyword ("they") in its immediate context. In the first step of this analysis, the context was defined as five words before and after the keyword. During the analysis of these context units, the first attempts to categorise the data were made. Then we followed up by increasing the context to entire utterances, and the transcripts were read word by word and categories were developed inductively (Hsieh & Shannon, 2005).

From this analysis, the following categories emerged in relation to how the student teachers' referred to the pupils (as "they"):

- General reference to pupils
- Characteristics of pupils':
    - behaviour (B)
    - cultural background (CB)
    - certain needs (CN)

Below is an utterance from one of the student teachers in the two interviews. It has been chosen for illustration since it contains uses of the keyword "they" that relate to all the three subcategories of "characteristics of pupils". It also contains an example of other uses of the keyword (O).

> ST: It is of course possible to provide assistance with homework. It is fair enough that all pupils have a right to receive such assistance. You can, I mean, if you have more than two minority-language [pupils], you have a right to get a teacher assistant. [You] can help them (CB) in this way. By doing that you can split your class. You get those (B) who are diligent, that they (B) might be seated in a group of their own and work with things they (B) are able to [do on their own], so that they (B) are always ahead of the difficult tasks while you still help those (CN) who are struggling. That you have those (O) two assistants who walk around and help, and... Yes. It depends on how much learning difficulties they (CN) have, those (CN) two other pupils, but this is where you have the opportunity to get in some extra help.

As we can see from the first few sentences in this excerpt, the student teacher is talking about the challenges of having pupils with a minority language in the classroom. (S)he points to a regulation concerning the right to receive help with homework (for the minority pupils), and another regulation concerning the right to have a teacher assistant in the classroom if there are more than two pupils with a

minority language background in the class. When a teacher assistant is present to take care of the minority-language pupils, the teacher can more easily split the class into groups. This student teacher is obviously in favour of separating the pupils in groups according to level. It is interesting to observe that the best pupils are referred to as diligent rather than smart, clever or high achieving. From this statement, it is possible to suggest that this particular student teacher holds a belief where high achievement in mathematics is related to effort.

The weaker pupils, on the other hand, are referred to as "struggling", and the student teacher follows up by talking about them as pupils with a certain level of learning difficulties. So, whereas the best pupils are characterised by their effort, the lower achieving pupils seem to be characterised as pupils with learning difficulties, pupils who have certain needs, and pupils who are entitled to receive extra (external) support.

CONCLUDING DISCUSSION

In their distinction between three important aspects in research on beliefs about teaching, Van Zoest, Jones and Thornton (1994) mentioned learner focused as a third aspect. We have seen in the results from our analyses that the student teachers, when reflecting about teaching, had a strong focus on the pupils. It seems, however, that the student teachers—when talking about the pupils in our FGIs—did not focus much on mathematics, teaching or the pupils as learners; they focused more on characteristics of pupils. In this way, the student teachers' beliefs—although they were arguably about teaching—somehow did not fit inside of Beswick's (2012) table (see Table 1). The student teachers did focus on the learners, but they seemed to focus more on the pupils as persons with different characteristics.

Our aim with analysing the FGIs was to learn more about student teachers' beliefs through their reflections (in focused discussions) about teaching mathematics. After having made some early analyses, it appeared that reflections about the mathematical content were not dominating in the student teachers' discussions. Mathematical concepts were used, but they were mainly referred to rather briefly. When applying summative content analysis to the data material, we found that the FGIs contained more reflections about pupils than on mathematical content. The word "they"—which was mostly used with reference to pupils—were among the most frequently used words in the FGIs (table 2). After having made even further analyses of the data material, using conventional content analysis, we learned more about the different aspects of these reflections about pupils.

When analysing their characterisations of the pupils, we could distinguish between reflections concerning the pupils' behaviour, their cultural background or certain needs that the pupils might have. The student teachers, in their reflections, seemed to believe that the responsibility for pupils' learning is to be placed outside the teacher. They related the possibilities to help the pupils to other factors than their own

competence. One example of this can be found in the excerpt from the transcripts that we have discussed above. In this excerpt, the student teacher suggests that the pupils would learn if there were enough teacher assistants. Their focus here can be interpreted as being on surviving in the classroom rather than on pupils' learning (Richardson & Placier, 2001). This is, of course, only one example, but we found the same tendency in our analysis of the entire data material. In both interviews, there seemed to be a belief that the pupils represented different kinds of challenges to the teacher, and the student teachers might suggest that a solution to these challenges could be found outside and not inside themselves. Skott (2001) argued that teachers' beliefs about mathematics teaching are often obscured by the more general priorities related to organising the classroom, and this might be part of the explanation for the seeming lack of focus on mathematics and mathematics teaching in our FGIs.

Much can be learned about student teachers' beliefs by analysing their reflections in focused discussions. We decided to use summative and conventional content analysis in our analyses of data from FGIs with student teachers prior to field practice, but there are other kinds of analyses to make—each with different advantages as well as disadvantages or limitations. One of the advantages we found with using content analysis in our study was that it helped us discover what the student teachers mainly focused on in their discussions. The combination of approaches to content analysis also made it possible for us to discover reflections that were made by using a common word like "they". In order to learn more about student teachers' beliefs, it is also relevant to use the results of this as well as other analyses to make a new evaluation of the interview guide. When looking back at the case—which was presented in the FGIs—it can be noticed that it was more focused on students than on mathematics. The case might thus have had an effect on the participants' reflections in the FGIs.

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