

Tutors' qualification in responding to pupils during private lessons

TSG 46: Knowledge in/for teaching mathematics at secondary level

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Abstract

Private tutoring is important for quite a lot of secondary school pupils in Austria. Usually these private lessons are met with great expectations on the part of the pupils and their parents. The article presents a pilot study on the interaction of pupils and their tutors (university students to become teachers) in private lessons. The main focus of the paper is the qualitative analysis of the tutors' qualification in responding to pupils' statements, actions and underlying conceptions. It shows that tutors tend to take on a question or misunderstanding of the pupil, which is usually not very well formulated, elaborate on this utterance on a mainly syntactic level and in doing so miss out on the opportunity for initializing a learning process that leads to deeper understanding.

Keywords:

Educational research
Teacher competencies
Responsiveness

1 Surrounding Conditions

The "Institut für empirische Sozialforschung IFES" conducted a questionnaire-based telephone survey with about 3.000 parents of school-aged children in 2014 (IFES, 2014). According to this study about 30% percent of Austrian households with one or more pupils made use of private tutoring in the year 2014, in the majority of cases in mathematics (60%). It turned out that there are two different kinds of philosophies behind taking private lessons: half of the pupils take private lessons during the whole school year while the other half only studies together with a private tutor right before an examination. The main reasons for taking private lessons according to the study are improving grades or to prevent failing a class.

The focus of the presented empirical study lies on the investigation, whether university students of mathematics have already developed enough subject knowledge, pedagogical content knowledge and pedagogical knowledge to respond to pupils' statements, questions, actions, conceptions and beliefs in an appropriate, semantic-based way. This should also provide some insight into how effectively the education and professional development of pre-service mathematics teachers at university is working.

2 Theoretical background and research

It has been shown that private tutoring is often slanted towards the algorithmic aspect of mathematics (Hohoff, 2002). Particularly in cases where the private lessons are given right before exams, the focus lies on conveying elementary strategies to solve tasks effectively. The syntactic aspect therefore dominates the semantic aspect of mathematics. This seems paradoxical considering that private lessons could be the ideal setting to deepen their individual understanding of mathematical concepts, overcome obstacles in their previous learning experiences and so on. From a socio-cultural point of view this could originate from the tutor's motives for giving and/or the pupil's motives for taking private lessons and on the purposes that this tutoring pursues (Wertsch,

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1991). It has been described in literature, that even good classroom teaching can lead to undesirable results, namely processing algorithmic procedures without deeper understanding (Schoenfeld, 1988). In addition one can often witness situations during exams, in which pupils are successful only by performing the set tasks, to the letter, as introduced by the teacher during the maths lessons.

The aim of the presented qualitative study is to take a deeper look at the interaction taking place in private lessons and at the conditions that lead to this dominance of algorithmic procedures. Does the dialogue between the tutor and the pupil even provide the opportunity to make a diagnosis of the pupil's misunderstandings and misconceptions, respectively? If so, does the tutor make use of such situations? In what way? Who assumes responsibility for the learning process, particularly concerning the creation of a learning environment that focuses on semantic aspects of the learning matter? A specific and focused research question has yet to be formulated in this phase of the study.

Even and Schwarz (2003, p. 288-289) describe five different kinds of responsiveness that can be found in conversations between pupils and teachers during maths lessons: *Accompanying talk* (the teacher attends to the pupil's talk without elaboration, but typically acknowledging that he follows the pupil's talk), *Elaborating talk* (teacher elaborates utterances and expresses deeper cognitive involvement), *Opposition* (teacher explicitly expresses disagreement and objection), *Puzzlement* (teacher expresses confusion, perplexity or bewilderment) and *Non-Responsiveness*. We will use these notions to describe the quality of the contributions of the tutor and to make clear in which way he refers to statements or questions of the pupil.

3 Method

As a basic principle for the present study the interpretative education research method utilized and refined by Bauersfeld, Krummheuer and Voigt (Bauersfeld, 1978, Krummheuer & Voigt, 1991) is used. We will do without presenting this method in detail and will limit ourselves to sketching the essential terms used in this field of research.

Framing (in the German original: "Rahmung") and framing differences: Usually different interlocutors have different perceptions of the same educational situation. While teachers often focus on the systematic of mathematics as a field of research, pupils tend to take into account their daily experiences with learning mathematics, the mathematics lessons at school and their teachers. Moreover varying motives for giving and taking private mathematics lessons can lead to different conceptions and expectations of the learning situation.

Modulation and finding an *interim agreement* ("Arbeitsinterim"): Framing differences can be modulated and adjusted through interaction between the teacher and the pupil. This can lead to new perspectives for both interlocutors and the interaction can be kept going. The interaction focusses on the creation of an interim agreement between teacher and pupil. They are then able to communicate using "the same language" without necessarily thinking the same. The interim agreement can be seen as a transitional stage between the previous experiences of the pupils and the conception that the pupil should acquire (Krummheuer, 1983).

4 Case study

In an initial pilot study with varying teachers and pupils 9 private lessons were filmed and transcribed in part by a graduate student in the context of her diploma thesis (Lisa Korlath). These transcripts represent the data base for the first analyses.

Due to the shortage of space we will present only one case in this paper: Agathe (10) attends the fifth grade of an Austrian secondary school and is taking a private lesson right before her next written exam. Agathe describes difficulties with placing the comma in the results of basic arithmetical calculations that she performs by hand. The tutor first asks for an example and Agathe mentions the subtraction $24 - 3,12$. The following passage is an excerpt of the transcript of the private lesson (table 1, English translation of a German conversation).

Line	Interlocutor	Conversation	Responsive-ness	Level
1	Agathe	The problem is, when there is, for example, 24 and 3,12. In this situation I don't know, where it belongs.	-	open

2	Tutor	You can always write: 24 comma zero zero zero and so on. You can attach as many zeros as you want. It doesn't make any difference, okay?	ET	syntactic
3	Agathe	Mhm.	-	-
4	Tutor	So, if you have a number with two digits after the comma, you can attach two zeros to the other number as well. 24,00, that's the same. And then you can easily write 3,12 beneath.	ET	syntactic
5	Agathe	Okay.	-	-
6	Tutor	The comma is in the same position always.	ET	syntactic
7	Agathe	Yes. And for example, when we, for example, subtract, I don't know, when we attach zeros, should I ask 2 and how much is 10?	-	syntactic
8	Tutor	Correct! 2 and how much is 10!	AT	syntactic
...				
18	Tutor	The comma is always in the same position. It cannot occur that the comma of the first number is here and the comma of the second number is somewhere back here. They have to be exactly below one another.	ET	syntactic

Table 1: Conversation between Agathe (10) and her private tutor, AT (Accompanying talk), ET (Elaborating talk)

This scene between Agathe and her tutor can be considered as representative for many situations we have seen in the transcripts of the pilot study. It starts with Agathe's formulation of the problem in line 1, which is open to both options, a more semantically *and* a more syntactically oriented response by the tutor. The tutor shows readiness of mind, for he instantly offers practical advice to Agathe. In doing so he chooses a syntactic level for his response. He elaborates on Agathe's question without trying to find out what exactly her problem is. He therefore misses out on the opportunity to see whether Agathe has built up misconceptions concerning the place-value system. In line 7 one can see that Agathe adopts the tutor's level when she asks how to execute the first step in the written subtraction of 24,00 minus 3,12. Again this time the tutor loses out on switching to a more semantic way of explaining the supplementation from 2 to 10 hundredths. The whole scene is typical of private lessons in the sense that the tutor explains by means of an elaborating talk, instead of trying to gain a deeper insight into the thought process of the learner. The aim of the lesson seems to be the acquisition of an algorithm to solve certain kinds of tasks. Agathe contents herself with these explanations on a syntactic level, maybe without knowing that it would be possible to understand these procedures more deeply. Subsequently Agathe's misconceptions appear again while processing the subtraction task 14,04 – 14,028 (see table 2), not making the private lesson conducive to substantial advancement.

Line	Interlocutor	Conversation	Responsive-ness	Level
1	Agathe	And now that (points to 14,028) minus that (points to 14,04).	-	open
2	Tutor	Why did you interchange the two numbers?	ET	semantic
3	Agathe	Because 28 is greater than 4.	-	semantic
4	Tutor	But we have 14,028. This means, as we have mentioned earlier, we can attach zeros.	O	syntactic
5	Agathe	Exactly. Then this (points on 14,04) is greater.	-	-

Table 2: Conversation between Agathe and her tutor, part II, ET (Elaborating talk), O (opposition)

Prospects: In addition to the investigation of further private lessons in the main study, it is planned to document the socio-cultural background (motives for taking/giving private lessons) via a questionnaire for pupils and tutors. That way framing differences and associated expectations can be taken into account for the interpretation of the transcripts.

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