Pre-service Teachers' Perception, Interpretation, and Decision-Making in Mathematics at the Primary Level – Using Video-Vignettes for Research

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Abstract
Teachers' perception, interpretation, and decision-making skills are considered a prerequisite for appropriate teacher behavior in complex teaching situations. For researching these skills, video-vignettes are recommended as a context-sensitive stimulus. The article presents a study about these skills of pre-service teachers using video-vignettes showing learners dealing with context-related problems. When watching these video-vignettes, the pre-service teachers perceive various aspects relevant to teaching and learning about learners' processing of context-related problems and draw on existing subject-specific didactic knowledge. Concerning further work with the learners, they mention various possibilities but rarely specify them. So, it seems that the conclusion is difficult for them. Therefore, it would be advisable to integrate videos into university teaching to create more learning opportunities to acquire these skills and help pre-service teachers conclude.

Keywords: Situation-Specific Skills, Video-Cued Testing, Video-Vignettes, Context-Related Problems

1. Introduction

Learners' actions and utterances often occur in parallel in the classroom, and teachers decide in the respective situation where to focus their attention and how to act on this basis (e.g. Geisen, 2021). Teachers´ underlying perception, interpretation, and decision-making skills are linked to pupils' learning success (cf. Kersting et al., 2012). They are, therefore, of particular relevance in the everyday school life of teachers. They relate to the professional vision of teachers, a construct of teacher profession research (e. g. Berliner, 2004; Sherin & van Es, 2009; Kersting et al., 2012). This construct is considered an essential prerequisite for appropriate teacher behavior in complex teaching settings and an indicator of teachers' professional competences and beliefs (cf. Seidel & Stürmer, 2014). As the competences and beliefs of teachers are of central importance in connection with successfully coping with professional demands in the context of school and teaching (cf. Kunter et al., 2011), the construct of professional vision has increasingly become a focus of research in recent years (van Es & Sherin, 2010, p. 157). Of particular relevance in this context are videos, which are, among others, used as a context-sensitive stimulus in research (cf. Blömeke, 2013).

This article first provides an insight into the theoretical background of perception, interpretation, and decision-making skills using selected relevant studies. These skills are then neatly integrated into a competence model, which forms the basis for the study presented in the following article. As part of this study, the skills mentioned above were examined in the mathematical content of context-related problems with the help of video-vignettes. The research questions are laid out about the study, and a methodological categorisation and detailed insight into exemplary results are provided. These results are discussed, and conclusions are drawn.

2. Theoretical Background

2.1 Wide Range of Conceptualisations and Survey Options Regarding Teacher's Perception, Interpretation, and Decision-Making

Teacher´s skills of perception, interpretation, and decision-making refer back to the concept of professional vision to Goodwin (1994), who defines "professional vision" as "socially organized ways of seeing and understanding events that are answerable to distinctive interests of a particular group" (p. 606). Concerning the teaching context, teachers, therefore, have particular patterns of perception. The contributions of Sherin and Van Es (e. g. 2006, 2009) based on Goodwin's approach to professional vision are especially pertinent. Drawing on Goodwin's framework, Van Es and Sherin (2006) differentiate two sub-facets: selective attention and knowledge-based reasoning. Selective attention focuses on what is essential in a particular situation, making the connection to perception evident (ibid.). The process of thinking about perceived events in an understandable way is known as knowledge-based reasoning; in this case, interpretation is obvious (Sherin & van Es, 2009, p. 22; van Es & Sherin, 2006, p. 125 f.). These two sub-facets were investigated by examining recorded discussions held in video clubs. Usually, with the help of a research assistant, some practicing teachers with varying degrees of experience viewed and discussed their instructional videos in these video clubs. The methodology extended to conducting interviews with the participants before and after these video club sessions, offering insights into teachers' reflections on authentic teaching videos (Sherin & Van Es, 2009, p. 23; Van Es & Sherin, 2006, p.126).

While acknowledging the significance of interpretation, Star and Strickland (2008) and Star, Lynch, and Perova (2011) primarily focus on attention, aligning only with the first sub-facet of the van Es and Sherin (e. g. 2006, 2009) definition. Their research centers on understanding the elements that capture or elude the attention of pre-service teachers during their observation of classroom lessons, positing that interpretation is inherently contingent upon the initial act of perception (Star & Strickland, 2008, p. 111; Star et al., 2011, p. 119f.). They used videos of real-world mathematics lessons, which included the entire 45-50-minute lesson instead of selective excerpts. After viewing the videos, pre-service teachers responded to a series of questions - spanning true/false, multiple choice, and open-ended formats - designed to assess various dimensions, including the classroom environment, management strategies, mathematical content, tasks, and communication strategies. This methodology offers insights into pre-service teachers' focal points and potential oversights when confronted with the complexities of real-world classroom settings.

Jacobs et al. (2010, 2011) expand on Sherin and Van Es' conceptualisation to create a tripartite model encompassing perception, interpretation, and decision-making. The latter only refers to decisions made in the heat of the moment and leaves out teachers' long-term choices before or after a lesson (Jacobs et al., 2010, p. 173; 2011, p. 98 f.). Jacobs et al. (2010, 2011) utilized a mixed-method approach involving both video- and text-vignettes to investigate these sub-facets. These vignettes depicted scenarios from elementary school lessons or presented problems solved by elementary students. Participating teachers, both practicing and prospective, were then asked to engage with these vignettes by completing written tasks that addressed the three identified sub-facets.

The research group of Seidel and Stürmer is more in line with Sherin and van Es's approach (e.g. 2006, 2009). They segment professional classroom perception into two sub-facets: noticing and knowledge-based reasoning (Seidel et al., 2010, p. 297). Noticing is the identification of relevant situations and events in the classroom (ibid.). Knowledge-based reasoning is the analytical processing of these identified elements through the lens of theoretical knowledge (ibid.). The latter sub-facet is further elaborated into three dimensions, which are determined by Seidel et al. (2010) as describing "components of a learning-effective lesson based on theoretical knowledge," explaining "teaching situations based on scientific theories and findings", and predicting "effects of teaching situations on further teaching-learning processes" (p. 297). This conceptualisation contains the perceiving and interpreting sub-facets but not the deciding sub-facet. To operationalize this framework, the "Observer" instrument was developed by Seidel and Stürmer's research group using twelve authentic video-vignettes from five subjects and matching rating items based on the presumptive dimensions of describe, explain, and predict. This instrument emphasizes general teaching aspects such as goal orientation, support for learning, and classroom environment while excluding content-specific considerations (Seidel et al., 2010, p. 299). This approach underscores the importance of general pedagogical skills over domain-specific knowledge in assessing teaching effectiveness.

This section provided an overview of the diverse conceptualisations and survey methods used by research groups that have carried out fundamental work in this area (cf. Orschulik, 2021). To illustrate the spectrum of existing survey options, this review presents three conceptual frameworks originating from the United States and an additional framework from Germany. For a concise summary of the varied methodologies and frameworks presented, see Table 1.

Who?	What?	How?
Sherin and van Es (e. g. 2009)	Noticing as selective attention and knowledge-based reasoning	Video-clubs and interviews
Star and Strickland (2008) and Star, Lynch, and Perova (2011)	Noticing is restricted to attention	Videos of complete authentic mathematics lessons and multiple choice or open questions
Jacobs et al. (2010, 2011)	Perceiving, interpreting and deciding	Video-vignettes and text vignettes
Seidel and colleagues (e. g. 2014)	Noticing and knowledge-based reasoning	Video-vignettes and rating-items

Table 1: Diverse conceptualisations and survey methods.

The relevance of perceiving, interpreting, and decision-making in complex teaching situations is also demonstrated by the fact that these skills are an integral part of competence models, such as the model by Blömeke et al. (2015), in which these skills are explicitly identified as sub-processes of the teacher´s situation-specific skills.

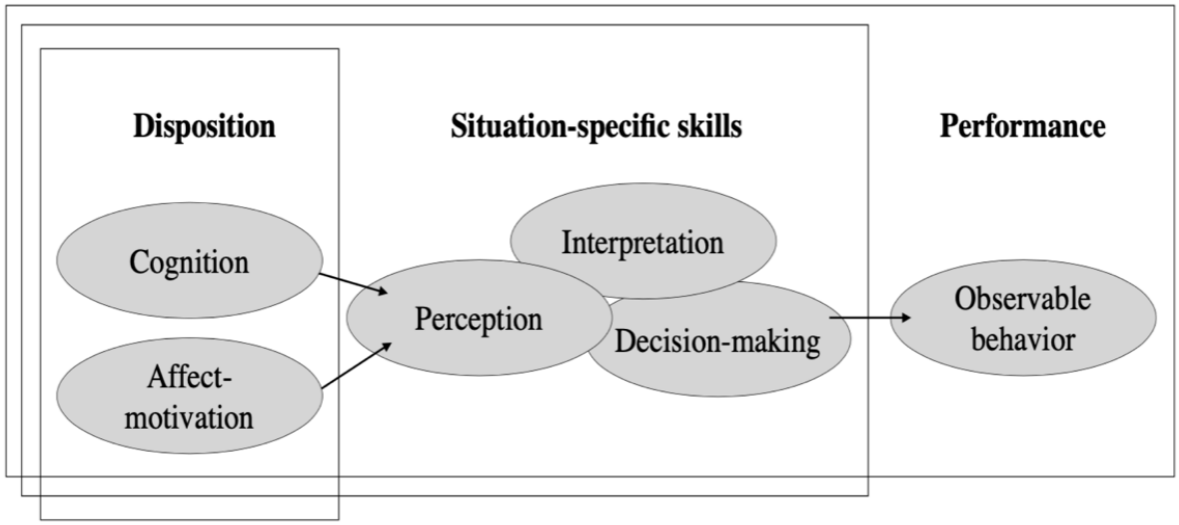

Figure 1: Competence as a continuum‘ based on Blömeke et al. (2015, p. 7).

In the actual execution, the processes of perception, interpretation, and decision-making merge into one another (König et al., 2014, p. 78f.) and are more likely to be conceived as a continuum (cf. Blömeke et al., 2015).

2.2 Video-Vignettes in Research

Videos in empirical research and educational contexts are becoming increasingly popular (e.g. Seifried & Wuttke, 2017; Sherin, 2007). Growing digitalization and advancing technological advances are likely responsible for this development (cf. Geisen, 2021). However, the use of videos in empirical research has existed since the 1970s and is a familiar approach (cf. Sherin, 2007). This is also evident when analyzing the survey methods regarding the skills of perception, interpretation, and decision-making in the section before. In addition, the categorisation in the previous section showed that videos could depict both natural lesson recordings and fictitious but realistic scenes (cf. Geisen, 2021; Blömeke, 2013). According to Blömeke (2013), a distinction can also be made between three forms of video use in research:

- Videographed lessons can be used as a data pool to analyse context-sensitive questions.
- Videos can be used to describe, classify, or illustrate examples of best practices.
- Videographed lessons can also be used as a context-sensitive stimulus for data collection, whereby various methodological approaches are possible.

Regarding the latter, a further differentiation is made. On the one hand, videos can be used as a conversation starter in the context of interviews, called video-cued interviews (cf. Blömeke, 2013). This corresponds to the video-stimulated recall interview approach introduced in the 1980s (see Calderhead 1981; see also e. g. Wyss 2013). On the other hand, there is the approach of video-cued testing, in which videos are integrated into a test instrument (cf. Blömeke, 2013). Compared to written procedures, the use of video-vignettes as a test instrument is said to have the potential to achieve a higher validity, which is particularly true for the assessment of competence and perception constructs (cf. Bruns & Eichen, 2015; Lindmeier, 2013). In contrast to paper-based methods, video-vignettes enable a better replication of teaching settings' complexity, spontaneity, and immediacy (cf. Bruns & Eichen, 2015).

2.3 State of Art on Context-Related Problems in Mathematics Education

Since the study is in mathematics didactic research, a content-related reference must be established by dealing with context-related problems in primary school mathematics lessons in the following.

Because mathematics is used in science, technology, and daily life, it is crucial to solve context-related problems successfully (cf. Kaiser et al., 2011). Therefore, there is a long history of using context-related problems in mathematics education (e. g. Geisen, submitted). Context-related problems are defined as "the process of translating between the real world and mathematics in both directions" (Blum & Borromeo Ferri, 2009, p. 45) rather than merely calculus-like arithmetic. Working with context-related problems is a crucial component of curricula all over the world (e.g. National Council of Teachers of Mathematics (NCTM) 2000; Kultusministerkonferenz (KMK), 2022), and according to the German standards it is interwoven with all contents of mathematics and at the same time with all the process-related skills (cf. KMK, 2022). This means a context-related problem can relate to the contents of sizes, measurements, or functional relationships, and when the problem includes, for example, a request for reason, the skill of mathematical arguing is addressed (cf. Geisen, 2021).

Solving context-related problems is summarized under modelling, and the whole process is described as a cycle (cf. Blum & Borromeo Ferri, 2009). Although there are many different cycles (cf. Blum, 2015), the following steps are more or less familiar to all cycles: Firstly, the modelling cycle begins with a problem situation referring to nature, society, or other scientific fields that are not explicitly related to mathematics (Blum & Borromeo Ferri, 2009, p. 45; cf. Pollak, 1979). This real-world problem must be modified if necessary by simplifying, structuring, generalizing, or making it more precise. Secondly, the problem situation has to be translated into mathematics to create a mathematical model as a solution approach (mathematising). Subsequently, internal mathematical processes such as calculating and solving equations can be applied, after which mathematical consequences result. These consequences are converted into real-world mathematical results (interpretation), and these actual results need to be verified. The validation process may result in the discovery of a workable solution or in the need to "round the loop a second time, for instance, in order to take into account more factors [...]" (Blum & Borromeo Ferri, 2009, p. 47).

The modelling cycle shows the complex process of working on context-related problems so that this is often challenging for pupils (cf. Galbraith & Stillman, 2006; Blum & Borromeo Ferri, 2009; Houston & Neill, 2003; Frejd & Ärlebäck, 2011). The complexity refers to technical, factual, and linguistic requirements (cf. Geisen, 2021). Nevertheless, the reasons for these challenges are very heterogeneous (ibid.), and every stage of the modelling process may challenge pupils (cf. Goos, 2002; Galbraith & Stillman, 2006; Blum, 2015). However, teachers also struggle with context-related problems due to their real-world knowledge and the unpredictability of teaching (e.g. Freudenthal, 1973; Pollak, 1979; Blum et al., 2007; Blum & Borromeo Ferri, 2009). As a result, teachers worldwide consider context-related problems less in mathematics education (cf. Blum & Borromeo Ferri, 2009). Therefore, it is crucial to consider teachers' dispositions and their situation-specific skills in this context (cf. Blömeke et al., 2015, see Figure 1).

3. Video-Cued Testing About Pre-service Teachers' Situation-Specific Skills Regarding Context-Related Problems

3.1 Research Questions and Methods

About the relationship between the mathematical expertise and mathematics didactic knowledge of teachers on context-related problems and their behavior in mathematics lessons concerning the use of context-related problems that stimulate a modelling process and the learning processes of learners, the international mathematics didactics literature points to a research desideratum (cf. Verschaffel et al., 1997; Verschaffel et al., 2000). This desideratum is of particular relevance, as, on the one hand, many learners have difficulties when working on context-related problems and need support from teachers in this regard (e.g. Blum, 1985; Geisen, 2021). On the other hand, however, dealing with context-related problems is difficult for learners and teachers (ibid.). The question, therefore, arises as to what (pre-service) teachers perceive about learners' processing of context-related problems and what conclusions they draw from this. This question is investigated by analyzing pre-service teachers' situation-specific skills regarding context-related problems. As the concept of professional vision can be regarded as a promising indicator of professional knowledge (cf. Seidel & Stürmer, 2014), this is an attempt to address the research gap described at the beginning. So the study focuses on their perception, interpretation, and decision-making skills (cf. Blömeke et al., 2015). Based on these skills, the study was guided by three research questions:

- What mathematics didactic aspects do pre-service teachers perceive regarding pupils dealing with context-related problems?
- How do they interpret the watched situation?
- What situational and long-term decisions would they make?

Perception, Interpretation, and Decision-making are seen as a linear process but also as never-ending and starting from the beginning again and again.

A web-based video tool was developed and implemented in the university's learning management system to answer the research questions. The tool was developed based on the qualitative interviews from the author's Ph.D. project (cf. Geisen, 2021). The video tool comprises four parts:

- Part 1: Query of relevant personal data of the pre-service teachers,
- Part 2: Processing of a context-related problem by the pre-service teachers and uploading of the processing,
- Part 3: Viewing of a video-vignette by the pre-service teachers and answering open-ended items,
- Part 4: Inquiry of the professional beliefs and self-efficacy expectations of the pre-service teachers regarding context-related problems.

Part 2 allows the pre-service teachers to familiarize themselves with the context-related problems (introduction). They should work on a context-related problem and upload their work. On the one hand, the pre-service teachers already deal with the relevant context-related problem of the following part 3 by working on it. This forms an essential basis for the analyses in part 3. Secondly, the student's work can be analysed as part of the study and, if necessary, linked to the analyses in part 3. Subsequently, the pre-service teachers watched a video-vignette in part 3 and answered open items regarding the perceived teaching and learning-relevant aspects and the further work with the learners. The open items allow the pre-service teachers to freely analyse and reflect on the video-vignettes without predetermined, guiding answer options.

The video-vignettes show an excerpt of two learners working on a context-related problem (for example, see Figure 2). Part 3 is variable regarding the video-vignette used so that different scenes can be used in the instruction. The instrument described, particularly part 3, corresponds to the video-cued testing method, according to Blömeke (2013). Part 4 refers to a developed questionnaire on professional beliefs and self-efficacy perceptions about context-related problems. Since perception, interpretations, and decision-making skills are not only influenced by professional knowledge but also by professional beliefs (cf. Blömeke et al., 2015), this questionnaire is supplemented to be able to establish a connection between the beliefs of pre-service teachers and their professional vision about context-related problems. For the questionnaire, the results of previously conducted studies on the beliefs of primary and secondary school teachers regarding context-related problems are incorporated (cf. Kaiser & Maaß, 2007; Verschaffel et al., 1997).

This paper focuses on the third part, when pre-service teachers analyse and interpret a video-vignette. Used were two video-vignettes. The video-vignettes show short, authentic scenes of two third graders working on context-related problems and having difficulties outside the classroom. The group composition in terms of pupil performance levels was heterogeneous. The video-vignettes can be considered for various mathematics didactic questions.

A context-related problem with the title pocket money, where Cem and Lena talk about the amount of their pocket money (cf. Geisen, 2021, p. 120; see Figure 2) and an excerpt from the corresponding video-vignette are presented below as examples (see Table 2).

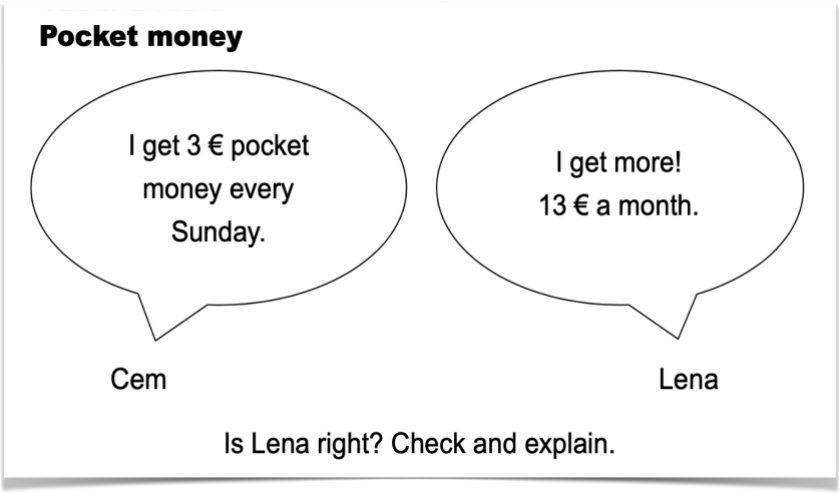

Figure 2: Pocket money problem (cf. Geisen, 2021, p. 120).

Line	Pupil	Transcription
1	P1	So Cem gets 3 € pocket money every Monday.
2	P2	And Lena gets.
3	P1	More.
4	P2	13 per month.
5	P1	Yes.
6	P2	So Lena gets 13 €, per month.
7	P1	Yes. (Laughs) (10 sec.) Now we need to know how many weeks in a month.
8	P2	(Nods) How many weeks?
9	P1	I have no idea. (laughs)
10	P2	So how many, um, days are there in a month?
11	P1	I don't know that either.

Table 2: Transcript excerpt of third grader's solving process (cf. Geisen, 2021).

Pupil 1 (P1) and Pupil 2 (P2) try to find out who gets more pocket money. So, P1 and P2 first read the context-related problem (lines 1-6) and then consider what information they need to complete it. P1 notes that it is necessary to know how many weeks a month has (line 7) but cannot draw on this knowledge (line 9). P2 responds to this and asks how many days there are in a month (line 10). In this section, the lack of knowledge of the dimension of time means that learners are initially unable to carry out any mathematisation (e. g. Klieme, Neubrand & Lübke, 2001).

3.2 Data Collection, Sample, and Analysis

16 Masters students participated in the study, 13 female and three male, aged between 20 and 43. Three students are studying mathematics as a subject, and 13 students only study mathematics as part of a basic education. They only complete one didactic and one scientific module. Five students are working as substitute teachers in primary schools and six as private tutors and, therefore, already have initial teaching experience.

At the time of the survey, the students participated in a mathematics didactics lecture in the master's program. In this lecture, subject-specific didactic principles of context-related problems were taught following participation in the study. Complete data from 16 students is available for analysis.

The data material was analysed as a content-structuring qualitative content analysis (cf. Kuckartz, 2014), which combines structuring and summarizing qualitative content analysis according to Mayring (e. g. 2015) and made an inductive and deductive approach possible. The content-structuring qualitative content analysis, according to Kuckartz (2014), is divided into seven phases:

1. Text work (highlighting noteworthy passages, writing initial memos)
2. Development of main thematic categories (inductive and deductive categorisation)
3. Coding the material (assigning the main thematic categories to the material)
4. Compiling the text passages with the same main category
5. Inductive determination of subcategories in the material
6. Coding the entire material
7. Simple and complex analyses and visualizations

Main thematic categories were developed inductively and deductively, and the sub-categories were determined inductively. The following main categories, in particular, can be identified as the perceived and interpreted aspects relevant to teaching and learning about the processing of context-related problems by learners (research questions 1 and 2):

- Learners' partial skills and abilities,
- Editing process,
- Learner's difficulties.

Perceived and interpreted aspects could not be meaningfully separated based on the data material and were, therefore, summarized. The main categories can be further differentiated into various sub-categories. The main category of partial skills and abilities of the learners can be concretised concerning the aspects of prior knowledge (experiential and factual knowledge; cf. Franke & Ruwisch, 2010), content-related competence in quantities and measurement (e. g. understanding of measurement systems and numbers; cf. KMK, 2022), content-related competence in numbers and operations (ibid.) and reading and writing skills. About the editing process, a distinction can be made between the sub-processes of the modelling cycle of understanding the situation, mathematising, and processing (cf. Klieme et al., 2001). In this regard, the learners' approaches were also considered. The main category of learner´s difficulties includes the sub-categories of factual context, unclear task, learner´s approaches, content-related competences of quantities and measurement (support point concepts and understanding of measurement systems and numbers; cf. KMK, 2022), and numbers and operations (operation concepts; cf. KMK 2022), orientation towards surface features as well as reading and language skills. Difficulties are also expressed in the modelling cycle (understanding the situation, mathematising, and processing; cf. Klieme et

al., 2001). Figure 3 shows the main and sub-categories identified for research questions 1 and 2.

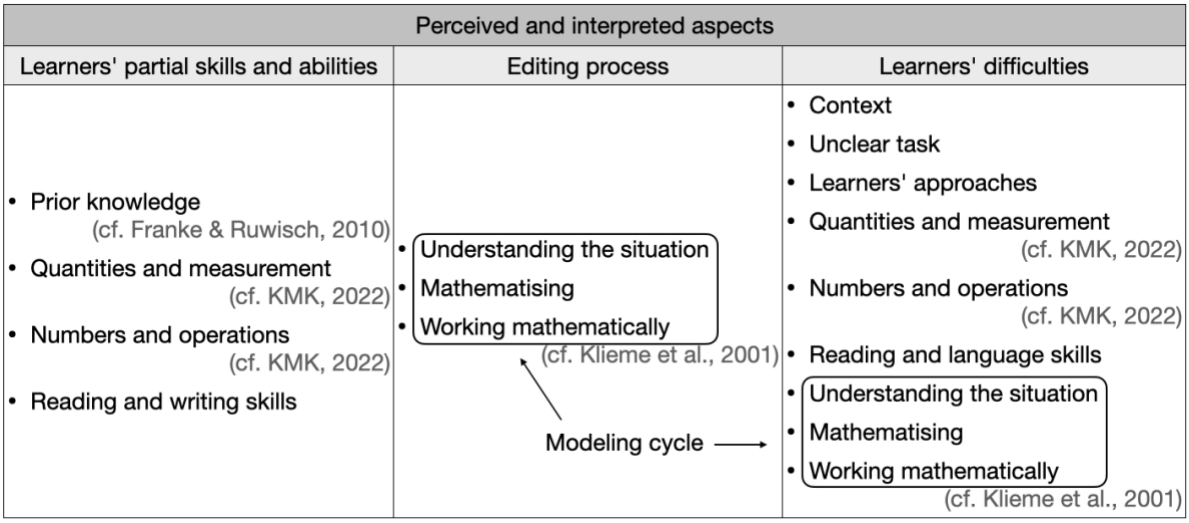

Figure 3: Category system referring to perceived and interpreted aspects.

Concerning further work with the learners and the pre-service teachers' arguments in this regard (research question 2), three main categories can be identified:

- Learner's partial sub-skills and abilities,
- Editing process,
- Variation possibilities.

Regarding the main category of relevant sub-skills and abilities, the sub-categories are the content-related competences of quantities and measurement (e. g. understanding of the measurement system and numbers), numbers and operations (cf. KMK, 2022), and reading and language skills. The sub-processes of the modelling cycle are identified as sub-categories in the main category of the editing process. The structuring aids and support services form a further sub-category. A variation of the task is considered concerning an opening and the degree of difficulty. Figure 4 shows the main and sub-categories identified for research question 3.

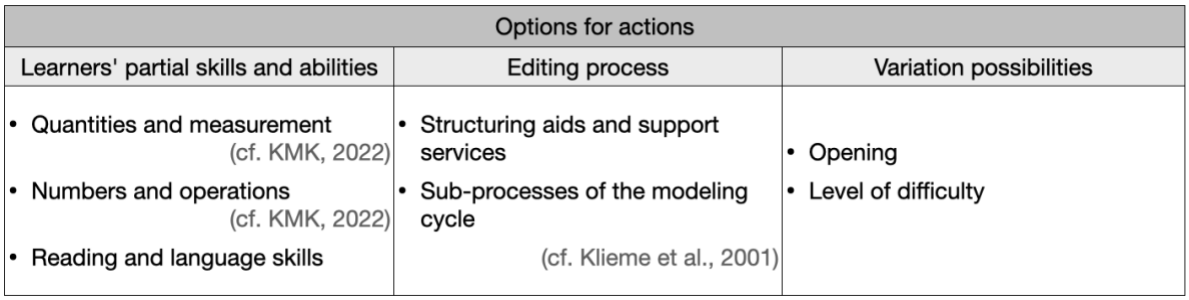

Figure 4: Category system referring to options for actions.

As a consideration of all sub-categories in detail is not possible in this paper, the focus in the following is exclusively on the dimension quantities and measurement of the sub-category learner´s partial skills and abilities of the main categories perceived and interpreted aspects and options for actions.

3.3 Exemplary Results

This section provides an exemplary detailed insight into the analyses and, thus, the results. In doing so, the focus is on the dimension quantities and measurement, an everyday relevant and, therefore, significant mathematical content (e. g. KMK, 2022). The pocket money problem (Geisen, 2021, p. 120), a task used in the study, relates to the quantities of money and time (see Figure 2). The accompanying video-vignette, which the pre-service teachers analysed and interpreted, shows two pupils trying to determine whether Cem or Lena receives more pocket money (see Table 2).

Concerning the focus placed here, the pre-service teachers perceived the missing units of measurement by one pupil when pupil 2 says, for example "13 per month" (see Table 2 and line 4):

The corresponding units of measurement are not considered in some of the statements of P2.

The pre-service teachers thus classify this as a difficulty for the learners. It was to be expected that difficulties in connection with the handling of money and time would be addressed (cf. Geisen, 2021). In particular, learners must establish a connection between days, weeks, and months and, if necessary, refer to a year, whereby the units are not decadal and are subject to fluctuations (e.g. leap year - typical year; cf. Franke & Ruwisch 2010).

In addition to the difficulties, the pre-service teachers also recognised learners' partial skills and abilities. They interpreted that Pupil 1 understands the difference between month and week by asking the question how many weeks are in a month (see Table 2 and line 7):

P1 already understands the difference between a month and a week.

Concerning options for actions, the pre-service teachers decided, for example, to repeat the non-decadal alliance structures of periods with pupils 1 and 2:

In addition, the non-decadal alliance structures of periods should be repeated.

They justify this based on the lines 4 and 7 to 11 in the transcript excerpt (see Table 2). However, how exactly the pre-service teachers would implement this in lessons with the learners is not explained in detail.

4. Summary and Conclusion

In this paper, the construct of professional vision, which is essential for teaching, was first concretised, and the potential of videos in the relevant research context was highlighted using selected exemplary studies (e.g. Sherin and van Es, 2009) and a competence model (cf. Blömeke et al., 2015). This model conceptualizes perception, interpretation, and decision-making skills as situation-specific skills related to performance and cognitive and affective-motivational dispositions (ibid.).

A research desideratum can be identified in dealing with context-related problems in mathematics lessons, which is about the relationship between the mathematical expertise and mathematics didactic knowledge of teachers, on the one hand, and their behavior in mathematics lessons concerning the use of context-related problems on the other hand (cf.

Verschaffel et al., 1997; Verschaffel et al., 2000). The situation-specific skills of teachers could be of interest in analyzing this relationship and offer a way of approaching it. This was attempted in the study presented here by developing a video instrument with open-ended items. The survey was conducted with 16 pre-service teachers, after which the data matrix was analysed qualitatively.

The pre-service teachers who participated in the survey perceive various aspects relevant to teaching and learning about learners' processing of context-related problems and draw on existing subject-specific didactic knowledge. They perceive partial abilities and skills necessary for the processing and sometimes document these with concrete statements from the learners. They identify sub-steps of the modelling process and recognize various difficulties of the learners, e.g. content-related skills (cf. KMK, 2022). Concerning further work with the learners, various possibilities are mentioned but rarely specified.

The pre-service teachers certainly use their subject-specific and didactic knowledge to identify aspects of the video-vignette relevant to teaching and learning and focus their attention on them (cf. Sherin, 2007; Sherin & van Es, 2009). However, pre-service teachers seem to find concluding difficult (ibid.). According to Seidel and Stürmer (2014), this would suggest that pre-service teachers' knowledge is less coherent and structured and, therefore, cannot yet be applied flexibly. The results can be supported by the study by Seidel et al. (2010), according to which novices tend to merely describe teaching situations due to their lack of knowledge. In contrast, experts tend to explain and predict these situations.

Integrating video-vignettes in university teaching could create more learning opportunities to acquire these skills and help pre-service teachers conclude. It would also be interesting to compare the pre-service teachers' assessments with those of practicing teachers. Further research activities are being planned to make a long-term contribution to research into teacher situation-specific skills about context-related problems.

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