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Silent video tasks in pre-service mathematics teacher training

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Teaching mathematics in multilingual diverse settings

Even though majority of pre-service teachers might be aware of diversity (backgrounds different from the dominant culture, e.g., cultural and linguistic), still, most of them do not transfer their awareness into diversity-aware teaching strategies or approaches – ways that “combine awareness of differences among pupils, appreciating those differences, and taking actions to promote equity in classrooms” (Hummel & Bohlmann, 2022). For example, in the case of second language learners in mathematics, one such teaching strategy involves building norms in the classroom such that students are expected to and supposed to explain their thinking and thus to actively engage in a joint production of mathematical explanations and solutions (Barwell, 2020). In other words, teachers would be required to facilitate classroom discussion. It is very challenging for most teachers and teacher students to orchestrate productive mathematical discussions (Smith & Stein, 2018, p. 54 and p. 70). For professional training in orchestrating group discussions, Smith and Stein (2018) have described five practices of anticipating, monitoring, selecting, sequencing, and connecting students’ thoughts. Building on these practices, Kooloos (2022) collaborated with a group of Dutch in-service teachers, supporting them in developing their practice of teaching through mathematical whole-class discussions. To do this, teachers videorecorded their own practice and collectively reflected on their lessons with the researcher. This poster (tiny.cc/BK23) suggests that teacher educators might use silent video tasks to approach the task of supporting teacher students in their first steps toward orchestrating whole-class discussions in mathematics. It reports on how the variety of responses to a silent video task gave rise to discussion on diversity and the role of language and mathematical discussions in an international pre-service teacher training. It raises the question whether silent video tasks might be a useful tool in pre-service teacher courses for teacher educators who wish to raise awareness of linguistic diversity and to illustrate the importance and complexity of leading a group discussion in mathematics class.

Silent video tasks as a tool for training orchestration of mathematical discussions

A silent video task revolves around a short, animated video clip with no sound or text, focusing on a specific mathematical topic that is displayed for the whole class before a link is distributed to students for repeated viewing. In pairs, students prepare and record their description, explanation, and/or narration to the video and the teacher leads a group discussion based on students’ voice-over recording responses (Kristinsdóttir, 2021). Such a task might be implemented in secondary school classrooms either before starting a new topic, to gather students’ pre-ideas about the topic, or toward the end of working on a topic, e.g., with the aim to develop common understanding of the mathematical topic at hand.

In a pre-service teacher-training program, within the frame of a 90-minute-long workshop (taught in English), participants (N=22) from Germany, Greece, Italy, and Portugal were introduced to silent video tasks and given the opportunity to experience a silent video task in the student role by recording

a voice-over in English for a short (1 m 33 s) animated video. The selected video illustrates the property described by Viviani's Theorem that the altitude of an equilateral triangle equals the sum of the distances from any interior point to the sides of the triangle (see youtu.be/-nUDBmplu_Y). Immediately after handing in their voice-over recordings (11 in total), they were listened to in no particular order, collecting concepts and phrases on the blackboard in such a way that equivalent or related words were grouped together. For example, we noticed that some recordings mentioned *perpendicular*, other *orthogonal*, one *vertical*, and one *with a 90°angle* when referring to the line segments that showed the distance from the interior point to the sides of the triangle.

The diversity of responses seemed to catch students by surprise and their attention certainly was brought to the importance of language and discussion. Ways to link the recorded responses to each other and to reach common understanding of the mathematics displayed in the video were discussed. For example, we discussed our perceived transparency of words, how this type of task might offer opportunities for second language learners to enter the classroom discussion, and questions that we might pose, such as “Can you tell me in other words what this group focused on in their recording?”

Conclusion

One way to introduce the practice of facilitating mathematical discussions is to put teacher students in the role of pupils like what was described above. Pair discussions and task responses could be recorded and transcribed, and students asked to reflect on what questions they might have posed to pupils during classroom discussion. In a linguistically homogeneous group of teacher students, they could be provided with and asked to plan whole-class discussion based upon recordings or transcripts of responses from secondary school pupils (including multilingual pupils). This poster illustrates in text and simple comics drawings how and why silent video tasks might be a tool for raising teacher students' awareness of diversity regarding language and access to the classroom discussion.

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