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# Development of silent video tasks as a tool for formative assessment

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## Introduction

This poster reports on results from a design-based research project (e.g. Bakker, 2018) focusing on the definition, design, implementation, and development of silent video tasks—tasks were students watch and add their voice-over (in the form of explanations, descriptions, narrative) to short, silent animated mathematics films. Experiences made with teachers in the first phase of the research project formed the basis of the first drafts of a definition of silent video tasks and a description of their instructional sequence that were presented in the form of comics on a poster at CERME11 in Utrecht (Kristinsdóttir, 2019). Based on reactions from participants in TWG15 at CERME and at ICTMT-14 in Essen, a second phase of the design-based research project was prepared and conducted in fall 2019 with the aim to develop further the process of assigning silent video tasks. The second phase of the research project—which could be viewed as a case study—was conducted in collaboration with three Icelandic upper secondary school mathematics teachers, who had some previous experiences with the use of formative assessment. This poster presents the refined instructional sequence of silent video tasks, in the form of comics, based on results from the case study.

## Methodology

Prior to the case study, some potentials of silent video tasks to be used as a tool for formative assessment had been identified, using a list of technology-based formative assessment strategies by Wright, Clark, and Tiplady (2018). Hence, teachers with experience of formative assessment practices were purposefully selected to take part in the case study. It so happened that all three teachers, that accepted participation, taught a course for low-achieving students entering grade 11 (age 16-17) in upper secondary school. Based on teachers' suggestions and in accordance with the course curricula, I (the first author) created three one-minute-long silent videos on the topics of coordinate geometry and linear equations. Teachers planned to implement all three videos within the course of one semester. They were encouraged to suggest refinements to the tasks' instructional sequence already in the first interview prior to the silent video task implementation.

Data collection was mainly in the form of teacher interviews that were conducted before and after each implementation of a silent video task and classroom observation notes written during each implementation of a silent video task. Furthermore, during three of the interviews, the teacher who tried out all three silent video tasks was asked to do some think-aloud exercises to prepare and reflect on his task implementation. These think-aloud exercises proved to be helpful to understand the reasons behind his actions and decisions regarding the task implementation.

All interviews were transcribed verbatim in Icelandic. Analysis started immediately after the first interview, focusing on the instructional sequence design and development. After transcribing the last

interview, an iterative process of open coding and detailed notes-writing was used to gain an overview of how teacher's ideas, experiences, and expectations developed over time. Thus, creating a base for forming the design principles of silent video tasks, using a format suggested by van den Akker et al. (2013, p. 67) that included characteristics, procedures, and underlying theoretical and empirical arguments for the design.

## Results

In the end, only one of the participating teachers implemented all three videos, and the other two teachers both implemented one of the videos in their teaching. Based on teacher interviews, think-aloud reflections, and classroom observations, the instructional sequence of silent video tasks was further developed. Prior to the case study, the silent video tasks' instructional sequence involved the selection of a silent video; whole class viewing of the video; students working in pairs to prepare and record their voice-over for the video in a first lesson, teacher preparation (listening to all students' responses) before the follow-up lesson, and a group discussion based on a part of students' task responses in the follow-up lesson. Teachers in the case study, however, wanted feedback to be immediate and instead of only listening to selected task responses, they wanted a whole group listening and discussion as a reaction to all students' responses to the task. This proved to be challenging for teachers. Nevertheless, the teacher who implemented all three silent video tasks developed his ways of conducting the group discussion and during the third implementation, he was observed to make connections between students' discourse (as presented in students' responses to the task) and the mathematical discourse (as had been presented in classes before the silent video task implementation). This might be connected to the process of reification (Sfard, 2008, p. 44), which involves a transition from describing processes towards talking about objects.

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