FEATURES OF VIDEO HOMEWORK IN FLIPPED ALGEBRA INSTRUCTION

Jaepil Han
University of Missouri
jhph6@mail.missouri.edu

Stacy Hirt
University of Missouri
smhckd@mail.missouri.edu

Jessica Kamuru
University of Missouri
jgc7vc@mail.missouri.edu

Zandra de Araujo
University of Missouri
dearaujoz@missouri.edu

Samuel Otten
University of Missouri
ottensa@missouri.edu

Wenmin Zhao
University of Missouri
wz2mb@mail.missouri.edu

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Flipped instruction is an instructional model in which a teacher assigns videos or other multimedia to be viewed outside of class. Many teachers report adopting this model because they want to have more collaborative time during class (de Araujo, Otten, & Birisci, 2017) and, with content delivery still an important part of their instructional vision, they move the content delivery to the video homework. Because mathematical content is typically delivered via these videos in flipped instruction, it is important that we examine them more carefully to capture how content delivery may differ (or not) between flipped and non-flipped instructional models. Thus, our study examined the following question: what are the features of lecture videos selected/created by Algebra 1 teachers utilizing flipped instruction?

We observed 13 Algebra 1 lessons. Each lesson was taught by a teacher who had adopted a flipped instructional model, however, only 11 of the teachers had assigned videos for the observed lesson. Of the 11 lessons with videos, nine had one assigned video, one had two assigned videos, and one had three assigned videos. We collected digital versions of each of these videos and analyzed them using our Flipped Mathematics Instruction Observation Protocol (Zhao, Han, Kamuru, de Araujo, & Otten, 2018).

In terms of duration, the videos ranged from six minutes and four seconds to 13 minutes and 45 seconds with an average of nine minutes and 44 seconds. All the videos were lecture videos featuring worked examples. All of the videos were created by the teachers, and all but two were created utilizing voice-over recordings of their written work. The other two videos utilized picture-in-picture formats. None involved “lecture capture” (e.g., a person recorded at a whiteboard) which has been found to be most effective in content delivery (Chen & Wu, 2015).

We also examined the instructional quality of the videos (e.g., mathematical development, visual representations, mathematics errors) and the extent to which the teachers adhered to multimedia design principles (e.g., personalization, redundancy between narration and text) (Clark & Mayer, 2008). The instructional quality of the videos varied more than the quality of multimedia design. Our analysis of these lecture videos sheds light on how content delivery may differ between flipped and non-flipped instruction and even among the teachers who have adopted flipped instruction. In addition, it provides a better understanding of current implementation of flipped instruction in Algebra 1, potentially informing supports that we may offer teachers.

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