

Examining Relationships Between Flipped Instruction and Students' Learning of Mathematics

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2017–2018 (Year 1)

Recruitment & Preparation Year

- Participant recruitment
- Created & revised protocol
- Administration of teacher survey ($n = 302$)
- Analysis of survey data and identification of sample for Phase 2 data collection
- Pre/post testing of high school algebra students
- Administration of student survey
- Graduate assistants trained in analytic frameworks

Participants

- 20 flipped and 20 non-flipped algebra 1 classes in the Midwestern United States

Dissemination

de Araujo, Z., Otten, S., Zhao, W., Kamuru, J., & Han, J. (under review). Fostering collaboration with the flip.

Otten, S., Zhao, W., de Araujo, Z., & Sherman, M. (under review). Evaluating videos for flipped instruction.

Otten, S., de Araujo, Z., & Sherman M. (in press). Capturing Variability in Flipped Mathematics Instruction. *Proceedings of the 40th Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*, Greenville, SC.

Zhao, W., Han, J., Kamuru, J., de Araujo, Z., & Otten, S. (accepted). Flipped Mathematics Instruction Observation Protocol. Session to be presented at the 40th Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education, Greenville, SC.

Otten, S., de Araujo, Z., Zhao, W., Han, J., Mason, E., & Kamuru, J. (2017, Dec). *Making the most of flipped in-class time*. Presentation at the annual meeting of the Missouri Council of Teachers of Mathematics, Columbia, MO.

de Araujo, Z., Otten, S., Zhao, W., Han, J., Mason, E., & Kamuru, J. (2017, Dec). *Evaluating videos for flipped instruction*. Presentation at the annual meeting of the Missouri Council of Teachers of Mathematics, Columbia, MO.

Research Description

Using mixed-methods techniques, this 3-year study will examine activities occurring in flipped and non-flipped high school algebra classrooms. In each classroom environment, researchers will distinguish high-quality from low-quality univocal discourse, dialogic discourse, and high cognitive demand from low cognitive demand tasks.

Research Questions

RQ1: What are salient factors entailed in teachers' implementation of flipped instruction in secondary algebra?

RQ2: To what extent do these factors predict students' learning of algebra as measured on a state-mandated end-of-course assessment and on a concept-of-variable inventory?

Research Framework

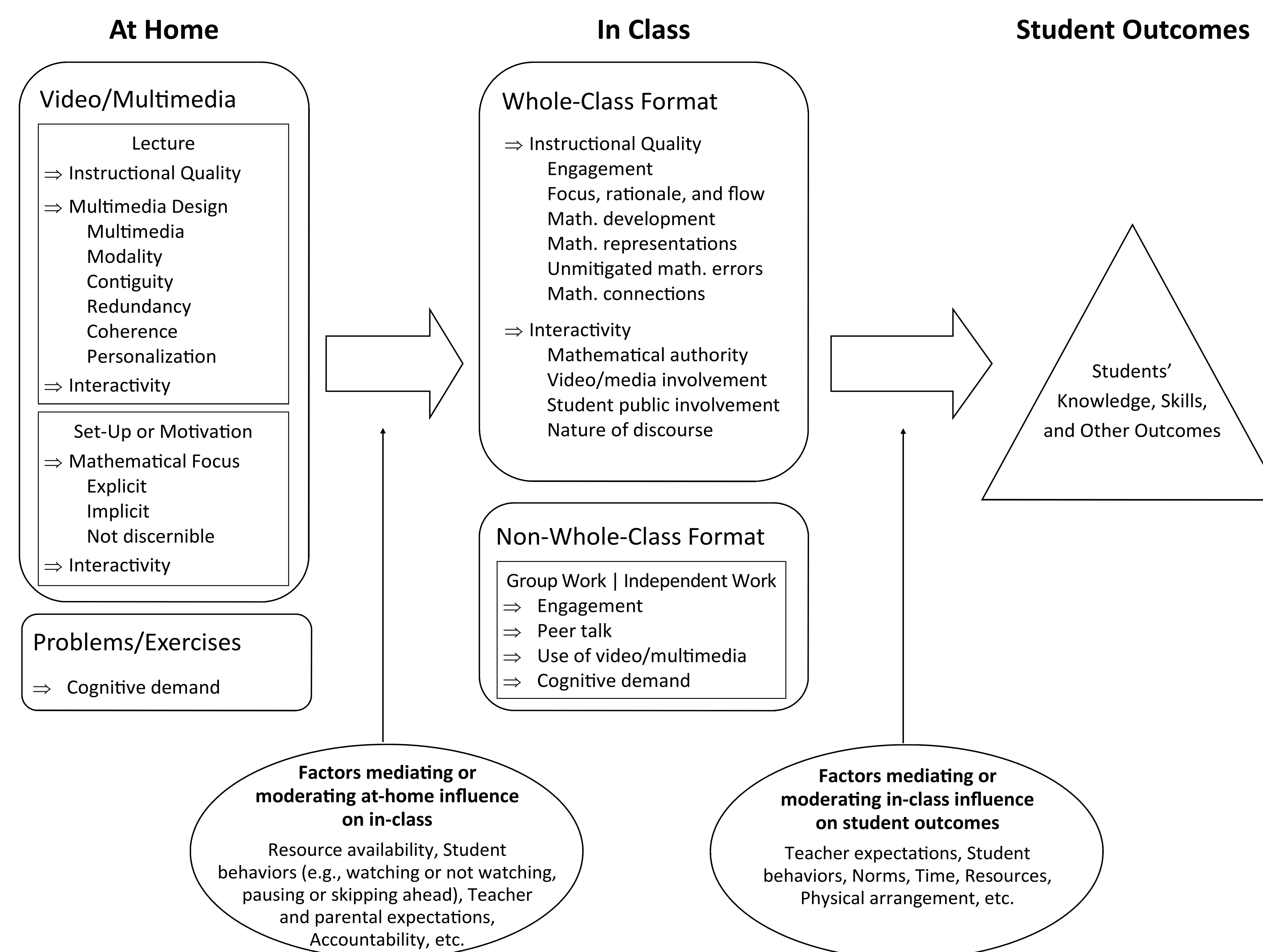


Figure 1. A framework for flipped mathematics instruction

www.flippedmathstudy.net

2018–2019 (Year 2)

Data Collection Year

- For all classes ($n = 40$; 20 flipped / 20 non-flipped)
 - 3 lesson observations per class
 - Pre/post-AY conceptual instrument administered and analyzed
 - Student survey administered
- For flipped classes ($n = 20$):
 - Observation of in-class time
 - Lesson materials and home videos collected
- For non-flipped classes ($n = 20$):
 - Observation of in-class time
 - Homework materials collected
- Preliminary data analysis

Research Team

- PI: Zandra de Araujo (dearaujoz@missouri.edu)
- Co-PIs: Samuel Otten, James Tarr, Ze Wang
- Advisory Board: Chris Devers, Dan Heck, Beth Herbel-Eisenmann, John Opfer, Phil Wood
- Graduate Assistants: Wenmin Zhao, Jaepil Han, Jessica Kamuru, Erica Mason

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