(OVERVIEW)

SCREEN-CAPTURE INSTRUCTIONAL TECHNOLOGY:

A COGNITIVE TOOL FOR BLENDED LEARNING

A Dissertation

Presented to

Dissertation Committee Members

Saint Mary's College of California

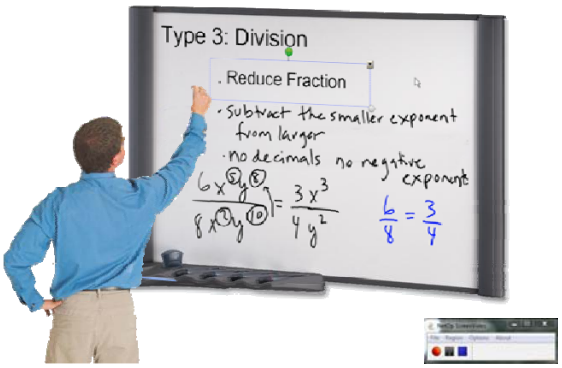
In Partial Fulfillment

of the Requirements for the Degree

Doctor of Education in Educational Leadership

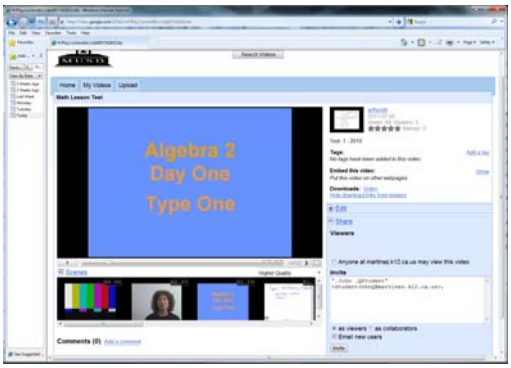
Step 1 - Capture classroom face-to-face instruction into multimedia lessons

Enables - Teacher Self-Analysis / Peer Collaboration / Administrative Overview



Step 2 - Upload multimedia lessons to the teacher's Webpage / Server

Available for home with parents and in the classroom for recovery purposes



Step 3 - Incorporate multimedia lessons for one-to-one computing

Increase Achievement / Preference / Cognitive and Psychological Engagement

Abstract

This study investigated academic achievement, engagement, preference, and curriculum development using screen-capture instructional technology. A 2-group experimental pretest-posttest was deployed over a four week period on secondary Algebra students accessing their teacher's screen-capture instructional multimedia both inside and outside of the blended classroom. Students who learned Algebra through the screen-capture methodology showed significantly greater gains in math performance than did the students in a live-lecture class, even after controlling for prior levels of math performance. On average, students viewed each online instructional multimedia lesson two and a half times within the classroom using mobile multimedia devices and an additional one and a half times at home. Additionally, a psychometric student engagement instrument (SEI) measured the participant's cognitive and psychological engagement. The screen-capture students demonstrated increased levels of cognitive engagement from their self-regulated learning and added psychological engagement from feeling less inhibited when asking their classroom teacher face-to-face questions. Ninety-three percent of the students indicated their preference for learning Algebra in the future using their teacher's screen-capture instructional multimedia. During the initial lesson development phase, the classroom teacher incorporated the instructional technology as a new tool to evaluate her Algebra instruction and also discovered the online component as an instrument for collaborating with a fellow classroom teacher. This study suggests that a teacher's screen-capture instructional technology can be used toward establishing a blended learning environment within the secondary classroom.

Screen-Capture Instructional Technology Themes

Area	Theme
Lesson Development	**Screen-capture instructional technology was a new tool used to analyze and evaluate the teacher's classroom instruction.** *"So, I had to think ahead of time of how I was going to teach it. It enabled me to look at the lesson and say, with the exponents, that it needed some more work on it. The lessons that I did for the parabola section, I felt, were good but it required me to think ahead of time of what I did. Some of it was creating another way of doing it to be more organized because I couldn't change what I wanted to say in the middle of the lesson. I had to know exactly what I was going to say because the kids couldn't ask me halfway through, 'Wait! Do you mean that you wanted this done?' They couldn't ask that, so I had to make sure that when I did the lesson, it was very clear."* **The teacher using screen-capture instructional technology recaptured the initial instructional multimedia lesson in hopes of improving the instruction.** *"In dealing the exponents first as a trial, I realized that in the exponent lessons, I have to go re-back and re-teach a couple; present another video that was more detailed. . . And the first couple sections, needed to be rerecorded a couple times because I didn't like the way it was being presented."* **Screen-capture instructional technology was a new tool used for teacher collaboration.** *"It's time and collaboration. Now, I have to think about, 'Well, is it a better way to teach it this way or should I do it the way I did it?' And I kind of think it's better to do imaginary numbers a different way, and this was also in talking to another Algebra II teacher and she said, 'Oh, no. I did quadratic formula last, after imaginary numbers.' So, it has to do with the collaboration of the Algebra II teachers."*

Academic Achievement

Students learning from their teacher's screen-capture instructional technology demonstrated higher algebraic knowledge compared to their peers learning from the teacher's live-lectures.

Table 3

Algebra Pretest and Posttest Results

	Live-lecture (n = 24)			Screen-capture (n = 32)		
Measure	*M*	*SD*	Std. Error Mean	*M*	*SD*	Std. Error Mean
Pretest	26.34	13.31	2.97	20.56	14.50	2.55
Posttest	70.73	20.13	3.65	81.49	15.26	3.15

Table 4

Geometry Scores and Posttest Results

	Live-lecture (n = 24)			Screen-capture (n = 32)		
Measure	*M*	*SD*	Std. Error Mean	*M*	*SD*	Std. Error Mean
Prior Geometry Scores	80.46	9.31	1.90	83.17	10.14	1.79
Posttest	70.63	20.13	3.25	81.56	15.26	2.81

Student Preference

Students preferred to learn from their teacher's screen-capture instructional multimedia because they found it easier to understand than the teacher's live-lecture.

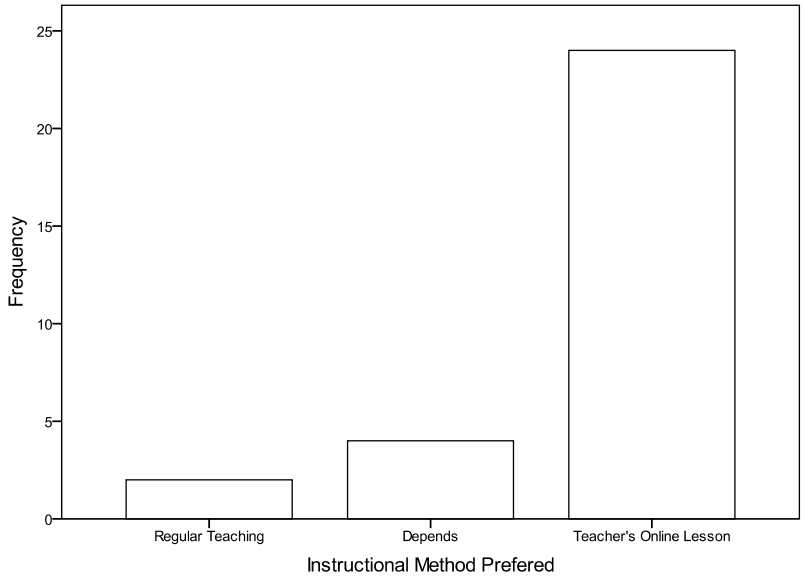


Figure 4.2. "If you had to learn math in the future, which method would you prefer?"

Note. N = 30

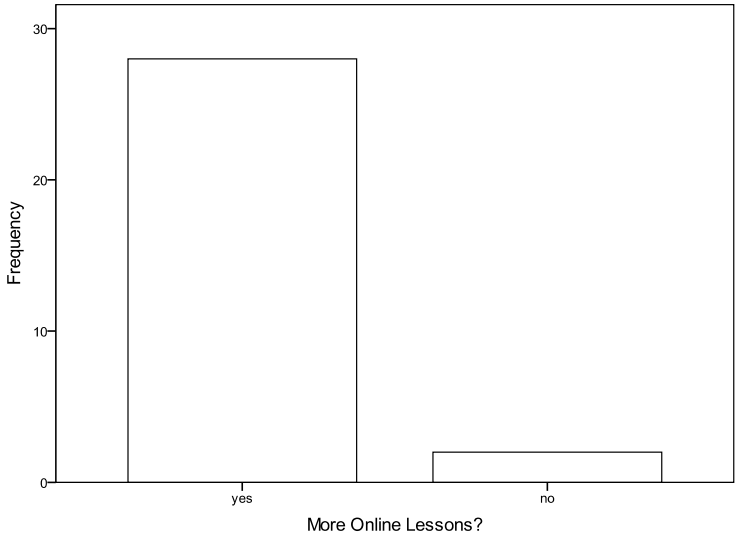


Figure 4.3. "Would you like your teacher to make online lessons for another math chapter?"

Note. . N = 30

Cognitive Engagement

Students actively controlled the pacing of the screen-capture instructional multimedia.

Nearly a third (31%) of the 61 responses wrote about the ability to control the pacing of their teacher's instruction. For example, one of the screen-capture student's response was "The ipad, I liked being able to take notes at my own pace" and another student stated "when taking notes, I could pause them so I didn't miss anything."

Students reviewed each screen-capture instructional multimedia lesson as often as needed.

Students responded to their ability to rewind and review each lesson with statements including, "I could pause & rewind if I didn't understand something or if I missed something." Another student claimed, "The fact that I could go back and rewatch a video to prepare for my test or if I just didn't remember a lesson."

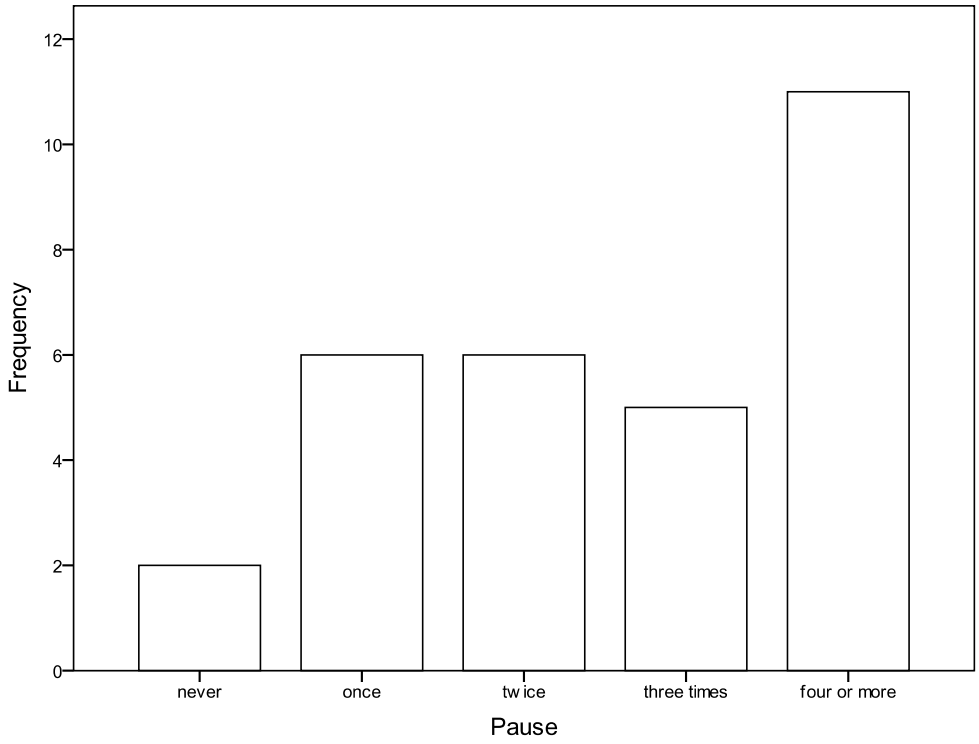


Figure 4.4. "On average, how many times did you pause each online lesson?"

Note. N = 30

Screen-capture instructional multimedia was more efficient and faster for learning new algebraic concepts within the classroom than live-lectures.

Supporting statements that students were able to learn Algebra at a faster rate can be found throughout the screen-capture survey responses. One student suggested that, "when we do regular teaching it is sometimes slowed by others." For example, six (11%) of the 56 student responses explained why they felt the online multimedia lessons improved their learning with statements such as "It made it easier instead of someone asking a question in front of the whole class . . . that takes up time."

Students gained independence by being able to watch their teacher's instructional multimedia in class after they missed school, before and after class, and at home.

Students indicated that they could miss instruction and still learn, "If we missed school we could watch the lesson at home." The screen-capture students also indicated cognitive engagement when they explained why they selected their preference to the online instructional multimedia, "If I'm absent I can just go online & watch the lesson." One went on to explain "If I was absent one day I wouldn't be behind."

Psychological Engagement

Screen-capture instructional multimedia enabled the classroom teacher to provide more one-to-one instructional support to students than the live-lecture format.

The student responses to this relationship contained some of the most powerful comments to any of the survey questions. One student stated, "It felt like I had a personal teacher." Another of the screen-capture students claimed, "Seems like you're the only student." Students indicated that they were able to have more one-to-one conversations during class with the teacher that was privy from the other classroom students.

Students preferred to watch the online screen-capture instructional multimedia in the classroom with their teacher, rather than at home in a flipped model.

"Because if I have a question I can just ask in class and you cannot do that @ home if you are listening to the video." A student commented, "I feel like watching them in class is better so if you have questions you're able to ask." The screen-capture students also responded with statements such as, "We could ask questions right away if the videos had something we didn't understand."

When students learned from their teacher's screen-capture instructional multimedia in the classroom, they were not disturbed by their classmates.

"No distractions! Just me and my iPad." One student suggested, "We can pause & ask questions without disrupting everyone else." Their responses can be found in their comments of what they liked most about the teaching of Chapter 5 with comments such as, "It kept the class room quiet making it easier to focus," and "The I-Pads made class a lot quieter because everyone was working."

Students using the screen-capture instructional multimedia were less afraid to ask their teacher or peers questions in front of classmates.

One student revealed, "Too afraid to ask teachers questions in front of whole class because don't want to look stupid" The student responses suggest the classroom instructional multimedia enables discreet conversation and individualized instruction with the live classroom teacher with statements such as, "I use to be nervous to ask a question in front of everybody." The basis of the more intimate relationship can be found throughout the written remarks as a student described what occurred in a live-lecture environment with comments such as, "Absolutely nothing, I never learned anything, no questions of mine were answered w/ out me feeling stupid."

Students using screen-capture instructional multimedia were able to receive additional instruction from their parents at home.

Nine students (30%) reported they had viewed the online lessons with their parents. In addition, a student indicated that while viewing the lesson at home, the parents were helping them solve Algebra problems based on the teacher's online instruction.