

The Effect of a Blended Learning Approach on Math Engagement

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INTRODUCTION

According to the Nation's Report card (National Center for Education Statistics, 2016) in 2015, the average scores in mathematics were 1 and 2 points lower in grades 4 and 8, respectively, than the average scores in 2013. Scores at both grades were higher than those from the earliest mathematics assessments in 1990 by 27 points at grade 4 and 20 points at grade 8. It is vital to keep the scores rising. Even the slightest drop is cause for concern. The use of the blended approach in which technology is infused in learning could be the change needed to keep scores on the rise.

In August of 2010, the California State Board of Education adopted the California Common Core State Standards (CCSS) for Kindergarten through 12th grade. The goal of the adoption was to provide a more rigorous group of skills that would allow all students to be able to engage deeper into the curriculum and become global thinkers. The skills and knowledge provided by the CCSS could also give students a greater opportunity to succeed in college and careers.

Table 3: Number and Percentage of Students by Grade and Achievement Level for Mathematics

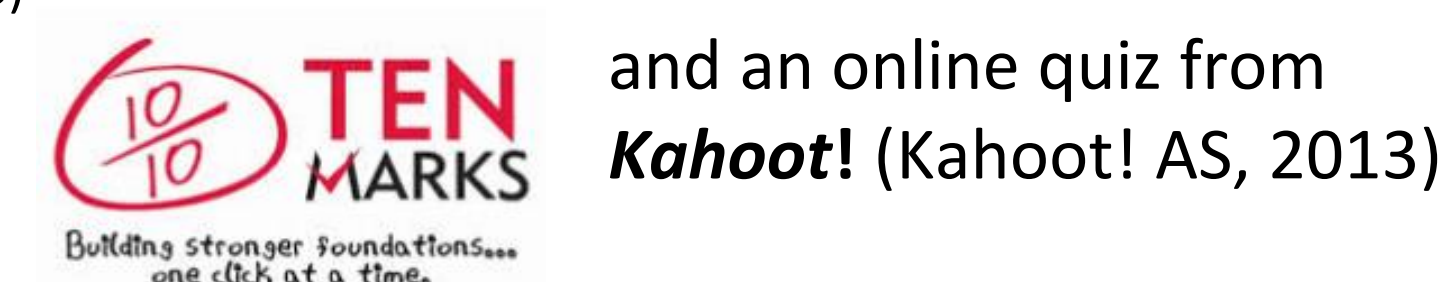
Grade	Number of Students Tested	Mean Scale Score	Percent of Students who Exceeded Standards	Percent of Students who Met Standards	Percent of Students who Did Not Meet Standards
Grade 3	473,136	2415.1	14	26	27
Grade 4	481,875	2463.8	13	22	25
Grade 5	459,918	2482.3	15	15	20
Grade 6	456,194	2504.4	13	18	21
Grade 7	449,122	2518.5	15	19	23
Grade 8	455,151	2524.0	16	17	20
Grade 11	418,880	2552.3	11	19	25
All California Students	3,169,239	-	14	19	25

Note: Percentages may not total to 100 percent due to rounding.

METHODOLOGY

Study Design

This study used a pre-experimental mixed method design. There was one single group studied with a pretest and a posttest administered. The teacher analyzed the results for the study group's pretest compared to the study group's posttest results. The results of this study clarify the effects that a Blended Learning Approach had on math engagement in this 4th grade classroom. The study was performed in class during the regular math period. This action research study helped determine the effects of a Blended Learning Approach in math on student engagement. Students performed online math lessons from **Tenmarks Math Education** (Ten Marks Math Education, 2016)

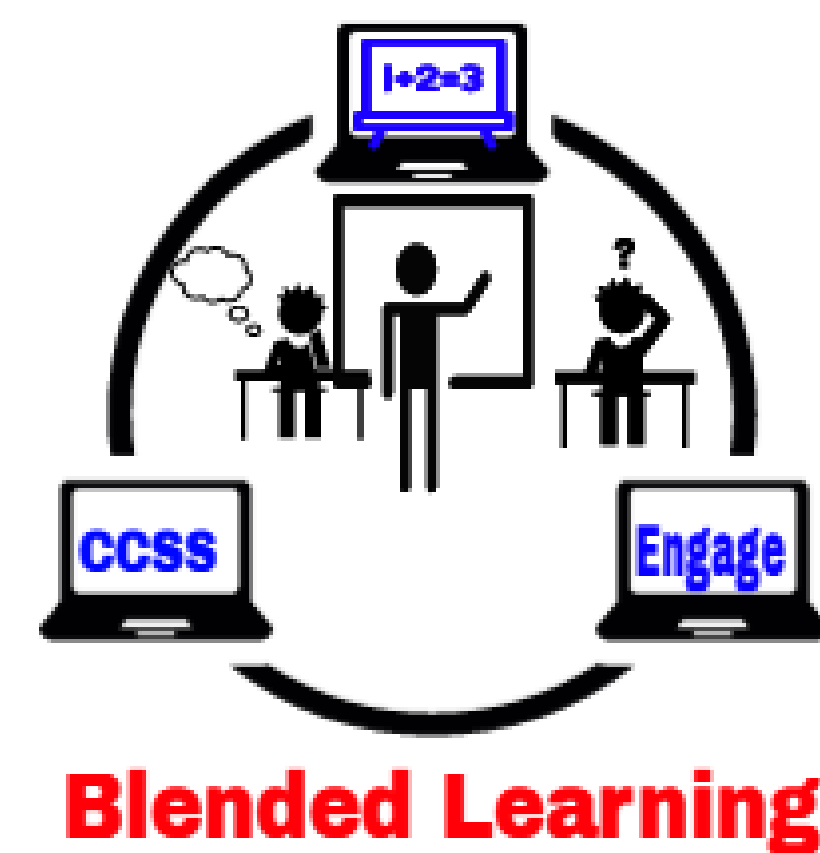


and an online quiz from Kahoot! (Kahoot! AS, 2013) on Chromebooks that coincided with the face to face lesson conducted in a small group format, using the district adopted program, **Bridges** (The Math Learning Center, 2005).



STATEMENT OF THE PROBLEM

As schools engage in our 21st century skills activities, unmotivated students find ways to piggyback on the work of others. The purpose of the study was to see if a blended learning approach that included several types of technology tools would have any effect on student engagement and performance in math. The research question which guided this study was "What are the effects of a Blended Learning Approach on math engagement?" In today's society, students engage in the use of technology frequently. In this study, was important to investigate not only the use of technology tools but also their combination with the implementation of Chromebooks and new Common Core Standards. Would student engagement and performance change in the math lesson in a more successful manner than a whole class math lesson?



PURPOSE OF THE PROJECT

The use of a blending learning approach in this 4th grade classroom (convenience sample) was chosen as the instructional method to support the students to stay engaged with math and work at a pace that allowed the them to easily understand and learn the material. This approach gave students opportunities to learn in a different styles, allowed the teacher to change with the trends of technology, improve feedback for the teacher and the students, and allowed the students to have fun with what was being taught.



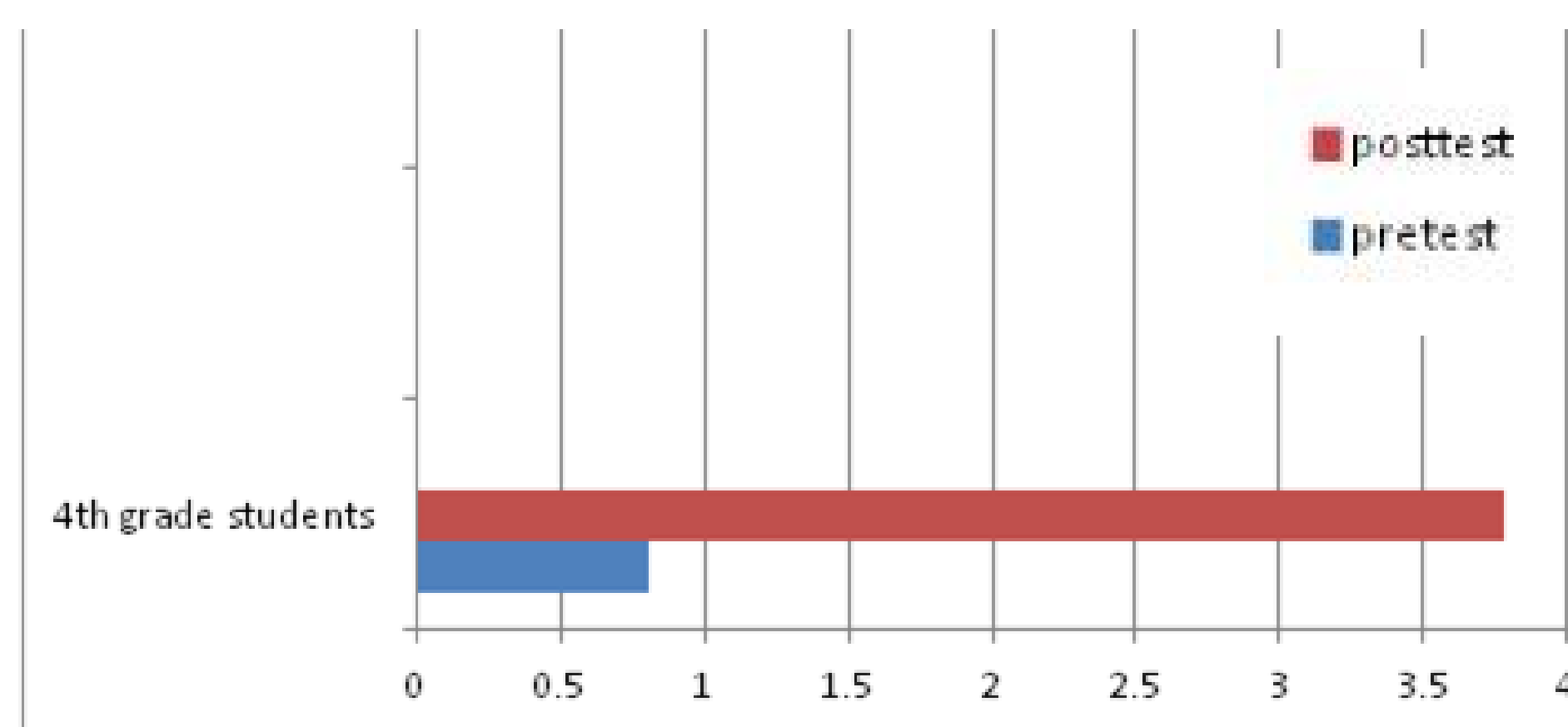
RESULTS

Pretest/ Posttest Results

Figure 1, illustrates the difference in the pre/post test scores. After spending a week engaging in the math lessons during small group time using the blended learning tools, students demonstrated increased test scores.

The mean pretest score was 0.81. The mean posttest score saw an increase to 3.78. There was a significant difference in the pre-test scores (M=0.81, SD=1.71) and post-test scores (M=3.78, SD=3.81); $t(26)=3.69$, $p < .0005$. These scores indicate that the treatment did make a positive impact on student achievement.

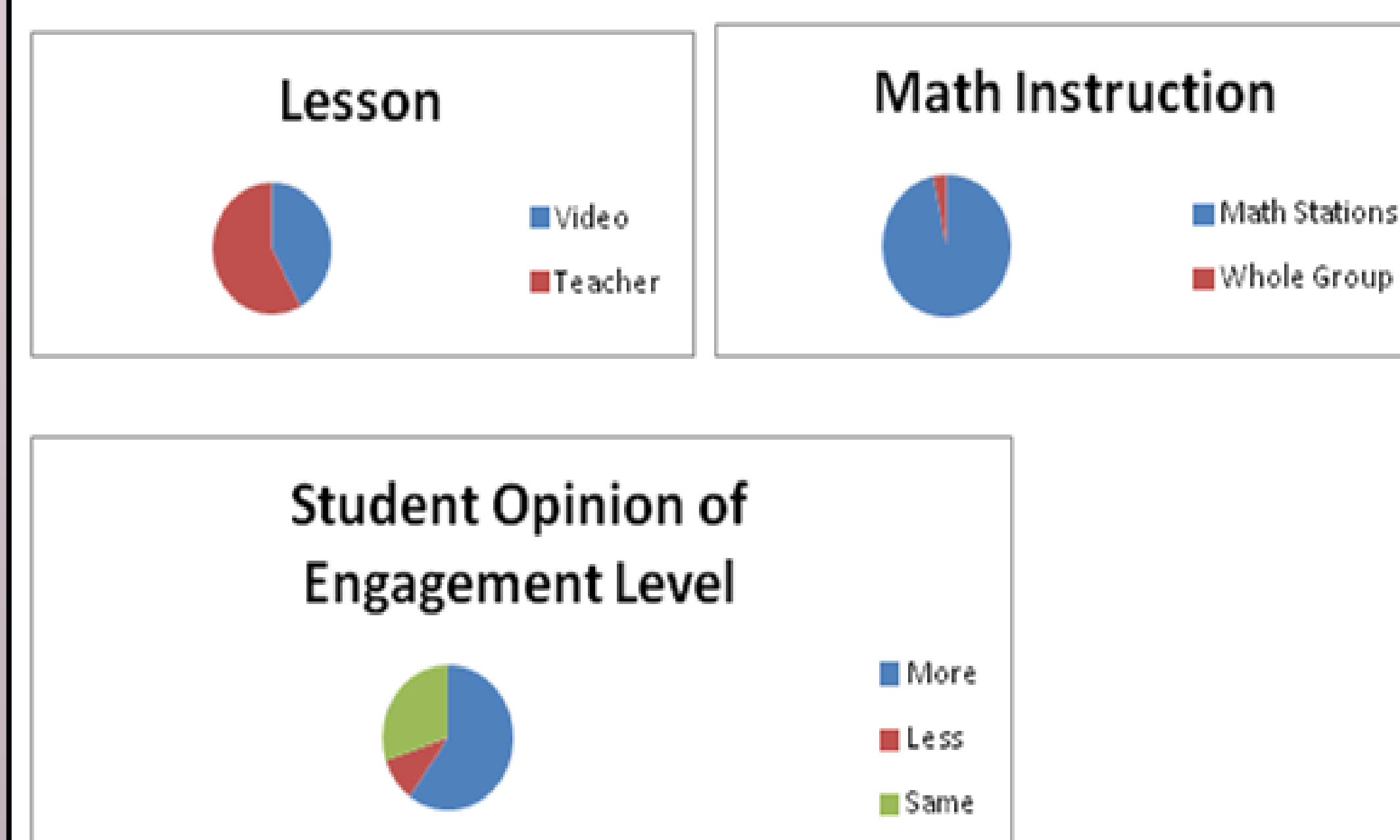
Figure 1 Pre-Test/Post-Test Results



Focus Group Discussion Results: Student Opinion

During a whole group discussion, students were asked their opinions in three questions. When asked "Which lesson did you enjoy the most, the lesson instructed by the teacher or the lesson instructed by the video?", 60% of the students preferred to have their lesson instructed by the teacher. When asked, "Which type of instruction did they enjoy the most, math stations or whole group, 90% of the students preferred the math stations. When asked, "Did you feel you were more engaged, less engaged, or the same as before the use of the Blended Learning approach, 60% said they were more engaged, 10% said they were less engaged and 30% felt that their level of engagement didn't change.

Figure 3: Student Opinion Results



CONCLUSIONS


This study investigated the effect of a blended learning approach to instruction on student engagement and math performance. Data revealed student engagement appeared to be better, with most students on task in all four math stations. Despite observed motivation to work on the Chromebooks, and confirmation during the focused discussion, scores on the online TenMarks math program did not reflect understanding of the subject matter. Student attention was observed to be focused more on the desire to use technology, rather than the content of the lessons. According to the opinion of the students, there appeared to be more of a desire to learn the content during the face to face with the teacher. A longer more detailed investigation is recommended.

LITERATURE CITED

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