

Action Research Project

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Mathematics is one subject that students struggle with significantly especially in low-income schools. From elementary to high school, mathematical skills build upon one another so one misconception along the way can curtail success. The sentiment "I hate math" is sometimes heard uttered from the mouths of students in class or the hallways. With this mentality, students often shut down resulting in low achievement and participation in class. The students often do not want to answer questions in class or even do the work because they feel as if they will fail even if they try. These struggles were evident in the classroom when in-person instruction was taking place but virtual instruction during the pandemic has amplified the lack of participation and low achievement. Students are losing vital content mastery required for future courses. Learning gaps have become larger as virtual instruction became the norm for students struggling to adapt. Increasing participation in class in hopes to shrink those gaps became a daily struggle but it is something that needed to be addressed. Over nine weeks in a block schedule setting, I initiated research in my Algebra 1 class. I set forth to see if participation and achievement were related in the classroom. My overall objective was to increase students' mathematical achievement in Algebra 1 through student participation in the virtual learning environment.

The high school I currently teach in is located in Clayton County, Georgia. We have approximately 1700 students with the majority of students being minorities. We are also a Title 1 school like most schools in Clayton County so the majority of our students come from low-income families. Typically, low-income students have lower achievement rates and educational deficits, especially in math. With the county being virtual, students were struggling attending class, getting assignments completed, and even understanding the material. It was a constant

battle that we tried to address in our collaborative planning meetings. Because of this, I wanted to see if I could instill some initiatives in class to boost their participation.

To boost their participation, I needed to first determine what their rewards were going to be, what I was going to use to measure their participation, and how I would track that information. From prior experience, I knew students were driven by food but being in the virtual environment it was difficult to give that to them. I then decided to send them a gift card in the mail was the next best thing. The top participants would each receive a certificate of achievement, candy, and a gift card in the mail. Next, I decided to use a tracking tool called Class Dojo. This program allowed me to assign points to students based on factors I chose which took care of how I was going to measure their participation. The factors I tracked were early to class, top winners in review games, asking questions in class, answering questions in class, having their cameras on, and staying on task. Each of these demonstrated an important factor in participation. The points were tracked daily for each student. At the end of the 4½ and 9 week grading periods, I would tally the data and reward the top three students who accumulated the most points. Each grading period was independent of one another in terms of gathering points. I began all students at zero after the 4½ week period so everyone had a fair chance at winning. Because the students knew they would be getting incentives, their class participation increased. But, did this participation affect their achievement.

To determine the students' achievement, I looked at the unit tests they took each grading period along with their progress grades. For the first 4½ weeks, the students completed the Unit 1 test. They also completed approximately 11 other assignments that were included in their progress grade. Due to privacy concerns, I assigned each of my 30 students a number so I was able to share my data. I did have one outlier in my data which was a student who never came to

class and had not completed any assignments. Figure 1 below shows the data that was collected from the students. The grades for the students are on a 100-point scale and there was no limit to the amount of Dojo points they could accumulate. Figure 2 and 3 give a visual representation of the comparison between the unit test, progress grade, and Dojo points for each grading period.

I began looking at the top three students with the most Dojo points and compared them to their performance in the class. For the first grading period, I had a three-way tie for first, one in second, and a two-way tie for third. Student 13 was one of the first place students in points and their grades reflected high achievement with a 100 on the Unit 1 test and a 95 progress grade. When looking at the other leaders, some did receive high marks on the test and/or their progress grades. In that data, student 3 came in second in points but received a failing mark for the progress grade. Student 17 was on the other end in that they received high marks on their test and progress grade but they had very low participation points. Only a few students showed a disconnect between achievement and participation. The same can be said for the data for the next grading period. The majority of the data does show a correlation between the number of participation points and the student's achievement in class. As you look through Figures 2 and 3 you can see how the line for Dojo points matches closely in direction to the other two data lines in the graph. There are some abnormalities but again the majority can be seen as a correlation.

From gathering this data, I could make inferences about the impact participation has in the virtual environment. It is difficult to control the actions of students on the other end of the camera where being in the classroom would produce a different result. As the students began to participate more in class, they were able to understand the material better which is what the ultimate goal was in this situation. After these 9 weeks, implementing an incentive program for participation has shown benefits to the increasing student achievement. Moving forward,

providing students with incentives for their participation, especially in the virtual environment, can help drive some lower-level students to success.

Figure 1

Grades and Participation Points

Student #	Unit 1 test	4.5 week	Dojo Points	Unit 2 test	9 weeks	Dojo Points
1	40	75	30	30	63	11
2	70	44	30	75	42	5
3	85	60	70	90	96	24
4	55	63	10	35	60	3
5	95	93	60	95	93	14
6	35	20	10	5	23	3
7	0	36	20	20	46	8
8	45	64	20	40	61	3
9	85	97	50	90	81	15
10	0	44	10	0	28	4
11	85	92	90	95	91	51
12	90	78	30	80	78	10
13	100	95	90	95	96	34
14	70	38	10	0	28	2
15	85	15	50	20	25	17
16	0	0	20	15	2	4
17	95	100	20	85	100	9
18	70	51	40	30	49	12
19	55	16	0	10	15	1
20	95	89	10	20	85	4
21	70	56	60	40	46	31
22	95	82	30	95	84	17
23	45	63	30	95	63	19
24	0	0	0	0	0	0
25	50	16	0	0	10	12

26	0	82	90	95	78	4
27	85	90	40	90	92	20
28	0	89	20	75	92	26
29	95	63	0	30	49	8
30	55	89	20	55	82	10

Figure 2

Grades vs Participation

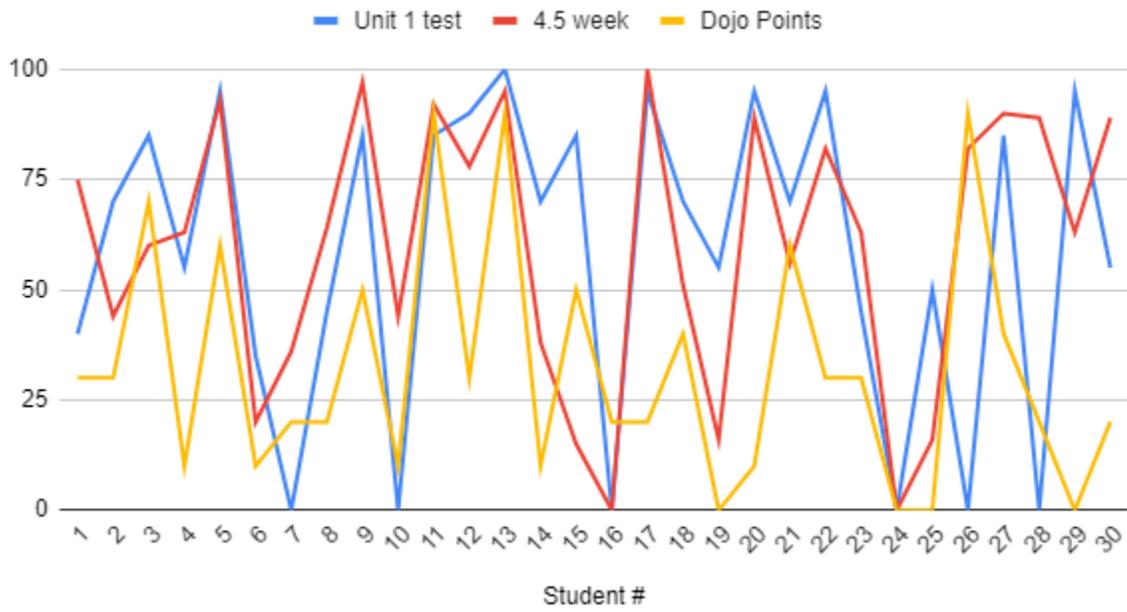


Figure 3

