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The Effectiveness of Lesson Openers on Students' Engagement in Class

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The purpose of this action research study is to see if the use of classroom openers has an effect on students' attention and engagement throughout the lesson. Participants include sophomore and junior students who attend a 41-minute Honors Algebra II class every day. Two periods of 21 and 22 students will be looked at and analyzed. The classes will be videotaped to analyze the differences in student behavior and attention when the instructor goes straight into the lesson as well as when a classroom opener of "What's my Function" is used. A post survey asking three questions will be administered at the end of the study.

Introduction

Teachers can spend hours on end planning a lesson for their class. Each part of the lesson will contribute to the overall learning of the students. Do some parts of the lesson have more benefit than others? Some may say the motivation, or attention grabber, is the most important since this is the first time the students will be introduced to the lesson. One reason why this project is important to research is because of my past experience with classes that use classroom openers. I have personally been more engaged when something is used to catch my attention in the class because I want to know how that connects with the lesson. For example, in high school, I remember sitting in a science class where the teacher showed a short video in the beginning. This video was showing part of Hurricane Katrina and how that impacted the surrounding areas. The lesson that followed the videos was about storm systems and how major storms develop. I still remember that video and lesson today. I would like to explore more about this connection to see if it applies to other students and their engagement throughout class, or if that is my own personal experience. There are many different techniques that teachers can use to grab the attention of their students during their lesson. Are some more effective than others? Daniel Brahier, author of the textbook *Teaching Secondary and Middle School Mathematics*, explains that the motivation of a lesson is the most crucial part because it can help the students become more engaged in the content that is about to be presented (Brahier, 2016). One way a teacher could achieve this is by using a lesson opener.

Teachers need strategies to increase the students' motivation and engagement in their classroom when the content is being presented. One way this could take place is by using lesson openers before the content is presented. This study is aimed at seeing if using a lesson opener will increase the engagement of the students. The research question focusing this study is; Will

including a lesson opener, such as "What's my Function", in the beginning of class increase student engagement throughout the lesson?

"What's my Function" is the classroom opener that I have focused on while conducting the research. This activity involves displaying a set of points for all students to see. Students then had a few minutes to think to themselves and come up with a function that matched these points. Students were given the opportunity to talk about their function and how they came up with this function with another person in the class. After this discussion, students shared their answers with the whole class before I revealed the function.

In order to conduct this study, I have completed some research on the background of this topic. Specifically, I have looked at the different lesson openers that have been used in the past, as well as the benefits that other teachers and researchers have seen from using those lesson openers. I have also researched student engagement and what it means for a student to be engaged throughout a lesson.

Literature Review

The purpose of my action research was to explore classroom opening activities and their effectiveness on students' attention span and engagement in the classroom. It is important to explore what is considered a lesson opening activity, how they have been used in the classroom previously, as well as how the qualitative research will impact my findings. Throughout this study, the term lesson openers will be referred to as the activities that teachers use to begin class, before starting their lesson.

Lesson Openers

Lesson openers are routinely used in the beginning of each class, however, little is known about the effectiveness it can have on the students' engagement throughout the lesson. During

these classroom opener activities, teachers often give material to students to remind them of previous content that was learned, or something they may need to know for the next class (Zertuche, Gerard, & Linn, 2012). Another useful resource for teachers is using technology-enhanced mini-lessons as their openers. This technology can help to transform these openers from just busy work for the students to enriched learning experiences for the students to help support the material or content they are about to cover (Zertuche et al., 2012). The article, *How do Openers Contribute to Student Learning?*, studied the impact of lesson openers compared to not using a lesson opener with an eighth grade classroom. This study focused on using technology as the main focus when using lesson openers. This study took place with two eighth grade teachers and a total of 236 students in one public school. The specific lesson opener they used is called WISE, Web-based Inquiry Science Environment. This is an online and open-source learning environment for students. This specific study looked at assessments that were embedded into the lesson opener. The analysis concluded that students who had an opener before beginning the lesson for the day made greater learning gains than students who did not have an opener. The article goes on to explain that if teachers use technology-enhanced openers in their classroom, then "the computer stores and organizes a record of each student's work including their multiple revisions, and provides ways to make examples of the student's work public to the whole class," (Zertuche et al., 2012). This means the teacher can not only look to see if their students are on the right track with their thinking but they can also choose specific work to show to the class for a discussion. Lesson openers are most useful when the teachers use the information gained to redefine their teaching and what material the students are struggling with.

There are many advantages to using lesson opener activities that benefits the teacher, the students, and the class as a whole. As Ducharme (1997) explains, using lesson openers can help

to focus student attention at the beginning of the class. This was concluded after the teacher had students read an announcement to the class before getting started with the lesson. Duncharme noticed that students were more interested in the lesson when it started with their classmates reading this announcement, compared to going straight into the lesson. Lesson openers can also help to bring routine to the class as well as form a smooth transition from the bell to the lesson (Ducharme, 1997). The activities can also be used in a wide range of topics across many disciplines. Opening activities can have many benefits. Some examples include promoting recall, participation, interest in current topics, as well as practical applications within the discipline. One large benefit lesson opener activities can have is they encourage students to draw relationships from the content in the classroom to real-world examples (Ducharme, 1997). These activities can also benefit the teacher. These benefits include helping with the transition from the bell to the lesson plan as well as they help to encourage student involvement in the classroom.

Dr. Daniel Brahier is a professor of mathematics education at Bowling Green State University (BGSU), author of the textbook *Teaching Secondary and Middle School Mathematics* as noted in the introduction, and the director of the Science and Math Education in ACTION scholarship program at BGSU (Brahier, 2016). Dr. Brahier has worked in the field of education for more than 35 years and held many different positions at the high school and college level during this time. In his textbook, he said a lesson opener can be a book that is displayed on the board or having part of it read to the class. Other examples include a problem or question that is posed to the students, a video clip, newspaper clipping that is displayed, or a game the students can play either individually or with a partner. Brahier goes on to explain that the motivation, or lesson opener, can be key because it helps students become engaged and motivated in the lesson that is about to be presented. However, he says that most experienced teachers find this part to be

the most difficult part of their lesson to write. This is because in order to have an effective lesson opener activity, the teacher should know their students well enough to see what will grab their attention and what will not.

One teacher decided to implement lesson openers as a way for her to complete her morning tasks while students enter her room (Palmer, 2011). She did not want to waste the students' time while she was taking attendance and collecting homework, so she decided to give the students work, or an activity, to complete in the first five minutes of class. She referred to this as "prime learning time". Palmer designed activities that have students use their critical-thinking skills of analyzing and evaluating. One benefit she explains is the immediate feedback it gave her before she started her class. Palmer knew right away whether she was going to have to explain a topic again or move on with her lesson.

Benefits of Student Engagement

Student engagement is defined as a psychological process, especially "the attention, interest, investment, and effort students expend in the work of learning," (Marks, 2000). Marks says while every teacher strives for every student in their class to be actively engaged in their lessons, enhancing this student engagement is an on-going challenge that educators face. Lack of student engagement can have a downward spiral effect on their lifestyle. This can lead to students acting out in school and even, in some extreme cases, dropping out of school before graduating all together. According to Marks, "Students who are engaged with school are more likely to learn, to find the experience more rewarding, to graduate, and to pursue higher education," (p. 154). The problems of student engagement in the schools started in the mid-1980s when teachers were discouraged about their students' academic achievement as well as having a fragmented curriculum. Marks says one way teachers could help with engagement in

their classroom is by obtaining a deeper knowledge of their students. Engagement from the students depends on their backgrounds. His article also stated that it is also known that girls, at all levels of schooling, tend to be more academically engaged in their school work compared to men.

One main problem for student disengagement that teachers seem to be worried about is that if their students are not engaged in their classroom then it leads to them dropping out of school. This is theorized to be a gradual process due to student disengagement (Shernoff, Csikszentmihalyi, Schneider, & Shernoff, 2003). Because of this, there has been an increase of awareness of student engagement in the schools and importance on student learning and achievement. There is research on student engagement in the schools suggesting that it is influenced by the relevance of instruction and the students' ability to relate the content to real-world situations. Research also suggests that "high engagement during tasks in high school classrooms has been a significant predictor of continuing motivation and commitment as well as overall performance in college". The article, titled *Student Engagement in High School Classrooms from the Perspective of Flow Theory*, explains the Flow Theory is a "state of deep absorption in an activity that is intrinsically enjoyable," (p.160). The article also states that concentration, interest and enjoyment all need to be present for the flow theory to be present.

Fred Newmann, author of the book *Student Engagement and Achievement in American Secondary Schools*, has spent a great deal of time researching what student engagement is in the school system. In his book, Newmann discusses reasons why students might be disengaged in their classes as well as some tasks that teachers can do in order to help their students become more engaged. He defines engagement in the classes as a physiological investment in the student's school work, not just completing the task in front of them to receive a good grade on

that assignment (Newmann, 1992). Better student engagement can be seen as an increased amount of time spent on an assignment, enthusiasm and interest expressed in their school work, degree of care when completing assignments, as well as an increased amount of participation while in class. However, engagement in school requires more than motivation to do well. Engagement encompasses active interest, effort, as well as concentration to learn as much as possible.

There are three specific types of engagement that can be seen in the classroom. These are known to be behavioral, emotional, and cognitive engagement (Fredricks, Blumenfeld, & Paris, 2004). Behavioral engagement is when a student shows involvement in learning and academic tasks. Some examples of increased behavioral engagement include when a student adheres to classroom norms, as well as does not disrupt or skip class. One way to measure this behavioral engagement is when the teacher is asked to measure a student's level of participation during class discussions and activities. Students can also be asked to rate themselves on their knowledge of asking questions throughout class or their knowledge of participation during a discussion. The article also states that observation can also be used when measuring behavioral engagement. Using a scale ranging from students being off task to deeply involved, the teacher is able to rate the class or specific students on their attentiveness, doing the assigned work, or showing interest in the lesson.

On the other hand, emotional engagement can be seen when a student reacts to something in the classroom. Some examples are boredom, happiness, sadness, etc., especially when going through a lesson or having a class discussion (Fredricks et al., 2004). The main way that emotional engagement can be measured is by personal measure. Some questions on a survey could be given to the student in reference to emotions towards the school, work given in the

class, or the people at the school (Fredricks et al., 2004). However, emotional and behavioral engagement can be combined into a single scale and tend to overlap on issues that are measured with each.

Cognitive engagement stresses investment in learning. An example of this is when a student goes above and beyond what they are asked on an assignment or in class in general. However, a student's effort when going above and beyond on their assignments needs to be clearly noticed instead of the students just doing what is asked of them (Fredricks et al., 2004). Some ways to measure cognitive engagement include seeing if the student is flexible in their problem solving, shows hard work in their school assignments, as well as copes well with failure. Observation is a popular technique when measuring a student's cognitive engagement. Such as when a student exchanges ideas with other classmates or justifies an answer. Another way this can be measured is by self-report questionnaires asking the students how they set goals, plan or organize their school work.

There are three main ways to measure student engagement in the classroom. These are known to be student self-reports, teacher reports, and observational measures (Fredricks, McColskey, Meli, Mordica, Montrosse, & Mooney, 2011). Incorporating student reports into the research study can bring the critical voices as well as different perspectives into improvement efforts. There are many different student reports that a researcher could use which range from broad to very specific. Teacher reports give details on one student at a time. For example, one report a teacher could use in a reading class is the Reading Engagement Index where teachers rate students on aspects of engagement in reading and then find a total score depending on their answers. On the other hand, observational measures are used to look at the class overall. There

are specific details that teachers could look for such as how many students are off task or interrupt a class period during a certain time (Fredricks et al., 2011).

However, there are other factors that could influence engagement in the classroom such as family, community, culture, and educational experiences (Fredricks et al., 2004). Some other factors in the school that influence engagement in the classroom are having clear and consistent goals for the students, as well as small class sizes and student participation in school policy. It was found that students were able to develop more and deeper social connections with other students in smaller schools compared to larger ones, which can lead to deeper student engagement in the classroom. The amount of support shown by the teacher also can influence behavioral, emotional, and cognitive engagement (Fredricks et al., 2004).

Overall, this study is aimed at seeing if the use of lesson openers will increase student engagement in the classroom. It is important to know the research behind both lesson openers as well as student engagement before the study can take place. This will help to guide the study in a way to make sure there is validity for the data being gathered to answer the research question about student engagement from the use of lesson openers.

Methodology

Participants

The participants of this study were 43 students in two different class periods, both learning the same content of Honors Algebra II. The two periods were second, which had 21 students, and third, which consists of 22 students. These participants were enrolled with the same teacher throughout the school year. The study took place at a high school in Northwest Ohio. The students are Sophomores and Juniors in an Honors Algebra II class. The students were observed from the same class, at the same time each day. As a preservice teacher researcher, I

was conducting the study in an experienced in-service teacher's classroom in which rules, norms and expectations for conduct had be established prior to the study. In what follows, the in-service teacher will be referred to as "the teacher". Therefore, this research was conducted in a setting that was not entirely of my own making and some elements would have been different if done in an autonomous setting.

Teaching and Learning Context

During this study, the students were learning about the natural base "e", logarithms, as well as simplifying rational expressions. The opening activities for second period was implemented when learning about the natural base "e" as well as logarithms and logarithmic functions. The opening activity for third period was when the students were learning about simplifying rational expressions.

On a typical day, students come into class and get out their homework. The teacher will then post the answer key to the homework from the previous night on the SMART board while the students double check their answers. The students will then ask any questions they might have from the homework, and then they will move onto the notes for the day. If there is any extra time at the end of class, the students are allowed to work on homework.

Prior to this study, students were not very familiar with classroom opening activities. The only opening activity they had seen prior to this study was a "Problem of the Day" that was on the SMART board before correcting their homework from the night previous. This problem of the day only occurred once or twice a month. This is where the teacher would post a challenging problem for students to work on right as they are coming into class pertaining to the homework from the night before or a problem that related to what the students were learning that day.

Procedure

For this study, the focus was directly on the classroom opener of "What's my Function". This opener is where a graphing calculator is displayed in the front of the classroom with a data table on the screen. Students took these points and wrote an equation to match the data. The students had a few minutes to think about the function on their own first. Then, the students were given the opportunity to discuss their equations with a partner before sharing with the rest of the class. In the beginning of the study, the students were recorded during a normal class period where lesson openers were not used. The classes were recorded with no openers for a week. This gave a baseline of how the students were engaged in the classroom. Then the focus was on one class period and gave an opener of "What's my Function" to the students while recording the whole period as well as the other period, which still did not have an opener. After a week, the openers given to the classes were switched. This means, third period was given "What's my Function" classroom opener, while still recording both periods. A survey of three questions were given to the class after a week of going through the "What's my Function" opening activity.

The type of functions given to the students varied. The same functions were used for both class periods and these functions varied from easier to harder. The functions started off with easier functions for students to understand what the opening activity of "What's my Function" was as well as start to build their confidence with this activity. The functions used are listed below in order.

1. $f(x) = 2x + 3$
2. $f(x) = \frac{1}{2}x - 2$
3. $f(x) = x^2 + 1$
4. $f(x) = 2^x$

5. $f(x) = 2^x - 3$

The functions were not related to the material the students were learning at the time. The students learned about these functions earlier in the year, however, at the time the students were learning about other content.

Videotaping the classes in which the study took place helped when analyzing the results. Being able to refer back to a specific spot in the video benefited the results and made the study stronger. Using a check-sheet to have something to compare the two classes helped when looking at the recordings to have something specific to look for in the videos. This was based on Fredrick's framework about the three types of engagement. This included behavioral, emotional, and cognitive engagement. An example of behavioral engagement was how many times a student participated in classroom discussions. One example of emotional engagement was the reactions of students when going through a lesson, comments made by the students if they are bored, or if they did not want to complete an assignment. An example of cognitive engagement included was if a student shared their thinking with another student or if he or she kept their thoughts to themselves.

Timeline

During February 2018, the study began by recording second and third period Honors Algebra II classes. These classes are similar in size as well as both occur in the morning, which decreased on the number of outside factors that might have contributed to the engagement in the class periods. The two classes were recorded for a week to have a baseline of what the classes were like in order to have something to compare to. After a week, the "What's my Function" opening activity was given to second period, while still recording both periods. However, third period did not have an opener. At the end of the week, second period was given a short survey

asking their opinions on the activity and how they felt. After a week, the periods switched and third period was given the same "What's my Function" opening activity. Both periods were still recorded, however, second period did not have an opening activity. The same survey was given to third period.

Limitations

This study's findings are not intended to generalize what will work best in every classroom. The purpose of this study was to see if interactive classroom openers will increase the engagement of students. Since the sample population is relatively small, it does not account for the whole student body. Therefore, there might be other factors that could influence student engagement in the classroom, such as developmental disabilities, race, ethnicity, etc. Additionally, the study occurred in a classroom where a student teacher and a cooperating mentor teacher (CMT) was present so there could be other factors that influenced the engagement of students in the class.

Results

In this section, I will discuss the findings from implementing my Action Research in my classroom. I have videotaped both second and third period for 3 weeks and analyzed the video recordings. The students have also completed a short survey on their feelings towards the opening activity of "What's my Function" and whether they feel it helped to prepare them for class. I have analyzed these findings from the survey.

Video-Recordings

Students were videotaped throughout the 3 weeks of collecting data. One week was recorded to have a baseline of the students' engagement without any opening activities. One week second period had the opening activity and the next week third period had the opening

activity. I went through and analyzed the videos by creating a chart and making a tally in the chart depending on the content of the videos. The results from analyzing the videos are below.

1. No openers

	2nd period	**3rd period**
# of questions I asked the students	46	51
# of students' responses that I received immediately	19	18
# of responses after I repeated the question	16	24
# of responses I received when called on the students individually	11	9
# of questions asked by students	8	5

Throughout the first week, there were about 46 questions asked in second period. Of those 46 questions, 41% were answered immediately by a student, 35% had to be repeated one or more times before a student answered, and for 24% it was necessary to call on a student to answer them. However, throughout the 5 days of video recording, only 8 questions were asked by the student about the content that was being presented.

In third period, there were about 51 questions asked. Of the 51 questions, 35% of them were answered immediately by students, 47% of those questions I had to repeat before a student answered, and 18% of the questions I called on a student to answer. Only five questions were asked by the students about the content.

2. "What's my Function" opener

The number of questions and responses in the following table are from questions related to the content and do not include the questions asked or responses during the opening activity.

	2nd period	**3rd period**
# of questions I asked the students	53	55
# of students' responses that I received immediately	31	20
# of responses after I repeated the question	16	22
# of responses I received when called on the students individually	6	13
# of questions asked by students	12	8

Of the 53 questions asked in second period, 58% of the questions were answered by a student immediately, 30% of the questions I had to repeat before having a student answer it, and 12% of the time I had to call on a student to answer the question. The number of questions asked by the students were 12.

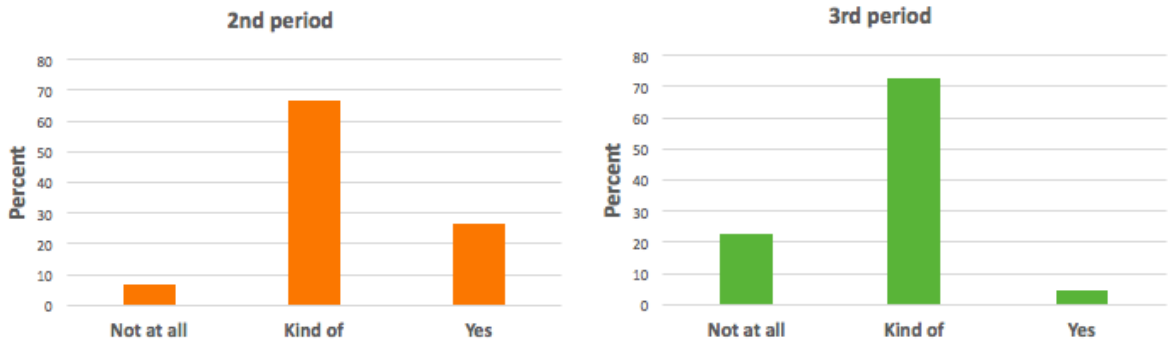
For third period, I asked about 55 questions to the students. 36% of those questions were answered immediately by a student, 40% of the questions I had to repeat before a student answered it, and 24% of the questions no student raised their hand, so I had to use a random name generator to see who would give their opinion. There were 8 questions asked by the students.

Overall, there was an increase in the number of students answering questions immediately. However, there was a larger difference between second period than third period. In third period, the number of students I had to call on to answer my questions increased from the first week to when the opening activity of "What's my Function" was implemented in their class.

Student Survey

The survey given to the classes consisted of three questions. Additionally, there was a part at the end of the survey for students to write comments on whether they would like to continue with the opening activity and why. The survey that was given is shown in Appendix A. The survey was anonymous in hopes the students would answer it honestly. The survey was given to the students after five days of participating in the "What's my Function" opening activity during class. The results to the survey are below.

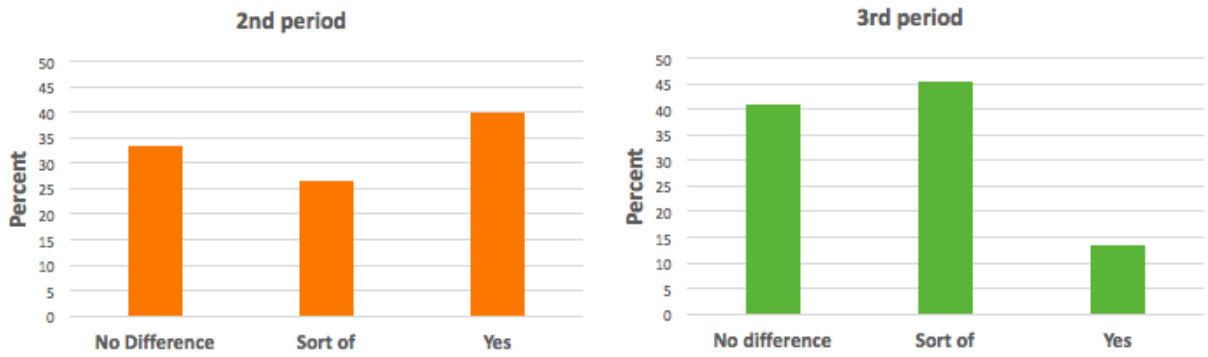
1. Did you feel the "What's my Function" activity helped you get ready to think mathematically for our class period?



The results from second and third class periods came out to roughly be the same. Most of both the classes answered "Kind of" to whether the "What's my Function" activity helped them get ready to think mathematically for our class period. Specifically, 66.66% of the students in second period and 72.73% of students in third period answered "Kind of". However, there were more students in second period that felt the opening activity did help them prepare to think mathematically for our class. 26.66% of students in second period answered "Yes" compared to 4.55% in third period. Additionally, more students in third period said the activity did not help them think mathematically for our class period. 6.66% of students in second period answered, "Not at all" whereas 22.72% of students in third period answered the same. From these results,

the opening activity of "What's my Function" did help some of the students get ready to think mathematically for our class.

2. Did you feel more engaged in class when starting with a "What's my Function" opening activity compared to starting right away with the notes or homework?



There was more of a difference when the students were answering this question on the survey. There were more students in second period who felt the opening activity did help with their engagement in math when starting with the opening activity compared to coming into class and getting started with correcting their homework or with the lesson for the day. 40% of students in second period answered "Yes" compared to 13.63% in third period. However, in second period, the class was about split between answering "Yes" and "No Difference". While 40% of the students said the opening activity did help them feel more engaged, 33.33% said they felt no difference on their engagement in class. On the other hand, third period was split between feeling the opening activity did not help them feel more engaged and sort of feeling it helped them be more engaged in class.

3. Do you want to continue with doing the "What's my Function" opening activity?

The results from the third question was about the same from both classes. Most students answered this question "Yes", they would want to continue with the opening activity of "What's my Function". Specifically, 66% of students in second period and 56% of students in third period answered "Yes". Only a small percentage of students said they felt the opening activity was a waste of time while more students said they did not want to continue with the opening activity of "What's my Function". Here are some examples of student's responses.

If no, why not?

If students answered "no" to the third question, asking if the students would want to continue with the opening activity of "What's my Function", most of them answered no because it was not relevant to what they were learning in class. Additionally, this opening activity was implemented as a review for the students. Therefore, this could have impacted their attitude and engagement during the opening activity. Specific student responses are listed below.

Second period:

- *"I thought that it helped us start thinking but it wasn't that useful to what we were learning."*
- *"It doesn't really help me."*

- *"Because although it is a math problem, I feel it doesn't affect my readiness/ effectiveness."*

Third period:

- *"Doesn't really help/do anything."*
- *"It's really easy and I feel like it doesn't relate to what we're learning."*
- *"I don't think that it really helps at all and I would rather get that time at the end of class to do homework."*
- *"I just feel like it would be easier to learn it together."*

<u>If yes, why?</u>

If students answered "yes" on the last question on the survey, the overall theme of their comments were that they liked that the whole class was involved in the activity and they felt it was a fun way to review functions, even if it was not relevant to that day's lesson. Specific examples of student responses are listed below.

Second period:

- *"Because it made me think about what it could be and I'm learning a little more every day."*
- *"It's like a warm up and easy."*
- *"Yes, because if I know what the function is then I feel smart. But then if I get it wrong, I learn."*
- *"It helps to wake you up and get ready for class. I also think it will help on tests like the ACT."*
- *"Although not always relevant, the little competition makes it fun and lightens up the class a little bit."*

- *"Helps review functions and learn how to read graphs from just data tables."*

Third period:

- *"It helps refresh my mind."*
- *"It gets the class involved."*
- *"I feel as though the functions are relatively easy but it helps me transition from study hall to math."*
- *It helps me review previous concepts and plus I'm bad at functions so it gives me more practice."*
- *"It gets me thinking about math."*

Discussion

This opening activity was completed with Honors Algebra II students. These students have learned about linear, quadratic, and exponential equations before completing this opening activity. Therefore, this opening activity was a review for these students instead of a challenge to think about a new idea or concept. Therefore, students may have had an easier time creating an equation to match the data points. Since this was a review activity for the students, they questioned the opening activity more than if it dealt with a new concept that they had not learned. If this was a concept students had not learned about previously, they would have had to draw on past information and connect ideas together to create an equation to match the data tables presented. This could have an effect on their engagement throughout the lesson. Additionally, the opening activity only consisted of "What's my Function". This is only one of the many opening activities to start a lesson. More research is needed to explore the effectiveness of other opening activities besides "What's my Function".

Overall, the students seemed to really enjoy this opening activity. When going through the lesson for the day, the students seemed to talk more about mathematics as well as participate more by asking questions or answering my questions without a long wait or having to call on a student. Questions being answered more quickly seemed to be more relevant in second period than in third period. This can be seen by looking at the video data for both periods. The second period class had 58% of the questions asked answered immediately whereas third period only had 38% of the questions asked answered immediately. However, both classes seemed more alert and attentive in class when the opening activity was implemented. After completing the opening activity a few times, the students in both classes made it a competition on who was able to think of the function the quickest. It appeared the opening activity had more of an impact on second period compared to third period. Second period seemed to enjoy the activity more and more students seemed to participate in the discussion of how they were able to come up with that specific function. Even in the beginning stages of the research project, second period seemed to participate more in class compared to third period. I did, however, notice a difference in third period and the amount they participated in class when completing the opening activity compared to going straight into the notes or homework.

In my classroom, the students wanted to shout out the answer to the activity right as they were able to come up with it. Additionally, I quickly realized some students were typing the data points into their calculators and using their calculators to create an equation. This was easier with the beginning examples, however, I had to remind the students that they were not allowed to use their calculators during this activity.

While completing the activity research in my classroom, some students decided not to participate in the activity, which was permissible due to previous classroom protocol. For

students participating, I had the students put a thumb up when they had an idea of what the function was. Therefore, when the majority of the class had their thumb up, I let the students discuss their findings. I called on different students each day to explain their reasoning and I asked the class if there were any other ways to think about the data other than the one that was explained. However, I still had students who just sat in their seats and decided not to participate in the class discussion. This could have contributed to the number of students who did not feel engaged in the class or did not want to continue with the opening activity. The students who came up with a function to match the data are students who typically participate in classroom discussions on a regular basis.

In the future, I will continue with opening activities. I felt the students were more engaged in class, whether it was from the opening activity or something else. The students were more awake in the class and completing opening activities was a good way to transition from another class to math, while helping to build the students' confidence around mathematics. As I continue, I plan on incorporating different opening activities while asking the students opinions on which one they feel makes the biggest difference in their engagement in the classroom.

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Appendix A

Please circle the answer to the following questions.

1. Did you feel the "What's my Function" activity helped you get ready to think mathematically for our class period?

Not at all Kind of Yes

2. Did you feel you were more engaged in class when starting with a "What's my Function" opening activity compared to starting right away with the notes or homework?

No Difference Sort of Yes

3. Do you want to continue with doing the "What's my Function" opening activity?

Waste of time No Yes

If no, why not?

If yes, why?