

“Using Clickers in Math”

Inquiry Team:

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Background:

Avon Maitland District School Board has begun to equip some classrooms with SMART Boards over the last few years. Use of interactive classroom response systems (clickers) has also been part of the experiment. The SMART Response System (Senteos) have allowed for the use of a response system with the SMART Notebook software. Following the research of Paul Black and Dylan Wiliam, by increasing the students' practice through formative assessments, improvements in their learning should follow. The use of clickers will allow for frequent practice. While clickers could be used as “assessment for learning”, they could be used as “assessment as learning” to complete questions on a test. In either case, the technology has been known to be more engaging to students. We were unable to find any information on the different strategies to use this technology in a classroom.

Using the opportunity provided through the London Region MISA Professional Network Centre, a group of educators from two Avon Maitland District School Board schools worked together on a collaborative inquiry focused around engaging students in mathematics by using the clicker technology with SMART Boards. The schools included one elementary school (grades K-8) and a secondary school from the same community and focused the Inquiry around this question:

<p><i>Does the use of clickers in math class improve the engagement of students in certain grades, and improve student learning?</i></p>
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The Inquiry

The team consisted of educators at different levels of comfort with the technology. SMART Board Senteo clickers were purchased for each school to

be used by the “main” teachers. Although the clickers were new to all teachers, those in the secondary schools had greater experience with SMART Boards and computers in general. The main teacher in the elementary school had a SMART Board and computer installed into the classroom early in the Inquiry which allowed the use of the technology in the classroom without hindrance.

The team met for 3 – two hour sessions in the secondary school and in the elementary school with a number of objectives:

- tutorials on using SMART Boards and the clickers
- creating assessments using the tools
- classroom management issues using the tools
- sharing assessments that were created using the tools

A survey was co-created and delivered to both the grade 8 and grade 9 Applied classes that were the focus on the Inquiry. (Appendix A) In both grades, the use of technology seemed to be high anticipated by the students as an instructional tool.

For one session, a math coach taught the grade 8 class using a math quiz and clickers as a tool for instruction. After the class, the team reflected on the engagement of the class when the clickers told the student if he/she got the answer correct, versus the questions where the student did not know if the answer was correct.

Feedback from the students and teachers confirmed that the students preferred to receive the immediate feedback from the clickers on their answers.

Students would actively seek out the correct answer once they knew their response was incorrect. - unfortunately they did not necessarily seek out to correct their misunderstandings.

Furthermore, students would work at practice questions for a longer time on task when the clickers were involved than they would with other standard methods of individual practice.

The team was able to reflect on several of the features with the SMART Board clickers that seemed to be potentially useful but proved to be distracting to the class. These included students being able to signal when they had a question - producing students who would repeatedly turn their question button on and off; signing in and out could also be signaled and distracting; students could sign in as another student if the login ID was not complex enough; and students who had lost interest in their efforts could enter unexpected values in open response questions; e.g. 1234567890, 6969696969. It was observed that most of these issues only occurred in the Grade 9 Applied class.

Inquiry Challenges:

The major challenge this project had was the difference in the level of experience and engagement the participants had for the Inquiry itself.

While some of the participants had a lot of experience with using technology in their classrooms, others were new to using technology like the SMART Board and clickers. This resulted in difficulties meeting the needs of everyone in the group in a short timeline. Although support from the Board's IT was received to provide further support, this remained the largest challenge.

Also, to encourage teachers to use new technology, the hardware need to be available and installed, and the technical support persons need to be readily available in the learning stages. Teachers who did not have this access lost interest in the project.

Evaluation of the Inquiry Question:

Reflecting on the question at the start of the inquiry, we recognized it would be difficult to determine how effectively the clickers have improved student achievement, given our limited time.

By using the clickers during a class for assessment for learning, teachers indicated that the display of results allowed them to focus on the questions most in need of discussion, instead of spending time (and attention) on the questions with which the class had been successful. This had an obvious positive impact on engagement and improved student learning.

The survey below, given to the Grade 9 Applied Mathematics class, suggested the students found instruction more engaging with the use of the clickers. Tied to the SMART Board, the students' response to "Do you like using the clickers in math class?" was unanimously "yes". The same survey was done with the Grade 8 class, and their data mirrored the findings of the Grade 9 class.

When the EQAO results of the Grade 9 Applied math class were considered, the Applied class of semester 2 scored 68.9% on the multiple choice questions on the test. This compared to a 59.4% score on the multiple choice questions on the test during the Winter. While recognizing that these scores cannot be seen as causal, it is not wrong to suggest that the extensive use of the clicker technology with the Spring class played a role in improving the results for this class.

Avon Maitland DSB Collaborative Inquiry
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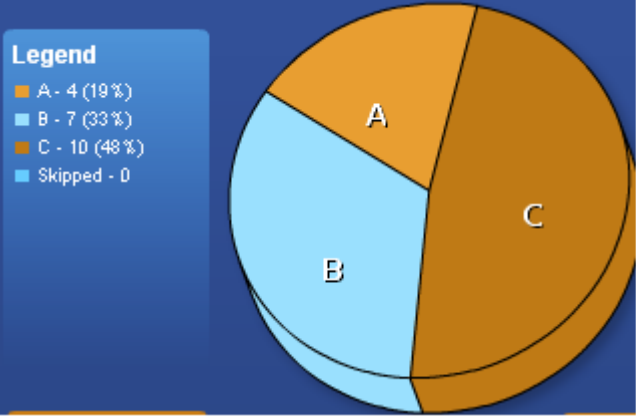

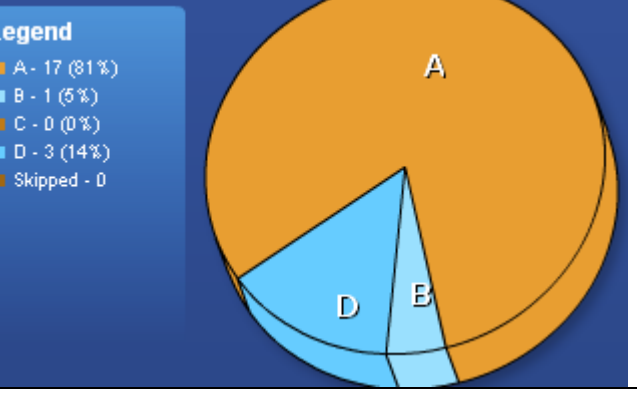


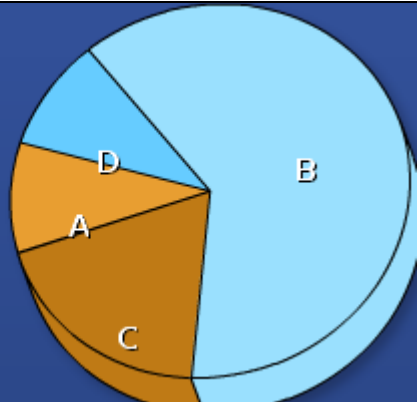
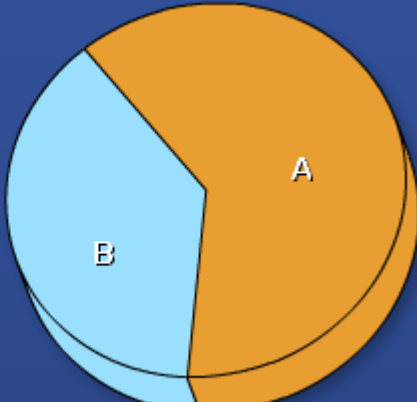
Next Steps:

Most of the students from the elementary school's grade 8 class have moved on to the secondary school involved in the project. In designing the project, we were aware that the effects of using the technology will be interesting to follow in their grade 9 year. Of the twenty seven students that were in the Grade 8 class, one student left the Board and one student went to another school in the Board. Of the remaining 25 students, 15 students are scheduled for Academic math, and 10 students are scheduled for Applied math.

A recommendation from the Inquiry Team to the Board was the creation of SMART Board quizzes, designed to incorporate within a unit, or be used as a standalone culminating review. Also, the Board should improve their training on the use of this technology by including some of the best practices discovered in the Inquiry to further support teachers in their classroom.

Appendix A – Survey results from Grade 9 Applied Class

Question	Results
<p>1. Do you enjoy math class?</p> <p>a) yes b) no c) depends on the topic</p>	 <p>Legend</p> <ul style="list-style-type: none"> ■ A - 4 (19%) ■ B - 7 (33%) ■ C - 10 (48%) ■ Skipped - 0
<p>2. Do you enjoy using the clickers in math class?</p> <p>a) yes b) no</p>	 <p>Legend</p> <ul style="list-style-type: none"> ■ Yes - 21 (100%) ■ No - 0 (0%) ■ Skipped - 0
<p>3. Did you use clickers in another high school class or in elementary school?</p> <p>a) no b) yes, in high school c) yes, in elementary school d) yes, in high school and elementary school</p>	 <p>Legend</p> <ul style="list-style-type: none"> ■ A - 17 (81%) ■ B - 1 (5%) ■ C - 0 (0%) ■ D - 3 (14%) ■ Skipped - 0

<p>4. Do you like learning math with the SMART Board? If yes, why?</p> <p>a) no b) yes, it is more interesting c) yes, it is fund to draw on d) yes, I like to help the teacher use it</p>	<p>Legend</p> <ul style="list-style-type: none"> A - 2 (10%) B - 13 (62%) C - 4 (19%) D - 2 (10%) Skipped - 0 
<p>5. Do you prefer to have your clicker response marked at once or when the whole test is done?</p> <p>a) Right away b) When the whole test is done</p>	<p>Legend</p> <ul style="list-style-type: none"> A - 13 (62%) B - 8 (38%) Skipped - 0 
<p>6. When you get an answer wrong, are you more likely to find out the right answer to the question,</p> <p>a) When your use the clickers b) When you are doing your homework c) When you are doing seat work d) All are equal</p>	<p>Legend</p> <ul style="list-style-type: none"> A - 14 (67%) B - 3 (14%) C - 2 (10%) D - 2 (10%) Skipped - 0 