

MISA Final Report - Algonquin Lakeshore Catholic District School Board
Learning Pods: ALCDSB Numeracy Project 2014-15

The ALCDSB inquiry project comprised of a collaboration of teachers and administrators of three schools; Holy Name Catholic School, St. Thomas More Catholic School, and St. Marguerite Catholic School. There were 17 teachers involved in this project, with a core of 6 teachers (3 junior and 3 intermediate) directly funded by MISA. The group focused on the integration of technology in Math instruction and the impact of student learning and performance. Several school effectiveness framework indicators were selected and instructional and collaborative progress was made by all members of the team. Specifically;

- ❑ Teachers continued to collect meaningful data, and use it to monitor learning, and inform instruction and next steps. This was collected through student and teacher questionnaires, daily work, observation,

- ❑ Teachers worked together, shared new knowledge and problem solved together. This created a professional learning atmosphere, where teachers took risks and shared outcomes. It also allowed teachers to share frustrations, and help to plan for students that were having difficulty meeting expectations. Teachers kept and shared journal entries, student work, and professional resources.

- ❑ Teachers developed a deeper understanding of the curriculum when making decisions with regards to technology implementation (choosing some applications that promoted the advance of basic skills, but more importantly, focusing on applications that encouraged a deeper understanding of mathematics - the digital format allowed students to manipulate and explore in ways that may not be available otherwise ex. Geometer's Sketchpad).

The project was dependant on laptops arriving in classrooms in a timely manner. Each junior/intermediate classroom was to receive 5 laptops. This board initiative (reimaging of computers and delivery of additional technology) time line was September/October 2014. Although two schools received the laptops during late fall of 2014, the third did not go through this process until late February 2015. Until then, teachers had limited access, which made it difficult to authentically implement technology at the point of instruction during the entire project.

The implementation of technology in classrooms took various forms. The use of technology depended on the application, teacher/student comfort level, classroom dynamics, school or classroom policies (ex. BYOD), and accessibility of technology (devices and connectivity). A few of the methods of implementation included;

- ❑ Independant use (ratio of one student to one device)
- ❑ Small group (2-3) student center (multiple students using one device)
- ❑ Small group (2-5) teacher guided center (ratio of 1-2 students per device)
- ❑ Large group activities (comprised of various ratios)

Teachers agreed that each classroom had to develop rules and routines around the use of any device. As the teacher/student established these and comfort level increased, less time was spent on troubleshooting.

Throughout the project, teachers participated in a variety of professional development opportunities. Through our board math initiatives this year, ALCDSB has created “Math Pods” which were divisionally (grades 4-6 and grades 7-8) focused. As our project was an extension of or integrated in the board initiative, teachers were able to meet within a larger context (with other teachers not involved in the MISA project), as well as in a smaller “MISA” forum.

ALCDSB Math Pod Activities:

November 28 - PA DAY - Junior and intermediate teachers met at St. Marguerite. Teachers had the opportunity to sign up for various technology based informational sessions run by other teachers within the board. Also, in the afternoon, teachers attended a Marian Small workshop.

January 14 -Intermediate division- St. Thomas More - Video
<https://www.youtube.com/watch?v=W0isg00sv0E> Small group planning on Measurement (Volume and Surface Area) and the second group work on Algebra. Teachers went into classrooms in the afternoon to implement lessons based on the creation of centre activities using technology. Teachers were asked to complete a survey of needs for their classrooms that asked them to provide input into what they would like planned for upcoming pod dates.

January 19 - Junior division - St. Thomas More - Video
<https://www.youtube.com/watch?v=W0isg00sv0E> Small group planning on Measurement (Volume and Surface Area). Teachers were asked to complete a survey of needs for their classrooms that asked them to provide input into what they would like planned for upcoming pod dates.

Summary of Classroom Activities -<http://youtu.be/Yn5lik2x5g0>

<https://www.youtube.com/watch?v=wO4baBYz218>

February 9 -Intermediate division - St. Marguerite - Based on teacher Survey feedback from January 14th our pod determined that teachers wanted to learn how to use Geometers Sketch Pad effectively in their classrooms. Our groups arranged for Chris G. to come into the school to work with teachers to instruct them on use of the application. Teachers created lessons for classroom use for the afternoon.

Feb 13 - Junior division - St. Marguerite - Based on teacher Survey feedback from January 19th our pod determined that teachers wanted to learn how to effectively implement John Van De Walle’s book Teaching Student-Centered Mathematics: Developmentally Appropriate Instruction for Grades 3-5 and explore additional software that could be used in their classrooms. During part of the morning Terry Marquez lead a discussion on how the book is laid out and how teachers might use the book in their classrooms. In the latter part of the morning Dan Finn worked with teachers to provide an overview on the use of Tinkerplots. In the afternoon teachers worked together to create lessons for classroom use for their classrooms that focused on Data Management. Teachers also had the opportunity to share

digital resources with one another that they were using with students.

April 8 - Junior division - Holy Name - Teachers participated in a session led by Andrew Paquin. Teachers explored Geometer's Sketchpad and Dynamic Numbers.

MISA Math Group Activities

October 30 - Initial Meeting in Ottawa at MISA Conference

November 28 - Afternoon only - group met at St. Marguerite with Theresa Dostaler to discuss data collection and review of project.

February 19 - Group met after school hours to discuss progression of use of technology in the classrooms. No release time was used for this meeting.

Jan 22 - MISA/EODSN Conference at Ambassador Hotel

April 27 - Group meeting at St. Thomas Moore to discuss project progression and collection of data. Teachers shared rich discussion of technology implementation in classroom.

May 11 - Group meeting at Holy Name to discuss project, compile data, and prepare for presentation. Each teacher created their own web page to display independent findings.

May 20 - Final report writing at Holy Name

Student Surveys

During the project, teachers felt that the students' attitudes regarding mathematics improved with the use of technology, and that their overall academic skills also improved, as determined through classroom assessments. A few examples of student responses to survey questions from **The Mathematics Survey A Tool for Assessing Attitudes and Dispositions** - NCTM Teaching Children Mathematics April 2007 are presented below:

Pre-Survey Comments	Post Survey Comments
<p>To be good in Math you need to ...</p> <p>“Be focused because it is easier to memorize.”</p> <p>“Concentrate because you learn know”</p>	<p>To be good in Math you need to ...</p> <p>“Use technology because it helps you visualize the question and understand it better”</p> <p>“You need internet because you can look up math websites [information/instructions] and</p>

	math games too.”
<p>How can Math help you?</p> <p>“It helps you have a job”</p> <p>“When you get bills you need to make sure the math is right”</p>	<p>“Math can help you in everyday life, like buying things for a birthday party or grocery shopping”</p> <p>“Math helps when you’re dividing candy..it also helps when I have to triple a pancake recipe.”</p>
<p>If you have trouble solving a problem in Math, What do you do?</p> <p>“Skip it and go to the next question”</p> <p>“Ask the teacher”</p>	<p>“I ask my friends what strategies they used - to help me solve a problem”</p> <p>“Ask a friend or ask a teacher. Re-read the question and check the computer”</p>

Teachers reviewed students’ survey responses and the summary of students’ responses are presented in the table below:

Survey Question	Pre Project Trend Implied by Student Responses to the Surveys	Post Project Trend Implied by Student Responses to the Survey Questions
To be good in math, you need to because	<ul style="list-style-type: none"> - to be good in math: focus, ask for help,listen, study, participants, understand the problem, know math skills,show your work . - study hard, try hard, be patient and practice -stay calm/do not get mad, - take your time, pay attention, practice 	<ul style="list-style-type: none"> - pay attention, use your strategies. - focus, use strategies, practice -listen carefully when the task is being explained. -using the computer helps you learn because you will be more focused. You will be having so much fun you won’t want to stop learning. -go over your notes at night to keep concepts fresh -show your steps so you can identify where you went wrong and prevent the same mistake in the future; double check your answers.

		-participate to learn; try hard (work hard) because you need math every day in life - it will pay off; think outside the box because math has "compound thinking behind it"
Math is hard when ...	<ul style="list-style-type: none"> - people are talking, I work independently, when you have to read problems, we have to use operations, I don't understand the problem, I don't use a calculator, you don't ask questions, we do something new. - you don't understand the question/problem was not explained properly, get frustrated, give up. 	<ul style="list-style-type: none"> - I get distracted by other students talking, when we don't understand what the question is asking, when I can't figure out what strategy to use. - when you have to picture it in your head, fall behind, can't hear the teacher. - I don't listen, you know you're having problems, but you don't ask for help; I'm not paying attention.
Math is easy when ...	<ul style="list-style-type: none"> - you have a partner, when you understand what you are doing, we use graphs, we use manipulatives, you ask questions and focus, we use a calculator, questions are clear, and participate. - you have a quiet space to work and aren't interrupted when you ask questions. - understand the question, problem makes sense and is explained properly the teacher helps. 	<ul style="list-style-type: none"> - when you do math problems with classmates, -when you do math problems online, you use manipulatives, using graphs and hands on, when I am working with someone who understands math the same way I do. -working in groups to share your ideas and see where you went wrong; when we get to see other people share the answers to see how they solved a problem; -having a peer helper
How can math help you?	<ul style="list-style-type: none"> -Math can help me: with quick math without a calculator; shopping, future jobs, playing minecraft. - it can help you later in your life/when you are older, like if I need to know what something costs, business/banking, help you in everyday life, you need to learn about money and numbers to pay for things, help with most jobs, graphs in hospitals and business, get into college and university, figure out tax. 	<ul style="list-style-type: none"> - shopping, taxes, money, angles, manage money, building, day to day problems, get an education -in everyday problems, like money - when you are buying stuff at a store or getting groceries, future jobs (plumber), paying bills, when you need to divide candy with your friends. -making sure you're getting a deal on what it is you're buying -you can use a calculator ... but you need to know what to put in the calculator, in tournaments ... how far

		you are going to run in 26 minutes, school work
If you have trouble solving a problem in math, what do you do?	<ul style="list-style-type: none"> - when I have problems solving math: ask a teacher or adult, use a calculator, reread the question, skip it, ask a peer, go through past resources, rewrite it - complain/take a break/calm down, fake it until I make it, use a calculator, re-read question, not do it all 	<ul style="list-style-type: none"> - ask someone for help (peer, teacher), reread the question, do the parts I know, look back in the notebook, ask google, use manipulatives. - try new strategies (or ask friends what strategies they used)
I like to use ... to help me solve a math problem. It helps me learn because ...	<ul style="list-style-type: none"> - I like to use a calculator, counters, pictures, manipulatives, scrap paper & pencil, fingers, examples from my teacher -chalkboard/whiteboards, hands on activities, blocks. 	<ul style="list-style-type: none"> - pattern blocks, a calculator, graphs, cuisenaire rods, multiples, computers. - technology, math sketches, C.U.B.E.S., counters, my phone, pictures, and songs -partners to learn from each others point of view

In collection of data on attitudes and beliefs from students our findings were consistent with the article **The Mathematics Survey A Tool for Assessing Attitudes and Dispositions** - NCTM Teaching Children Mathematics April 2007. Overall, our data collection showed a belief that educators were the sole source of knowledge. Furthermore, little mention was made of working independently or with friends to solve problems together. Similarly to the article, students identified math as important for employment, paying bills, and counting money. Students did not report a strong sense of awareness of strategies when stuck. After evaluating the data supplied by the students, teachers identified a number of instructional changes and actions to implement. These included;

- Strategy development
- Self selection of tools needed to solve problems
- Implementation of technology
- Development of expectations when using technology
- Integrating interesting learning activities
- Allowing students to visit same concept various ways
- Working on math vocabulary and terminology
- Use of real world applications and big questions
- Build classroom resources (manipulatives and technology)

After the project, the student surveys revealed an overall improvement in attitudes and dispositions. Students showed a more complex and robust understanding that math is everywhere and applies to their lives NOW, not just in the future. Students reported the use of strategies, asking each other questions, and working with and in a small group to answer

math problems. When stuck, students identified the need use resources such as technology, and specific manipulatives to help them move forward. Additionally, students impressed the importance of breaking down a problem into smaller, more manageable steps - and using this to help when they do not understand what to do next. Overall, students are taking more ownership in their learning. When asked how can math help them, students showed a broadened view of the use of mathematics. Managing money, taxes, being able to figure out when they are getting a great deal were all mentioned. But students also mentioned that they needed math to be able to divide candy among friends, figuring out how many points you can earn in a team tournament, and solving regular, day-to-day problems. This reveals a greater understanding that math is all around us, that they use it everyday, and it is valuable.

When compared to the article listed above, it is clear that our teachers were also able to shift the thinking from the educator as sole giver of knowledge to a more collaborative based, group problem solving attitude. Also, there are striking similarities between our students, and those identified in the article. Each reported better responses overall (which shows an improved confidence in language surrounding math), fewer references to the teacher (which demonstrates less dependence on an adult, more collaborative thinking, connections among ideas in math, and an increased ownership and responsibility.

Students with Exceptionalities

Generally, teachers found that the use of technology in Mathematics provided students leverage in learning. Specifically, students with difficulty in fine motor skills, spatial awareness, or general retrieval/processing skills appeared to benefit from the use of technology. Students with high needs appeared to benefit from technology differentially.

“A few students in my room have difficulty with spatial awareness. Geometers Sketch Pad allowed them to “see” and manipulate objects in order to better understand the mathematics behind it. It helped them visualize the concepts, and experiment with them digitally.”

“Two students, with high needs, really benefitted from using technology. While “gaming” programs worked really well for one student, the other benefitted from repeated practice. The different visual supports provided by different programs or apps, coupled with audio support, were particularly effective at meeting these students’ needs. Additionally, the immediate feedback reinforced their work and learning.”

Overall, teachers reported through discussions how all students appeared to benefit from the use of technology especially students with exceptionalities and students

Technology in the Classroom: Teachers’ Recommendations

Teachers also evaluated the usefulness of technology used in the classroom. Many of the trials also included feedback from the students themselves. Generally, students were excited and interested in using technology, which, in turn, encouraged them to take risks, and deepen their understanding of new concepts. Some of the applications that were particularly useful included:

Technology Implemented	Teacher Recommendation
<p>Dynamic Number to use with Geometer's Sketch Pad</p> <p>http://www.dynamicnumber.org/</p>	<p>Excellent website for students to use regularly. Has a number of activities that can be used in Geometers Sketch Pad. If not familiar, it is recommended that teachers/students complete a tutoring session to become familiar with GSP. The activities in Dynamic Number are various levels and encompass several strands (not just geometry). They also include teacher resources and lesson guides, and student worksheets. Great for differentiating lessons. ~ Highly recommend!</p>
<p>Splash Math (IPAD App)</p>	<p>Great application for kids! This would be an excellent addition to a math center for students to practice independently or in small groups. The app has fun rewards for students to collect (full version), is curriculum based (Common Core – US), includes various games and several grade levels. If set up – the program can print off reports of student progress. Although this program is not instructional, it had “hints” to help. This could be loaded and used at home for extra practice. ~ Recommend!</p>
<p>Illuminations http://illuminations.nctm.org/</p>	<p>This is the online NCTM problem bank. There are many rich problems. Some problems have an interactive tool that can be used by whole class or in small group settings. It is a great tool and resource for teachers ... one that should be referred to whenever teachers are planning for deeper learning. This tool is recommended by Marian Small</p>
<p>Figure This!</p>	<p>Another NCTM tool recommended by</p>

http://figurethis.nctm.org/	Marian Small.
Create a Graph http://nces.ed.gov/nceskids/createagraph/	A simple tool to use that is intuitive and effective. This is definitely a stepping stone to Excel. It has a high tolerance for error. Students like its simplicity.
Interactive Geo Board http://www.mathplayground.com/geoboard.html	Another intuitive tool that can be used for whole class, or in small groups. No flying elastics! Students respond positively to using this tool.
Dragon Box 2	This is a iPad application. The best \$8.00 spent in algebra. It is the direction that gaming is going for education. It teaches conceptual understanding with no numbers. Play it for 5 minutes and you will be sold! When numbers and symbols get in the way of algebraic thinking, Dragon Box 2 makes learning accessible.
Yummy Math http://www.yummy-math.com/	Another great bank of problems worth the visit! Some great real world problems that makes math more meaningful for some students.
Nrich Math http://nrich.maths.org/frontpage	This is the British Illuminations! Cambridge University has developed some of the richest problems for students ... when students can work through these, you know they are making progress!
Learn Zillion https://learnzillion.com/	This is an American site that has a great deal to offer. As a teacher, you can watch videos on how to teach a math concept. Students can watch videos on how to solve problems, and then pause the video to work, hit play and see how they did. Misconceptions are discussed. Concepts, knowledge and skills are scaffolded and built upon. There are a lot of different possible uses for this site. Free version has a lot to offer.

Teacher Survey

Half of the teachers involved in the project completed the initial survey, and approximately a third completed the survey at the end of the project. Initial teacher surveys were completed by 8 teachers, evenly split between the Junior and Intermediate Divisions. At the end of the school year, 6 teachers completed the survey. The same survey questions were used, pre- and post- Math Pod sessions. Likert scales were used.

Five out of eight consistently or usually reported using 3 part problem solving instruction at the beginning of the project. In May, five of six teachers reported similar use of 3 part problem solving instruction. At the beginning of the project, all teachers stated that they consistently or usually created opportunities for student collaboration and for students to make their thinking visible. At year end, one teacher reported that they only facilitated collaborative inquiry sometimes. The reason for this change is not clear. Interestingly, all teachers at the end of the project reported that they created opportunities for students to make their thinking visible.

In the fall, three of the eight teachers reported that they felt that they were a novice when it came to integrating technology in the classroom; and similarly, these teachers also felt that their students were novices when using technology for academic purposes. In the spring, only one of six teachers felt that they were a novice in integrating technology. All teacher felt that their students were proficient, or better, at using technology to demonstrate their learning. When asked to identify specific technology used in the last 10 months, the range of answers was one program to six programs. All but one teacher reported using Smart Notebook. Two teachers reported only using one program. It would appear that once teachers move beyond using one program or application, that they begin to use a variety of tools.

Two teachers reported that they used manipulatives either rarely or less than half the time. All responses at the end of the school year indicated that teachers consistently or usually used manipulatives. Only two teachers reported that they consistently or usually used technology in math instruction. Again, by year end all teachers reported that they used technology consistently or usually. Use of Gizmos remained low throughout the project. As Gizmos was not a focus of this project, this result is not surprising. Teachers did receive training in the use of Geometer's Sketchpad, and it appears that teachers were more likely to use this tool at year end than they were at the beginning of the year. The change was significant (change from "not yet" to "sometimes") and it would be interesting to see if there is continued increasing use of this tool in the 2015-16 school year.

Three teachers reported that they used strategies for memorizing math facts. By year end, only one teacher reported consistently developing strategies to memorize math facts. Two

teachers reported using math textbooks or student workbooks more than half the time in their classroom. All teachers reported that they rarely or sometimes (less than half the time) used textbooks or workbooks at the end of the project. There appears to have been a decrease in the use of these tools. It would be interesting to see if or how (e.g. which strand) this shift in teaching or learning method impacts performance on EQAO. Every teacher in the Math POD reported consistently or usually using their teacher resource laptop for whole group instruction at both the beginning and end of the school year.

Teachers were asked about how they felt they were applying the 4 core instructional strategies in their math class. At year end the picture of teachers' use of core instructional strategies changed somewhat. All (6/6), as opposed to 75% (6/8) of teachers, reported that they were consistently using rich and engaging tasks. Teachers, at year end, were much more likely to report (5/6) that they usually used technology to deliver rich and engaging tasks. At year end, one teacher reported that they were only using accountable talk sometimes, as opposed to all teachers reporting using accountable talk in the fall. The change, while small may indicate a deeper understanding of accountable talk and explain the change. At the end of the project, all teachers felt that they could effectively use technology to create opportunities for accountable talk, compared to only half in the beginning. At both the beginning and end of year, all teachers indicated that they were effectively applying shared and guided practices. Teachers, 6 of 8, felt the most confident using technology for shared and guided instruction in the fall. In the spring, all teachers were confident in using technology for shared and guided instruction. It is possible that all the work done in literacy on shared and guided practices has transferred to the math classroom. When asked about precise, timely, and descriptive feedback, teachers initially indicated that they consistently or usually met the needs of students, in this regard, 75% of the time, compared to 100% of the time at year end. Slightly more than half of teachers, 5 out of 8, felt they could provide effective feedback using technology in the fall. In the spring, 5 of 6 teachers felt they could effectively use technology to provide feedback.

While the integration of technology to instructional strategy use changed over the course of the year, these findings should be used to plan for future professional development. For example, the use of technology to facilitate rich and engaging tasks is not clear. Did teachers use technology to locate "better" problems to present to students? Was the presentation of the problem in digital print format, video format, or interactive format? Did using the internet help teachers develop "better" teaching strategies (e.g. lesson plan that integrates manipulatives)? Was technology used by students to read or explore (e.g. interactive tool) or solve (e.g. multiple choice) or report (e.g. digitally record answer in some format) responses to problems? Was the digital tool used designed specifically for math (e.g. Geometer's Sketchpad) or a generic tool (e.g. Explain Everything) that could be used for math? Parsing teachers' professional development vis-a-vis subject knowledge, teaching practices, and effective use of technology is complex and well beyond the scope of this project. More research in this area of teacher training should be sought to develop plans for future professional development opportunities.

Teacher Journal Entries

Below are several teacher journal entries. It is clear from the entries that both teachers and students have developed their respective understanding of math skills and knowledge. Teachers are more confident in their pedagogy, and students are more engaged in their learning. Teachers' reflections are indicative of their thinking and understanding of their teaching practices, impact of practices on students' development of math skills and knowledge, and assessment of student learning and engagement. It is hoped that the teachers in this project, through MISA or ALCDSB, will continue to further develop their teaching practices, especially in regards to mathematics. And lastly, that teachers' commitment to their own professional development will result in greater student success.

February 2nd, 2014

Strand – Number Sense and Numeration

Application: Multiplication Unplugged (audio recording)

Good:

- Students enjoyed the songs and loved following along
- Basic multiplication skills improved dramatically (with continued use – almost every day over a few months)
- An easy and fun way to rehearse basic multiplication facts
- Students who are arts inclined excelled when using this
- Takes only 4-6 mins a day – can be done any time – not a lot of set up

Improvements:

- Students require base instruction on what multiplication “looks” like
- Not demanding – just practicing facts

Overall: This activity is great for a quick rehearse before math class begins. Students can be given song lyrics to practise or use multiplication tables for help. Great way to practice facts, but not a demanding task.

April 16th, 2015

Strand – Number Sense and Numeration

Application: Geometer's Sketch Pad

Good:

- Students LOVED this application – and asked to do several activities
- Students commented that it helped them “see” fractions much more easily, and

understand what numerator and denominator represent and their relationship to each other.

The students have a much more firm grasp of fractions (as compared to other years) and are better able to represent (with computer, manipulative, and orally) fractions and compare them.

Lessons (on website) have student hand-outs and teacher notes.

Ability to work in small or large groups on leveled applications is available

Improvements:

Students must spend time working with Geometer's Sketch Pad in order to complete the activities.

Overall: This application and website is an excellent way to keep kids engaged! They can work in multi-level groups, as a whole or individually. It provides direction, but also allows students to experiment. Would work well as a small group activity center for students to rotate through. Requires little supervision once the students know how to use Geometer's Sketch Pad – and is great for introduction, review or practice of concepts.

January 20, 2015

Strand: Measurement

The first day of our measurement unit was an inquiry day, where teachers were together working in our numeracy pods. We went into my grade seven/eight classroom and gave students the following learning activities to choose from:

Choice 1:

Go to http://www.learner.org/interactives/geometry/area_volume.html

Do the activities, complete the following questions:

- When might you use volume in your life?
- What did you learn about finding the volume of a rectangular prism?
- What do you need to help you become an expert at finding the volume of an object?

Choice 2:

Work with a partner. Using 16 cubes, build different rectangular prisms and record the dimensions, surface area and volume. Describe any patterns that you notice.

Students had a chart to fill in:

Sketch	Dimensions	Surface Area	Volume
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Choice 3:

Find a partner to work with and complete the table below. Please note that you are required to find and measure **four shapes (two rectangular prisms and two other geometric shapes)** in your classroom or around the school. You are encouraged to use technology to assist you in this process. Students had a chart to fill in:

Sketch	Dimensions	Surface Area	Volume
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Choice 4:

Go to <http://illuminations.nctm.org/Activity.aspx?id=4182> or use linking cubes.

You are to create figures using 12 cubes. On the Illuminations website there is a pdf for students to work through.

Choice 5:

<http://illuminations.nctm.org/Lesson.aspx?id=2911>

Student Feedback:

Once again student feedback ranged based on the exit card with the following questions:

1. Today I learned....
2. I thought the learning activity was....
3. Today during this afternoon's math activities I felt....

Without being instructed as to what the learning goal was, students responded to number one at a rate of 75% that they learned about surface area, volume or dimensions. The learning goal was to activate thinking about the relationship between dimensions, volume and surface area. I am confident that the feedback would not be as high for an initial lesson in a strand if it were paper pencil.

Additionally, the student response to number two was that 80% of the students had fun, therefore were engaged in whatever learning activity they chose. Several students expressed in their response that although they may have had difficulty with their choice of activity they liked:

- working with partners
- the choices
- using different tools (technology and/or manipulatives) to help them work through the learning activities.

Lastly, students felt positive about the learning activity. Over 80% of the students expressed positive emotions to prompt number three on the exit card. These emotions include:

- "happy"
- "I was good at finding volume and surface area."
- "great because I understood volume and surface area."
- "excited"
- "like I accomplished something because I was the one who found out that the skinnier the prism the greater the surface area."

January 20, 2015

I felt proud of my students today. My initial thoughts on going into my classroom with other educators and five stations were not positive. I thought the whole experience might be overwhelming for my students. I was completely wrong. The students were highly engaged in the activities and appropriately challenged. They were able to take away the learning goal without being told what it was: understand the following terms - dimensions, volume, surface area.

My takeaways were:

- take greater risks in my lesson planning.
- use technology (even when I am uncomfortable) because the students are capable of figuring out the kinks.
- technology and choice certainly increase student engagement and learning.

January 2015

My students are working to solve problems. They seem to persist but are always checking to see if they are right. When I ask them what they know about math that will help them, they usually seem to think that they have never seen a similar problem - every problem is unique. They are beginning to check with one another and search for definitions on the internet, but still think that they just need the formula. They do not seem interested in learning the math behind the formula, but rather what do they need to do to get the right answer ... whether they understand it or not. Their answers are starting to move away from "the answer is ____."

May 2015

Students are really more comfortable with working through problems. They are starting to understand how to write a response that shows what they know and what math ideas/language/models they can use to solve and explain their work. They are starting to get comfortable with working through a problem and realizing that they are not going to be able to solve it the way they thought and then work through it again another way. They are more independent in problem solving and far less concerned with getting the right answer. Assessment that gives them a level for their thinking has had a profound effect on their work ... they are working to show their thinking. They ask better questions, and ask each other better questions. The discourse in the class is richer, as well as the skills being developed. They no longer think math is "hard" ... it is a problem or an idea that they need to understand, that is based on math that they already know, and they recognize it when it is integrated and when it is cross curricular. They will begin doing "math" and then realize that they are doing "math" ... and will always comment that there is math in everything!

Financial Statement:

Date	Purpose	Teacher(s)/Day Allocation	Total Expenses	Running Balance
Open Bal				\$10000.00
Oct 30/14	Meeting in Ottawa	6x249.26	1495.56	8504.44
Jan 14/15	Junior Meeting Pod at St Thomas More	3x249.26	747.78	7756.66
Jan 19/15	Intermediate Meeting at St Thomas More	2x249.26 (T. Lollar Absent)	498.52	7258.14
Feb 9/15	Intermediate Meeting at MB	3x249.26	747.78	6510.36
Feb 13/15	Junior Meeting at MB	3x249.26	747.78	5762.58
Jan 22/15	MISA Meeting Ambassador Hotel	6x249.26	1495.56	4267.02
Apr 8/15	Junior Meeting at Holy Name	4x249.26	997.04	3269.98
Apr 8/15	Andy Paquin release to train teachers	1x249.26	249.26	3020.72
Apr 27/15	Team meeting to collect/compile data at St Thomas More	.5x6x249.26	747.78	2272.94
May 11/15	Team meeting to create presentation at Holy Name	5x249.26	1246.30	1026.64
May 20/15	Final report written at Holy Name	2x249.26	498.52	528.12
May /15	Teacher release St Thomas More	1x249.26	249.26	278.86
May /15	Teacher release MB	1x249.26	249.26	29.60
May 27/15	Teacher release to finalize report	2x124.63	249.26	(219.66)

