Using Mathletics to Support Mathematics Instruction

Capstone Report Part B 1, 2 & 3

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Brumby's School Improvement Plan (SIP) for the last four consecutive years has had a goal of increasing proficient and above math scores in all grade levels (Georgia Department of Education, 2018a). Students at Brumby are consistently underperforming in math compared to other students in the district and state (Georgia Department of Education, 2018b). With a large percentage of Brumby students performing below grade level in math, a support system is needed. "A recent study illustrates how alignment between content-area learning standards and carefully selected technology uses can significantly increase math scores" (Cradler, McNabb, Freeman, & Burchett, 2002). Mathletics is an online tool that will serve as an instructional support. The program can be used for student-driven learning as well as teacher-led instruction. With online tools, students can take their learning and practice beyond the classroom. Mathletics is aligned to state and Common Core standards and allows teachers to differentiate instruction, remediate and extend students' math capabilities. Using Mathletics to support instruction is critical to raising math achievement at Brumby.

Description of Capstone Experience

Several actions were planned for the implementation of the Mathletics program. To show classroom teachers how to use the program and all its reports, assessments, and data, Mathletics provided a training session. A Mathletics wall of fame, a list of top ten classes, and a list of top ten students were also planned as visuals for students to see student and class participation and success. Pre- and post-tests were to be given to students in first through fifth grade for data collection to determine the success of the program.

A Mathletics's Wall of Fame in the math hallway kicked off the Mathletics program. When students earned a medal, a blue ribbon or gold star with the student's name and bronze

medal sticker was hung on the wall of fame and updated as students earned more bronze, silver

or gold medals. Another key step was posting a top ten Mathletics class and student list and

updating it on a biweekly basis. The top classes and students were also highlighted on the Friday

morning news. Students or classes that appeared on the Mathletics web-site's top 50 in the

country or world section also received recognition on the news. Teachers received one-on-one

instructional assistance in using the Mathletics program upon request. Finally, pre- and post-tests

were given to some classes in second through fifth grade. The data that was collected showed

increased scores from pre- to post-test, and Title I approved the purchase of the Mathletics

program for the 2019-2020 school year.

Implementation

The Capstone project consisted of three major project objectives. The first project was to

provided teachers the opportunity to learn how to use the Mathletics program comfortably to use

it confidently in the classroom. The first deviation was in the deliverable of creating meaningful

professional development workshops on how to use Mathletics. Teachers contacted the onsite

Mathletics expert with individual questions and individual tutorials were given in response to

questions.

The second Capstone project deviation was in the third project objective. All students

first through fifth grade were to be given a pre- and post-test on the same domain standard.

Students in second through fifth grade were given pre- and post-tests, but not all classes in these

grade levels were given pre and posttests. Due to the infrequency in which first-grade students

used Mathletics, the majority of first grade Mathletics time was used getting logged on and

learning how to manipulate the program. Thus, a decision was made not to give first graders a

pre- and post-test. The lack of detailed, organized record-keeping played a role in classes not all

classes taking both the pre- and post-test. The core expansion rotations schedule affected some classes form taking a pre- or post-test. Homeroom classes are on a three-week core expansion rotation. This schedule was often disrupted with special events, field trips, early release, sick days, breaks, no available technology and other unforeseen schedule conflicts. However, there was enough data collected, and the proposal deviations did not compromise the integrity of the Capstone project.

Project Outcomes

The first project objective was to provide teachers the opportunity to learn how to use the Mathletics program giving teachers the confidence needed to use the program independently in classrooms. "Technology can have the greatest impact when integrated into the curriculum to achieve clear, measurable educational objectives" (Cradler, McNabb, Freeman, & Burchett, 2002). The deliverables started with creating a needs assessment survey to determine teachers' understanding of the Mathletics program. Next, using the needs assessment, professional development workshops were to be created. Finally, teachers were to provide feedback regarding the use of Mathletics in the classroom.

The second project objective was to create a student and class incentive program to promote awareness and incite program participation. The first deliverable was to announce weekly on the Friday news the top three Mathletics students and classes. The second deliverable was to create a way to show student achievements and display individually earned medals. The last deliverable in the second objective was to create a class of the month or top ten class poster to promote Mathletics use school-wide.

The third project objective stated that all students in first through fifth grade would be given a pre- and post-test on the same domain standard. A workshop would be offered to show

teachers how to use data to cater Mathletics program to individual student needs using the data. The deliverables were to give students pre and posttest, show teachers how to access class data on the Mathletics program and instruct teachers on how to use the data to individualize student Mathletics programs.

Barriers Encountered

Several barriers were faced in the execution of this project. The first was time. The core expansion classes take place during grade level planning periods. Workshop implementations were not possible unless a substitute was provided for the day. Time was also a factor in administering pre and posttests. The pre- or post-test often took longer than one core expansion period. Thus, only one of the two classes could be tested in one day. Going through class and student data to update student and class achievements was very time-consuming. To overcome the obstacle of time, individual tutorial sessions were provided for interested teachers. Student progress was updated on core expansion math day or when volunteers came to help, and class progress was updated biweekly.

The second challenge was keeping organized data on pre and posttests for all 28 classes second through fifth grade. To overcome this obstacle, grade level files were created with pre and posttest checklists and attached was the common domain and standard. Classes that missed a pre- or post-test were assigned the pre- or post-test and this was available for them to do in their classroom or at home.

The final challenge was trying to get all classroom teachers to participate in the use of the Mathletics program. To overcome this obstacle, the Mathletics program was made prevalent throughout the school. A Mathletics Wall of Fame was created, and all students who earned a bronze, silver, or gold medal had a trophy displayed on the wall. The Wall of Fame encouraged

students to participate in the program. The administration promoted the program by highlighting the top students on the school news and visiting classes with outstanding Mathletics performance.

Follow-Up

The Mathletics program was approved and funded by Title I. After analyzing the data from this Capstone project, it was determined that Mathletics was a beneficial support program, and it was approved for the 2019-2020 school year. Therefore, the follow-up will be improving the Capstone project and revisiting the project deviations. To support teachers and encourage them to use the Mathletics program in their classrooms, Title I has also approved funding for Mathletics workshops. The onsite Mathletics expert will be provided a substitute to deliver workshops during grade level planning. To avoid future deviations from the implementation plan, a calendar of pre and posttests will be created, and grade level files will continue being used. The incentive wall of fame was successful and will be put in place again. A student volunteer will be used to support the updating of student and class achievements. Students, teachers and classrooms were able to use Mathletics to support math instruction, and students were excited about math. A report from The Alliance for Excellent Education and the Stanford Center for Opportunity Policy in Education (SCOPE) finds that technology-when implemented properly-can produce significant gains in student achievement and boost engagement, particularly among students most at risk (Darling-Hammond, Goldman, & Zielezinski, 2014).

Discussion and Reflection

During the implementation of the capstone project, several lessons were learned about being a leader in technology integration, teaching, learning and assessment. Designing or implementing meaningful and intentional content is important. Working on this capstone, I

learned the benefits of individualized learning based on the needs of students. I also learned how technology could be used to support students and increase engagement and achievement (Darling-Hammond, Goldman, & Zielezinski, 2014).

The capstone addressed three PSC standards. I used knowledge, skills, and dispositions required of an effective technology facilitator to meet the needs of these standards successfully. Addressed below are the key elements:

- *2.5 **Differentiation** Candidates model and facilitate the design and implementation of technology-enhanced learning experiences making appropriate use of differentiation, including adjusting content, process, product and learning environment based upon analysis of learner characteristics, including readiness levels, interests, and personal goals* (Georgia Professional Standards Commission, 2010).

The design of the lessons enabled students to work at their own pace, on their strengths and areas of improvement. Being knowledgeable about personalized learning principles was key in developing this project. The lessons are based on individual learner needs and personal goals. This project requires the skills of a technology leader as one must be able to facilitate, troubleshoot, and teach students and teachers.

- *2.7 **Assessment** Candidates model and facilitate the effective use of diagnostic, formative, and summative assessments to measure student learning and technology literacy, including the use of digital assessment tools and resources* (Georgia Professional Standards Commission, 2010).

The capstone project has multiple opportunities for diagnostic, formative assessments, and the Mathletics program has built-in summative assessments. The digital assessment tools can be shared with students, parents, teachers and other stakeholders.

*2.8 **Data Analysis** Candidates model and facilitate the effective use of digital tools and resources to systematically collect and analyze student achievement data, interpret results, communicate findings and implement appropriate interventions to improve instructional practice and maximize student learning.* (Georgia Professional Standards Commission, 2010).

Data gathering and analysis were instrumental in determining the effectiveness of the Mathletics program at Brumby. Having a disposition of organization and communication while using skills to collect and analyze student data systematically is critical. I had to present the data to the school administration at least twice a year and shared the data with teachers regularly.

The capstone provided me with useful insight. The strength of the capstone was the number of students that were involved, the student engagement, and the overall increase in math scores school-wide. To make the capstone better, I would have had students use technology to document learning goals and collect their pre- and post-test data. Another suggestion to make this project more meaningful would be assessing all second through fifth graders with pre- and post-tests. This data can be compared and used to analyze the Mathletics data with the EOG data. Overall, the program was a success and will be carried out another year. The recommended improvements will be made, and ongoing reflections will drive adjustments to the program to meet the needs of our students.

What advice or recommendations would you give to others who might attempt to address a similar need/problem/question?

Others who might attempt to use Mathletics in a school setting need to be sure that the exceptions for the program are clearly laid out for the teachers, students, and parents. Training a few other teachers who could help with administering the assessments and analyzing the data would be helpful and save time. To increase the involvement of classroom teachers with

consistently using Mathletics, I would provide some incentives for the teachers that have their students using the program, like small gift cards and recognition on the news. Using Mathletics in elementary schools to increase math achievement has great potential but would have a higher participation rate with a strong team of teachers implementing and encouraging the use of the program.

References

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