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Mastery Learning in Action: One District's Journey Toward the Continuous Improvement of Assessment Practices to Positively Impact Student Learning

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MASTERY LEARNING IN ACTION:

One District's Journey Toward the Continuous Improvement of
Assessment Practices to Positively Impact Student Learning

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and Stephanie Zee (*Educational Leadership*)

STUDENT AUTHOR BIO SKETCHES

Michael Carpenter, Justin Rentschler, and Stephanie Zee are currently graduate students in Purdue University Fort Wayne's Educational Leadership master's degree program. During the course of their final year, these graduate students are working with Dr. Laura Link as she facilitates district-wide Mastery Learning pilots with Southwest Allen County Schools in Fort Wayne, Indiana. The graduate students collected, organized, and analyzed student survey and assessment data; developed visual representations of the data; and generated reports for teachers, building administrators, and district-level leaders. In addition, graduate students created training materials to support the pilot. Mike Carpenter also participated in the pilot program with his fifth grade high-ability students. All graduate students aim to assume roles as school leaders, or principals, after graduation, where they plan to put their knowledge of Mastery Learning into action. The purpose of this service-learning research study is to investigate K–12 students' classroom assessment and affective outcomes as their teachers implement Benjamin Bloom's Mastery Learning instructional process.

INTRODUCTION AND BACKGROUND

In the last year, Southwest Allen County Schools (SACS) instituted a "Portrait of a Graduate" vision in their community. This vision provides all stakeholders with information on the skills graduates from SACS will possess at the end of their senior year of high school. To accomplish this, SACS wanted to examine how well the teaching, learning, and reporting of learning aligned. One aspect of this process was to examine how well report cards were communicating student learning and progress to parents and students. To achieve this goal, SACS collected survey data from a variety of community members that evaluated their understanding of the meaning of grades. Survey data revealed that parents, teachers, administrators, and central office staff disagreed on the meaning of grades at all levels. The discovery of this misalignment led district leaders to pursue

strategies that ensure greater alignment in what students are learning to the grades that are on students' report cards. Under the guidance of Drs. Link and Guskey, we partnered with SACS to facilitate the pilot of Benjamin Bloom's Mastery Learning instructional process in order to increase student learning and develop new ways to deliver on the promises described by the Portrait of a Graduate vision. Mastery Learning allows teachers to meet the individual learning needs of all students, in turn improving student learning and confidence. The use of this method also provides teachers with a framework to align instruction and assessments, ultimately leading to greater transparency and clarity on student report cards.

In our course work with Dr. Laura J. Link at Purdue Fort Wayne, we learned about Benjamin Bloom's Mastery Learning teaching method and its ability to improve student learning. Through this course, we met Dr.

Figure 1. The Mastery Learning Instructional Process. Reprinted from T. R. Guskey (2015), *International Encyclopedia of the Social & Behavioral Sciences* (p. 754). Oxford: Elsevier. Copyright [2015] by Elsevier Ltd.

Thomas R. Guskey, from the University of Louisville and an authority on Mastery Learning, and were invited to assist in a pilot program as junior researchers. When provided with an opportunity to partner in the facilitation and implementation of Mastery Learning at SACS, we felt that this was an important opportunity for us personally and professionally. In addition, as a teacher in the SACS district, Mike participated in the Mastery Learning pilot, providing him a unique insight into the process.

The purpose of this service-learning research was to improve student learning and confidence and to increase the clarity regarding the meaning of grades in order to achieve the goals set out in the Portrait of a Graduate vision. Because of this, we aimed to investigate K–12 students’ classroom assessment and confidence levels as their teachers implement Benjamin Bloom’s Mastery Learning instructional process. Implementation of Mastery Learning has had consistently positive effects on student learning and achievement, student participation in classroom activities, and students’ confidence levels (Guskey & Pigott, 1988). Throughout implementation, we found that Mastery Learning achieved these outcomes. However, results varied on the role Mastery Learning played in influencing students’ confidence levels because of the limited amount of time this study took place. While the data we collected did not directly show an improvement in students’ confidence, conversations with students revealed that they found Mastery Learning impactful in the classroom.

Researcher John B. Carroll (Carroll & Spearritt 1967) believed that learning is a function of the time an individual student spends on learning course objectives in relation to the amount of time the student needs to master those objectives. In other words, when students are given enough time to learn the material, nearly all students can learn well (Bloom, 1968). Mastery Learning provides students with the time needed to learn course material. It also requires teachers to provide meaningful and timely feedback to students along with additional

instruction focused on meeting individual student needs (Guskey, 2015). In a Mastery Learning instructional unit, teachers provide high-quality instruction to all students, which culminates in a Formative Assessment A (Figure 1), a test that measures students’ understanding of course concepts after teachers’ initial instruction. This first assessment provides information to teachers and students about what has been learned well and areas where students need additional instruction. Based on students’ performance on the first assessment, students then complete enrichment or corrective activities. Students who have demonstrated that they have learned the information well, or in other words have shown mastery of the content, are given enrichment activities, which are designed to extend student thinking beyond unit objectives. Students who still have objectives they need to work on will complete correctives, which are activities focused on helping students learn the course objectives that they did not show an understanding of on the first assessment. During this time, teachers provide additional instruction based on students’ individual learning needs. Once these activities and instruction are complete, students take a parallel Formative Assessment B to measure students’ current level of learning in relation to unit objectives (Figure 1). This means that students take a second test, which is similar but not identical to the first test, to measure changes in student learning.

METHODOLOGY

This project served students and teachers at Southwest Allen County Schools (SACS), a suburban school district in Fort Wayne, Indiana. A total of 118 teachers from a variety of grade levels and subject areas across the district volunteered to receive training and pilot Mastery Learning in their classrooms. As a result, 4,840 out of a total of 7,471 K–12 students were directly affected by this pilot.

The Mastery Learning Pilot began with a survey of community stakeholders in order to gauge understanding of the meaning of grades. Surveys revealed a misalignment

in the understanding of grades, such as discrepancies in the importance of providing information to students about their learning progress. School leaders found this more important than parents and district leaders. This revealed a need for further exploration of the purpose of grades and the alignment of teachers' instruction and assessments. In response, SACS partnered with Drs. Link and Guskey to facilitate the implementation of a Mastery Learning Pilot.

Based on SACS's vision, we created training tools by partnering with another local district who had implemented a similar Mastery Learning Pilot the previous year. We developed training videos, which included successes, challenges, and recommendations from teachers who had successfully implemented Mastery Learning. We also created questions to facilitate discussion among teachers and a template to begin planning Mastery Learning units. Drs. Link and Guskey used the training materials to assist teachers in the understanding and use of Mastery Learning in the classroom.

We used four questions to evaluate the impact of Mastery Learning on SACS:

1. Does the percent of students reaching mastery increase from Formative A to Formative B assessments?
2. Does the percent of students reaching mastery increase over instructional units?
3. Do students' pre-pilot surveys differ from beginning to end (pre-pilot versus post-pilot)?
4. Is alignment in content, format, and level of difficulty improving over time?

These questions were used to guide the creation of surveys and collection and analysis of data, and to measure the success of the Mastery Learning pilot.

Teachers in the pilot participated in two days of training over the summer with Dr. Link and Dr. Guskey in order to learn about the Mastery Learning instructional process. From this training, teachers were required to create three units of instruction that included assessments, correctives, and enrichment. These units were submitted to building principals as well as Dr. Link and Dr. Guskey for feedback and review prior to implementation.

When the fall semester began and prior to implementation of Mastery Learning units, pilot teachers from grades 6–12 administered pre-pilot surveys to participating students in Qualtrics, a data collection, analysis, and reporting platform. The purpose of these surveys

was to gather a baseline measure of students' confidence levels. Once pre-pilot surveys were administered, teachers implemented their Mastery Learning units. After the first assessment in each unit, an additional survey recorded whether students believed that the assessment reflected the content students learned, the type of questions asked, and the perceived level of difficulty. After the surveys were completed, we created individual teacher reports. In his role as the liaison between our team and the district, Mike Carpenter sent these reports to teachers. If the report revealed a misalignment between instruction and assessment, pilot teachers were expected to use the data to inform changes in future instruction and assessments. Once all Mastery Learning units were complete, teachers administered a post-pilot survey in Qualtrics, which measured students' confidence levels in their academic performance.

Throughout the pilot, teachers collected assessment data for each class in the pilot. Teachers reported the number of students showing mastery on the first and second assessment. At the end of the fall semester, all pilot teachers (K–12) reported the number of students achieving mastery on the first and second assessment. Teachers reported data for all Mastery Learning units completed, but only data from the first three units were used in the analysis to ensure the amount of data collected and analyzed was consistent between participants. We analyzed pre-/post-assessment survey data to determine if trends were present. To analyze the data, Justin developed a template, which generated visual data displays. We then compiled data using the template to create reports for individual teachers, building leaders, and district leaders. Stephanie created a template to display the reports and to ensure consistency in reporting between all researchers. Reports were compiled by grade level (K–2, 3–5, 6–8, 9–12), by subject area, and by individual building. Additional reports were generated for the elementary, secondary, and district levels.

RESULTS

A total of 4,840 K–12 students participated in the Mastery Learning Pilot. A total of 117 out of 118 teachers participating in the Mastery Learning Pilot demonstrated an increase in student mastery. When comparing student mastery on the first assessment to the second assessment across the district, student growth (K–12) increased 17% overall (Figure 2).

Research question two compares and evaluates the percentage of students reaching mastery from the initial first assessment to the final first assessment given. Data revealed a disparity in the increase of students reaching

Mastery A, A/B & Average Growth (K-12)

Figure 2. Average growth in mastery from first assessment (A) to second assessment (A/B).

Figure 3. Mastery of instructional units on the first assessment (Formative A).

mastery on the first assessment across instructional units. When comparing the number of students reaching mastery from the initial first assessment to the final first assessment, grades K–2 showed a 1% increase in mastery, grades 3–5 showed a 7% increase, and grades 6–8 showed a 2% increase (Figure 3). However, grades 9–12 showed a 19% decrease in mastery on the first assessment across instructional units (Figure 3).

In comparing students' pre- and post-pilot survey data regarding students' confidence levels, data revealed

differences between students in grades 6–8 and students in grades 9–12. Students in grades 6–8 reported increased confidence in their ability to get rid of self-doubt, to keep trying even when course concepts get confusing, to stop themselves from worrying about upcoming assessments, and to stay focused after receiving a low or failing grade (Table 1). Conversely, students in grades 9–12 reported decreased confidence in their ability to keep low grades from getting them down, to stay positive after failing an assessment, to stay focused on learning instead of grades, and to stop

Table 1. Percent increase/decrease in confidence levels from pre-pilot to post-pilot.

Questions	MS	HS
Can I keep low grades from getting me down?	-2.8%	-4.7%
Can I stay positive after failing an assessment?	-1.0%	-2.1%
Can I get rid of self-doubt?	1.1%	-1.2%
Can I keep trying even when it gets confusing?	0.3%	-4.5%
Can I stop worrying about upcoming assessments?	1.7%	-0.7%
Can I stay focused on learning instead of grades?	-2.3%	-1.4%
Can I stay focused after receiving a low or failing grade?	0.6%	-1.2%
Can I stop myself from being upset by low/failing grades?	-0.6%	-0.7%

themselves from being upset by a low or failing grade (Table 1). Students in grades 9–12 reported decreased confidence from pre- to post-pilot surveys on all questions (Table 1).

In comparing students' survey data collected after each first assessment was administered, there was a discrepancy in outcomes between grades 6–8 and grades 9–12 when comparing the initial first assessment to the final first assessment survey results. Students in grades 6–8 reported improvement in their perceptions of the alignment of the content and the type of questions asked on assessments administered in Mastery Learning units (Table 2). Students in grades 9–12 reported perceptions that content and question type were less aligned to assessments administered in Mastery Learning units (Table 2). Students in grades 6–12 reported perceptions that assessments were more challenging than expected (Table 2).

Table 2. Percent increase/decrease in assessment content, format, and difficulty level.

Questions	MS	HS
Did this assessment include content covered in class?	4.4%	-2.1%
Did this assessment include similar problems or questions as covered in class?	5.6%	-3.5%
Was this assessment harder or easier than you thought it would be?	2.8%	4.0%

K-12 COMMUNITY IMPACT

Of the 118 participating teachers, 117 teachers demonstrated that Mastery Learning had a direct and positive impact on student learning. Pilot teachers represented all subject areas, grade levels, and student ability levels, showing that Mastery Learning can be implemented successfully in every classroom. Additionally, data revealed that 17% more students mastered course content as a result of the Mastery Learning instructional process. Without the Mastery Learning Pilot, these students would not have achieved the same levels of learning. From this data, we can conclude that the alignment of instruction, assessments, and reporting practices benefits students, teachers, parents, and the local community. This has larger implications for student success after high school because students will be more prepared to successfully enter the workforce or attend college. This helps to address a need that has been identified by Indiana legislators and the local business community.

In addition, Mike experienced a change in the attitude and mindset of his students. Mike's class includes the

Figure 4. A student works on an enrichment activity after mastering unit objectives.

only self-contained high-ability program in the district, which is a program that identifies students who have the ability and/or aptitude to achieve at high academic levels. Because Mike's students tend to be highly competitive and results driven, traditional learning can often produce feelings of anxiety and fear of making mistakes. As a result of Mastery Learning, Mike noticed that his students are much more willing to persist in the face of academic challenges, and they are more receptive to using feedback to further their understanding of course objectives. Additionally, in a follow-up student panel discussion with the SACS superintendent, high school students reported that Mastery Learning improved their attitude towards learning, helped them be more open minded, and increased their readiness to learn. While students self-reported positive changes in their attitude towards learning, the data revealed mixed results.

As a result of this pilot, teachers and administrators began talking about the instructional process in new ways, moving the focus from what the teacher taught to what the students are learning. For example, Mike reported that this process required him to critically analyze his instructional practices through use of the assessment data. Mike and the other high-ability fifth grade teacher compared results from each assessment to determine areas of need to drive future instruction. Through this, teachers were able to experience the impact of data. The pilot data was shared and was able to inspire teachers who did not

participate in the pilot to examine their instructional practices to improve student learning.

District leaders reported positive parent feedback as a result of the Mastery Learning efforts. Parents were requesting for their students to be placed in classes of teachers implementing Mastery Learning. Parents and students saw the benefits of the additional time and instruction embedded in the Mastery Learning instructional method, and they could see the tangible impact on student learning. Additionally, this pilot inspired districtwide change in the design of the elementary report card, clarifying the meaning of grades for parents and students. Because parents and students know what these grades mean, they are provided with more information on what students know and need to improve on. This allows students to take ownership of their learning and continue progress towards the Portrait of a Graduate vision. This will provide students with the skills that they need to be successful after graduation.

Because this was a pilot program, students were not experiencing Mastery Learning in all class periods throughout their entire day. This could have played a role in the disparity between students self-reported beliefs and the survey data, as it is possible that student were completing the survey based on their beliefs beyond classrooms specifically implementing Mastery Learning. It is also difficult to determine if pre- and post-pilot surveys, which recorded these beliefs, were given directly

Figure 5. Mike Carpenter and his partner teacher, Sarah Kruckeberg, comparing formative assessment data.

before and after implementation of Mastery Learning units. If they were not given at the appropriate time, it is difficult to determine if the survey data accurately reflects the influence that Mastery Learning had on students' beliefs about their grades and learning.

To continue our work with SACS, teachers who participated in the Mastery Learning pilot in the fall semester were asked to continue the pilot throughout the entirety of the spring semester. Additional training was provided for pilot teachers, including the creation of a Table of Specifications, a tool used to align objectives, instruction, and assessment, in order to ensure greater alignment between instruction and assessment. Teachers were required to submit Tables of Specification along with first and second assessments to building administrators for feedback. In addition, teachers received continued support and feedback from administration throughout the semester using common and specific evaluation criteria. We continued to monitor assessment and survey data. At the end of the spring semester, we compiled data and generated reports for teachers, building leaders, and district leaders.

STUDENT IMPACT

This experience provided us with an insight into the principal's role in implementing, monitoring, and supporting a districtwide vision. We were able to see the importance of the principal providing the resources and feedback to support teachers throughout the entire implementation process. Principals must also check in with teachers regularly to monitor teachers' progress and determine what supports are needed. In order for change to occur and be sustained, teachers must also be provided the time to meet in professional learning communities throughout the implementation process to collaborate with peers, review student data, and share successes and challenges. As aspiring principals, this opportunity provided us with firsthand experience on how a principal can impact student learning. We believe providing instructional leadership is an important role for a principal. We were able to connect the learning from our graduate coursework to the application of instructional initiatives that impact student learning.

As a research team, we all brought our own experiences and expectations to this research effort. We each teach in different school districts in the area, and we brought with us our own views on instructional leadership through experiences in our respective schools. During this service-learning initiative, we utilized each other's strengths to enhance the research process. For example, Stephanie had gone through a similar pilot process in the previous year,

which provided us a deeper understanding of successes and challenges that come with implementing a Mastery Learning pilot. Justin also used his experience in collecting, sorting, and analyzing data to provide the results in format that could be used by SACS. As a result, we were able to see how a team of individuals works together towards a common goal and vision. As future principals, we understand the importance of creating teams possessing various skills and experiences to provide the greatest positive impact on student outcomes. It is important for a building leader to be able to identify teachers' strengths and use them to contribute to the overall goals of the school.

CONCLUSION

Our work in helping to implement Mastery Learning had a lasting impact not only on us as future principals but also on the students and teachers at SACS. We were able to grow in our understanding of leadership and its role in effectively providing support for teachers to increase student learning in their classroom. We also saw growth in student and teacher learning as a result of our efforts. We wrote this article because we believe that leaders have to power to positively influence student learning outcomes and confidence levels. We believe that the strategic use of assessment data to drive future instructional practices, like those present in the Mastery Learning teaching method, is critical to meet the needs of every student.

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