

Formative Assessment

Providing multiple opportunities for practice to my students and checking for understanding during the learning process is an important aspect that needs to take place in my classroom. According to McMillan (2011), formative assessments are what teachers use when they want to obtain information about student understanding during instruction and provide feedback that helps students learn. The sole purpose of formative assessment is to improve student motivation and learning. It is a major part of any classroom that encompasses anything from statewide accountability tests, to informal tests, to even metacognition strategies. (Garrison & Ehringhaus, 2011). In order to ensure success in my classroom, it is necessary that I provide my students with different types of assessments to enhance their opportunity for success. In addition, I provide them with quick, constructive feedback to increase their skills and understanding of the material. Formative assessments encompass a variety of tools that are helpful in assessing student's strengths and weaknesses. Along with this, they help me as the teacher recognize where my students are struggling and figure out ways to address the problems immediately.

In my math classes, one of the best ways to ensure that I have provided multiple opportunities for success is to offer my students with different types of formative assessments as a way of measuring their progress. I make frequent, interactive assessments of student understanding as well as the traditional quizzes in my classroom to that help me to gauge how my students are faring on a daily basis (Looney & Istance, 2005). By incorporating formative assessments into my daily classroom practice, I am able to gather the information needed to adjust my teaching, as well as get feedback on how well students understand the material. Formative assessments provide students with the ability to practice while they are learning, and

do not always hold them accountable in grade book fashion for the skills and concepts they are being introduced to (Garrison & Ehringhaus, 2011). These types of assessments help to determine what steps of the learning process I can move on to and which steps I need to review a few more times. Along with this, it helps me as the teacher reflect on my teaching and make adjustments as needed.

Formal and Informal

There are many examples of formative assessment that I can use regularly with students in my mathematics classroom. Providing students with a traditional-type assessment (i.e., homework worksheets, tests, quizzes) is one way I can provide opportunity for success to my students. Homework, quizzes, and tests are used “both to check student understanding and extend and solidify their understanding and application of knowledge and skills” (McMillan, 2011, p. 135). In the 10th grade math class I taught while student teaching, when assessing my students it was essential I gave them traditional quizzes that reflected the material learned throughout the lesson. The assessments needed to allow for practice in order for my students to become successful with the material, and provided my students with quick feedback so they could see how well they understood the topic.

One way I accomplished this was with a topic about midpoint. After teaching a lesson on midpoint, I gave the students a [quiz](#) that assessed the concept of midpoint and the discrete skills needed in order to solve a problems including midpoint. I made sure that my quiz only covered information on midpoint and gave a couple different types of problems the students would have to solve to show their understand of the concept. The quiz ended up being very beneficial. I was able to see what the students understood about midpoint and what needed to be worked on. In

one particular class, I noticed that while most of the class excelled with the first few problems, when it came to answering the last question they lacked the ability. A majority of the students got the last two problems wrong. When I asked them why, they told me it was because they were unsure of the steps to take to answer it. This helped me to reflect on my own teaching and I decided that I may have not taught that particular topic in a way that my students understand. As a result of the quiz, I made sure to go over those problems the next day in class and explained to the students the process needed to solve them. I also thought about the way I had originally taught my students how to answer those questions to try and figure out why they were confused and I could I change my approach for the next time I taught that subject. I determined that when I taught it, I told the students two different ways in which they could find the answer. One way was a “short cut” and the other was the long way. I think I had pushed the short cut in hopes that all the students would understand it better. In reality, they needed to learn the long way first because they could understand the short cut.

While students are familiar with traditional assessments, being able to provide them with high quality performance assessments as well can increase their motivation and keep them engaged. While traditional assessments have been used effectively for many years to assess knowledge and understanding, there is greater emphasis on reasoning and being able to apply learning to situations more like real life (McMillan, 2011). When I provide students with high quality performance assessments, I am requiring them to show me what they can do, rather than just telling me what they know or would do. Through these types of assessments, students are using their ability to perform tasks and producing their own work with their own knowledge and skills.

I created [this performance assessment](#) in one of my classes at Marist. I would give it to students in my geometry class. My students would use their knowledge of Three-Dimensional shapes to determine the cheapest way to build a pool in their back yard. When giving an assessment like this, it would be necessary I provide my students with a step-by-step guide which explains what I expect from them. This assessment would be beneficial to use in my classroom because it allows students to recognize how geometry can be applied to the real world. With this assessment, students are also able to take the different figures they learned about all year and apply different formulas to those figures. In order to grade this assessment I would use [this rubric](#). I would also make sure my students see the rubric ahead of time so they know what my expectations are.

Another tool that I use for a quick check on student understanding is exit slips. Exit slips offer students the opportunity to ruminate over and question what has been discussed in class that day, and provide them with the ability to capture different ideas as they occur (Leigh, 2012). Exit slips are used at the end of a lesson and can take many different forms. They can be done verbally or written down on paper and can contain questions varying from reflective questions, to problem solving questions, to vocabulary questions.

In the geometry class I taught last year during a leave replacement, I used exit slips regularly to ensure my students understood the concepts I taught them and were reflecting on their learning. I provided my students with several different types of exit slips. I remember in particular when I taught them about writing equations of lines I provide them with this [exit slip](#) because I knew the topic was new to them and it had many different parts that could get confusing. I used this reflective exit slip to determine if any of parts of the lesson were giving students a challenging time. This provided me with feedback to help guide the class discussion

the next day. When I used this reflective exit slip on writing equations of lines, I noticed many students were struggling with when to use the point-slope formula vs. when to use the slope-intercept formula. The next day, I reviewed the topic with the class and made sure the students understood the differences better.

Along with a reflective exit slip, another type I would consistently use in my future classrooms would be [exit slips](#) in which students have to solve problems similar to one they had just learned in class. This type of exit slips allows me to see if students are grasping the concept and also tells me if there are any misconceptions or common mistakes being made throughout the class. In my future classes, I will try to provide exit slips on a weekly basis to get my students into a routine. I will look at the exit slips at the end of the week and decide how to grade them depending on the class.

Another way to use formative assessment in the classroom is through classroom response systems. McMillan (2011) refers to using technology in a classroom and how it allows students to anonymously submit answers to their teacher immediately during class. While I was doing a leave replacement, since I did not have a class set of clickers, I used other ways with my students that mimic the idea of the clickers. For example, in an Algebra AIS classroom, I used whiteboards where students could answer problems and hold up their answers for me to see. Since it was the end of the year, we were focused on reviewing for the Regents and doing practice problems in order to prepare for the regents in June. Usually, the students would work on 15 problems individually and then we would go over them, but I noticed the students were beginning to just circle answers and wait to get the final answer when we went over them as a class. I decided to give each student a whiteboard for them to use when doing the regents review packet. I told the students that we would be taking the packet one question at a time and the

students would individually write their answers (and show their work) to each question on the whiteboard and then everyone would hold up their answers. Since the class was small, the students were very comfortable with each other and not too worried about if they got the answer wrong. When the students held up their answers, if I saw a student was right I told them they were correct and they could put their board down. If a student was incorrect, I told them to try again and they did. If I noticed a majority of the class got an answer wrong, I stopped and went over the question with the entire group so they understood what the correct answer was. With this method, I could quickly see who was getting the answers correct and who seemed to be struggling. Based off the different answers I saw, I was also able to lead discussions on common mistakes and used incorrect answers as teachable moments where I discussed with the students why certain answers could not be correct.

When using the whiteboards, I will always need to be careful students aren't seeing how their peers are answering the questions and copying their answers. When I used this method in the AIS class, I just had students put up the boards as soon as they had an answer. I would consider giving a cue to my students when they all can hold their boards up at the same time to prevent students from seeing each other's answers. Another way of avoiding copying could be to have students hold the boards up to their chest as opposed to in the air. In addition to this, I will have to make sure my students all feel comfortable holding up their answers for their classmates to see.

Metacognition

An important aspect of formative assessment is involving students in the learning process. A major distinction of formative assessment is student involvement (Garrison &

Ehringhaus, 2011). It is important to provide students with choice so they are more motivated to learn because it is something they have suggested. With this, students are able to be involved in their own learning. By allowing my students to do this, they are able to take ownership of their work which in turn increases their motivation.

Reflective essays are one way I could allow my future students to be involved in the learning process. Reflective essays allow students to think about concepts they just learned and connect the concept to their lives outside of the classroom. Through reflective essays, students can also write down things they enjoyed about the lessons as well as some things they struggled with. Reflective writing allows students to express their own views on an experience and fosters metacognition (Hampton, n.d). An advantage of a reflective essay is that students are able to look back on lessons and think about the things they enjoyed and the things they would not want to do again if given the choice. It helps them to learn and provides them with the opportunity to communicate their insights to others (Hampton, n.d). Along with this, it helps me to see what students are getting out of my class and whether or not there are aspects that need to be improved.

If I was going to give my students the opportunity to write a reflective essay in my math class, I would ask them to write down their feelings about a particular concept they just learned and how they could connect the concept to something other than mathematics. This is a way for me to see what the students found challenging during my lesson, what they found useful, and how they could make connections with topics other than math. I also think it would be beneficial to provide them with a reflective essay at the end of the school year in which they can reflect on the entire year. For example, giving my students a reflective essay [like this](#) I would ask for their opinions on how they feel they did throughout the year and their input on how I could improve

the lesson to better my instruction for next year. By having the students complete a reflective essay, I would be able to get their feelings about the topic and hopefully use the information to adapt the unit for the next time I teach it.

An informal formative assessment I use to involve students and fosters metacognition is the thumbs up/thumbs down strategy. This technique allows me to make sure my students are assessing their own work, are thinking, and gives them the opportunity to express to me how they are feeling about the particular topic (Scott, 2000). The thumbs up/thumbs down method can be used in a variety of ways, it can be used to see if students understand the material or for students to answer true/false questions. Another variation of the thumbs up/thumbs down method would be the “first-to-five” method where I ask my students a question with multiple choice options and the students hold up their fingers to indicate the number of the correct response. I used all of these methods in my student teaching placements to reinforce student understanding.

In my 10th grade geometry class where I student taught, it became routine for my students to use the thumbs up/thumbs down strategy to ensure they were following along with the topic and not feeling lost or confused. For example, when my students needed to find the surface area of a particular shape, I gave the students a few minutes to figure out the answer. Then, one student would raise their hand and state the answer. I proceeded to tell the class “thumbs up, thumbs down” and the rest of the class would put their thumbs up if they agreed or thumbs down if they disagreed. I could then tell them if the answer was correct and the students could get immediate reinforcement. I used the thumbs up/thumbs down method to improve the learning of my students. I remember there was one student in particular who was consistently putting his thumb down. I spoke to this student after class in the beginning weeks of school and discussed why he felt he kept getting the answers wrong. He told me that although he was trying his best,

the material was just very challenging for him and he thought that if he could spend some extra time learning the material he would have a better understanding of it. I discussed this with another 10th grade Geometry teacher who I collaborated with on a daily basis. We decided we would offer this student the opportunity to sit in on her class the period after mine if he felt he was struggling that day. The student was thrilled with the opportunity and for several weeks when he felt he was struggling he stayed for two periods of class. Soon enough he was putting his thumb up more than he was putting his thumb down.

When thinking back about the thumbs up/thumbs down strategy, I should be careful about students who are afraid to get the wrong answer. It is not always easy to tell if some students are just giving the thumbs up so they can move on to the next topic. Some of them may not be comfortable allowing the entire class to see if they got the answer right or wrong. To better improve on this strategy, I could have students close their eyes when showing their results, this way no one feels embarrassed, or I could tell students to put their thumbs up/thumbs down in front of their chest or under their chin so no one else could see.

Feedback

Another important part of formative assessment is involving students in their own assessment process by providing them with feedback as they learn. Feedback is the transfer of information from the teacher to the student following an assessment (McMillan, 2011). Formative feedback “represents information communicated to the learner that is intended to modify the learners thinking or behavior for the purpose of improving the learning (Shute, 2007). When delivered correctly, formative feedback can improve the learning process and can increase student knowledge, skills, and understanding of the material they are learning. Providing

students with descriptive feedback pushes them forward in their learning and provides them with an understanding of what they are doing well and what they need to work on (Garrison & Ehringhaus, 2011). Feedback is helpful when it is given frequently and descriptively and focuses on progress, key errors, and effort attributions.

In my classroom, it is necessary I provide my students with descriptive feedback to help them develop self-reflective skills and self-assess their work (Scott, 2000). The feedback I give my students helps them to see if they are on track and understanding the full concept of the material. For all the assessments I mentioned above, I would provide effective feedback to my students in order to communicate with them how they did on the assessment so they could understand what they did well and what they need to work on. When I give a traditional assessment, if it is one that is collected it is best that I return the assessment within the next few days. After I hand back the assessments, I would spend time going over the answers with the students to ensure they do not have any questions or concerns regarding the feedback on their paper. On certain assessments, such as this [quick quiz](#) on the formulas my geometry students had learned during a previous unit, I could allow students to switch papers with the person next to them this way they could have immediate reinforcement. I would go over the correct answers with the class and each student would mark what answers were correct or incorrect and then gave the quizzes back to the correct student so they could see how they did. After the quiz, the students would hand it up to me so I could record the grades.

When given the opportunity to create assessments for my students such as authentic assessments or reflective essays, the best thing I could do for them is provide an analytic rubric that I would use to grade their work. I have not had the opportunity to do this, but I have had the opportunity to create several rubrics I would use for an authentic assessment. I created this [rubric](#)

to go along with a [WebQuest](#) I created for a Statistics class. In order to grade the WebQuest, I would use this exact rubric and I would make sure students receive it so they know the specific standards that need to be met. Rubrics are designed to clarify, communicate, and assess performance of students (Scott, 2000). Rubrics like these are grading tools that contain specific information, as well as, lay out the expectations for my students. By using an analytic rubric to grade projects, I am able to provide specific feedback while giving my students a detailed analysis of their performance. These rubrics would allow my students to see my expectations for the project and know exactly what they need to do in order to get an appropriate grade. After they completed the projects, I would fill out the rubric and return them to the students so they could see immediately how they did on the project, what aspects they excelled in, and where they may have lost a few points.

A great thing I could do when creating a rubric is allow my students to have some input on the rubric itself. Listening to what students feel should be an important requirement for a project is a great way to get an idea of what they find significant and what they think is trivial. By sharing and discussing the contents that would go in the rubric with my students, it would engage them and get them interested in earning a good grade. This is where student involvement comes into play and this is a great way to make students a part of their learning process.

Another type of feedback I want to include in my future classroom is peer feedback in which students can use their peers as resources. Peer feedback is when students offer each other advice about their work by discussing what has been done well, what still needs to be done, and advice on how to achieve that improvement (Assessment for learning, n.d). In my future math classroom, I would use peer feedback as another way to communicate understanding and success to students. When students have to complete writing in my classroom such as this [reflective](#)

[essay](#), or [this problem](#) where they have to explain the steps, they could use each other as resources to check their work to make sure they have all the requirements and have answered the question being asked.

In order to be a skillful and effective teacher I need to understand the importance of formative assessments and the benefits they would bring to my class. By providing multiple opportunities for practice to my students, I am able to check for understand during the learning process as well as monitor progress throughout the entire school day. Different varieties of tests allow for my students to analyze and reflect on the information they learn in order to demonstrate their understanding (Scott, 2000). By assigning formative assessments that foster metacognition, whether informal and formal, as well as providing students with feedback, I am able to enhance the opportunity for success in my classroom. Along with this, using formative assessments, I am able to reflect on my own teaching and instruction and make changes for my future students.

Standard 7: Assessment		
Aspects	Explanation	Ways I Met Standard
Integrate a range of assessment methods	<p>Accomplished mathematics teachers incorporate a range of assessment methods into their instruction to promote learning of all students.</p> <p>Accomplished mathematics teachers view ongoing assessments as an important part of their instruction, and design appropriate assessments to monitor progress of both the entire class as a whole as well as students as individuals.</p>	<p>By incorporating formal and informal assessments, such as traditional quizzes, exit slips, and essays I am able to monitor students understanding of mathematical concepts and procedures. By providing students with the opportunity to complete performance assessments such as the perfect pools project, they are able show me that they know how to do the math and how it can be connected to real life.</p> <p>Using the thumbs up/thumbs down method, as well as the whiteboards, and reflective essays I am using methods to check for students' understanding by allowing students opportunities to express misconceptions, lack of clarity, and level of understanding on any given topic.</p>
Provide opportunities for students to reflect	Accomplished teachers regularly provide opportunities for students to write a reflection or justification on their work.	Using reflective essays and well as a reflective exit slip, I provide y students with the opportunity to reflect on strengths and weaknesses they have, as well as the days lesson and topic they learned.
Using results to create future learning opportunities	Accomplished mathematics teachers use formative assessment results to modify their lessons and learning opportunities and activities. They provide timely and constructive feedback to students to identify strengths and areas for improvement.	<p>The thumbs up/thumbs down method helped me to see one student in particular was struggling. Together we were able to come up with a solution to help him understand the material better.</p> <p>Returning students traditional assessments in a timely manner allows them to see what they understand and what areas they may need to work more on.</p>

		Along with this, provide students with the opportunity to grade each other's quizzes allows for immediate reinforcement.
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Standard 8: Reflection and Growth		
Aspects	Explanation	Ways I Met Standard
Reflect on what they teach, how they teach, and how their teaching impacts student learning	Accomplished mathematics teachers modify their teaching practices based on past experiences. They gather information from students about the effectiveness of their teaching to help reexamine instructional methods and choices made in order to better students understanding.	<ul style="list-style-type: none"> • When I gave students the quiz on midpoint, I determined that I have not taught them how to answer the last couple problems in a way that was understanding to them. After students took the quiz, I noticed that many of them got the same two questions wrong. Because of this, I reflected on my teaching and ended up going back to that topic the next to explain it to my students in a different way. • When students filled out the reflective exit slip during the equation of a line unit, I noticed many of them wrote down that they were unsure of when to use the two different formulas they learned. Because of this, I was able to recognize that many students were struggling and go back and hold a discussion with the class the next day about the difference between the formulas. • When students write reflective essays, it allows me to see what aspects of the classroom they enjoy and what aspects they are not happy with. This would help me to adjust my teaching and classroom structure for the next year.
Improve knowledge and practice	Accomplished mathematics	When I observed my students

<p>through the use of a professional learning community</p>	<p>teachers work with colleagues to use their knowledge and understanding of mathematics and students to enhance learning for all students.</p>	<p>throughout the semester during the “thumbs up/thumbs down” informal assessments, I worked with a close colleague to determine ways in which we could help the student. Together, we came up with a solution that the student could sit in the back of her class if he felt he was confused with the topic. In the end, the student used this privilege all year until he felt comfortable enough with the material.</p>

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