A QUANTITATIVE STUDY OF THE IMPLEMENTATION OF FORMATIVE ASSESSMENT STRATEGIES IN THE CLASSROOM

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A QUANTITATIVE STUDY OF THE IMPLEMENTATION OF FORMATIVE ASSESSMENT STRATEGIES IN THE CLASSROOM

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ASHLAND UNIVERSITY, 2018

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The purpose of this quantitative study was to investigate the breadth of formative assessment strategies implemented by classroom teachers. Educators have been turning to the formative assessment strategies as a process of learning to engage students in learning and foster academic growth. This process is only effective if the strategies are incorporated into classroom lessons. In this study, 42 educators from Northeast Ohio who attended the same formative assessment professional development program completed a single survey. This survey was completed to gather information regarding the frequency of use of 15 formative assessment strategies. Strategies were categorized based upon three steps in an operational structure that frame the formative assessment process and if they are student- or teacher-driven. The data identified the overall frequency of use of formative assessment strategies, frequency of use of strategies by operational step, and frequency of use of student and teacher driven strategies.
Dedication

I dedicate this study to my wife Michelle and our children, Emma and Scott Jr. Thank you for being patient and understanding through this program and dissertation process. You had to adjust to me being both physically and mentally absent as I went through this experience. To my wife, Michelle, thank you for selflessly taking on more so that our family stayed on track, happy, and together. To my children, Emma and Scott Jr., I hope that you can learn from this experience as well. I really do not like writing and many times would have loved to just stop. However, it is through persistence and hard work, even doing things you do not like, which bring the greatest rewards.

To my parents, John and Ellen Goggin, I give my thanks for pushing me and making sure that I continued my education. I am sorry that my father is no longer with us. It would have been nice to celebrate this time with him too. However, as I write this, your marriage resulted in four successful sons, eight grandchildren, and one great-grandson. There is a lot in our family to celebrate.
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CHAPTER I

Introduction

The current focus on implementing the formative assessment process in the classroom to improve student growth has deep roots. Since the passage of the No Child Left Behind Act in 2001, there has been a surge in student testing (Chappuis & Chappuis, 2008). The growth measure utilized for accountability has evolved. The process to measure growth changed from counting the number of students proficient on an assessment to using a formula to measure an individual student's growth from year to year. Accountability also has become more individual to school employees. Principal and teacher evaluations now are influenced by student growth measures. As educators search for strategies to improve student growth, many have turned to the formative assessment process. The formative assessment process is considered one of the most effective educational strategies (Keeley, 2007).

The formative assessment process could be viewed as a key vehicle to fostering growth in students; it will only work if it is incorporated into the classroom. This study was designed to research the breadth of implementation of formative assessment strategies in the classroom.

Background of Study

School accountability and assessments are integrated into public education. A significant piece of legislation in the evolution of school accountability and assessments was the 2001 revision of the federal Elementary and Secondary Act (ESEA) known as No Child Left Behind (NCLB). Through the No Child Left Behind provision, it was mandated that schools be held accountable for their levels of effectiveness by annually
administering reading and math assessments in grades three through eight (U.S. Department of Education, 2001). In regard to levels of performance on these assessments, the expectation stated in NCLB is that 100% of students achieve a rating of proficient or higher by the 2013-2014 school year (Wiley, Mathis, & Garcia, 2005). Another rating requirement within NCLB is that schools must make "Adequate Yearly Progress" (AYP) toward the goal of 100% of students achieving at least a proficient score on the mandated state assessments. A school or school district's growth rating is determined by the progress toward this goal (Linn, 2003). The growth measured by AYP is not based upon a student's individual improvement on a test but is based on an increase of the number of students within a school passing the assessment. This is an advantage for schools that already have a large number of students passing the state assessments and a disadvantage for the schools with larger percentages of students who are not proficient (Linn, 2003). The low-performing schools have to make greater improvements than high-performing schools within the same time frame (Kim & Sunderman, 2004).

House Bill 3, which was approved by Ohio legislators in 2003, incorporates the requirements of NCLB. An additional growth measure called "value added" also was included in this measure (Stump, 2003). The value added formula was designed to measure the effectiveness of schools and teachers based upon the amount of growth a student achieves from year to year (Olson, 2004). Students are not compared to a standard of proficiency but by individual academic improvement. This measurement addresses the differences in student background characteristics (Anderman, Anderman, Yough, & Gimbert, 2010). Educators believe the value added component to be a more
realistic growth measure than the 100% proficient mandate associated with AYP (Olson, 2004).

Accountability continued to change. In the 2014-2015 school year, the State of Ohio transitioned to a new set of assessments. These assessments were released in correlation with other initiatives such as the new teacher evaluation system, new principal evaluation process, third grade guarantee, new district report card, and a revised resident educator program (Ohio Department of Education, 2013). The district report card, teacher evaluation, and principal evaluation utilized the value added measure (Ohio Department of Education, 2015). Growth measures have extended past the district report card; educators' evaluations are now directly impacted by measures of growth. The goal of the formative assessment process is to provide both teachers and students with feedback during the learning process. This feedback is aimed to allow teachers to refine instructional programs and inform students about their own learning (Stiggins & Chappuis, 2008). Formative assessments have been determined to be strikingly effective. In fact, researchers in a number of countries have described formative assessments as "perhaps one of the most important interventions for promoting high performance ever studied" (Keeley, 2007, p. 64). There is no single approach to the formative assessment process (Keeley, 2007). Moreover, many of the strategies utilized in this process have been commonly used in education. Formative assessment, as a process, outlines the intention for which these strategies are used (Chappuis, 2009). The effectiveness of this process, according to Chappuis (2009), “hinges on developing students’ capacity to monitor the quality of their own work during production” (p. 10). Chappuis (2009)
synthesized the process into three purposes that were framed in question format that need to be considered when implementing the formative assessment process.

These questions are intended for teachers to direct:

1. Where are you trying to go? (Identify and communicate the learning and performance goals);
2. Where are you now? (Assess, or help the student to self-assess current levels of understanding); and
3. How can you get there? (Help the student with strategies and skills to reach the goal). (Chappuis, 2009, p. 11)

Educators are able to select or design strategies based upon the purposes framed within each question. The strategies that teachers utilize should help students and teachers meet these three purposes while empowering students to take more control in driving their learning. If the teacher is the only one using assessment or formative assessment information and the student is not, then a primary contributor has been eliminated from the learning process (Chappuis, 2009).

**Statement of Problem**

In Ohio, student growth is measured through the value added formula. This formula is anticipated to be fairer than other measures because it measures a student's individual growth and should account for background and demographics (Anderman et al., 2010). The value added measurement is not only used to evaluate school districts' performances, but also the individual performance of teachers and principals (Ohio Department of Education, 2015). Researchers contend that the formative assessment process is one of the most important interventions ever studied in regard to promoting
high performance with students (Keeley, 2007). Schools and educators are being held accountable for the academic growth of all learners. The formative assessment process is beneficial for students from kindergarten through university students, and has been most effective with low-achieving learners (Black & Wiliam, 1998; Volante & Beckett, 2011). The formative assessment process is a process that promotes growth for all learners. The Ohio Department of Education (ODE) has recommended the formative assessment process to school districts to help improve instruction and promote student academic growth. In fact, ODE launched a program to assist school leaders with implementing the formative assessment process in their local districts (Battelle For Kids, 2017). Subsequently, school district leaders have had their educators and administrators participate in professional development programs designed to teach the formative assessment process, with the goal of having this process being implemented in the classroom. Jonsson, Lundahl, and Homgren (2014) warned that even though professional development has been a part of the educational landscape for years, there was little evidence that professional development made any difference in student achievement. There should not only be professional development, but also a focus of what the teacher is doing in the classroom.

Specifically, in regard to formative assessment, Black and Wiliam (2003) asserted:

Improvement of formative assessment cannot be a simple matter. There is no "quick fix" that can be added to existing practice with the promise of rapid reward. On the contrary, if the substantial rewards of which the evidence holds out promise are to be secured, this will only come about if each teacher
finds his or her own ways of incorporating the lessons and ideas that are set about into her or his own patterns of classroom work. (p. 629)

The intention of this study was to research the breadth of the implementation of formative assessment strategies in classroom lessons.

**Purpose of Study and Research Questions**

The purpose of this investigation was to illuminate the breadth of formative assessment strategies implemented in the lessons used by teachers in the classroom. Strategies were categorized based upon Chappuis' (2009) three purposes that frame the components of the formative assessment process and if they are student- or teacher-driven.

The research questions studied were as follows:

1. How frequently are educators utilizing formative assessment strategies in their lessons?
2. To what extent are educators utilizing the formative assessment process to improve student learning?
   
   a. To what extent are educators utilizing teacher-driven strategies?
   
   b. To what extent are educators utilizing student-driven strategies?
   
   c. To what extent are educators utilizing strategies that follow Chappuis' process?

**Hypotheses**

I hypothesized the following:

1. Teachers in this study will report a high frequency of formative assessment strategies used in lessons.
2. Teacher-driven strategies will greatly outweigh student-driven strategies.

3. Strategies utilized will not encompass all of the steps in Chappuis' (2009) process.

**Conceptual Framework**

To frame this study properly, a history of educational accountability in Ohio was presented. The purpose of providing the history of accountability was to highlight the shift in practice of measuring success through proficiency of students on an assessment to a growth measure that compares a student to his or her own previous performance. The formative assessment process is identified as a process that can foster growth with students regardless of age or ability levels (Black & Wiliam, 1998). Even if educators have participated in formative assessment trainings, teachers can interpret the strategies used in the formative assessment process differently as they move from professional development and back into the classroom (Wiliam, Lee, Harrison, & Black, 2004). Moreover, Black and Wiliam (2003) argued that the documented rewards of the formative assessment process would only be realized if teachers incorporate the strategies into their current classroom structures. Although a great deal of literature has been dedicated to the components of the formative assessment process and the success of the process (Black & Wiliam, 1998; Chappuis, 2005; Sadler, 1989; Stiggins & Dufour, 2009), less research is available regarding the breadth and quality of the implementation of the formative assessment process (Wylie & Lyon, 2015). This study focused on the breadth of strategies implemented by teachers who have attended the same professional development program. Specifically, the intent of the study was to determine what strategies are being implemented, how the strategies follow the formative assessment
process through the lens of Chappuis' (2009) three questions, and if the strategies used were student-or teacher-driven.

**Significance of Study**

The results of this study could be used to guide educators as they strive to implement the formative assessment process in the classroom. My intent was for this study to be a starting point for dialogue, among educators, regarding the current state of formative assessment implementation in schools. There has been an increase in legislative policies directed toward the field of education; many times classroom practices remain unchanged (Hayward, Priestley, & Young, 2004). Educators should be provided relevant information and the opportunity to reflect on their practices in order to impact change at the classroom level. If educators only receive workshops without follow-up support, it is unlikely that the practices learned will be implemented in the classroom (Knight, 2009). Reviewing information regarding the strategies that are being implemented in the classroom can provide educators insight to their own practices. Educators can reflect on their implementation as an individual or team in comparison to how others are embedding the same processes. Understanding how educators are implementing formative assessment strategies can provide direction to school leaders to plan the appropriate follow-up training for their educators as they work toward bridging the knowing and doing gap of the formative assessment process. In each case, the results from this study can promote reflection for teachers, principals, or any other group that is working to fully implement the formative assessment process. Establishing the current state in regard to the end goal of formative assessment implementation, once established,
can provide a significant step toward closing the distance between the current and desired state.

**Delimitations and Limitations**

There are delimitations within this study that are significant. The population of subjects invited to participate in this research were teachers of students from grades kindergarten through twelfth grade. These teachers were primarily located in Northeast Ohio, specifically the Cleveland, Ohio area. The teachers attended a formative assessment training that was held at Cleveland State University. Data collection occurred over a two-month period from April through May of 2017. Participants were invited via e-mail to participate in the survey. Heiman (2010) defined a representative sample as a smaller version of a larger population with the intent for the sample to represent a larger population. For this study a voluntary, representative sample was utilized.

Roberts (2010) described a limitation, as "a factor that may or will affect the study in an important way, but is not under the control of the researcher" (p. 138). This quantitative research was a nonexperimental study. Nonexperimental studies are common in education. A reason this approach is used in education is that in schools many variables are not manipulable (Johnson, 2001). The limitation to this type of a study is that "little can be gained from a single nonexperimental research study, and students and researchers must always temper their conclusions" (Johnson, 2001, p. 8). However, this does not mean that this type of research is not valuable. Johnson (2001) acknowledged that there are limitations to nonexperimental research, but emphasized that this type of research is both appropriate and important to the field of education. The intent of this study was to identify strategies being used in the classroom and was not intended to
identify the quality of the implementation. Therefore, this investigation was limited to collecting information about how frequently strategies were being used and was not able to respond to the quality of use. That would be an opportunity for further research. Moreover, the sample size was a limitation. The overall response rate to the survey used in this investigation was 23.1%. Roberts (2010) indicated that the typical response rate for mail surveys was between 20% and 40%, however, this return rate is low and not optimal.

**Key Terms**

**Adequate Yearly Progress (AYP)** - Measure mandated by No Child Left Behind. Schools were expected to have 100% of students proficient on state math and reading assessments by 2014 (Linn, 2003).

**Assessment for Learning (AFL)** - Process of monitoring student learning toward a desired goal. The focus is on closing the gap between students' current status and the desired goal (Clark, 2012).

**Assessment of Learning (AOL)** - The process of using summative assessments to measure the level of mastery students achieve at the end of an instruction cycle (Chappuis & Chappuis, 2008).

**Formative Assessments** - "Formal and informal processes teachers and students use to gather evidence for the purpose of improving learning" (Chappuis, 2009, p. 5).

**Formative Instructional Practices (FIP) Ohio** - FIP Ohio is an initiative launched through the Ohio Department of Education to provide educators training in formative assessment practices (Battelle For Kids, 2017).
Summative Assessments- Assessments administered to students at the end of an instruction cycle to certify students or curriculum (Black & Wiliam, 2003).

Value Added - Value Added models are designed to measure student gains longitudinally from year to year. Students are compared to their scores on achievement tests from year to year (Anderman et al., 2010).

Summary

In the first chapter, I presented how school accountability on the federal level had a structure that held schools accountable for students achieving proficiency on select assessments. States interpreted federal mandates and created policies they deemed to be appropriate. In Ohio, value added was selected as a measurement of growth. This shifted accountability to not only include student achievement, but also to monitor student growth. Eventually, the value added measurement was expanded to be included on teacher and principal evaluations. The formative assessment process is a strategy that is used to foster student learning. However, in order for the formative assessment process to reach the desired benefits, teachers would need to integrate this process into their classroom structures and engage students in their personal learning.

The second chapter is a review of literature that focuses on the description, process, relevance, and strategies of formative assessments. In chapter three, the research methods, population selected, and instrument used in this study are described. The results from this study are provided in the fourth chapter. The final chapter is a discussion regarding the findings of this study and contains suggestions for future research regarding this topic.
CHAPTER II

This review of literature is structured into three sections. The first section contains an overview of the formative assessment process. This includes the delineation between summative and formative assessments, an introduction to formative assessments, and the relevance of the formative assessments. In section two, the emphasis is on formative assessment as a process, focusing on strategies that are designed to provide a clear target for learning, an understanding of a student's current position in relation to the target, and strategies that are designed to close the gap between the target and a student's current level of performance. In the third section, attention is placed on the importance of implementation in the formative assessment process and the empowerment of students within that process.

Formative Assessment Definition and Process

Perceptions of the purposes of assessments have a tendency to fall upon a large spectrum. All assessments may not be the same and have different purposes. Providing a clear delineation between summative and formative assessment is an appropriate first step. Even the term formative assessment has been interpreted differently. A criticism of formative assessment research asserted by Dunn and Mulvenon (2009) was that there is not an established consensus regarding the definition of formative assessment. Therefore, clear definitions of formative assessments and the process researched are necessary to explore the implementation in the classroom.

Summative and formative assessments commonly are used in education. Summative assessments traditionally are administered after learning is completed. Summative assessments are referred to as Assessment of Learning (AOL) (Chappuis &
Chappuis, 2008). Summative assessments do serve a purpose when measuring information that has been learned. However, Black and Wiliam (2003) contended that the summative assessment process has been too dominant in education and assessments within the learning process should also be utilized. Black, Harrison, Lee, Marshall, and Wiliam (2004) argued that numerical scores could lead a learner to believe that there is lack of ability to learn resulting a negative effect on the learner. Miller and Lavin (2007) expanded on this concept. They discussed research by Black and Wiliam (2003) that indicated using grades as a primary source of feedback for low-achieving learners could negatively impact their self-esteem.

Wiliam (2006) wrote that in 1967, Michael Scriven utilized the term formative evaluation as a way to evaluate curriculum or justify the expense for adoption of materials for a school system. Moreover, Wiliam (2006) reported that in 1969, Benjamin Bloom suggested that the same process could be used to evaluate student learning. Bloom utilized the term formative assessment instead of formative evaluation (Dunn & Mulvenon, 2009). A common component to both Scriven and Bloom’s definitions of formative was that the action taken based on the evaluation would not have happened without the evaluation. Sadler (1989) provided a more specific breakdown of the words formative and assessment. He described formative as “forming or moulding something, usually to achieve a desired end” and assessment as “any appraisal of a student’s work or performance” (Sadler, 1989, p. 120). Critics asserted that definitions of formative assessment were too vague and could be confusing. Dunn and Mulvenon (2009) argued that the essential components of the general definition and operational definitions were unclear and interpreted differently. For example, the use of the word assessment causes
confusion. An assessment is considered formative or summative by how it is used and not necessarily aligned to the structure of the assessment. Therefore, assessments that are summative in structure can be used formatively and assessments that are formative in structure are not formative unless they are utilized in the learning process. Clark (2010) affirmed this tenet and described a formative assessment as an assessment that “gives teachers information for instructional decisions and gives pupils information for improvement” (p. 341). The emphasis was on the use of assessments. Dunn and Mulvenon (2009) maintained that more clarity could be reached “by operationalizing assessment as something unique from evaluation” (p. 3). Some definitions of formative assessment did focus on the operation and did not include the word assessment at all. For example, Chappuis (2009) defined formative assessment as “formal and informal processes teachers and students use to gather evidence for the purpose of improving learning” (p. 5). The focus was directed more at the process than the assessment.

The other ambiguous component cited by Dunn and Mulvenon (2009) was the vagueness in the operational practice of the formative assessment process. The effectiveness of formative assessments is determined by the use of the information obtained during the assessment. As Black and Wiliam (1998) claimed, “learning is driven by what teachers and students do in the classroom” (p. 139). The formative assessment process is essentially a form of communication between the teacher and student. Formative assessments communicate the action the teacher and student are to take to close the gap (Brookhart, 2010). This belief has been developed into a process. Sadler (1989) noted three necessary conditions to provide the framework for implementation of the formative assessment process:
1. Possess a concept of the standard (or goal, or reference level) being aimed for;
2. Compare the actual (or current) level of performance with the standard; and
3. Engage in appropriate action which leads to some closure of the gap (p.121).

Not all operational steps follow Sadler's (1989) blueprint. For example, Clinchot et al. (2017) describe the process of formative assessment as multiple cycles of

- eliciting students' ideas;
- noticing the substance of student thinking;
- interpreting to make sense of student ideas; and
- acting to guide and support student learning (p. 70).

However, other authors included the core of Sadler's conditions with some variation.

For example, Ateh and Wyngowski (2015) encouraged a cycle that incorporated the following goals:

1. to establish where students are in learning;
2. to establish where they are heading; and
3. to establish how students can close the gap between what they know and are supposed to know. (p. 87)

Chappuis (2009) noted that in 2001 Atkin, Black, and Coffey translated Sadler's three conditions into question forms:

1. Where are you trying to go?
2. Where are you now?
3. How can you get there? (p.11)
Chappuis (2009) cited Atkin, Black, and Coffey's translation of Sadler's conditions and offered her own. She chose to take the same questions, but phrased them from a student's perspective:

1. Where am I going?
2. Where am I now?
3. How do I close the gap? (p.11)

Chappuis' (2009) operational steps have been widely utilized in the State of Ohio. The Ohio Department of Education and Battelle for Kids (2017) have partnered to develop a large-scale formative assessment training initiative called FIP (formative instructional practices) Your School to promote student growth and achievement (Battelle For Kids, 2017). Another professional development program held at of Cleveland State University, Formative Assessment Support Team (FAST) was dedicated to training educators to implement the formative assessment process (Snodgrass, 2010). Both programs utilized Chappuis' (2009) student-focused, operational steps for structuring the formative assessment process.

Ohio’s commitment to a particular process based upon the fundamental concepts listed above can be promising. Frohbieter, Greenwald, Stecher, and Schwartz (2011) found that teachers who were more familiar with a similar formative assessment process had a greater level of implementation.

**Relevance of Formative Assessment**

The educational experiences teachers designed for students are evolving. Classrooms that are designed to treat students as passive receivers of knowledge are not beneficial in preparing them for their future endeavors. The onset of globalization and
technology makes it difficult to determine what type of knowledge students need in the near future. Making that determination for a lifetime is even more difficult (Clark, 2015). Meanwhile, many classrooms are structured to have students sit in rows, measure achievement through high-stakes testing, and reinforce the behaviors of silence and compliance (Clark, 2012). Moreover, classrooms are becoming more inclusive, with students of multiple ability levels being instructed in the same classroom. Cornelius (2013) asserted that 57% of students with disabilities would receive 80% of their education in the general education classroom. Classrooms with diverse learners have stimulated the educational profession to look for strategies that can target both the struggling and advanced learners. Volante and Beckett (2011) noted that the use of formative assessment strategies such as peer assessment, feedback without grades, and self-assessment could double the speed of learning while having the greatest impact on low achievers. Black and Wiliam (1998) reported that the growth shown through the use of formative assessments is effective with all students from kindergarten to university age. The growth is also displayed through several school subject areas and throughout the world. Chappuis (2005) maintained that the proper utilization of a formative assessment process produces significant learning gains with effect sizes in the 0.4 and 0.7 ranges. Black and Wiliam (1998) elaborated on what an effect size that large could achieve. They emphasized that

- an effect size of 0.4 would mean that the average pupil involved in an innovation would record the same achievement as a pupil in the top 35% of those not so involved; and
• an effect size gain of 0.7 in the recent international comparative studies in mathematics would have raised the score of a nation in the middle of the pack of the 41 countries (e.g. the U.S.) to one of the top five." (Black and Wiliam, 1998, p. 141)

Strategies

What teachers and students do in the classroom is what drives learning (Black & Wiliam, 1998). Therefore, classroom teachers who concentrate on raising standards without focusing on the learning process are not likely to see the achievement desired. In order to raise the standards in a classroom, changes need to be implemented directly by the teachers and students (Black & Wiliam, 1998). Sadler (1989) argued that three necessary conditions must be satisfied to implement the formative assessment process. These do not necessarily need to be implemented sequentially, but must be satisfied. The three requirements that form the framework of formative assessment provide the learners the following:

1. A concept of the standard being targeted;
2. A comparison of the current level of performance and the standard; and
3. An engagement of activities that would begin to close the gap between the current level and desired goal (p. 121).

Chappuis (2009) offered a more condensed interpretation that divided these conditions into three questions. This version has been commonly accepted and used in professional development programs in the State of Ohio (Battelle for Kids, 2017; Snodgrass, 2010).

They are as listed below:

1. Where am I going?
2. Where am I now?

3. How can I close the gap? (p. 11).

Chappuis' (2009) version of this process is described in the pages that follow.

Where am I going?

Strategies within this section clarify the content and depth of the learning. The subject matter and expectations should not be something that the students have to decipher during the lesson. These should be clear from the beginning so students can focus on the content and reach the targets set in the classroom. Teachers typically know the product that they want from students when they see it. Sometimes it is difficult for teachers to articulate the standard that they expect (Sadler, 1989). Students driving their instruction is a primary goal in formative assessment, so if the teacher struggles to provide that clarity, students could have difficulty self-monitoring their progress toward the goal of the lesson (Sadler, 1989). Chappuis (2009) highlighted two over-arching strategies to achieve this:

1. Provide students with clear and understandable vision of the learning target.

2. Use examples and models of strong or weak work. (p. 17)

Learning targets can be as simple as a statement such as "Today, I will learn how to convert fractions to decimals" or something as complex as a target that includes a student-created rubric (Chappuis, 2009). Once the students understand the content that is being covered in class, it is important for them to understand what "good" looks like. Chappuis (2009) encouraged teachers to utilize strategies that will not only show students examples of good work, but models of weak work as well. This will provide students the
opportunity to compare the examples with each other and their own work to the examples. This practice essentially provides guidance of what to do and also what to avoid. Strategies under the condition of "Where am I going" are enabling strategies that set the stage for the other strategies in the formative assessment process. They begin to shift class work from being a task to be completed to learning being achieved (Chappuis, 2009).

Where am I now?

The purposes of strategies under this condition are to assist students to determine their current levels of performance and how that compares to the expectations set in Where am I going? (Sadler, 1989). Chappuis (2009) provided two over-arching strategies:

1. Offer regular descriptive feedback (p. 55).
2. Teach students to self-assess and set goals (p. 95).

Descriptive feedback is an essential component in the formative assessment process. When descriptive feedback is utilized within the lesson, it can act as a global positioning system for a student on the learning journey (Chappuis & Chappuis, 2008). The feedback must be more specific than a letter grade or noting which answers are correct or incorrect. It is also imperative that the students obtain the feedback while they still have time to take action. Descriptive feedback must provide students the information needed to identify their strengths and weaknesses so they can set goals and plan a route to close the gap between what they know and what is expected of them (Chappuis & Chappuis, 2008). At this point, students have the learning target, they have seen examples of good and bad work, and have received descriptive feedback regarding their work. Their next
step is to utilize all of that information and use self-assessment strategies to determine where they are and begin to set goals regarding their learning. Self-assessment is feedback. It is feedback that students give to themselves. Chappuis (2009) reported that when compared to feedback provided by teachers and feedback provided by peers, self-generated feedback had the largest gains measured by pre- and post-test scores.

**How can I close the gap?**

The purpose of this step of the formative assessment process is for the teacher and the student to utilize strategies to bring the learner closer toward the desired target. More importantly, learners must be taught how to select strategies to bring themselves closer to the stated goal (Sadler, 1989). At this point in the process, students should have an understanding of the learning goal, what good looks like, and the gap between their learning and the desired goal. Closing-the-gap strategies encourage the action of moving from the current to desired state. Overarching goals for closing the gap cited by Chappuis (2009) include:

1. Design lessons to focus on one learning target or aspect of quality at a time.
2. Teach students focused revision (p. 129).
3. Engage students in self-reflection, and let them keep track of and share their learning (p. 151).

For teachers to begin to utilize strategies to close the gap, they need to identify what is preventing students from reaching the target. Teachers can use in-lesson assessments that provide immediate feedback to the teacher and student. By using this feedback, the teacher can determine if the gap is a result of incomplete understanding,
misconceptions, partially developed skills, etc. (Chappuis, 2009). Once the root cause that is preventing the gap closure is identified, the teacher can immediately adjust instruction to meet the students' needs. Lessons can be designed to break learning into manageable chunks for students to address (Chappuis, 2005). This focused instruction can eliminate complexities so students can focus on key concepts. This manner of instruction leads into strategies that empower students to engage in focused revision, or focused practice. The strategies work in tandem: "focused instruction followed by focused practice" (Chappuis, 2009, p. 131).

Self-monitoring and self-reflection are gap-closing strategies that impact motivation and retention. Self-monitoring is the process of recordkeeping or evidence gathering as a student progresses toward a clear instructional target. The practice of monitoring or tracking work is a prerequisite to self-reflection (Chappuis, 2009). Self-reflection is the process of looking back on the collection of evidence and drawing conclusions about what content was learned, strategies that went well, strategies that did not go well, what would be done differently, and the overall progress that the learner has experienced (Chappuis, 2009). Hattie (2008) contended that the greatest effect on learning happens when learners display self-regulatory attributes such as self-monitoring, self-evaluation, self-assessment, and self-teaching. He described this as learners developing into their own teachers.

**Implementation**

Educators can only achieve the significant rewards that the formative assessment process can potentially provide if it is incorporated into their classroom work (Black & Wiliam, 2003). However, in many classrooms, teachers are assessing learning as their
predecessors did 60 years ago (Clark, 2015). Similarly, the structure of the classroom has not changed much either. In each classroom, three agents are involved in the learning process: the teacher, learner, and peer (Jonsson, et al., 2014, p. 105). Clark (2015) noted that “teachers typically plan for their interactions with pupils and not for the interactions between pupils” (p. 92). Educators have used professional development programs to gain knowledge and ideas to improve classroom instruction. The practice of professional development has been prevalent in education for many years. Yet, Jonsson et al. (2014) maintained that there is little evidence that professional development has made an impact on student achievement. It is important to improve what teachers know. However, for change to occur, focus must be placed on what teachers do in the classroom (Jonsson, et al., 2014).

Strategies are designed with a specific purpose and have a certain role in regard to identifying a target, current level of performance, and the gap between the learning target and current level of performance. The formative assessment process is used as a form of communication tool between the teacher and student (Brookhart, 2010). Evidence gathered through this communication should have the purpose of improving instruction (Chappuis, 2009). Consequently, it is important that action is taken based upon the feedback received in each step of the formative assessment process. Guskey (2008) declared that what matters most about formative assessments is how teachers and students use the information gained through the process. Guskey (2008) maintained that many educators overlook this vital step in the formative assessment process. Brookhart (2010) argued that it is important for action to be taken by both the teacher and student. These actions follow the process of setting a clear target, identifying where a learner is in
relation to the target, and closing the gap between a learner's current state and the established target. She noted examples of actions the teacher and student can take within the continuum of formative assessment. For example, when identifying the desired outcome of a lesson, the teacher should clearly identify and communicate the learning outcome while it is the student’s responsibility to understand the indicated target. Moreover, it is the teacher’s responsibility employ activities that would illustrate where the student’s work is in relation to the desired goal and the student’s responsibility to utilize these activities to compare his or her current work to that same goal. Finally, it is the role of the teacher to provide the support, strategies, or remedial instruction necessary to put the student in a position to close the gap. The action performed by the student would be the work, such as production or appropriate review, required to close the gap between current and desired state. It is typical for a teacher to be the person who would utilize the data or feedback acquired in class. However, by withholding or not utilizing opportunities for students to utilize strategies, the message is sent to the student than only the teacher possesses the knowledge necessary to evaluate student work (Sadler, 1989). Involving students make them active participants and can be motivating and help develop students' capacities to direct their own learning (Chappuis, 2009).

**Summary**

The literature review section started with the clarification between summative and formative assessments. To begin a study focused on formative assessment implementation, it is important to identify the differences between other commonly used assessments and the purpose behind the use of formative assessments. Summative assessments are the most frequently used assessments and are valuable to teachers. The
summative assessment is utilized to assess what a student has learned. The purpose of formative assessments is to utilize assessments during lessons to assist the teacher in adjusting instruction based upon students’ needs. The fundamental concepts of setting learning targets, assessing students during learning, providing feedback to students, and modifying instructions during the lesson based upon information gathered were shared to show that strategies are selected for a purpose. In this section, there was also literature reviewed regarding the relevance of formative assessment strategies. Classrooms are becoming more integrated with students who have different cognitive and skill levels. Furthermore, a globalized economy and a changing landscape of future careers have made it difficult to know what knowledge a student will need. The formative assessment process teaches the students how to learn. It significantly impacts student learning and has shown the largest effect with students who are considered struggling learners (Black & Wiliam, 1998).

The literature in section two focused on the strategies in the formative assessment process. This section provided a detailed description of the three questions posed by Chappuis (2009) as being the structure for the formative assessment process. These questions are as follows:

1. Where am I going?
2. Where am I now?
3. How do I close the gap?

Overarching strategies were presented for each of the three questions along with a description of how they are coordinated to each question. The three questions in this section were clarified to guide teachers and students through the formative assessment
process. This process is important to this study. It provided a way to categorize the strategies researched in this study.

Section three presented the importance of classroom implementation and student engagement. This information is an integral part of this study as it emphasizes the importance of the actions of a teacher in the classroom. Expectations of teachers and students have changed. For classrooms to evolve, it is not only necessary for teachers to know new strategies or processes, but they also need to be implemented in the classroom. Furthermore, as the literature emphasized, the strategies should engage students in their own learning and provide them opportunities to utilize educational strategies.
CHAPTER III

The purpose of this quantitative study was to test the hypothesis that teachers would more frequently implement strategies used within the formative assessment process that are driven by the teacher and would not implement strategies that cover all three of Chappuis' (2009) formative assessment process questions. In this investigation, teachers from grades kindergarten through twelfth grade were asked to complete a survey. All teachers who were invited to complete the survey participated in the same formative assessment professional development. Data were analyzed to identify the frequency of formative assessment strategies used in the classroom. Furthermore, the data were reviewed to identify the frequency that the strategies followed the formative assessment process through the lens of Chappuis' (2009) three questions and if they were teacher- or student-centered. This section details the research design, population and sample, instrumentation, data collection procedures, and the procedures for statistical analysis.

Research Design

This quantitative explanatory design consisted of one stage of data collection in which quantitative data were collected through a survey. Following the collection of demographic information, there was a single open-ended question in the beginning of the survey. Although this question is open-ended, it was not designed or analyzed qualitatively. Bridgeman (1992) argued that open-ended questions used quantitatively can be useful in a study and can eliminate a respondent from guessing or randomly selecting an answer. The rationale for this approach was to utilize an open-ended question to prevent an assumption that all subjects have the same definition of the formative
assessment process. The quantitative data gathered from the survey questions were collected to test the hypothesis stated in this study.

This study employed a nonexperimental research approach. The variables in this research were either not manipulable or not easily manipulated by the researcher. Johnson (2001) confirmed that the nonexperimental research approach is frequently used and an important mode of research in education. This approach allows data to be reported as they happen naturally in each environment. Creswell (2003) wrote that quantitative research was best used when testing a theory or examining factors that influence an outcome.

**Sample Population**

The purpose of this study was to research the classroom implementation of formative assessment strategies by educators from grades kindergarten through twelfth grade. Therefore, a representative sample of this population was selected to participate in this study. As indicated in the literature review, there can be multiple definitions of formative assessment as well as multiple strategies utilized in the process. In an effort to control for these factors, participants who attended the same professional development were invited to participate.

All participants attended the Formative Assessment Support Team (FAST) training through Cleveland State University. Although not all participants attended together, this program utilized the same instructor, same location, and nearly identical format. FAST was designed as a seven-day training and the program included an initial three-day training followed by a pair of two-day follow up sessions. The training utilized a cohort model. Groups of participants attended this seven-day training together. Each
participant was provided a copy of Chappuis' (2009) book *Seven Strategies of Assessment for Learning* to be used as a resource during the training. Snodgrass (2010) identified the learning intentions for the FAST training as listed here:

1. Understand how formative assessments fit into a balanced assessment system;
2. master a wide variety of minute-to-minute student involved classroom assessment techniques;
3. know how to engage in authentic data-driven decision-making based on real time data;
4. be able to employ classroom strategies that make students full partners in their own learning;
5. be able to lead and develop formative assessment professional learning communities and assessments for learning buddy systems in their building/district;
6. know how to create high quality common assessments that transform the standards into concrete agreed upon learning targets; and
7. develop a comprehensive and effective formative assessment-training packet to use in their home district. (p. 4)

**Instrumentation**

This study utilized a single survey to collect data. This survey was developed and then reviewed by two experts in the field of formative assessment to check for content validity. Creswell (2008) defined content validity as the extent in which the questions represent the total possibility of questions that can be asked about a particular content or
skill (p. 172). He also reported that it is typical for researchers to utilize experts to review instruments for content validity. The first person to review the questions and structure of the survey was the person who instructed the Formative Assessment Support Team (FAST) program at Cleveland State University. She is well regarded in the field of formative assessment and instructed all of the subjects in this study. She also was acknowledged in the book *Classroom Assessment for Student Learning* (Chappuis, Stiggins, Chappuis, & Arter, 2012). The topic of this book was the use of formative assessments in the classroom. The second person to review the survey was an assistant superintendent who was responsible for instruction for a school district in Northeast Ohio. He also is considered an expert in formative assessments and is experienced with testing, data collection, and analysis. He received training and practice in data analysis as a school psychologist and again through his training and completion of a doctoral program. In regard to formative assessments, he instructed a graduate level class on assessments, was hired as a consultant by school districts to provide assessment training, and his perspective as a practitioner was published in *Classroom Assessment for Student Learning* (Chappuis et al., 2012). Next, a small pilot was completed. Pallant (2010) wrote that a pilot of a survey by representatives from the intended population could be beneficial to insure that items such as the instructions, questions, or scale are clear to the subject. Consequently, the survey was sent to a small group of elementary, middle, and high-school level teachers. It was also sent to one middle-school administrator. After the small pilot was completed, the survey was sent to a larger group of educators. This pilot generated 94 completed responses. Upon review of the survey and responses, verbiage
used for some of the questions was revised. The final survey was completed and opened for participation from April 11, 2017 through May 31, 2017.

The participants in this study are teachers of students who are in kindergarten through grade twelve. They have various work assignments, school demographics grade levels, and subject assignments. The teachers who received a request to participate in this study all attended the same formative assessment-training program with the same instructor. The purpose of choosing participants who attended the same training program was to attempt to control for items such as knowledge of similar strategies and exposure to a consistent definition of formative assessment. The survey contained questions designed to gather

- demographic information for the educator (grade level taught, content area taught, number of lessons designed per day, number of students served daily, and student population served);
- overall frequency of the use of formative assessments in the classroom;
- frequency of the use of formative assessment strategies (strategies chosen from each of Chappuis' three purposes); and
- frequency of use of teacher- or student-driven formative assessment strategies (strategies chosen from each of Chappuis' (2009) three purposes).

The data obtained from the survey were sorted by demographic information. The open-ended responses were tabulated by the researcher and reviewed by the second expert mentioned above. The quantitative data collected were analyzed using IBM's SPSS Statistics software (Version 24).
This study utilized a survey that was administered one time to collect data. There were three sections to the survey. The first section was designed to collect information specific to the educator who completed the survey. This section contained collected information regarding the educator's grade band served, population served, number of original lessons planned per day, number of students served per day, and content area taught. In section two, the educators were requested to provide a definition of formative assessments. In the third section, educators were asked to report on their implementations of formative assessment strategies.

**Demographics**

The sample of educators who were targeted for this study covered multiple grade levels, subject areas, and work assignments. These variables could influence the responses collected. For example, an elementary school teacher who works with the same students all day and instructs them in multiple subjects may have a different response from that of a high school teacher who teaches the same lesson all day but to multiple groups of students. The first section of the survey was designed to gain information regarding an educator's grade level taught, content/subject area taught, number of lessons planned per day, number of students served per day, and student population served. These were reflected in five questions. First was the grade level the teacher served. An educator's grade level served was reported in two grade level bands from kindergarten through eighth grade. High school was identified as grades nine through twelve. There was an additional option coded as "other" to accommodate a combination not mentioned. The next working condition collected on the survey was the content areas taught by teachers. The selections for this question were created based upon the general subjects
within a school curriculum. Respondents were encouraged to check all subjects that applied to their work assignments. Teachers' assignments could include multiple subjects. This question also contained an "other" response to allow respondents to identify a subject not included on the survey. The third work-related identifier collected was the number of lessons a teacher planned each day. Teachers also were asked to identify a range reflective of the number of students that they served each day. Finally, teachers were asked to categorize the majority of students served. This information was used to sort educators into similar categories to ensure that responses were put into proper perspective.

**Definition of formative assessment**

The second section of the survey requested that the respondent submit a definition of formative assessments. Dunn and Mulvenon (2009) criticized formative assessment studies due to varying definitions of formative assessments. Subjects provided their own definitions of formative assessments in a comment box on the survey. After this was completed, they were provided a definition of formative assessments. The definition selected was the same definition that was used in the professional development they attended as well as the book they received as a resource. The purpose of this was to attempt to have subjects working under the same definition. The answers also were used during analysis of survey results.

**Implementation of Strategies**

The purpose of this study was to test the hypothesis that teachers would utilize formative assessment strategies, but would more frequently use strategies that were more teacher-centered and would not use strategies that covered Chappuis' (2009) three
questions. The strategies associated with the questions were selected based on the training all of the teachers experienced and covered the different questions within Chappuis' formative assessment process.

Chappuis (2009) identified three questions to guide the formative assessment process:

1. Where am I going?
2. Where am I now?
3. How do I close the gap?

Chappuis' (2009) three questions are a guide for the formative assessment process and were an important part of this study. Also, a goal of formative assessment is to involve students in the learning process actively. In fact, Chappuis (2009) emphasized that the effectiveness of this process hinged on the students' abilities to self-monitor through the learning process. She also asserted that self-generated feedback is more powerful than both teacher-driven and peer-generated feedback (Chappuis, 2009). As Black and Wiliam (2003) argued for the formative assessment process to provide the documented rewards, teachers need to incorporate the process into their instructional structure. Strategies in this survey were selected as they progressed through Chappuis' three questions and progressively become more student-driven. Table 3.1 is a list of each strategy that was used in the survey and connects each strategy to one of Chappuis' steps of the formative assessment process. It also identifies if that strategy was intended to be used primarily by the teacher or if the student was meant to perform the action of the strategy.
Table 3.1

*Formative Assessment Strategies, Associated Step in the Process, and Driver of Action*

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Steps in Process</th>
<th>Student or Teacher Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>I post learning targets for what I am currently teaching.</td>
<td>Where am I going?</td>
<td>Teacher</td>
</tr>
<tr>
<td>I provide my students with learning targets that are in student-friendly language.</td>
<td>Where am I going?</td>
<td>Teacher</td>
</tr>
<tr>
<td>I provide my students with checklists and/or rubrics that are teacher- or commercially made.</td>
<td>Where am I going?</td>
<td>Teacher</td>
</tr>
<tr>
<td>I help my students develop checklists and/or rubrics.</td>
<td>Where am I going?</td>
<td>Student</td>
</tr>
<tr>
<td>I provide my students with models or examples of anonymous student work at various levels of quality.</td>
<td>Where am I going?</td>
<td>Teacher</td>
</tr>
<tr>
<td>I gather real-time evidence of student learning simultaneously from all of my students with quick-check techniques like clickers, ABC cards, white boards, and/or thumbs-up.</td>
<td>Where am I now?</td>
<td>Teacher</td>
</tr>
<tr>
<td>In my classroom, students act as instructional resources to each other.</td>
<td>Where am I now?</td>
<td>Student</td>
</tr>
<tr>
<td>I provide descriptive feedback to my students about their performance.</td>
<td>Where am I now?</td>
<td>Teacher</td>
</tr>
<tr>
<td>My students provide each other with descriptive feedback.</td>
<td>Where am I now?</td>
<td>Student</td>
</tr>
</tbody>
</table>

(continued)
Table 3.1 (continued)

*Formative Assessment Strategies, Associated Step in the Process, and Driver of Action*

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Steps in Process</th>
<th>Student or Teacher Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>My students are provided the opportunity to self-assess and set goals (e.g. Stars and Steps).</td>
<td>Where am I now?</td>
<td>Student</td>
</tr>
<tr>
<td>My students are given time to revise their work based upon feedback that they received.</td>
<td>How do I close the gap?</td>
<td>Student</td>
</tr>
<tr>
<td>My students engage in self-reflection about the quality of their work.</td>
<td>How do I close the gap?</td>
<td>Student</td>
</tr>
<tr>
<td>My students monitor their learning over time, using recordkeeping techniques.</td>
<td>How do I close the gap?</td>
<td>Student</td>
</tr>
<tr>
<td>I adjust the sequence and pacing of my instruction, based upon information gathered from ongoing formative assessments.</td>
<td>How do I close the gap?</td>
<td>Teacher</td>
</tr>
<tr>
<td>I target my instruction to learning gaps, misconceptions, or other incomplete understandings identified through formative feedback.</td>
<td>How do I close the gap?</td>
<td>Teacher</td>
</tr>
</tbody>
</table>

**Data Collection**

Subjects for this study were from a pool of 322 people who participated in the Formative Assessment Support Team (FAST) training at Cleveland State University. This group received an e-mail inviting them to complete an electronic survey. Although the survey was sent to their specific e-mail addresses, the survey was completed anonymously. The primary safeguard for confidentiality was the technology used to
collect responses from the subjects. The online survey program collected responses but did not record any personal or identifiable information. All data were collected via the survey technology, and no information was transferred via e-mail or any identifiable method. The survey remained open for a two-month period. From the 322 e-mails sent, 110 were categorized as undeliverable and bounced back. The remaining 212 e-mails were successfully delivered. Of the 212 successfully delivered e-mail invitations, 49 surveys were submitted resulting in a return rate of 23.1%. Moreover, seven of the surveys returned were determined to be unusable. The elimination of those surveys resulted in 42 usable surveys. It should be noted that not all of the 322 educators who attended the formative assessment training were determined as valid for this survey. The professional development was attended by both administrators and teachers.

**Hypothesis and Research Questions**

There were two principal questions in this study. The first question was "How frequently are educators utilizing formative assessment strategies in their classroom?" The second question was "To what extent are educators utilizing the formative assessment process to improve student learning?" The second question had three subquestions. They were as follows:

1. To what extent are educators utilizing teacher-driven strategies?
2. To what extent are educators utilizing student-driven strategies?
3. To what extent are educators utilizing strategies that follow Chappuis’ (2009) process?

The purpose of these questions was to test three hypotheses. They were as follows:
1. Teachers in this study will report a high frequency of formative assessment strategies used in lessons.

2. Teacher-driven strategies will greatly outweigh student-driven strategies.

3. Strategies utilized will not encompass all of the steps in Chappuis’ (2009) process.

**Statistical Analysis**

Statistical analysis started by grouping and sorting the demographic information gathered on the survey. The demographics data were uploaded into IBM SPSS Statistics (Version 24) and a codebook was created for each of the following:

- the grade band that the teacher currently was teaching;
- the subject area(s) taught by the educator;
- the number of lessons the educator planned each day;
- the number of students an educator taught daily; and
- a general description of the educator’s student population served.

Educators also were sorted by their responses to an open-ended question in which they provided their own definition of formative assessment. An assumption was made that subjects who attended the same professional development would have a similar definition of formative assessments. The definition of formative assessments provided during the training was "formal and informal processes teachers and students use to gather information for the purposes of learning" (Chappuis, 2009, p. 5). This definition had two major points of emphasis. Through this analysis, two groups were created. The first group provided only one of the two points within the definition. The other group identified both
main points of the definition. Responses were tabulated and placed into one of these two groups.

Subjects were presented with 15 formative assessment strategies and asked to identify, on a Likert scale, the frequency in which each was used in their classrooms. Strategies were grouped in the following categories:

- all strategies;
- teacher-driven strategies;
- student-driven strategies; and
- step within Chappuis' formative assessment process.

The data collected in this section were uploaded and coded into IBM's SPSS Statistics software (Version 24). A frequency distribution for each of these categories was calculation by using IBM's SPSS Statistics software (Version 24) and Microsoft Excel (2011). This procedure also generated a mean for each category.

Although a correlational analysis was not necessary to answer the research questions, an educator's demographic information could impact the implementation of formative assessment strategies. Therefore, the decision was made to perform a correlational analysis between each demographic category and the mean of each formative assessment strategy category. This correlation analysis was performed in IBM's SPSS Statistics software (Version 24) using Spearman's correlation coefficient, also known as Spearman's rho. Palant (2010) maintained that Spearman's rho is an appropriate measure when using ordinal data as gathered in a Likert scale.
Validity and Reliability

This study utilized quantitative data gathered through one open-ended question and multiple closed-ended questions. A criticism of formative assessment research has been the lack of a clear definition (Dunn & Mulvenon, 2009). In this study, an open-ended question was used to collect each subject's definition of formative assessments. These data were tabulated by the researcher and reviewed by a person considered to be an expert in formative assessment who is also trained in data collection and analysis. In this study, each definition was placed into one of two groups. The grouping in this study and those of the external expert matched.

External validity is defined as the degree to which the results of a study can be applied to a larger population. A goal of quantitative research is to work to reduce the threats toward the external validity of the study (Creswell & Plano Clark, 2011). To limit the threats toward the validity of a study, researchers need to assess the content validity of the instrument used for data collection (Creswell & Plano Clark, 2011). As presented earlier in this chapter, three steps were taken to limit the threats to content validity. First, two experts from the field of formative assessments reviewed the instrument. Second, a small pilot was administered to a convenience sample that included elementary, middle, and high-school teachers. The pilot also included a middle-level principal. Third, a larger administration of the instrument occurred. This was followed by another review of the instrument and led to some adjustments to some questions and general verbiage.

The reliability of this instrument was tested during the data analysis phase of this study. The statistic, Cronbach's coefficient alpha, was used to assess reliability. Pallant (2010) declared that Cronbach's alpha is the most commonly used statistic to test
reliability as it provides an average correlation of all of the items on an instrument. She asserted that an acceptable level is above .7. After completing the calculation, the instrument used in this study had a Cronbach's alpha of .76.

**Summary**

The items presented in this chapter are related to the methodology employed in this research. Areas outlined included research design, population, and instrumentation. Research design was the first topic presented in this chapter. This is a quantitative study that utilized a single administration of a survey. A nonexperimental approach was used because many of the variables within the study were not subject manipulation by the researcher. This approach does provide some limitations to the conclusions that can be established from the research, however, it does permit the researcher to study the subjects within their natural environment.

The second principal element described in this chapter was the population and sample invited to participate in this study. This population was a representative sample of educators who served students from preschool through twelfth grade. All of the subjects invited attended the same formative assessment professional development. There were varying definitions of formative assessments and strategies used in the classroom. The intent was to utilize subjects who had a similar definition of formative assessments and who were trained to use similar strategies.

The instrument was designed to collect data containing each participant's demographic data, definition of formative assessment, and frequency of strategies used in the classroom. Experts in the field reviewed the survey for content validity. There was a small pilot with a convenience sample and a large administration of the survey. Questions
and verbiage within the survey were adjusted prior to full administration. Data collected from the survey were reviewed by using quantitative methods.
CHAPTER IV

As stated in the first chapter, this quantitative study explored teacher implementation of formative assessment strategies in the classroom. This chapter begins with survey information. There is a review of survey construction, description of survey distribution and completion, and results of reliability testing. Next is a summary of demographic information collected from those who completed the survey. In the previous chapter, there were two research questions with three sub-questions, and three stated hypotheses. The remaining sections of this chapter are organized by those specific questions and the hypotheses associated with each question.

Procedure

A single survey was created to collect quantitative data. Prior to the release of the survey, two experts in the field of education reviewed the instrument to check for content validity. Next, the survey was sent to a small group of elementary, middle, and high-school teachers, as well as a middle-school administrator. Following the small pilot study, the survey was released to a larger group of educators: 94 completed responses were received. The pilot responses were reviewed, and as a result, some changes were made to the survey questions.

The survey was sent via e-mail to 322 educators who attended the formative assessment support team (FAST) professional development program at Cleveland State University. Of those original 322 surveys sent, 110 bounced back as undeliverable. There were 212 surveys that were reported as successfully delivered. Of those 212 delivered surveys, 49 were submitted. After a review of the data, seven surveys were eliminated. This included two that were completed by administrators, four in which the subjects only
provided demographic information and one who provided a non-sense answer to the open-ended question. Following this reduction, 42 surveys were determined to be valid for this investigation. To test the survey for reliability, Cronbach’s alpha coefficient was used to assess the internal consistency. Palant (2010) identified Cronbach's coefficient alpha as one of the most commonly used indicators to assess internal consistency. According to Palant (2010), the ideal Cronbach coefficient for a scale should be above .7. In this study, the Cronbach alpha coefficient was .76.

**Demographics**

Each subject’s demographic information was collected through the survey instrument. The information collected was used to ensure that the participants in this study were classroom teachers who currently were working with students. Additionally, this information was used to determine if an educator's demographic information influenced that respondent's use of formative assessment strategies. Although, there were 49 respondents to this section, the number of responses fluctuated per question. Some subjects answered twice in an effort to clarify their demographics and others did not answer if not applicable.

**Grade Bands**

The target population for this study was comprised of classroom educators who were teaching students in grades kindergarten through twelfth grade at the time of their involvement in this investigation. Consequently, subjects were asked to identify the grade bands that best described their position. There was the ability for participants to write in descriptions of grade bands that were not present on the list. Table 4.1 shows the results regarding respondents' reported grade levels taught. There were fifty educators who
responded. Four respondents indicated that their assignments were not in the kindergarten through twelfth grade band. There were two educators who responded that their assignments were preschool (PK), and two who stated that they were school administrators. The decision was made to include the preschool teachers because the intent of this study was to illuminate the implementation of formative assessments in the classroom. These educators were working in school settings, classrooms, and directly with students. The respondents who reported that they were in administration were not directly teaching in a classroom; their responses when analyzing strategies were not used in this study.

Table 4.1

**Educator Grade Band**

<table>
<thead>
<tr>
<th>Answer Choices</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kindergarten - 1st Grade</td>
<td>4</td>
</tr>
<tr>
<td>Second - Third grade</td>
<td>6</td>
</tr>
<tr>
<td>Fourth - Fifth grade</td>
<td>13</td>
</tr>
<tr>
<td>Sixth - Seventh grade</td>
<td>8</td>
</tr>
<tr>
<td>Ninth - Twelfth grade</td>
<td>10</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td>9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>50</strong></td>
</tr>
</tbody>
</table>

**Teaching assignment**

For the purpose of this study, the information gathered regarding educators’ teaching assignments are as follows
• subject area taught;
• number of lessons planned;
• number of students; and
• general description of students.

Respondents were asked to identify the subject areas they were responsible for planning and teaching. They also were asked to report the number of lessons that they planned in a day. Additionally, participants were asked to identify the number of students they taught daily and to provide a general description of the student populations that they served.

**Subject area.** All of the participants who identified as classroom educators reported that they taught content area classes. The subjects, who identified themselves as administrators, indicated that they currently were not teaching in the classroom. As indicated in Table 4.2, there were no responses from teachers of special areas such as art, physical education, music, or world languages. Eighteen of the educators indicated that they taught multiple content areas. Open-ended responses to this question included slight clarifications of roles and resulted in 12 different combinations of subject areas. There were also teachers who identified themselves as instructors in special education. Special education is not a content area, but a population of students served. A description of the student population subjects served was collected after they identified the content areas taught. Therefore, that clarification is not necessary in this section.
Table 4.2

*Subject Area Taught*

<table>
<thead>
<tr>
<th>Subject Area</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Art</td>
<td>0</td>
</tr>
<tr>
<td>English/Language Arts</td>
<td>26</td>
</tr>
<tr>
<td>Mathematics</td>
<td>26</td>
</tr>
<tr>
<td>Music</td>
<td>0</td>
</tr>
<tr>
<td>Physical Education</td>
<td>0</td>
</tr>
<tr>
<td>Science</td>
<td>18</td>
</tr>
<tr>
<td>Social Studies</td>
<td>11</td>
</tr>
<tr>
<td>World Language(s)</td>
<td>0</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td>7</td>
</tr>
</tbody>
</table>

| Total Responses               | 46        |

**Number of lessons.** Respondents were asked to identify the number of lessons they planned and taught in a day. One reason for the clarification was that a teacher may be assigned one content area, but may teach different levels or subjects within that content area. For example, a high-school teacher may indicate that he or she teaches math. However, the educator may teach specific math subject areas such as algebra and geometry. Therefore, there would not be just one math lesson created daily. There would be a lesson for both algebra and geometry. This information was gathered for a deeper analysis within the demographics of subject areas taught by the educators in this investigation. There were four open-ended responses in this section. The two administrators noted that they did not plan for lessons. One respondent reported that it was necessary to plan for seven subjects per day. Table 4.3 contains a specific summary of the number of lessons respondents plan on a daily basis.
Table 4.3

Number of Lessons Planned

<table>
<thead>
<tr>
<th>Answer Choices</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 subject/lesson</td>
<td>9</td>
</tr>
<tr>
<td>2 subjects/lessons</td>
<td>17</td>
</tr>
<tr>
<td>3 subjects/lessons</td>
<td>7</td>
</tr>
<tr>
<td>4 subjects/lessons</td>
<td>6</td>
</tr>
<tr>
<td>5 subjects/lessons</td>
<td>7</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total Responses</strong></td>
<td><strong>46</strong></td>
</tr>
</tbody>
</table>

Number of students. The number of students that educators service per day can vary based upon their teaching assignments. Table 4.4 includes a summary of the responses from the subjects. Although the number of students served per day can vary, the most common ranges reported were 21-25 students, 61-100 students, and 101-125 students. All of these ranges shared the same percentage of responses (25.5%). There were no participants who reported that they served over 151 students per day.
Table 4.4

*Daily Average Number of Students*

<table>
<thead>
<tr>
<th>Answer Choices</th>
<th>Responses</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-20</td>
<td>3</td>
<td>6.38%</td>
</tr>
<tr>
<td>21-25</td>
<td>12</td>
<td>25.53%</td>
</tr>
<tr>
<td>26-30</td>
<td>1</td>
<td>2.13%</td>
</tr>
<tr>
<td>31-40</td>
<td>1</td>
<td>2.13%</td>
</tr>
<tr>
<td>41-60</td>
<td>3</td>
<td>6.38%</td>
</tr>
<tr>
<td>61-100</td>
<td>12</td>
<td>25.53%</td>
</tr>
<tr>
<td>101-125</td>
<td>12</td>
<td>25.53%</td>
</tr>
<tr>
<td>126-150</td>
<td>3</td>
<td>6.38%</td>
</tr>
<tr>
<td>151 or above</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td><strong>Total Responses</strong></td>
<td><strong>47</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Description of students.** The final question in the demographic collection section of the survey was included to identify a general description of the students the respondents in this study served. Table 4.5 contains a summary of the responses. Respondents were able to select a general description from a list. There also was a section so open-ended responses could be made; five open-ended responses were submitted. The respondents used the open-ended section to provide clarifying information more specific than the response choices provided. There were two cases where the open-ended responses were the only information provided. One subject identified his or her description of students as at-risk. The other described a co-teaching setting where there were both students with and without disabilities. The majority of the subjects described their students as being typically developing or diverse in which no major classification can be identified.
Table 4.5

*Description of Students*

<table>
<thead>
<tr>
<th>Answer Choices</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typically developing students</td>
<td>20</td>
</tr>
<tr>
<td>Students identified as needing special education</td>
<td>9</td>
</tr>
<tr>
<td>Students identified as gifted and talented</td>
<td>3</td>
</tr>
<tr>
<td>Students identified as second language students</td>
<td>0</td>
</tr>
<tr>
<td>My students are diverse; there is not major type.</td>
<td>15</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total Responses</strong></td>
<td><strong>47</strong></td>
</tr>
</tbody>
</table>

**Definition of Formative Assessment**

A criticism of formative assessment research has been that there are varying definitions of formative assessments (Dunn & Mulvenon, 2009). Although all participants attended the same formative assessment training, it was not assumed that all would have the same definition. First, respondents were asked to define formative assessment. The definitions provided by the educators were compared to the definition used in their common training. The instructor who provided the professional development to these subjects defined formative assessments as "formal and informal processes teachers and students use to gather information for the purposes of learning" (Chappuis, 2009, p. 5). This definition is segmented into two parts. First, is that collection of information can occur by using any means. Second, the information gathered is used to adjust teaching and learning (Chappuis, 2009). The definitions provided were reviewed to include both the collection of information and the use of that information to adjust teaching and learning. Table 4.6 depicts the analysis of the definitions provided by the subjects. There was one respondent who offered a nonsense answer. As a result, the
subject's responses were removed from the study. All of the responses identified the first component of using formative assessments to gather information about student learning. However, only half of the respondents identified the second component, which is using the information gathered to guide or adjust instruction.

In this study, an assumption was made that there could be inconsistent responses regarding the definition of formative assessment. Therefore, the definition that was presented to them in their training and used in this study was provided to them after they submitted their open-ended answers on the survey. The definition was specified prior to the subjects responding to the questions about the implementation of formative assessment strategies in the classroom.

Table 4.6

<table>
<thead>
<tr>
<th>Definition Contains</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gather information only</td>
<td>21</td>
</tr>
<tr>
<td>Gather information and guide instruction</td>
<td>21</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
</tr>
</tbody>
</table>

**Research Questions and Hypothesis**

Data analysis was performed on the results gathered through this survey with a focus on answering the research questions and sub-questions identified in this investigation. Each question was accompanied by at least one hypothesis. Research questions and sub-questions were presented along with the associated hypothesis. There are three themes associated with these questions. First was the overall frequency of use of
formative assessment strategies. Second was the use of teacher- and student-driven strategies. Third is the use of formative assessment strategies by operational step.

**Overall Frequency**

The first research question was "How frequently are educators utilizing formative assessment strategies in their lessons?" The hypothesis associated with this question was that "Teachers in this study will report a high frequency of formative assessment strategies used in lessons." To collect this information, a 5-point Likert scale was created. It was structured in a positive direction. Therefore, higher scores are associated with a higher frequency of implementation. The responses and associated Likert scores are displayed in Table 4.7. Respondents were asked to rate the use of each strategy based on a usage range between "Do Not Use" and "Daily."

**Table 4.7**

*Likert Scale*

<table>
<thead>
<tr>
<th>Likert Response</th>
<th>Likert Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily</td>
<td>5</td>
</tr>
<tr>
<td>Once or Twice per Week</td>
<td>4</td>
</tr>
<tr>
<td>Monthly</td>
<td>3</td>
</tr>
<tr>
<td>Quarterly</td>
<td>2</td>
</tr>
<tr>
<td>Do Not Use</td>
<td>1</td>
</tr>
</tbody>
</table>

A frequency chart was created to display the responses participants provided regarding the use of different formative assessment strategies. Table 4.8 shows the frequency educators reported using each specific strategy. It also contains the average for each
strategy based upon the subjects' responses. The average was calculated per strategy by using the Likert score associated with each response.

Table 4.8

*Frequency of Formative Assessment Use*

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Daily (5)</th>
<th>Once or Twice a Week (4)</th>
<th>Monthly (3)</th>
<th>Quarterly (2)</th>
<th>Do not use (1)</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>I post learning targets (LT) for what I am currently teaching.</td>
<td>30</td>
<td>3</td>
<td>6</td>
<td>0</td>
<td>3</td>
<td>4.36</td>
</tr>
<tr>
<td>I provide my students with LT that are in student-friendly language.</td>
<td>32</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>4.49</td>
</tr>
<tr>
<td>I provide my students with checklists and/or rubrics that are teacher- or commercially made.</td>
<td>6</td>
<td>14</td>
<td>11</td>
<td>5</td>
<td>6</td>
<td>3.21</td>
</tr>
<tr>
<td>I help my students develop checklists and/or rubrics.</td>
<td>0</td>
<td>3</td>
<td>7</td>
<td>10</td>
<td>22</td>
<td>1.79</td>
</tr>
<tr>
<td>I provide my students with models or examples of anonymous student work at various levels of quality.</td>
<td>2</td>
<td>9</td>
<td>18</td>
<td>7</td>
<td>6</td>
<td>2.86</td>
</tr>
<tr>
<td>I gather real-time evidence of student learning simultaneously from all of my students with quick-check techniques like clickers, ABC cards, white boards and/or thumbs-up.</td>
<td>25</td>
<td>14</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>4.45</td>
</tr>
<tr>
<td>In my classroom, students act as instructional resources to each other.</td>
<td>19</td>
<td>17</td>
<td>4</td>
<td>0</td>
<td>2</td>
<td>4.21</td>
</tr>
</tbody>
</table>

*Note.* For average, each frequency assigned a Likert Score. Average calculated by strategy. 1 = Do not use; 2 = Quarterly; 3 = Monthly; 4 = Once or twice per week; 5 = Daily.

(continued)
Table 4.8 (continued)

*Frequency of Formative Assessment Use*

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Daily (5)</th>
<th>Once or Twice a Week (4)</th>
<th>Monthly (3)</th>
<th>Quarterly (2)</th>
<th>Do not use (1)</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>I provide descriptive feedback to my students about their performance.</td>
<td>14</td>
<td>23</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>4.21</td>
</tr>
<tr>
<td>My students provide each other with descriptive feedback.</td>
<td>2</td>
<td>14</td>
<td>13</td>
<td>6</td>
<td>7</td>
<td>2.95</td>
</tr>
<tr>
<td>My students are provided the opportunity to self-assess and set goals (i.e. Stars and Steps)</td>
<td>1</td>
<td>8</td>
<td>16</td>
<td>11</td>
<td>6</td>
<td>2.69</td>
</tr>
<tr>
<td>My students are given time to revise their work based upon feedback they receive.</td>
<td>10</td>
<td>18</td>
<td>13</td>
<td>1</td>
<td>0</td>
<td>3.88</td>
</tr>
<tr>
<td>My students engage in self-reflection about the quality of their work.</td>
<td>4</td>
<td>10</td>
<td>17</td>
<td>6</td>
<td>4</td>
<td>3.1</td>
</tr>
<tr>
<td>My students monitor their learning over time, using record keeping techniques.</td>
<td>4</td>
<td>8</td>
<td>7</td>
<td>7</td>
<td>14</td>
<td>2.53</td>
</tr>
<tr>
<td>I adjust the sequence and pacing of my instruction, based upon information gathered from ongoing formative assessments.</td>
<td>32</td>
<td>8</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>4.71</td>
</tr>
<tr>
<td>I target my instruction to learning gaps, misconceptions, or other incomplete understandings identified through formative feedback.</td>
<td>29</td>
<td>9</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>4.52</td>
</tr>
</tbody>
</table>

*Note.* For average, each frequency assigned a Likert Score. Average calculated by strategy. 1 = Do not use; 2 = Quarterly; 3 = Monthly; 4 = Once or twice per week; 5 = Daily.
The average that was calculated for each formative assessment strategy is presented in Figure 4.1 as a bar chart. This is intended to visually display the average frequency of use by strategy. The research question and hypothesis target the frequency of the use of formative assessments. The information displayed in Figure 4.1 shows that 7 out of the 15 formative assessment strategies in the survey have an average in the range between “Once or Twice a Week” and "Daily." Only one strategy was in the range between "Do Not Use" and "Quarterly."

**Figure 4.1.** Chart of Frequency of Formative Assessment Use. Average is calculated per strategy using Likert Score. 1 = Do not use; 2 = Quarterly; 3 = Monthly; 4 = Once or twice per week; 5 = Daily.

**Discussion**

The frequency of each strategy was reviewed individually and as an average. The frequency distribution was presented in Table 4.8. In Figure 4.1, the average of each strategy was presented in the form of a bar graph. The data displayed in this section does
answer my research question regarding the frequency of use of formative assessment strategies. The evidence also supported my hypothesis that teachers would report a high frequency of use of formative assessment strategies. In this investigation, seven of the 15 strategies surveyed were identified as being used between “Once or Twice a Week” and "Daily". Moreover, educators reported that three additional strategies were used between “Once or Twice a Week” and “Monthly.”

**Student- and Teacher-Driven Strategies**

The second research question in this study was "To what extent are educators utilizing the formative assessment process to improve student learning?" Using the formative assessment process to improve student learning was specified in the sub-questions. The intent of the questions was to determine if teachers were using strategies that engaged students in the learning process and if strategies associated with all steps of the formative assessment process were used. The three subquestions associated with this question. They were as follows: (a) To what extent are educators utilizing teacher-driven strategies? (b) To what extent are educators utilizing student-driven strategies? (c) To what extent are educators utilizing strategies that follow Chappuis' process?

There were also two hypotheses associated with this research question:

1. Teacher-driven strategies will greatly outweigh student-driven strategies.
2. Strategies utilized will not encompass all of the steps in Chappuis’ (2009) process.

A strategy is determined to be student- or teacher-driven depending on who is performing the action. Table 4.9 contains a list of strategies used in this study. Each strategy is described as either student- or teacher-driven.
Table 4.9

**Student- and Teacher-Driven Strategies**

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Student- or Teacher-Driven</th>
</tr>
</thead>
<tbody>
<tr>
<td>I post learning targets for what I am currently teaching.</td>
<td>Teacher</td>
</tr>
<tr>
<td>I provide my students with learning targets that are in student-friendly language.</td>
<td>Teacher</td>
</tr>
<tr>
<td>I provide my students with checklists and/or rubrics that are teacher- or commercially made.</td>
<td>Teacher</td>
</tr>
<tr>
<td>I help my students develop checklists and/or rubrics.</td>
<td>Student</td>
</tr>
<tr>
<td>I provide my students with models or examples of anonymous student work at various levels of quality.</td>
<td>Teacher</td>
</tr>
<tr>
<td>I gather real-time evidence of student learning simultaneously from all of my students with quick-check techniques like clickers, ABC cards, white boards and/or thumbs-up.</td>
<td>Teacher</td>
</tr>
<tr>
<td>In my classroom, students act as instructional resources to each other.</td>
<td>Student</td>
</tr>
<tr>
<td>I provide descriptive feedback to my students about their performance.</td>
<td>Teacher</td>
</tr>
<tr>
<td>My students provide each other with descriptive feedback.</td>
<td>Student</td>
</tr>
<tr>
<td>My students are provided the opportunity to self-assess and set goals (e.g. Stars and Steps).</td>
<td>Student</td>
</tr>
</tbody>
</table>

*Note.* Either student or teacher as the primary driver of action used to categorize strategies.

(continued)
Table 4.9 (continued)

*Student- and Teacher-Driven Strategies*

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Student- or Teacher-Driven</th>
</tr>
</thead>
<tbody>
<tr>
<td>My students are given time to revise their work based upon feedback they receive.</td>
<td>Student</td>
</tr>
<tr>
<td>My students engage in self-reflection about the quality of their work.</td>
<td>Student</td>
</tr>
<tr>
<td>My students monitor their learning over time, using recordkeeping techniques.</td>
<td>Student</td>
</tr>
<tr>
<td>I adjust the sequence and pacing of my instruction, based upon information gathered from ongoing formative assessments.</td>
<td>Teacher</td>
</tr>
<tr>
<td>I target my instruction to learning gaps, misconceptions, or other incomplete understandings identified through formative feedback.</td>
<td>Teacher</td>
</tr>
</tbody>
</table>

*Note.* Either student or teacher as the primary driver of action used to categorize strategies.

The average of each strategy was used to compare the frequency of use between student- and teacher-driven strategies. In Figure 4.2, strategies are listed from the highest frequency to the lowest frequency of use. The top five, most frequently used strategies, were all driven by the teacher. In comparison, the student drives four out of the five least frequently used strategies. Furthermore, six out of eight least frequently used strategies are student-driven.
**Teacher-Student Driven**

Figure 4.2. Average frequency of teacher- and student-driven formative assessment strategies. Average is calculated per strategy using Likert Score. Strategies arranged in descending order based upon average. 1 = Do not use; 2 = Quarterly; 3 = Monthly; 4 = Once or twice per week; 5 = Daily.

The average of all student-driven strategies was 3.02. The average of all teacher-driven strategies was 4.10. Figure 4.3 shows the average of all student- and teacher-driven strategies on a continuum. This continuum ranges from “Do Not Use” (1) to “Daily” (5). The average for the use of teacher-driven strategies was 4.10. On the continuum, an average of 4.10 places the frequency of use for these strategies slightly above “Once or Twice a Week.” The average for the use of student-driven strategies is
3.02. On the continuum, an average of 3.02 places the frequency of use for these strategies slightly above “Monthly.”

![Figure 4.3](image)

*Figure 4.3. Average of the use of teacher- and student-driven strategies. Strategies are categorized as either student- or teacher-driven. Likert Score is used to calculate average of all strategies in each category. 1 = Do not use; 2 = Quarterly; 3 = Monthly; 4 = Once or twice per week; 5 = Daily.*

If teacher-driven strategies were used “Once or Twice a Week”, that could be up to four to eight times per month. If student-driven strategies averaged an overall use of “Monthly,” teacher-driven strategies would be used much more frequently. As a result, teacher-driven strategies could be used four to eight times more frequently per month as compared to student-driven strategies.
Discussion

Strategies were categorized as either student- or teacher-driven by the primary driver of action of each strategy. Strategies in which the teacher was the primary driver of action were categorized as teacher-driven strategies. Those in which the student was the primary driver of action were categorized as student-driven strategies. Reviewing teacher- and student-driven strategies individually suggested that individual teacher-driven strategies were used more frequently than student-driven strategies. Furthermore, when the mean of all teacher-driven strategies was compared to the mean of all student-driven strategies it appeared that teacher-driven strategies were used each week while student-driven strategies averaged a “Monthly” use. This data did produce evidence to support my hypothesis that the use of teacher-driven strategies would greatly outweigh the use of student-driven strategies.

Operational Structure

The formative assessment process is intended to progress students through the process of clarifying a learning target, identifying where a student is in relation to the target, and closing the gap between the student's current state and the intended goal. Chappuis (2009) presented these steps in the following, student-centered, structure:

1. Where am I going?
2. Where am I now?
3. How do I close the gap?

The survey used in this study included strategies from each of these steps. There were 15 total strategies surveyed. This included five strategies from each step. All strategies and the step associated with the strategy are listed in Table 4.10.
Table 4.10

**Strategies and Chappuis Step**

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Chappuis Step</th>
</tr>
</thead>
<tbody>
<tr>
<td>I post learning targets for what I am currently teaching.</td>
<td>Where am I going?</td>
</tr>
<tr>
<td>I provide my students with learning targets that are in student-friendly</td>
<td>Where am I going?</td>
</tr>
<tr>
<td>language.</td>
<td></td>
</tr>
<tr>
<td>I provide my students with checklists and/or rubrics that are teacher-</td>
<td>Where am I going?</td>
</tr>
<tr>
<td>or commercially made.</td>
<td></td>
</tr>
<tr>
<td>I help my students develop checklists and/or rubrics.</td>
<td>Where am I going?</td>
</tr>
<tr>
<td>I provide my students with models or examples of anonymous student</td>
<td>Where am I going?</td>
</tr>
<tr>
<td>work at various levels of quality.</td>
<td></td>
</tr>
<tr>
<td>I gather real-time evidence of student learning simultaneously from all</td>
<td>Where am I now?</td>
</tr>
<tr>
<td>of my students with quick-check techniques like clickers, ABC cards,</td>
<td></td>
</tr>
<tr>
<td>white boards and/or thumbs-up.</td>
<td></td>
</tr>
<tr>
<td>In my classroom, students act as instructional resources to each other.</td>
<td>Where am I now?</td>
</tr>
<tr>
<td>I provide descriptive feedback to my students about their performance.</td>
<td>Where am I now?</td>
</tr>
<tr>
<td>My students provide each other with descriptive feedback.</td>
<td>Where am I now?</td>
</tr>
<tr>
<td>My students are provided the opportunity to self-assess and set goals</td>
<td>Where am I now?</td>
</tr>
<tr>
<td>(e.g. Stars and Steps).</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Strategies are categorized by the correlating step in Chappuis (2009) operational structure.

(continued)
Table 4.10 (continued)

*Strategies and Chappuis Step*

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Chappuis Step</th>
</tr>
</thead>
<tbody>
<tr>
<td>My students are given time to revise their work based upon feedback they receive.</td>
<td>How do I close the gap?</td>
</tr>
<tr>
<td>My students engage in self-reflection about the quality of their work.</td>
<td>How do I close the gap?</td>
</tr>
<tr>
<td>My students monitor their learning over time, using recordkeeping techniques.</td>
<td>How do I close the gap?</td>
</tr>
<tr>
<td>I adjust the sequence and pacing of my instruction, based upon information gathered from ongoing formative assessments.</td>
<td>How do I close the gap?</td>
</tr>
<tr>
<td>I target my instruction to learning gaps, misconceptions, or other incomplete understandings identified through formative feedback.</td>
<td>How do I close the gap?</td>
</tr>
</tbody>
</table>

*Note.* Strategies are categorized by the correlating step in Chappuis (2009) operational structure.

The responses from subjects indicated that there does not appear to be a large discrepancy associated with strategies when viewed by step in the formative assessment process. Figure 4.4 is a bar chart of formative assessment strategies. The averages for the strategies are listed from the most to least frequently used strategies. All of the strategies are represented at the top and bottom of the range.
Figure 4.4. Average use of formative assessment strategies by Chappuis' steps. Average is calculated per strategy using Likert Score. Strategies arranged in descending order based upon average. 1 = Do not use; 2 = Quarterly; 3 = Monthly; 4 = Once or twice per week; 5 = Daily.

When viewing the seven most frequently used strategies, two are from the steps "Where am I going?" and How do I close the gap?" There are three strategies from the step "Where am I now?" All seven of these strategies averaged a range of use between “Once or Twice a Week” and “Daily.” Similarly, of the seven least frequently used strategies, there are three strategies associated with the step "Where am I going?" and two strategies from both "Where am I now?" and "How do I close the gap?"
Strategies within the "Where am I going?" step were designed to provide a clear vision for the student in regard to the learning target set by the teacher. Table 4.11 contains each of the strategies in the survey that are associated with this step and shows specific data for the strategies within this step of the formative assessment process. The first two strategies of posting learning targets and posting student-friendly learning targets are similar. Both provide an overview of what generally is expected from the students. The data indicate that both strategies were used frequently. In this investigation, 33 out of 42 (78.6%) teachers reported that they posted learning targets between “Once or Twice a Week” and “Daily.” Additionally, 35 out of 41 (85.4%) teachers responded that they posted student-friendly learning targets in the range between “Once or twice a week” and “Daily.” Rubrics are used to provide more detail of expectations for student work. There are two strategies regarding rubrics. The difference is who created the rubric, the student or the teacher. Rubrics created by the teacher are reportedly used by 47.6% of the respondents in the range of “Once or Twice a Week” and “Daily.” Rubrics created by the student were used only "Once or Twice a Week" by 7.1% of the respondents. The strategy in which students created rubrics was the least frequently used strategy in the survey with 52.4% of the respondents indicating that they "Do Not Use" this strategy. The final strategy presented in Table 4.11 is the use of student work to model strong and weak examples. Although 26.2% of respondents reported that this strategy was used between "Once or Twice a Week" and "Daily," the largest group of the teachers (42.9%) used it “Monthly.”
Table 4.11

*Frequency of strategies used--Where am I going?*

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Do not use (1)</th>
<th>Quarterly (2)</th>
<th>Monthly (3)</th>
<th>Once or twice per week (4)</th>
<th>Daily (5)</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Targets--Posted</td>
<td>3</td>
<td>0</td>
<td>6</td>
<td>3</td>
<td>30</td>
<td>4.36</td>
</tr>
<tr>
<td>Targets--Student-friendly</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>32</td>
<td>4.49</td>
</tr>
<tr>
<td>Rubrics, Teacher- or commercially-created</td>
<td>6</td>
<td>5</td>
<td>11</td>
<td>14</td>
<td>6</td>
<td>3.21</td>
</tr>
<tr>
<td>Rubrics, Student-created</td>
<td>22</td>
<td>10</td>
<td>7</td>
<td>3</td>
<td>0</td>
<td>1.79</td>
</tr>
<tr>
<td>Work samples of various levels of quality</td>
<td>6</td>
<td>7</td>
<td>18</td>
<td>9</td>
<td>2</td>
<td>2.86</td>
</tr>
</tbody>
</table>

*Note.* For average, each frequency assigned a Likert Score. Average calculated by strategy. 1 = Do not use; 2 = Quarterly; 3 = Monthly; 4 = Once or twice per week; 5 = Daily.

Strategies associated with the step "Where am I now?" were designed to identify a student's current state in regard to the learning goal. Strategies are used to identify the current state and provide feedback to both the teacher and student. Table 4.12 shows the data associated with "Where am I now?" This step had three out of five strategies reportedly used between "Once or Twice a Week" and "Daily" by over 80% of the respondents. They were as follows:

1. Gather real-time evidence (92.8%);
2. Teacher providing feedback (88.1%); and
3. Students as instructional resources (85.2%).
The strategy in which students provided feedback to each other had the largest frequency of use between "Monthly" and "Once or Twice a Week" (64.3%). The final strategy in this step was when students self-assessed and set goals. This strategy had the lowest frequency in this section. Concerning this strategy, 64% of respondents reported a frequency of use between "Quarterly" and "Monthly."

Table 4.12

*Frequency of strategies used--Where am I now?*

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Do not use (1)</th>
<th>Quarterly (2)</th>
<th>Monthly (3)</th>
<th>Once or twice per week (4)</th>
<th>Daily (5)</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gather real-time evidence.</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>14</td>
<td>25</td>
<td>4.45</td>
</tr>
<tr>
<td>Students act as instructional</td>
<td>2</td>
<td>0</td>
<td>4</td>
<td>17</td>
<td>19</td>
<td>4.21</td>
</tr>
<tr>
<td>resource</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachers provide feedback.</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>23</td>
<td>14</td>
<td>4.21</td>
</tr>
<tr>
<td>Students provide each other</td>
<td>7</td>
<td>6</td>
<td>13</td>
<td>14</td>
<td>2</td>
<td>2.95</td>
</tr>
<tr>
<td>feedback</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students self-assess and set</td>
<td>6</td>
<td>11</td>
<td>16</td>
<td>8</td>
<td>1</td>
<td>2.69</td>
</tr>
<tr>
<td>goals.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* For average, each frequency assigned a Likert Score. Average calculated by strategy. 1 = Do not use; 2 = Quarterly; 3 = Monthly; 4 = Once or twice per week; 5 = Daily.

The first two strategies in the formative assessment process are designed to set the targets for learning and to identify the distance a student is from the learning target. The final step of "How do I close the gap?" is intended to bring the student closer from the current state to the desired target. The most frequently used strategies in this section
revolved around teachers adjusting their lessons and curriculum based upon information
gathered from formative assessments. Two strategies had a large percentage of educators
responding in a range of "Once or Twice a Week" and "Daily." They are as follows:

1. I target my instruction to learning gaps, misconceptions, or other incomplete
   understandings identified through formative feedback (90.4%).

2. I adjust the sequence and pacing of my instruction, based upon information
   gathered from ongoing formative assessments (95.2%).

One of the least frequently used strategies is found within this step. Educators reported
that 35% of those surveyed do not have students monitor their learning over time. This is
the second highest percentage of a strategy not being used. This information is displayed
in Table 4.13.

Table 4.13

*Frequency of Strategies Used by Chappuis’ Step--How do I close the gap?*

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Do not use (1)</th>
<th>Quarterly (2)</th>
<th>Monthly (3)</th>
<th>Once or twice per week (4)</th>
<th>Daily (5)</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students revise work.</td>
<td>0</td>
<td>1</td>
<td>13</td>
<td>18</td>
<td>10</td>
<td>3.88</td>
</tr>
<tr>
<td>Students engage in self-reflection</td>
<td>4</td>
<td>6</td>
<td>17</td>
<td>10</td>
<td>4</td>
<td>3.1</td>
</tr>
<tr>
<td>quality of work</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students monitor work over time.</td>
<td>14</td>
<td>7</td>
<td>7</td>
<td>8</td>
<td>4</td>
<td>2.53</td>
</tr>
</tbody>
</table>

*Note.* For average, each frequency assigned a Likert Score. Average calculated by
strategy. 1 = Do not use; 2 = Quarterly; 3 = Monthly; 4 = Once or twice per week; 5 =
Daily.

(continued)
Table 4.13 (continued)

*Frequency of Strategies Used by Chappuis' Step--How do I close the gap?*

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Do not use (1)</th>
<th>Quarterly (2)</th>
<th>Monthly (3)</th>
<th>Once or twice per week (4)</th>
<th>Daily (5)</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher adjusts pacing and sequence based upon evidence.</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>8</td>
<td>32</td>
<td>4.71</td>
</tr>
<tr>
<td>Teacher targets instruction based upon evidence.</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>9</td>
<td>29</td>
<td>4.52</td>
</tr>
</tbody>
</table>

*Note.* For average, each frequency assigned a Likert Score. Average calculated by strategy. 1 = Do not use; 2 = Quarterly; 3 = Monthly; 4 = Once or twice per week; 5 = Daily.

The average of each strategy was calculated per strategy based upon the Likert score. Each step in Chappuis' (2009) formative assessment process is listed in Table 4.14 along with the number of strategies within a range based upon the average. The ranges are between

1. Do not use--Quarterly
2. Quarterly--Monthly
3. Monthly--Once or Twice a Week
4. Once or Twice a Week--Daily

The step "Where am I going?" had two strategies average a frequency between the range of "Once or Twice a Week" and "Daily." There was also one strategy in each of the other ranges. The step described as "Where am I going?" had three strategies that ranged between "Once or Twice a Week" and "Daily." This is the highest of all steps. The final step of the process, "How do I close the gap?" had two strategies that averaged a
frequency between "Once or Twice a Week" and "Daily." This step also had four out of five strategies range between "Monthly" and "Daily." No gap-closing strategy or "Where am I now?" strategy ranged in the lowest section between "Do Not Use" and "Quarterly."

Table 4.14

*Frequency of Formative Assessment Strategies by Chappuis Step*

<table>
<thead>
<tr>
<th>Range of Usage</th>
<th>Where am I going?</th>
<th>Where am I now?</th>
<th>How do I close the gap?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily--Once or Twice a Week</td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Once or Twice a Week--Monthly</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Monthly--Quarterly</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Quarterly--Do not use</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

*Note.* Average is calculated per strategy using Likert Score. Based upon calculated average, the number of strategies within each range is identified. 1 = Do not use; 2 = Quarterly; 3 = Monthly; 4 = Once or twice per week; 5 = Daily.

Finally, the averages of all of the strategies within each of Chappuis' (2009) steps were calculated. Each step was categorized by function within the operational structure. The Likert scores were used to compute the total average of use for strategies within each step. These averages are displayed in Table 4.15. All of the frequency averages for each of the strategies were in the range between “Monthly” and “Once or twice a week.” Specifically, the average of strategies in the category of "Where am I going?" was 3.34; "Where am I now?" strategies averaged 3.70; and strategies categorized as "How do I close the gap?" averaged a usage rate of 3.74.
Table 4.15

*Average of Formative Assessment Strategies by Chappuis' Step*

<table>
<thead>
<tr>
<th>Operational Step</th>
<th>Average</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Where am I going?</td>
<td>3.34</td>
<td>Once or Twice a Week--Monthly</td>
</tr>
<tr>
<td>Where am I now?</td>
<td>3.70</td>
<td>Once or Twice a Week--Monthly</td>
</tr>
<tr>
<td>How do I close the gap?</td>
<td>3.74</td>
<td>Once or Twice a Week--Monthly</td>
</tr>
</tbody>
</table>

*Note.* Strategies are categorized by step in Chappuis' (2009) operational structure. Likert Score is used to calculate average of all strategies in each category. 1 = Do not use; 2 = Quarterly; 3 = Monthly; 4 = Once or twice per week; 5 = Daily.

**Discussion**

Each strategy used in this survey had a purpose and was associated with a step in Chappuis' (2009) formative assessment process. In this section, strategies were categorized by step. Each strategy was presented individually with every response that was submitted. The averages of each strategy were also studied within the step they represented. Finally, the strategies from each step were averaged by using Likert scores and were presented along with the average range of usage reported by educators. The evidence in this study did not support the hypothesis that the strategies utilized would not encompass all of the steps in Chappuis’ (2009) process. Teachers did use strategies from each of the operational steps. In fact, the usage averages for each step were within the same range of usage.

**Correlations**

The purpose of this study was to research the breadth of implementation of formative assessment strategies in classrooms. The analysis focused on frequency data.
An additional level of analysis was performed. Correlational tests were performed between each demographic collected and the frequency average of

- student-driven strategies;
- teacher-driven strategies; and
- each of Chappuis' formative assessment steps (Where am I going? Where am I now? and How do I close the gap?).

The intent of this correlational analysis was to research if a subject's demographic information had an impact on the breadth of implementation. This information was analyzed by using Spearman's correlation coefficient, or Spearman's rho. A significant correlation was found between

- subject area taught and average of student-driven strategies; and
- subject area and average of gap-closing strategies.

It should be noted that the 42 valid responses were used to gather demographic information. This collection led to 12 different subject area combinations. With the number of respondents and the amount of subject area combinations, there was a concern that the category of subject area taught could be diluted. Pallant (2010) warned that small sample sizes could make it difficult to generalize the findings. Nevertheless, statistically significant correlations did exist. As displayed in Table 4.16, there was a medium positive correlation between subject area taught and the average frequency of use of student driven strategies, $r = .421$, $n = 42$, $p = .006$. The coefficient of determination ($R^2$) was also calculated to assist in determining how much variability is shared by these variables. In this case, $R^2 = .18$. This indicated that an educator's subject area taught could account for 18% of the variability in the use of student-driven strategies.
Table 4.16

*Correlation Between Subject Area Taught and Student-Driven Strategies*

<table>
<thead>
<tr>
<th>Spearman's rho</th>
<th>Subject Taught</th>
<th></th>
<th>Average Student Driven</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Correlation Coefficient</td>
<td>1.000</td>
<td>.421**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.</td>
<td>.006</td>
</tr>
<tr>
<td>N</td>
<td>46</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>Average Student</td>
<td>Correlation Coefficient</td>
<td>.421**</td>
<td>1.000</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.006</td>
<td>.</td>
</tr>
<tr>
<td>N</td>
<td>42</td>
<td>42</td>
<td></td>
</tr>
</tbody>
</table>

*Note.*

**. Correlation is significant at the 0.01 level (2-tailed).

The other statistically significant correlation, presented in Table 4.17, was between an educator's subject area taught and the average frequency of use of closing-the-gap strategies. There was a medium positive correlation, r = .406, n = 42, p = .008. The coefficient of determination (R2) was .16. This information indicated that an educator's subject area taught could account for 16% of the variability in the use of gap-closing strategies.
Table 4.17

*Correlation Between Subject Area Taught and Gap-Closing Strategies*

<table>
<thead>
<tr>
<th>Spearman's rho</th>
<th>Subject Taught</th>
<th>Correlation Coefficient</th>
<th>Sig. (2-tailed)</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Subject Taught</td>
<td>Correlation</td>
<td>Sig. (2-tailed)</td>
<td>N</td>
</tr>
<tr>
<td>Spearman's rho</td>
<td>Subject Taught</td>
<td>1.000</td>
<td>.</td>
<td>46</td>
</tr>
<tr>
<td>AvgGap</td>
<td>Correlation</td>
<td>.406**</td>
<td>.008</td>
<td>42</td>
</tr>
</tbody>
</table>

| AvgGap         | Correlation    | 1.000                    | .               | 42 |
| N              | Correlation    | .406**                   | .008            | 42 |

Note.
**. Correlation is significant at the 0.01 level (2-tailed).

**Summary**

Chapter IV provided an overview of the procedure followed to collect data utilized in this investigation. Afterward, the data collected were presented. The structure of the chapter followed the research questions and hypotheses. The questions and sub questions were answered. Furthermore, the determinations for each of the three hypotheses also were included. In short, the evidence provided in this chapter appeared to support two out of the three hypotheses.

Chapter V begins with a detailed overview of the entire investigation. Next, there is a detailed discussion of the data collected in this investigation. The data are connected to literature that was reviewed earlier in this investigation. Furthermore, the chapter provides implications for action as well as recommendations for future research.
CHAPTER V

Chapter V provides a summary of this quantitative study. It begins with an overview of the problem, review of the purpose statement, research questions, and hypotheses. The chapter continues with a review of the methodology used and a discussion of results. Chapter V concludes with implications for actions and recommendations for future research.

Overview of Problem

Accountability has been a significant topic in public school districts. Since the passage of No Child Left Behind (NCLB), there has been an increase in student testing (Chappuis & Chappuis, 2008). There has also been a shift in accountability measures imposed on school districts. Early measures had a focus on student achievement. The number of students who would be considered proficient on a state level assessment determined a school district’s performance on accountability measures. Currently, school districts are still held accountable based upon achievement, however, school districts are also measured based upon student growth measures. In 2003, the State of Ohio implemented the provisions from NCLB and included a measure called "value added" that was intended to measure the growth component (Stump, 2003). Starting in the 2014-2015 school year, principal and teacher evaluations were revised to reflect a mandate to value added or growth measures.

The addition of student performance data on teacher and principal evaluations connected school district-level accountability to individual educators. Educators were researching initiatives that could influence growth. The formative assessment process has been identified as a classroom approach that can be effective in the classroom to promote
both growth and achievement. Moreover, researchers have described the formative assessment process as "perhaps one of the most important interventions for promoting high performance ever studied" (Keeley, 2007, p. 64). In order to benefit from the formative assessment process, teachers need to figure out a way to incorporate these strategies purposefully into their daily lessons (Black & Wiliam, 2003). The Ohio Department of Education (ODE) supported the use of formative assessments and partnered with an organization named Battelle for Kids (2017) to create a program to help school districts train staff. In addition to ODE's program, other organizations offered formative assessment training for educators.

Research regarding teacher training and the impact on classroom implementation is not promising. In fact, while professional development has been embedded in educational practice for years, there is little evidence that it has made any difference in student achievement (Jonsson et al., 2014). This is especially concerning because in order for the formative assessment process to be effectively used in classrooms, teachers need to change their practices to purposefully incorporate these strategies into their lessons. There is significant research published regarding the benefits of formative assessments. However, there is less research available regarding the breadth and quality of the implementation of the formative assessment process (Wylie & Lyon, 2015). In summary, educators are turning to a process to help with growth and achievement that relies upon being integrated into classroom lessons. However, professional development has not had a significant impact on student achievement and there is limited research focused on the implementation of formative assessment strategies.
Purpose of Study and Research Questions

The purpose of this quantitative study is to investigate the breadth of implementation of formative assessment strategies in the classroom with a focus on student improvement. For the purposes of this study, the use of formative assessment strategies, the operational use of the formative assessment process, and the engagement of students as active learners defined the focus on student improvement. The research questions and subquestions examined in this study were as follows:

1. How frequently are educators utilizing formative assessment strategies in their lessons?

2. To what extent are educators utilizing the formative assessment process to improve student learning?
   a. To what extent are educators utilizing teacher-driven strategies?
   b. To what extent are educators utilizing student-driven strategies?
   c. To what extent are educators utilizing strategies that follow Chappuis' (2009) process?

This study also contained three hypotheses. They were as follows:

1. Teachers in this study will report a high frequency of formative assessment strategies used in lessons.

2. Teacher-driven strategies will greatly outweigh student-driven strategies.

3. Strategies utilized will not encompass all of the steps in Chappuis’ (2009) process.
Methodology

This quantitative study employed a nonexperimental research approach and was completed to illuminate the breadth of use of formative assessment strategies by classroom teachers. Specifically, the intent was to identify: (a) the frequency in which formative assessments were being used, (b) the use of student- and teacher-driven strategies, (c) the use of formative assessment strategies within an operational structure.

The participants in this study were all preschool--12th grade educators, from Northeast Ohio, who currently are teaching in the classroom. These educators participated in the same formative assessment training. Although all of the subjects in this study participated in the same professional development, it was not the intent for this study to make any judgment regarding the training the teachers attended. The purpose of including educators who attended the same training program was to attempt to control for varying definitions of formative assessments and multiple strategies that could be utilized in the process. All participants received the same resources and were exposed to the same definition of formative assessment and formative assessment strategies. The purpose was to investigate the action taken by the teachers upon returning to the classroom.

A single survey was created for this study. There were three components to the survey designed for the collection of

1. demographic information;
2. an open-ended definition of formative assessment; and
3. the frequency of use of formative assessment strategies.

The survey was created based upon the resources and lesson structure of the formative assessment training the subjects attended. Demographic information was gathered for
sorting purposes. Additionally, it is possible that an educator's demographic information could influence the implementation of formative assessment strategies. Although the correlation between demographic information and formative assessment strategies was not specified in a research question, I wanted to gather the information for the possibility of guiding future research. The next section of the survey collected an open-ended definition of formative assessment from each participant. A criticism of formative assessment research has been that there are differing definitions. The participants did attend the same training, however, I was not going to assume that they would all have the same definition. Collecting the definition provided another opportunity to analyze correlations between the definition provided and the implementation of strategies. After the subjects submitted their open-ended answers, the definition that was used during their training was provided to them. The final section of the survey included 15 formative assessment strategies. Respondents were directed to rate their frequency of use on a Likert scale. The ratings ranged from 1 to 5. The strategies were those that the subjects were taught during their training. There were both teacher- and student-driven strategies selected. Out of the 15 strategies, eight of the strategies were teacher-driven and seven strategies were student-driven. The operational structure that the subjects learned had three steps. The strategies were evenly distributed with five strategies from each step. To ensure content validity, two experts in the field of formative assessments reviewed the survey. The first expert was the instructor of the formative assessment training. The second expert was an assistant superintendent who was in charge of the formative assessment implementation for his school district. Following this review, the survey was sent to a small number of educators as a pilot. Next, a larger, pilot was completed. This
pilot generated 94 completed responses. The pilot was critiqued and resulted in changes to some verbiage and question structure.

The revised survey was sent via e-mail to 322 educators who attended the FAST program for professional development. There were 110 emails that bounced back as being undeliverable. Of the 212 e-mails that were delivered, 49 surveys were submitted. After a review of those 49 surveys, 42 were determined to be valid for this study. Statistical analysis of these responses relied heavily on IBM's SPSS Statistics (Version 24) program and Microsoft Excel (2011). First, to test for internal reliability of the survey, a Cronbach's alpha was calculated. Palant (2010) asserted that Cronbach's alpha is the most commonly used test for reliability and recommended a score over .7. The Cronbach's alpha for this instrument was .76. The tabulated data from the open-ended question were reviewed by the assistant superintendent who is considered an expert in formative assessment and has experience with data analysis. The expert's interpretation matched my findings. Frequency data were generated for the overall usage of formative assessment strategies. Strategies were also grouped by

- student-driven strategies;
- teacher-driven strategies; and
- each of the steps in the operational structure.

For each of these groups, every strategy was analyzed individually. Furthermore, the mean frequency for each group was calculated. My goal was to look at each strategy to determine if there were some strategies within a group that were used more or less frequently than others. Following that individual analysis, my intent was to combine the strategies into groups to determine if some groups of strategies were used more or less
frequently than others. In addition to the analysis of frequency distribution, I also used SPSS to calculate Spearman's correlation coefficient between each of the educators' demographics collected and the average frequency of usage of student-driven strategies, teacher-driven strategies, and the average of each step in the operational structure. Moreover, the same correlational analysis was calculated based upon the open-ended definition of formative assessments provided by each of the subjects.

**Discussion of Results**

In this section, the results and discussion are framed similarly to the structure of the study. It starts with the results and discussion regarding the overall use of formative assessment strategies followed by an analysis of the use of strategies within each operational step. Strategies are reviewed by the role in the process and if the student or the teacher performed the action. The section concludes with a presentation and review of the correlational analysis completed. My intent was to start with a broad review of implementation followed by looking at the use of strategies by their specific purpose.

**Overall Frequency**

Educators have been turning to the formative assessment process to change how classroom assessments are being used to improved student learning. Clark (2015) argued that teachers are still assessing learning much like their predecessors did 60 years ago. To change how educators are using assessments in the classroom, training must occur. Although training is an important step in implementing new strategies, it is just as important to focus on the action that is occurring in the classroom after educators receive training. Jonsson et al. (2014) affirmed the importance of training, but emphasized that in order for change to occur, there needs to be a focus on what actions are taken in the
classroom. Investing time and school district resources in formative assessment training will only benefit student learning if teachers return to the classroom and use the strategies they learned. The first step in this investigation was to review the overall frequency of use of formative assessment strategies as reported by teachers. There were 15 strategies listed on the survey. Educators used a Likert scale to indicate the frequency of used. The Likert scale is displayed in Table 5.1.

Table 5.1

*Likert Response and Likert Value*

<table>
<thead>
<tr>
<th>Likert Response</th>
<th>Likert Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily</td>
<td>5</td>
</tr>
<tr>
<td>Once or Twice per Week</td>
<td>4</td>
</tr>
<tr>
<td>Monthly</td>
<td>3</td>
</tr>
<tr>
<td>Quarterly</td>
<td>2</td>
</tr>
<tr>
<td>Do Not Use</td>
<td>1</td>
</tr>
</tbody>
</table>

Out of the 15 strategies on the survey, teachers reported, on average, to use seven of the formative assessment strategies between “Once or Twice a Week” and “Daily.” Furthermore, three strategies averaged a usage between “Monthly” and “Quarterly.” This information is presented in Table 5.2.
Table 5.2

Average of All Formative Assessment Strategies

<table>
<thead>
<tr>
<th>Range of Usage</th>
<th>Number of Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily--Once or Twice a Week</td>
<td>7</td>
</tr>
<tr>
<td>Once or Twice a Week--Monthly</td>
<td>3</td>
</tr>
<tr>
<td>Monthly--Quarterly</td>
<td>4</td>
</tr>
<tr>
<td>Quarterly--Do not use</td>
<td>1</td>
</tr>
</tbody>
</table>

*Note.* Average is calculated per strategy using Likert Score. Based upon calculated average, the number of strategies within each range is identified. 1 = Do not use; 2 = Quarterly; 3 = Monthly; 4 = Once or twice per week; 5 = Daily.

My hypothesis was that teachers would report a high level of implementation of formative assessment strategies. The data from the survey supported my hypothesis. The frequency of use is not surprising. Many of the strategies used within the formative assessment process are commonly used in education. What can be different is the purpose in which these strategies are used (Chappuis, 2009).

**Operationalized Structure**

The onset of globalization and advances in technology make it difficult for educators to determine what type of knowledge students need to be successful in the future (Clark, 2015). Due to that challenge, educators who are only focused on the content of a lesson are not necessarily preparing students for the future because what they need to know can evolve quickly. That statement is not intended to minimize the lack of importance of teachers focusing curriculum on knowledge based content, but it is stating the importance of teachers not only focusing on content. Students need to know how the learning process works for them as individual students. The point is that what a student is taught in school may not be relevant when they reach the work force. Therefore, students
should be able to follow a process in which they can continue to learn new content or
skills as the landscape of our world shifts due to technological advances or other factors
that initiate change. Formative assessment strategies have been designed within
operational structures to form a learning process that can help students learn the content,
become an active partner in learning, and gain an understanding of the process of
learning. This investigation reviewed the frequency of use for each of the formative
assessment strategies. They are reviewed in overall groups of (a) total frequency of use
(b) use by operational step and (c) if action is performed by the student or the teacher.

Although there is a great deal of literature available about the effectiveness of
formative assessment, there are criticisms. First, there are critics who pointed to the lack
of clarity of an operational structure (Dunn & Mulvenon, 2009). This could impact
research because not all subjects are using the same process. This investigation attempted
to limit the lack of clarity of an operational framework by surveying educators who
attended the same training. Second is the limited research available regarding the breadth
and quality of implementation (Wylie & Lyon, 2015). The intent of this investigation was
to focus on the breadth of implementation of formative assessment strategies. The goal
was to identify the frequencies of use, question the appropriateness of use, and encourage
educators to reflect on their use of formative assessment strategies to determine if the
process was reaching the desired outcome in their classrooms. An important point to
reinforce is that this investigation is limited because it only focused on frequencies. There
may be some strategies that were used less frequently than others and that may be
appropriate for that classroom. Making authentic or concrete judgments may be difficult,
however, I questioned usage with the intent to encourage reflection.
The use of operational steps is the difference between using formative assessment strategies and using a formative assessment process. Strategies serve a purpose to achieve each step of the operational process. The intent is for students to learn the content as well as practice the process of learning. As identified in this investigation, teachers reported frequent usage of formative assessment strategies in the classroom. Subsequently, the focus of this investigation shifted to the purpose in which formative assessments were being used. Dunn and Mulvernon (2009) argued that there was ambiguity in the operational practice of the formative assessment process. Sadler (1989) established three necessary conditions for a successful implementation framework to implement the formative assessment process. They were as follows:

1. Possess a concept of the standard (or goal, or reference level) being aimed for;
2. Compare the actual (or current) level of performance with the standard; and
3. Engage in appropriate action, which leads to some closure of the gap (p. 121).

Twenty years later, Chappuis (2009) provided a more concise operational framework that was built from the student's perspective. This framework is structured through the questions:

1. Where am I going?
2. Where am I now?
3. How do I close the gap? (p. 11)

In this investigation, there were 15 strategies presented in the survey to respondents. There were five strategies selected from each of Chappuis' (2009) three-question operational structure. The data collected were analyzed by each step.
**Where am I going?** This question used by Chappuis (2009) was created from Sadler's (1989) emphasis on the importance for students to understand what they were expected to learn. Chappuis (2009) contended that it is not only important to be clear in the learning objective but also must include clarity to the level of quality expected. In this investigation, there were five strategies that were designed to achieve the goal of clarity of educational expectations. They are as follows:

1. I post learning targets for what I am currently teaching.
2. I provide my students with learning targets that are in student-friendly language.
3. I provide my students with checklists and/or rubrics that are teacher- or commercially made.
4. I help my students develop checklists and/or rubrics.
5. I provide my students with models or examples of anonymous student work at various levels of quality.

The first two strategies focus on learning targets. The first strategy was directed toward the practice of a teacher posting a goal or standard. It can be more technical or directly from the standards provided by the State. The second strategy also is used to communicate the intended learning standard but is delivered in a student-friendly format. Both of the strategies are used to communicate the intended learning of a lesson. The next two strategies are the building of rubrics. The rubric is created to establish criteria for success. It is used to communicate to the learner and teacher what is expected to reach the target of the lesson successfully. There were two types of rubrics on the survey. The first was used to collect the frequency of use of teacher- or commercially created rubrics. The other strategy was included to collect information pertaining to the use of student-
developed rubrics. The final strategy on the survey was about the use of models of work to show different levels of quality.

As displayed in Table 5.3, the most frequently used strategies designed to communicate the standard, or intent, of a lesson were those used to identify learning targets. Specifically, 78.1% of respondents indicated that they use student-friendly learning targets on a "Daily" basis. Similarly, the more general strategy of posting learning targets was reportedly used on a “Daily” basis by 71.4% of the respondents. On the other hand, rubrics were used less frequently. Only 14.3% of respondents replied that teacher- or commercially constructed rubrics are used “Daily.” The same percentage, 14.3%, indicated that they “Do Not Use” these particular rubrics. Respondents reported most frequently (33.3%) to using these rubrics “Once or Twice a Week.” Moreover, student-developed rubrics were used even less frequently than teacher- or commercially developed rubrics. In fact, 52.4% of the teachers in this investigation reported that they “Do Not Use” student-developed rubrics. Furthermore, there were no teachers who reported that this strategy was used “Daily” and 7.1% reported a usage of “Once or Twice a Week.” The largest response, in regard to usage, was 23.8% who reported that the strategy was used “Quarterly.” The final strategy in this operational step was the use of models of work showing different levels of quality. Only 4.8% of educators who participated in this investigation reported using this strategy “Daily” and 14.3% reported that they “Do Not Use” this strategy. The largest percentage of educators in this investigation (42.9%) reported that this strategy was used “Monthly,” followed by 21.4% who reported to use this strategy “Once or Twice a Week.”
Table 5.3

Frequency of strategies used--Where am I going?

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Do not use (1)</th>
<th>Quarterly (2)</th>
<th>Monthly (3)</th>
<th>Once or twice per week (4)</th>
<th>Daily (5)</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Targets--Posted</td>
<td>3</td>
<td>0</td>
<td>6</td>
<td>3</td>
<td>30</td>
<td>4.36</td>
</tr>
<tr>
<td>Targets--Student-friendly</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>32</td>
<td>4.49</td>
</tr>
<tr>
<td>Rubrics, Teacher- or commercially-created</td>
<td>6</td>
<td>5</td>
<td>11</td>
<td>14</td>
<td>6</td>
<td>3.21</td>
</tr>
<tr>
<td>Rubrics, Student-created</td>
<td>22</td>
<td>10</td>
<td>7</td>
<td>3</td>
<td>0</td>
<td>1.79</td>
</tr>
<tr>
<td>Work samples of various levels of quality</td>
<td>6</td>
<td>7</td>
<td>18</td>
<td>9</td>
<td>2</td>
<td>2.86</td>
</tr>
</tbody>
</table>

Note. For average, each frequency assigned a Likert Score. Average calculated by strategy. 1 = Do not use; 2 = Quarterly; 3 = Monthly; 4 = Once or twice per week; 5 = Daily.

Based upon the information presented in Table 5.3, teachers were setting goals frequently each week. However, they were relying most frequently on teacher- or commercial--created rubrics for quality. Even though this is the most frequent practice that is focused on quality, less than half of the respondents indicated that they used this strategy “Daily” or “Once or Twice a Week.” The overall average of use is slightly over “Monthly.” Furthermore, strategies like student-created rubrics and reviewing work of varying quality levels occur less than once per month. Teachers reported that, on average, targets were being set multiple times per week, however, all strategies that pertained to quality averaged a usage frequency near “Monthly.” This step in the operational process has two goals. The first goal was to provide clarity of the learning intention. The second
goal was to show the quality of work expected. Chappuis (2009) described these as enabling strategies that put in place the foundation for students to receive feedback, self-assess, and set goals. It appears that there was more time allocated to setting the target for students, but there was less time spent on guidance on setting the expectation of quality. Furthermore, the least used strategy in this step was the one that combined setting the expectations of quality and was student-driven. The strategy of student-created rubrics was reportedly not used by 52.4% of respondents in this investigation. Chappuis (2009) asserted that the effectiveness of the formative assessment process "hinges on developing the students' capacity to monitor the quality of their own work during production" (p. 10).

The frequency of use of strategies related to quality and student involvement leads me to question if the first stage of the formative assessment process lays the foundation for students to begin the journey to utilize feedback, self-assess and set goals. Sadler (1989) emphasized the importance of this step. He asserted that if the teacher struggles to provide this clarity at the beginning, students could have difficulty self-monitoring their progress toward the goals of a lesson. In short, is the proper foundation being established for students to be able to develop the capacity to monitor their learning during production with targets being set multiple times per week and quality strategies averaging a monthly use?

**Where am I now?** In the previous step, the target for learning and the expectations of quality were to be established. Sadler (1989) asserted that the next step would be to identify the students' current level of performance and compare it to the expected learning outcome. Chappuis (2009) condensed this part of the process into the
question "Where am I now?" The five strategies in this investigation associated with this step are as follows:

1. I gather real-time evidence of student learning simultaneously from all of my students with quick-check techniques like clickers, ABC cards, white boards, and/or thumbs up.
2. In my classroom, students act as instructional resources to each other.
3. I provide descriptive feedback to my students about their performance.
4. My students provide each other with descriptive feedback.
5. My students are provided the opportunity to self-assess and set goals (e.g. Stars and Steps).

According to the data presented in Table 5.4, teachers were gathering evidence of student learning within the lesson. Teachers responded that 92.8% of them use this technique “Once or Twice a Week” or “Daily.” In addition to gathering evidence, teachers indicated that they do provide feedback. In fact, 88.1% answered that they provided feedback “Once or twice a week” or “Daily.” Furthermore, 85.7% of respondents reported that they used students as instructional resources “Once or Twice a Week” or “Daily.” Teachers were also having students provide each other with feedback, however, it was happening less frequently than the first three strategies in this operational step. Educators reported that 64.2% of them had students provide each other feedback either “Once or Twice a Week” or “Monthly.” The least frequently used strategy within this step was the practice of having students self-assess and set goals. Only one teacher reported that this practice was used “Daily.” The most frequent response was that this strategy was used “Monthly” (38.1%) followed by “Quarterly” (26.2%).
Table 5.4

Frequency of strategies used--Where am I now?

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Do not use</th>
<th>Quarterly</th>
<th>Monthly</th>
<th>Once or twice per week</th>
<th>Daily</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gather real-time evidence</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>14</td>
<td>25</td>
<td>4.45</td>
</tr>
<tr>
<td>Students act as instructional resource.</td>
<td>2</td>
<td>0</td>
<td>4</td>
<td>17</td>
<td>19</td>
<td>4.21</td>
</tr>
<tr>
<td>Teachers provide feedback.</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>23</td>
<td>14</td>
<td>4.21</td>
</tr>
<tr>
<td>Students provide each other feedback.</td>
<td>7</td>
<td>6</td>
<td>13</td>
<td>14</td>
<td>2</td>
<td>2.95</td>
</tr>
<tr>
<td>Students self-assess and set goals.</td>
<td>6</td>
<td>11</td>
<td>16</td>
<td>8</td>
<td>1</td>
<td>2.69</td>
</tr>
</tbody>
</table>

Note. For average, each frequency assigned a Likert Score. Average calculated by strategy. 1 = Do not use; 2 = Quarterly; 3 = Monthly; 4 = Once or twice per week; 5 = Daily.

This operational step has two primary goals. First students need to gather feedback that helps them determine their current state in relation to the intended goal of the lesson. Feedback received within a lesson has been described as a global positioning system for students during their journey through the learning process (Chappuis & Chappuis, 2008). Second, Chappuis and Chappuis (2008) emphasized that students need to take that feedback and set goals so they can plan the correct route that will close the gap between where they are now and their desired destination. There were three different strategies related to feedback. The difference with each strategy was if the feedback was being provided by the teacher, other students, or self-provided feedback. In this investigation, 88.1% of respondents reported that feedback from the teacher occurred
either “Daily” or “Once or Twice a Week.” Conversely, less time was dedicated to student-to-student or self-directed feedback. Only 38.1% of respondents indicated that student-to-student feedback was used either “Daily” or “Once or Twice a Week.” Moreover, only 21.4% of the educators in this investigation reported that self-directed feedback was used either “Daily” or “Once or Twice a Week.” This imbalance of use is concerning because Chappuis (2009) asserted that feedback students provide to themselves or receive from peers is more impactful on test scores than feedback received from teachers. Furthermore, Sadler (1989) warned that by not utilizing opportunities for students to actively engage in strategies, the message is being sent that only the teacher possesses the knowledge to evaluate work. Based upon the data gathered in this investigation, the least impactful form of feedback averaged a frequency of use between “Daily” and “Once or Twice a Week.” The feedback that has the most impact on student learning has an average frequency of use that occurs less than “Monthly.”

The second goal of this operational step in the formative assessment process is for students to use the feedback they receive to create a route or plan that will lead them to the final learning destination. To achieve this, students need to take the feedback received and set goals. Respondents to this survey reported that this did not happen frequently in their classrooms. In this investigation, 38.1% of respondents indicated that students self-assess and set goals “Monthly” while 26.2% reported that this happened “Quarterly.” That means that 64.3% of educators in this survey used this strategy either “Monthly” or “Quarterly.” Based upon the information gathered in this investigation 85.4% of teachers were setting student-friendly targets between “Once or twice a week” and “Daily,” 88.1% of teachers were providing feedback between “Once or twice a week” and “Daily,” but
only 21.4% of students were processing this feedback and setting goals between “Once or twice a week” and “Daily.” Furthermore, the overall average use of self-reflection and goal-setting is less than “Monthly.” My concern is that the strategy that was the least used was not only student-driven, but it was also the strategy that enabled students to set their own goals in order to attempt to close the gap between their current and desired states. Based upon the lack of frequency that students were able to self-reflect and set goals, I question if students were prepared or had a plan to take action to close the gap.

How do I close the gap? As students reach this operational step, the learning intention is supposed to be clear and the students are to be aware of the distance between their current levels of performance. Sadler (1989) wrote that the last step is to engage in appropriate action that would lead to some closure of the gap between goal and current level of performance. Chappuis' (2009) condensed this step into a the student-focused question, "How do I close the gap?" The five strategies in this investigation that are associated with this step are as follows:

1. My students are given time to revise their work based upon feedback they receive.
2. My students engage in self-reflection about the quality of their work.
3. My students monitor their learning over time, using recordkeeping techniques.
4. I adjust the sequence and pacing of my instruction, based upon information gathered from ongoing formative assessments.
5. I target my instruction to learning gaps, misconceptions, or other incomplete understandings identified through formative assessment feedback.

The practice of revising work based upon feedback received generally is specific to the work a student is currently performing. Students incorporate the feedback or lesson
adjustments to the current lesson. The most frequent response from educators (42.8%) was that this occurred “Once or Twice a Week.” This was followed by “Monthly” (31%) and “Daily” (23.8%) occurrences. Next students monitor their learning over time by recording or keeping track of their learning. This can occur by recording progress, writing learning journals, or collecting previous samples of work (Chappuis, 2009). In this investigation, 35% of educators reported that they “Do Not Use” this strategy. This was the most frequent response followed by “Once or twice a week” (20%), “Monthly” (17.5%), “Quarterly” (17.5%), and “Daily” (10%). Self-reflection about the quality of work is an action students take as they review the records and work samples collected during the monitoring step. Chappuis (2009) asserted that collecting evidence does not, in itself, ensure that students become aware of their learning. Students need to take time and reflect on previous work to identify areas of strength and weaknesses. Students should also reflect on what they did to be successful or unsuccessful. Consequently, in this investigation the most frequent response (41.4%) was that this strategy is used “Monthly.” The second most frequent response (24.4%) was “Once or Twice a Week” followed by “Quarterly” (14.6%). The same number of educators (9.8%) reported a frequency of use of “Daily” and “Do Not Use.” The final two strategies on the survey involved the action of educators adjusting their instructions. When an educator adjusts the sequence or pacing of a lesson, they are modifying the order of the material or the speed in which instruction is happening. In this investigation, 76.2% of respondents indicated that they used this strategy “Daily” followed by 19% who reported that they used this strategy “Once or Twice a Week.” Five percent of educators responded with a usage rate of “Monthly.” There were no educators who responded that this strategy was
not used or used on “Quarterly” basis. The action of the last strategy is that teachers utilize the evidence from formative assessments to design lessons and instruction to address the root causes that are preventing the closing of the gap between the current and desired state. This is more involved than adjusting the pace or sequence based upon evidence. The lesson is specifically created to address roadblocks to gap closing such as misconceptions, misinterpretations, or gaps in student knowledge. Based upon the responses gathered in this investigation, 69.1% of educators responded that this action happened “Daily,” followed by 21.4% who responded that this occurred “Once or Twice a Week.” Educators who responded that this strategy was used “Monthly” (4.8%), “Quarterly” (2.4%) or not at all (2.4%) were minimal. This strategy was predominantly used “Daily” or “Once or Twice a Week.”

The step of closing the gap from current state to intended outcome is a coordinated effort between the teacher and student. There were five strategies in this step with two being action-driven by the teacher, and three with the student as taking primary action. Brookhart (2010) asserted that the purpose of the formative assessment process is to communicate the action that a teacher and student need to take to close the gap. The action the teacher takes is to adjust the lessons in content, sequence, and pacing based upon the evidence gathered within lessons. This action is directed toward eliminating factors that could be preventing students from closing the gap. This could be due to misconceptions, partially developed skills, or misunderstandings about the content being taught. The teachers’ actions are intended to prepare students to perform their role in this step. Students are expected to revise their work based upon feedback, monitor their work over time, and reflect about the quality of their work.
Teachers reported that they were planning their lessons and adjusting their sequence and pacing based upon evidence gathered in the classroom. In this investigation, 95.2% of educators reported that they adjusted the sequence or pacing of their lessons either “Once or Twice a Week” or “Daily.” Furthermore, 90.5% responded that they adjusted the content and targeted their instruction based upon deficiencies discovered by the evidence gathered. It appears that teachers were performing their role in this step. This information is displayed in Table 5.5.

Table 5.5

 Strategies--Teachers adjusting lessons

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Do not use (1)</th>
<th>Quarterly (2)</th>
<th>Monthly (3)</th>
<th>Once or twice per week (4)</th>
<th>Daily (5)</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher adjusts pacing and sequence based upon evidence.</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>8</td>
<td>32</td>
<td>4.7</td>
</tr>
<tr>
<td>Teacher targets instruction based upon evidence.</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>9</td>
<td>29</td>
<td>4.5</td>
</tr>
</tbody>
</table>

*Note.* For average, each frequency assigned a Likert Score. Average calculated by strategy. 1 = Do not use; 2 = Quarterly; 3 = Monthly; 4 = Once or twice per week; 5 = Daily.

On the contrary, there was less time allocated to students performing their role in this step. The three steps that students perform can be viewed as different levels of a process of reflection. Focused revision is an important step in this process. The action of the teacher in this step provided the foundation for revision. This is when students incorporate the adjustments that the teacher made in the lesson and amend their work. As
presented in Table 5.6, 66.7% of the respondents indicated that this practice was used either “Once or Twice a Week” or “Daily.”

Table 5.6

**Strategies--Student action-gap closing**

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Do not use</th>
<th>Quarterly</th>
<th>Monthly</th>
<th>Once or twice per week</th>
<th>Daily</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students revise work.</td>
<td>0</td>
<td>1</td>
<td>13</td>
<td>18</td>
<td>10</td>
<td>3.9</td>
</tr>
<tr>
<td>Students monitor work over time</td>
<td>14</td>
<td>7</td>
<td>7</td>
<td>8</td>
<td>4</td>
<td>2.5</td>
</tr>
<tr>
<td>Students engage in self-reflection quality of work</td>
<td>4</td>
<td>6</td>
<td>17</td>
<td>10</td>
<td>4</td>
<td>3.1</td>
</tr>
</tbody>
</table>

*Note.* For average, each frequency assigned a Likert Score. Average calculated by strategy. 1 = Do not use; 2 = Quarterly; 3 = Monthly; 4 = Once or twice per week; 5 = Daily.

The intent of having students monitor their work over time is to have students use this larger view of their progress for self-reflection. Chappuis (2009) maintained that self-monitoring and recordkeeping are a prerequisite to self-reflection. Students monitor their work by collecting evidence as they progress toward the learning target. After the student monitors their progress, they can look back on the evidence and draw conclusions about what has been learned, what went well, what did not go well, and their overall movement toward the goal (Chappuis, 2009). However, as presented in Table 5.6, self-reflection was used more frequently than self-monitoring. The teachers who reported that they had students monitor their work (30%) and reflect on their work (34.1%) “Once or Twice a Week” or “Daily” were similar in frequency. Moreover, there were similar percentages for both strategies in the frequency of “Quarterly” usage. Those percentages appear to be
similar, yet there were differences when reviewing all of the responses provided. The biggest difference was that 35% of the educators reported that they did not have their students monitor their work. About 9.8% of teachers responded that they did not have students self-reflect on the quality of their work. The lack of alignment of frequencies between these strategies leads me to question if they were being used in tandem. If this part of the operational structure was not being optimized, an important opportunity was being neglected. Hattie (2008) emphasized that the greatest impact on learning happens when students utilize self-regulatory practices such as self-monitoring and self-reflection. If students are not monitoring their work, what were they using for reflection?

Similar to the previous operational steps, the least frequently used strategy was a student-driven strategy. Furthermore, the three strategies in this step that are student-driven were the three least frequently used strategies. Teachers were actively adjusting their lessons based upon evidence they gathered within the lesson. They also reported that students were allocated time to revise their work. However, students were receiving less time to monitor their growth and reflect on the quality of their work over time. In my opinion, this information shows that there was more focus on the immediate learning and less focus on practicing the process of learning. If that were the case, students may have been missing out on developing the understanding of how they learn as individual students.

**Correlations**

Although correlational analysis was not specifically a part of this investigation, information was gathered with the intent of completing a correlational analysis. This was an attempt to gather information for future research to explore my theory that variables in
a teacher's work assignment could impact the implementation of formative assessment strategies. For example, would there be an increase in the frequency of usage of student-driven strategies that correlates with the increase of grade-level taught by a teacher? To calculate this, the Likert value for each strategy was averaged. Next, the strategies were placed into groups and a group average was calculated. The groups were (a) student-driven strategies, (b) teacher-driven strategies, and (c) by each operational step. A correlational analysis was completed between each of these groups and the demographic information collected in this investigation by using Spearman's Rho. There were two significant correlations identified. One was between the demographic of the teachers' subject area taught and the group of student-driven strategies. The other significant correlation was between teachers' subject areas taught and the use of gap-closing strategies. Following the findings of correlation, a coefficient of determination was calculated for each of these correlations. Although the initial correlational analysis using Spearman's Rho resulted in a significant correlation, the first correlation between subject area taught and student-driven strategies resulted in a coefficient of determination of .18. What this means is that the demographic of subject area taught would account for 18% of the variability in the use of student-driven strategies. The same coefficient of determination was completed for the significant correlation between the teachers' subject areas taught and the average use of gap-closing strategies. This calculation was .16 indicating that the teachers' subject areas taught accounted for 16% of the variability of use of gap-closing strategies. Although a significant correlation was found, I would not recommend that educators make decisions based upon this correlation. The demographics accounted for 16% - 18% of the variability but, there were other factors that accounted
for 84% to 86% of the variability. Furthermore, if I were to perform this survey again, I would narrow the possible selections for subject area taught. There was an open-ended section that led to educators submitting multiple variations describing the subject areas they instruct. I do believe this resulted in a dilution of this particular sample.

**Summary and Conclusions**

This discussion was framed by two research questions and three hypotheses. The questions and hypotheses were intended to focus on (a) the overall usage of formative assessment strategies, (b) use of formative assessment strategies as an operational structure, and (c) the frequency of use of student- and teacher-driven strategies.

Overall, teachers were using formative assessment strategies in their classrooms. Through this investigation, it was reported that seven out of the 15 strategies surveyed were used between “Once or Twice a Week” and “Daily.” Similarly, teachers were also using strategies from each operational step. In the first step, ”Where am I going?”, two out of the five strategies averaged a usage rate between “Once or Twice a Week” and “Daily.” During the second step, ”Where am I now?” educators were reporting that three out of the five strategies were used between “Once or Twice a Week” and “Daily.” Finally, in the step ”How do I close the gap?”, teachers responded that two out of the five strategies averaged a use between “Once or Twice a Week” or “Daily.” These results are displayed in Table 5.7.
Table 5.7

Frequency of Formative Assessment Strategies by Chappuis Step

<table>
<thead>
<tr>
<th>Range of Usage</th>
<th>Where am I going?</th>
<th>Where am I now?</th>
<th>How do I close the gap?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily--Once or Twice a Week</td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Once or Twice a Week--Monthly</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Monthly--Quarterly</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Quarterly--Do not use</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

*Note.* Average is calculated per strategy using Likert Score. Based upon calculated average, the number of strategies within each range is identified. 1 = Do not use; 2 = Quarterly; 3 = Monthly; 4 = Once or twice per week; 5 = Daily.

Although strategies from each operational step were reported as being used frequently in classrooms, I do have concerns about some of the strategies that were not being used as frequently. These strategies used less frequently have a designated purpose in each operational step. For example, during the step, "Where am I going?" teachers reported that targets were being set multiple times per week. However the strategies that focus on quality of work were used less frequently. There was more time allocated to identifying where students should go, but much less time spent on what good work looks like. In the next step, "Where am I now?" it was reported by teachers that students received feedback frequently. In this investigation, two out of the three strategies in this step that focus on feedback were reported to be used between “Once or Twice a Week” or “Daily.” On the other hand, teachers reported using two important strategies less frequently. The first is when students provide feedback to each other. Next is the strategy when students self-reflect and set goals. My first concern is that the most impactful forms of feedback were being used less frequently. Second, students in many of the classrooms
in this investigation received feedback multiple times per week and self-reflected or setting goals based upon that feedback on an average of less than “Monthly.” The purpose of setting goals in this step is to create a plan to close the gap between current and desired state. In the final step, "How do I close the gap?” the majority of respondents indicated that they adjusted their lessons or the pacing of their lessons on a “Daily” basis. Teachers were working to address the root causes of what could be preventing students from reaching the instructional goals. However, 35% of the teachers in this survey reported that students in their classroom did not monitor their work over time. This strategy provides the foundation for students to self-reflect about the quality of work. Although, the strategy of self-reflection was used more frequently, it is difficult to understand how students were self-reflecting without having a collection of evidence to reflect upon.

In short, during the first step of the learning process, teachers set targets for students in order to provide the learning destination. However, there was less time allocated to the quality of work expected. In step two, teachers provided feedback. Conversely, there was less time spent on feedback provided to students by their peers or themselves. Additionally, students less frequently were provided the opportunity to set goals with a purpose of closing gaps in their learning. In the final step of this operational practice, teachers reported that they adjusted lessons to prepare students to engage in gap-closing strategies, but less time was allocated to those gap-closing strategies and there appeared to be a misalignment between the use of monitoring and self-evaluation.

A principal goal in the formative assessment process is for students to drive their instruction. In this investigation, there were eight strategies that had the teacher as the
primary driver of the action and seven in which the student was the primary driver. 
Within each operational step reviewed, the most frequently used strategy in every step 
was teacher-driven and the least frequently used step was student-driven. Furthermore, in 
two out of the three steps in the operational structure, the two least frequently used 
strategies were student-driven. Moreover, the total average frequency of use of both 
student- and teacher-driven strategies was calculated based upon Likert score and 
compared. The data indicated that teacher-driven strategies average usage was 4.10 and 
student-driven strategies average usage was 3.02. The Likert score of four was associated 
with “Once or Twice a Week” and the Likert score of three was associated with 
“Monthly.” Therefore, teacher-driven strategies averaged being used four to eight times 
per month and student-driven strategies averaged a use of “Monthly.” This comparison is 
presented in Figure 5.1.
Figure 5.1. Average of the use of teacher- and student-driven strategies. Strategies are categorized as either student- or teacher-driven. Likert Score is used to calculate average of all strategies in each category. 1 = Do not use; 2 = Quarterly; 3 = Monthly; 4 = Once or twice per week; 5 = Daily.

In this investigation, I hypothesized that the strategies used would not encompass all steps of this operational structure and that the use of teacher-driven strategies would greatly outweigh the use of student-driven strategies. The data collected in this investigation did show that strategies from each step in this structure averaged frequent use in classrooms. Therefore, my hypothesis regarding operational structure was not validated. However, what did surface was information that leads me to believe that the
strategies in this structure can be utilized more efficiently to enhance the effectiveness of the formative assessment process in the classroom. The data in this investigation did support my hypothesis that teacher-driven strategies would greatly outweigh the use of student-driven strategies. On average, respondents reported that teacher-driven strategies were used between “Once or Twice a Week” and “Daily.” However, educators reported that student-driven strategies averaged a usage of “Monthly.”

**Implications for Action**

The idea for this investigation originated when I was responsible for overseeing the educational development for a school district. As a school district, we were searching for pedagogical improvements that would help foster growth and empower students. We sent educators to formative assessment trainings with their returning energized to bring this process into the classroom. However, we found that throughout departments, individual school buildings, and the entire district, there were different levels of implementation occurring. For example, I had a conversation with a teacher who was very excited about the strategies that she learned and how it was changing her classroom. She invited me into her classroom to observe her implementation of the formative assessment process. What I observed was the usage of formative assessment strategies with little purpose and a teacher who was confident that she was incorporating the formative assessment process in her classroom. I contacted the instructor of the professional development program that our teachers attended to discuss this with her. She informed me that although she has each attendee create an implementation plan, she does not have much information about what strategies teachers are actually using. However,
she would find that information very helpful. I believe that this information would not only be helpful for her but also for teachers and school leaders.

From what I have observed in my time in education, the story I shared regarding the classroom teacher whom I observed is reflective of a practice that I believe is common in education. Educators receive training in a program and may not get further than a surface-level implementation of a program. Over time, it was realized that we might not reaping the rewards that were promised by research. Eventually, we moved on to the next program that we believed to be our solution. Educators repeat this cycle because there is a tendency to not see full implementation through fruition. The purpose of this investigation was to create a starting point for dialogue about the implementation of formative assessment strategies in the classroom. Educators can use this information to compare it to their practices and self-reflect on how they are embedding formative assessments as a process and if they believe they are maximizing the effectiveness within their classrooms.

**Recommendations for Future Research**

This quantitative study was an investigation of the breadth of formative assessment strategies implemented by teachers from Northeast Ohio who attended the same formative assessment professional development program. This study utilized a nonexperimental approach. The benefit to this approach was that it allowed data to be collected within each subject's natural environment. Although, the nonexperimental design does provide useful information, it is recommended that the reaction to conclusions be tempered. Based upon the subject group as well as the scope and design of
this investigation, I would have three recommendations for future research. They are as follows:

1. identify variables that could encourage or hinder implementation;
2. expansion of the study; and
3. focus on quality.

This investigation focused on what educators were doing. It was not able to make connections concerning why they were doing what they were doing. I would recommend further examination regarding if there are variables that might encourage the use of the formative assessment process and if there are variables that might hinder the full implementation of this process. For example, in Ohio, the new teacher evaluation system requires that all teachers be evaluated based upon the same rubric. The highest ratings of this rubric do include some formative assessment strategies. Could the mandated rubric be encouraging educators to use more formative assessment strategies? On the other hand, I would question if the focus on high-stakes testing might be negatively influencing the use of quality-focused strategies. There is a certain amount of content teachers need to cover prior to the mandated testing. Are educators rushing to get through the content prior to the test? Will they report that the reason that the student-driven or quality-focused strategies are not used as frequently is due to lack of time?

This investigation was limited. The subjects attended the same professional development, some demographic information should have been collected differently, and the subject size was small. The professional development program these subjects attended is no longer being offered; that instructor retired. In the State of Ohio, the larger program currently in use is within the partnership between the Ohio Department of Education and
the organization, Battelle for Kids (2017). I would be curious to explore the implementation results from people who attended this, or any other professional development program. Moreover, this study had a low response rate. There may be benefits to perform a larger study that could be more generalizable. In a larger study, I would also recommend collecting each educator's subject area taught differently than I did in this investigation. I do believe that I diluted the sample by how I collected each educator's subject area. Educators were provided an open-ended section that created a large number of responses for this small sample size. Accurately collecting this demographic could lead to correlations that are more defendable. Also, with a larger subject pool, other correlations could potentially be discovered.

Finally, I would recommend future research to focus on the quality of implementation. Wylie and Lyon (2015) identified a lack of research pertaining to breadth and quality. This investigation was an attempt to contribute literature to the breadth of implementation. I would recommend extending research to include the quality of implementation. There is a benefit to know what strategies are being used in the classroom, however, knowing how well they are being used contributes to a more complete understanding of how the formative assessment process is being integrated by teachers.
References


*Educational Psychologist, 45*(2), 123-137.

http://dx.doi.org/10.1080/00461521003703045


APPENDIX A

HSRB APPROVAL
The Human Subjects Review Board has approved your research study. You may proceed with the study as you have outlined in your proposal. The approval is granted for one calendar year. Research participant interaction and/or data collection is to cease at this time, unless application for extension has been submitted and approval for continuance is obtained.

The primary role of the HSRB is to ensure the protection of human research participants. As a result of this mandate, we ask that you adhere to the ethical principles of autonomy, justice, and beneficence. We would also like to remind you of your responsibility to report any violation to participant protections immediately upon discovery. Likewise, we would like to remind you that any alteration to the research proposal as it was approved cannot move forward. Any amendment to the application must be submitted for approval before the project can resume.

We wish you success in your discoveries,

Doctor Chris Chartier
Ashland University
Chair Human Subjects Review Board
The purpose of this survey is to gather information regarding which formative assessment practices teachers at different grade levels and in different subject areas find most useful.

Certainly, no one teacher will find all formative instructional practices appropriate for this or any other setting. The information gathered from this survey is for a dissertation and should provide educators with a more realistic understanding of what formalize assessment practices fit best into different subject areas and grade levels and in subject areas that most useful. Certainly, no one teacher will find all formalize instructional practices appropriate for his or her setting. The information gathered from this survey is for a dissertation and should provide educators with a more realistic understanding of what formalize assessment practices fit best into different subject areas and grade levels.

If you have questions about the survey or our team, please contact Scott Goggin at sgoggin@ashland.edu. Concerns can also be directed to the Human Subject Review Board at Ashland University at hsrb-a@ashland.edu or (419) 289-5750. This survey was originally developed by the Northeastern Ohio Regional Assessment for Learning Team. The team was comprised of educators who are dedicated to helping Ohio teachers and administrators engage in high quality formative assessment practices.

This survey should take from 5 to 10 minutes to complete. Thank you in advance for participating in this survey.

I. Tell us about your position:

A. I teach students in the following grade band(s). (Please check all that apply).

- [ ] Kindergarten - 1st Grade
- [ ] Second - Third grade
- [ ] Fourth - Fifth grade
- [ ] Sixth - Seventh grade
- [ ] Fourth - Fifth Grade
- [ ] Second - Third Grade
- [ ] Kindergarten - 1st Grade

All the information from this survey will be reported anonymously. Your responses will be collected at different grade levels. All the information from this survey will be reported anonymously. Your responses will be collected at different grade levels. All the information from this survey will be reported anonymously. Your responses will be collected at different grade levels.
C. Some teachers plan multiple lessons or teach multiple subjects per day. Some can teach the same lesson multiple times. Based upon my teaching assignment, I plan/prepare for:

5 subjects/lesson □
4 subjects/lesson □
3 subjects/lesson □
2 subjects/lesson □
1 subject/lesson □

Other, please specify: ________________________________

B. I teach the following subject(s): (Please check all that apply):

Art □
English/Language Arts □
Mathematics □
Science □
Physical Education □
Music □
Social Studies □
World Language(s) □

Other, please specify: ________________________________

Ninth - Twelfth Grade □

Assessment for Learning Survey
E. The majority of my students can best be described as follows:

- Typically developing students
- Students identified as needing special education
- Students identified as gifted and talented
- Students identified as second language students
- My students are diverse; there is not a major type of any type.
- Other, please specify: ________________________________

D. On average, I teach the following number of students each day:

- 1.20
- 26 - 30
- 31 - 40
- 41 - 60
- 61 - 100
- 101 - 125
- 126 - 150
- 151 or above
- 151 or above

Other, please specify: ________________________________
II. Definition of Formative Assessment.

Please briefly provide your definition of formative assessments.

For the purpose of this study/survey, formative assessment is defined as “formal and informal processes teachers and students use to gather evidence for the purpose of improving learning” (Chappuis, 2009).

III. Different teachers implement some FA techniques more frequently than others. Please indicate how often you implement each of the following FA techniques.

<table>
<thead>
<tr>
<th>Techniques</th>
<th>Daily</th>
<th>Once or Twice a Week</th>
<th>Monthly</th>
<th>Quarterly</th>
<th>Do not use</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

- Do not use L.T. for what I currently teaching (L.T.) for what I post learning targets (L.T.) in student friendly language.
- C. I provide my students with L.T. that are
<table>
<thead>
<tr>
<th>Assessment for Learning Survey</th>
<th>Do not use</th>
<th>Once a Week</th>
<th>Daily</th>
<th>Quarterly</th>
<th>Monthly</th>
<th>4 a Week</th>
<th>Textual Techniques</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. My students engage in self-reflection receive feedback on their work.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. My students are given time to revise their work based upon feedback they receive.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. My students are provided the opportunity to self-assess and set goals (e.g., stars and steps).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D. My students develop checklists and rubrics.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E. I help my students develop checklists and/or rubrics.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F. Commercially made checklists and/or rubrics that are teacher-developed.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G. My students are provided the opportunity to develop checklists and rubrics.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H. I provide my students with checklists and/or rubrics.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I. In my classroom, students act as instructional resources to each other.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J. I provide descriptive feedback to my students about their performance.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K. I gather real-time evidence of student learning simultaneously from all of my students with quick check techniques like clickers, ABC cards, whiteboards and/or thumbs-up.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L. I help my students provide feedback to each other.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M. I provide students with anonymous student work at various levels of quality.</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>N. My students provide feedback to each other.</td>
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<td>O. My students are given time to revise their work based upon feedback they receive.</td>
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<td>P. My students are provided the opportunity to self-assess and set goals (e.g., stars and steps).</td>
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<td>Q. My students engage in self-reflection receive feedback on their work.</td>
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**Techniques**
<table>
<thead>
<tr>
<th>Frequency</th>
<th>R. My students monitor their learning through record-keeping.</th>
<th>S. I adjust the sequence and pacing of my instruction, based upon information gathered from ongoing formative assessments.</th>
<th>T. I target my instruction to learning gaps, identified through understanding identified through misconception, or other incomplete formative assessments.</th>
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</thead>
<tbody>
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<td>Daily</td>
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<td>Monthly</td>
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<td>Once or Twice a Week</td>
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