Using Student Growth Data to Improve the Instructional Practice of
Career and Technical Teachers

A doctoral thesis presented by
Robert A. Dutch
to
The Graduate School of Education
In partial fulfillment of the requirements for the degree of
Doctor of Education
In the field of Educational Leadership

College of Professional Studies
Northeastern University
Boston, Massachusetts
July 2016
Abstract

Regular evaluation of teacher performance, including student growth data, provides an opportunity for educators to reflect upon and improve their practice. Career and technical educators do not have the criterion-referenced standardized assessments that are available to math, English and science teachers to provide them with feedback regarding the growth of their students. Instead, they must identify or develop their own measurements to establish student growth data. The purpose of this qualitative study was to examine the types of student growth data that currently exists for educators within a single career and technical high school located in the Northeast, and how the teachers within this school collect and make sense of student growth data to improve their practice. Informed by the theoretical framework of continuous improvement, this study sought to answer the following central research question: what types of student growth data are most relevant and useful to career and technical educators as a part of their evaluation process? Research findings showed that career and technical educators believed that student achievement should not be a component in teacher evaluation, but that it does have value in terms of reflecting on their own teaching. The types of growth data career and technical educators find most useful are those focused on the measurement of skills learned. Career and technical educators make sense of student growth data through comparison of student performance in relation to established standards with the understanding that time and training are integral to the consistent, meaningful use of the data.

Keywords: Teacher supervision and evaluation, observation, mini observation, reflective conversation, teacher growth.
# Table of Contents

Abstract ......................................................................................................................................................... 2  
Table of Contents .......................................................................................................................................... 3  
Acknowledgements ....................................................................................................................................... 5  
Chapter 1: Introduction ................................................................................................................................ 6  
  Statement of the Problem ........................................................................................................................ 6  
  Significance of Research Problem ............................................................................................................. 9  
  Theoretical Framework ........................................................................................................................... 10  
  Definition of Key Terms .......................................................................................................................... 14  
Chapter 2: Literature Review ....................................................................................................................... 17  
  Introduction ............................................................................................................................................ 17  
  Value-Added Data and Teacher Evaluations ........................................................................................... 20  
  Educators’ VAM Data and Improving Instruction ................................................................................... 25  
  Conclusion ............................................................................................................................................... 31  
Chapter 3: Research Design ........................................................................................................................ 32  
  Introduction ............................................................................................................................................ 32  
  Positionality Statement ........................................................................................................................... 33  
  Research Design ...................................................................................................................................... 33  
  Research Paradigm .................................................................................................................................. 35  
  Research Tradition .................................................................................................................................. 37  
  Participants ............................................................................................................................................. 37  
  Recruitment and Access .......................................................................................................................... 39  
  Protection of Human Subjects ................................................................................................................ 40  
  Data Collection ........................................................................................................................................ 41  
  Data Storage ........................................................................................................................................... 48  
  Data Analysis ........................................................................................................................................... 48  
    Coding methods .................................................................................................................................. 49  
    Trustworthiness ................................................................................................................................... 52  
    Limitations .......................................................................................................................................... 56  
Chapter 4: Research Findings ....................................................................................................................... 59
Acknowledgements

The most important thanks go to my wife, Margaret. Words cannot express how grateful I am to you for putting our life on hold and spending countless weekends unable to plan as I worked on researching and writing. Thank you for listening, pushing, and supporting me when it was most needed. Thank you most of all for all of the sacrifices that you’ve made on my behalf as I pursued every goal over the last 33 years, culminating with my doctorate.

I would like to express my appreciation and thanks to my advisor, Dr. Kelly Conn. Your patience and guidance along the way were a tremendous support for me. I would like to thank you for encouraging me to persist as I encountered challenges. Thanks also to Dr. Chris Unger, who took over from a previous second reader and provided valuable practical edits which allowed me to move forward to completion, and Dr. Thomas Hickey, who served as the third examiner. I appreciate your support and guidance. Thank you to my school committee for supporting my educational and professional endeavors. Finally, I would also like to thank the teachers involved in this study for their support and assistance.
Chapter 1: Introduction

Statement of the Problem

With the passage and reauthorization in 2015 of the No Child Left Behind Act (NCLB) (2002), a shift in focus in school communities resulted throughout the United States toward meeting established performance standards, primarily in mathematics and English language arts. Student assessment data of tested subjects are now used to promote data-driven decision-making with regards to school funding, teacher evaluation, and interventions to promote student success. While the process for using student assessment data to decide school funding is fairly clear, what is less studied is how educators can use student assessment data reflectively to improve their instruction in order to best meet the needs of the individual learners they serve. This is particularly true for those educators who teach in career and technical education (CTE) high schools, where many of the subjects taught are not assessed with criterion-referenced, standardized assessments.

Research has demonstrated that the greatest influence on student achievement is the quality of the teacher (Marzano, 2003). Schools depend upon educators to provide effective lessons that result in student learning and achievement. Student growth data provides an opportunity for educators to reflect upon and improve their practice. Career and technical educators do not have the criterion-referenced, standardized assessments that are available to math, English and science teachers to provide them with feedback regarding the growth of their students. Instead, they must identify or develop their own measurements to establish student growth data. If we were better able to understand how career and technical educators measure and use student growth data, then we may be able to provide support toward their use of data for
instructional improvement. Therefore, this basic qualitative study examined how career and technical educators gather and use student growth data to better impact student performance.

All educators in Massachusetts are evaluated annually for the intended purpose of providing feedback for teacher improvement. As one component of that evaluation, student growth data is utilized to determine the type of plan a teacher is placed on; specifically, self-directed or directed. Recently, in 2013, the state of Massachusetts mandated districts to utilize a new teacher evaluation system, which was developed collaboratively between the Department of Elementary and Secondary Education (DESE), the teacher unions (American Federation of Teachers and Massachusetts Teachers Association), and the statewide associations of School Committees (Massachusetts Association of School Committees), Superintendents (Massachusetts Association of School Superintendents), and Principals (Massachusetts Secondary School Administrators Association). This move was in reaction to funding from the federal Race to the Top (RttT) initiative and the associated requirements to overhaul educator evaluation. The impetus for this overhaul was feedback from educators regarding the value of the current evaluation system. One of the goals of redesigning teacher evaluation was to include measures of student growth and achievement so that educators could be reflective on their practice.

The primary source of student growth data available to educators in Massachusetts is scores from the Massachusetts Comprehensive Assessment System (MCAS) in those grades and subjects that are tested. Educators within career and technical schools in Massachusetts have access to MCAS scores for mathematics and English language arts, but because of the very nature of career and technical schools, many of the educators within these schools cannot use these scores to reflectively improve their practices. Instead, these educators rely on other teacher- and administrator-driven instruments, known as district-determined measures (DDMs) to
determine student growth. DDMs assess the extent to which students have learned the most important content and skills taught and yield data that can then be used to inform instruction. Growth data can be generated through a variety of sources, including commercially-developed, standardized assessments and teacher-developed assessments, such as pre- and post-tests, portfolios, and progress assessments.

As accountability becomes an ever-increasing focal point for the U.S. Department of Education through RttT legislation, states continue to advance the idea of student performance, specifically growth, as an indicator of teacher effectiveness. As a result of requirements for eligibility to compete for funding through the federal RttT program, states developed mechanisms by which to evaluate, and thus assure, effective teachers in every classroom. In nearly all instances, the measures established included student performance, or more specifically, the idea of growth as a result of teacher influence, also called value-added measures (VAMs). Study after study substantiates that students who have teachers who are perceived as effective perform better on every measure of achievement. Those with less effective teachers are constantly catching up academically (Rockoff, 2004). Repeatedly, one of the most important elements of effective schools is having high-quality teachers (Koppich, 1998).

Data collection represents a significant role in school improvement efforts (Love, 2009). The purpose of data-driven decision making is to increase the quantity and quality of information teachers have about student performance, the theory being that they will then be more able to concentrate efforts at targeted improvement (Ancess et al., 2007). While the literature highlights that student growth data is used widely to improve instruction and student achievement, there is a dearth of knowledge related to how career and technical educators measure and use student growth to improve their instruction. The results of this study may help career and technical
educators target their classroom practices, instructional practices, and student learning experiences toward improvement. Such an analysis may result in discussion about teaching and learning among education stakeholders and policymakers and may result in better, higher-quality teaching and learning experiences, and may improve student performance. This research will also contribute to the literature in the context of developing, building, and utilizing high-quality formative assessments in the context of an accountability system for practitioners and policymakers.

**Significance of Research Problem**

The problem of how to provide meaningful student growth data to career and technical educators is significant because continuous improvement and the ability to be a reflective practitioner are dependent upon data. Darling-Hammond (1998) and Lieberman (1995) have demonstrated that providing teachers with meaningful data increases their capacities to change their practices. Understanding the perceptions of career and technical educators will help to inform ongoing professional development planning and ultimately lead to career and technical teacher improvement. Cohen and Hill (2001) believe that when professional learning components are built in to the policies they endorse, teachers are more likely to identify instructional goals that match those established by policymakers; specifically, evaluation.

**Research Questions**

The central question guiding this research was:

What types of student growth data are most relevant and useful to career and technical educators as a part of their evaluation process?

In addition, this study sought to answer the following research sub-questions:

1) How do educators within a career and technical high school measure student growth?
2) How do career and technical educators make sense of student growth data to improve their practice?

3) How do career and technical teachers gauge the effectiveness of their teaching?

**Theoretical Framework**

In order to build further understanding of how career and technical educators use student growth data to improve instruction, this study utilized the lens of continuous improvement (CI) theory. Continuous improvement theory informs this study in two important ways. First, it helps provide insight into how student growth data, particularly summative data, can be used improve educational systems. In this regard, continuous improvement in education is described as a set of processes and attitudes personified in the following categories: (1) continuous improvement; (2) data-based decision making; (3) studying and evaluating processes; (4) leadership; and (5) training (Detert, Kopel, Mauriel, & Jenni, 2000). Second, CI theory can be used make sense of how teachers use student growth data, particularly formative data, to improve classroom instruction. In this regard, continuous improvement is described as a set of classroom processes that include the plan-do-check-act (PDCA) cycle (Deming, 2000).

**Use of student growth data to improve educational systems.** Teacher improvement is a problem of continuous improvement; specifically, the capacity of administrators and teachers to recognize and problem-solve around continually shifting challenges (Resnick & Hall, 1998). Student growth data is a part of a system of feedback composed of “structures, people, and practices” that assist educators in transforming data into improved practice (Halverson, Prichett & Watson, 2007). The industry perception of “total quality management” can been substituted in teachers’ terminology with expressions such as “continuous improvement,” “quality assurance,” or “knowledge work supervision” (Duffy, 1997). These components of continuous improvement
and quality management relate to the existing perspective of educational policy and practice (Deming, 2000; Juran, 1988). Schools should be open to the idea of customer satisfaction and data (Rinehart, 1993) and school, teacher, and aggregate student data should be made available to the public. The NCLB movement supports continuous improvement, particularly in that significant emphasis is placed on data, standards, and policies related to accountability. In the United States, the National Education Association (NEA) and the American Federation of Teachers (AFT) have emphasized continuous improvement among their members through their own support of initiatives and policy adoption (Hawley & Rollie, 2002).

The notion that making decisions should be based on data is endorsed by the prominence in the organizational culture research on philosophies about the origin of reality and reasonableness. What is seen as rational and true permits one to make judgments (Saphier & King, 1985). Conversely, the quality management research contends that an explicit form of rationality, cause-and-effect analysis, be permitted. In schools, this frequently assumes beginning with the outcomes (student test results) and working in reverse to examine the possible reasons to be found in the curriculum and instruction (Supovitz, 2002).

The idea that improvement should focus on the customer translates in schools to a large variety of stakeholders, including legislators, Department of Education officials, district and school administrators, students, and parents (Smith & Piele, 2006). While many involved stakeholders are recognized in CI literature, there is still a belief that diverse constituencies will have corresponding expectations. In practice, teachers contend that within a school, consensus regarding how to gauge teaching effectiveness and thus, measure improvement is difficult to attain.
The concept of systemic feedback on practices is essential to the quality movement. Feedback systems are crucial for developing individuals within the organization so that they can learn from past practices and deliberately plan training to realize enriched ends (Senge, 1990; Senge, et. al., 2000). Constructive criticism practices convert individual outcomes into useful information that influence later instructional behaviors. The lack of recognized outcome measures for career and technical educators has been a prime impediment in establishment of systemic feedback procedures in CTE schools, making it challenging to produce valid data. The current publicity for using standardized testing as a means of accountability can be seen as a mechanism to deliver valid data for schools. Nonetheless, even with access to valid data, feedback in schools cannot be condensed to a routine process for integrating suitable information into practices. Ilgen et. al. (1979) stressed the importance of individual reasoning and sense-making by identifying how feedback should viewed and recognized as valid.

Evaluation systems necessitate component tasks that collect appropriate data, offer opportunities to scrutinize the data, and methods to bring results back into the primary instructional processes (Watson, 2005). The customary isolated nature of teachers in schools has worked against collaborative processes regarding instructional practices across classrooms in schools (Weick, 1995). The connection between data collection and use between administrators and teachers is minimally existent.

Fundamentally, there is a universal effort to increase the academic performance of the nation, through increasing teacher effectiveness and capacity (RttT, 2009). Smither, London, and Reilly (2005) state “the nature and the tone of feedback can greatly affect the recognition of the need to change one’s performance.” More specifically, Smither et al. found that feedback alone is not the foundation of performance modification, but that receiving any type of feedback
and then developing goals from that feedback results in changes in performance (2005). Human
capital is of maximum importance in this process, and that performance is unlikely to improve if
people elect not to perform (Swanson, 1999).

**Use of student growth data to improve classroom instruction.** In addition to using
assessment to track and promote individual students’ achievement, classroom assessment should
also be used to reflect upon teaching practices (Shepard, 1995). The use of student growth data
reflects the central concepts of the continuous improvement movement, which was inspired by
W. Edwards Deming. Deming encouraged moving beyond summative perspectives to focus on
embedding formative processes for continuous improvement (Deming, 2000). As shown in
Figure 1, Deming and Walter Shewhart described a cycle of continuous improvement that is
composed of four steps: plan, do, study and act:

![PDSA Cycle](http://raedis.com/images/shewhart.png)

*Figure 1. The PDSA cycle as described by Deming and Shewhart. Retrieved July 28, 2016, from http://raedis.com/images/shewhart.png.*

The PDSA cycle is a four-step CI model used for improvement and implementation of
change. Deming and Shewhart developed the PDSA method to direct CI processes in an
industrial manufacturing setting (Taylor et al., 2013). The PDSA model can be modified to guide CI actions in the environment of education. The PDSA process promotes CI through the evaluation of the intervention applied and measures the overall impact of the intervention toward the intended outcome (Taylor et al., 2013). The PDSA technique follows a recommended cycle of four stages, plan-do-study-act (see Fig. 1), that encourage the examination of minor incremental changes allowing timely assessment and reflection providing the opportunity to adjust and make needed changes (Taylor et al., 2013). Taylor stated that improvement can occur as participants examine the outcome data relative to their original perceptions and stressed that even if approaches show that a process may not yield the intended outcome, it can result in the development of an completely different tactic to the plan. The process of trialing is valuable even when outcomes indicate that proposed methods are not always the best choice.

Continuous improvement in the educational setting focuses on which factors teachers believe are important for leading students to learn and how they will demonstrate this knowledge and skill.

**Definition of Key Terms**

There are a number of terms that are important to this study.

**Accountability.** The process of evaluating school or educator performance on the basis of student performance measures (Hanushek, 2007).

**Accommodations.** An alteration of environment, curriculum format, or equipment that does not change the content (Robertson, n.d., p. 1).

**District Determined Measures (DDMs).** Massachusetts’ approach to measures of student learning, growth, and achievement related to the Massachusetts Curriculum Frameworks,
Massachusetts Vocational Technical Education Frameworks, or other relevant frameworks that are comparable across grade or subject level district-wide. These measures may include, but are not limited to: portfolios, approved commercial assessments and district-developed pre- and post-unit and course assessments, and capstone projects (Technical Guide A: Considerations Regarding District-Determined Measures, Massachusetts Department of Elementary and Secondary Education).

**Feedback.** Information that students receive about their work and performance and use to learn about their level of achievement or attainment (Frey, 2011).

**Formative assessment.** “…encompassing all those activities undertaken by teachers, and/or by their students, which provide information to be used as feedback to modify the teaching and learning activities in which they are engaged” (Black & Wiliam, 1998, p. 7).

**Learning goals.** The important things teachers expect students to master (Swarthmore College.).

**Modification of instruction.** “Making alterations,” including altering the content (Robertson, n.d., p. 1; NCLB).

**Reflection.** The process that enables the adapting of program, procedures, results and classroom atmosphere to learners’ interest, needs, and learning styles (Costa and Kallick, 2008).

**Reflective practices.** “The deliberate and purposeful act of thinking which centers on ways of responding to problem situations” (Loughran, 1996, p. 1).

**Reteaching.** “Teaching content again that students were unable to learn” (Marzano, 2003, p. 82).
**Student growth.** Student growth measures are a method for determining how much academic progress students are making by measuring growth between two points in time (Center for Public Education, 2007).

**Summative assessment.** An evaluation of student learning at the end of an instructional unit by comparing it against some standard or benchmark for the purpose of making decisions regarding students or programs (Sadler, 1998).

**Synchronous contingency.** Real-time adjustments that teachers utilize during teaching, or the way a teacher, after the responses of students taken by a class poll, implies that the learners are talking over replies with partner (Crouch & Mazur, 2001; Black & Wiliam, 2009).

**Value-added measures (VAMs).** Value-added measures are a way to analyze test data that can measure teaching and learning. Using students' test score changes from previous assessments, researchers can calculate the expected growth those students are likely to make in a given year. Using the same methods, researchers can look back over several years to determine the long-term impact that a particular teacher or school had on student achievement (Organization for Economic Co-operation and Development, 2008).
Chapter 2: Literature Review

Introduction

The United States public education system has been continuously evolving over the past forty years: the Elementary and Secondary Education Act (ESEA), Title I, the Education Consolidation and Improvement Act (ECIA), the Standards and Accountability Movement, the NCLB Act, and now the Common Core and RttT are all schemas for student academic achievement across the states nationally (Goe & Holdheide, 2011; U.S. Department of Education [U.S. ED], 2009). Policymakers and politicians steadfastly attempt to shrink gaps in the achievement of children in the U.S. while simultaneously working to improve the quality of how public school districts and their schools perform. In order to assess the quality of something and to measure its progression or regression, there must be data to analyze the facts and validate the findings. Quantitative data for school districts, individual schools, and the students within them have been collected over the past few decades by way of standardized tests, such as National Assessment of Educational Progress (NAEP) and the Trends in International Mathematics and Science Study (TIMSS). Often, these assessments are examining the achievement of students in public schools across America. Throughout this time the standards have changed, becoming more rigorous and in some cases determining whether a student can graduate from high school based upon his or her performance on standardized tests.

But what about the educators driving and supplying the knowledge for these students? Teachers are evaluated on their instruction and performance, but for several years they were evaluated by their schools’ principals through the use of non-standardized, subjective methods that provided them with information about their performance (Massachusetts Department of Education [Mass DOE], 2011, 2014; Goe & Holdheide, 2011). With the Common Core as the
newest movement in U.S. education, policymakers are attempting to connect students and their academic achievement with their educators through the use of value-added data from standardized tests (Goe & Holdheide, 2011). The goal of VAMs and the data that is connected and bridged to an educator is to supply administrators with information to hold them accountable, and hopefully help to influence teachers’ improvement towards how they educate their students (U.S. ED, 2014). According to Wiliam (2011), formative assessment was first used by Scriven (1967) to define the role that evaluation could play “in the on-going improvement of the curriculum” (Scriven, 1967, p. 41).

While extensive literature exists surrounding standardized assessments and students’ academic achievement in America, as well as how educators are being evaluated with the use of their students’ value-added data, sparse information has been published regarding how the student data of educators, specifically CTE teachers, can be used to impact, influence, and improve their classroom instruction. The literature review will cover how VAMs are being used in teacher evaluations, what this data means for educators, how they can use this information to improve their instruction, and more specifically, how CTE educators can utilize this information within their classrooms and vocational shops. Instructional improvement requires “a radical change in teaching style for many teachers. It is this aspect of formative assessment work that teachers were least likely to implement successfully” (Black & Wiliam, 2006, p. 14).

The term formative assessment was first used by Scriven (1967) to define the role that evaluation could play “in the on-going improvement of the curriculum” (p. 41). Bloom (1969) believed that assessment and evaluation were directly connected to the teaching and learning process that had an impact on the pedagogy of teachers, and the students’ level of comprehension.
Formative assessment, which potentially provides advancement of students’ achievement, has taken on new meaning as our understanding of the role of educators has evolved. Black and Wiliam (1998) shared that formative assessment is everything done by teachers, eventually executed by students, and used by the teacher to modify instructional activities.

Shepard, Hammerness, Darling-Hammond, Rust, Snowden, Gordon et al. (2005) expanded the previous definitions by stating that formative assessment was implemented to modify instructional planning by the teacher. The Organization for Economic Cooperation and Development (OECD, 2005), represents formative assessment as a process of periodic events instituted by the teacher to illuminate areas of difficulty for students, providing the opportunity for the teacher to fine-tune planning in order to accommodate the students’ instructional needs (Looney, 2005). Subsequently, Kahl (2005) defines formative assessment as a means to gauge understanding by the students.

The assertion that the need to employ formative assessments regularly during instruction was critical, state Crumrine and Demers (2007). However, teachers must be aware of which particular approaches should be used in the classroom, along with being open to modifying and adapting their plans. Crumrine & Demers (2007) go on to state that the persistent and regular assessment process results in deep understanding and improved student engagement. The modification and adjustment of instruction as a result of data collected from assessments is what makes the process formative (Boston, 2002). In the process of investigating over 250 research studies related to formative assessment, Black and Wiliam (1998) found that when educators utilized formative assessments to evaluate and modify instruction, students made substantial achievement gains.
**Value-Added Data and Teacher Evaluations**

During the 1990s, schools began to be held more responsible for student learning outcomes (Braun, 2005b). The emphasis in education shifted from input data, such as student-to-teacher ratio or per pupil costs, to outcome criteria, such as performance on statewide assessments. As a result, there has been a mounting need to develop accurate indicators of school performance (OECD, 2008). Value-added measurement in K-12 education is embedded in a succession of school effects research, which in the United States, began with the Coleman Report that examined the relationship of schools and families to student achievement (OECD, 2008; Coleman et al., 1966). In initial studies, schools were identified as high-achieving based upon student test scores in high-performing schools compared to those that were not. Later studies of faculty impact used analysis models of mean test scores at a precise point in time while accounting for pertinent demographic qualities of the students, including socio-economic data (Haveman & Wolfe, 1995). These complex representative sample models have been used to afford measures of school performance and to compare the resultant variances in school rankings (Hanushek, 2007). Such analyses were not considered value-added models due to the limited analytic framework since they represented a snapshot, based upon test scores at a single point in time without consideration of initial achievement levels of students (OECD, 2008). There has been an expanding interest in how to measure the performance of teachers, schools, and districts after accounting for the factors impacting student achievement such as academic ability when entering the teacher’s classroom (Hibpshman, 2004). In the mid-1980s, due to enhancements in statistical methodology and accessible data, researchers started to use more advanced VAMs (Raudenbush & Bryk, 2009), making substantial improvement in teacher effect studies. Progress and improvement of VAMs led to greater use of high-stakes teacher accountability systems in
the U.S. in states such as Tennessee, North Carolina, and Ohio (Hibpshman, 2004). While many different VAMs exist, the most commonly used, and most researched, has been the mixed-model approach developed by William Sanders, known as the Tennessee Value-Added Assessment System (TVAAS) (Hibpshman, 2004; Sanders & Horn, 1998). TVAAS is a hierarchical linear model (HLM) developed to represent the nested data structures and individual differences in growth curves over time in education research (Raudenbush & Bryk, 2009). While there are many different VAMs, the majority of those used in accountability systems use data that track student test score changes over time (Sanders et al., 1998; McCaffrey et al., 2004). Through a variety of statistical modifications, student growth data can be converted into indicators of value added (OECD, 2008). Most VAMs utilized in education use standardized test scores taken near the end of the school year to measure student growth core academic subjects, and infer from the results the effectiveness of teachers and schools. Since annual standardized tests such as the numerous statewide assessments mandated by the NCLB (which measures student achievement and occasionally requires teachers and schools to make annual, adequate achievement progress), research studies related to VAMs have multiplied (Goe et al., 2008).

Measuring students’ performance in academics within states across the nation has long been in practice through the use of standardized assessments. In light of the NCLB Act, in 2011, high-stakes testing was put into place to shorten the gap in achievement through the use of standardized tests in third through eighth grades, as well as in tenth grade, in which students needed a passing score in order to graduate from their public high schools (U.S. ED). Currently, national and state standardized tests are again being examined and revised, and their data is being used beyond just looking at student performances academically. Some students across the country may perform below proficiency in one or more areas of academia; however, while their
performance in a subject area may be low, their ability to grow from year to year may be in a high percentile (Mass DOE, 2011). The Massachusetts Department of Education also describes that if a student has high growth from one year to the next, this could potentially indicate that something new has occurred during that academic year – such as a new teacher, a new classroom environment, a new instructional design or technique from a teacher, or the introduction of a new program – and this stimuli has produced positive growth and change. Arguably, knowing that a student is improving and growing is just as important as knowing how proficient they are in a given subject.

**Teacher evaluations.** When examining student achievement, many parents, school districts, and policymakers look to the teachers to better understand the level of achievement, as this is the underpinning of education. Just as students are evaluated on their academic performance, teachers are evaluated on their instructional approaches and achievements through the use of teacher evaluations. Goe and Holdheide (2011) discuss that the traditional approach of evaluating teachers, such as looking at their credentials and observations of their teaching, are not always the most valid and sound measure of student growth. Similarly, the U.S. Department of Education states that observational teacher evaluations were created so that teachers could know how they were doing, not specifically how their students were doing based off their teaching approach and style.

Through RttT, a motivating program that gives states funding if they meet Common Core standards, VAMs were put in place in order to start bringing accountability to teachers for student growth and to link their effectiveness to student performance (U.S. ED, 2009). When students move one or one-and-a-half grade levels in growth, then the teacher connected to the data is considered to be “effective” or “highly effective” (Goe & Holdheide, 2011).
Areas of concern. Some areas of concern exist about the use of VAMs for teacher evaluations. According to Glazerman, Loeb, Goldhaber, and colleagues (2010), a major argument against the use of VAMs in teacher evaluations relates to the concern regarding how school districts and their administrators could use the data to affect teachers’ promotions or terminations, or their level of pay, as well as the fear of mislabeling teachers. The worry that teachers could be mislabeled relates to the issue of being held accountable, and means that teachers may be categorized as “ineffective,” when in fact they are realistically “average” or “above average” educators, if their students score below proficiency even after they have worked diligently and in accordance to national core standards, while other teachers may prevail and be labeled as “effective” even if they are below average and receive credit for their students reaching high scores (Glazerman, et al., 2010). Likewise, Glazerman et al. (2010) describe other areas of concern, such as VAMs not being reliable and valid measures of teacher effectiveness. Further still, another challenging area that dovetails with holding educators accountable is knowing which teacher is responsible for student growth if a student has more than one teacher in a particular grade and even for specific academic subjects (Bel Hadj Amor, Tucker, & Ozek, 2013).

Validating the strengths. Several of these concerns are addressed, rebutted, and reframed as food for thought in the 2010 article by Glazerman et. al. While the use and research of VAMs for teacher evaluations are in the infancy stages, when compared against similar evaluations in other fields that use high-stakes scores and data, such as real estate and professional baseball batting averages, VAMs have the same level of validity and reliability (2010). Additionally, while VAMs may be imperfect and produce false positives or negatives at times, they more importantly provide clear-cut and valid empirical evidence and data for
evaluating and categorizing teachers compared to using their credentials, observation
evaluations, and degree and level of experience (Glazerman et al., 2010; Goe & Holdheide,
2011).

Strikingly, the use of VAMs for teacher evaluations may prove to be critical when
districts are making decisions surrounding budget cuts and costs. Often, some districts cut costs
through the use of teacher layoffs, which can be based on seniority level rather than the
effectiveness of the teacher; however, if VAM data were used, teachers would be laid off if they
were labeled as “ineffective” based on low scores. Using VAMs for teacher layoffs may sound
negative, but the benefits are twofold. According to Glazerman and colleagues, districts risk
losing fairly equal numbers of “ineffective” as well as “effective” teachers when conducting
layoffs based on seniority, yet actually end up preserving more “effective” teachers if VAMs are
used (2010). The U.S. Department of Education further validates this vantage point, reporting
that students who have effective educators tend to achieve better and higher across the board and
in all areas, while their peers who had less effective teachers are often forced to play academic
catch-up and fall behind (2014). Therefore, the use of VAMs in educator evaluations should be a
motivator and should be used in classroom instruction.

**What this means for educators.** With the implementation of the Common Core and the
use of VAMs for educator evaluations, teachers will need to pay attention to the data that is
produced from the work of their students and not ignore what it relays (Glazerman et al, 2010).
Mitchell D. Chester, the Commissioner of Elementary and Secondary Education in
Massachusetts, wrote in a 2010 Letter to Educators that teachers should “use this data to discover
and learn from what worked well and what may not have worked as well by reflecting on student
growth trajectories and the possible factors that may be contributing to them.” What this means
for educators is that they may need to make adjustments annually to their classroom instruction in order to fine-tune what does work for students and what may hinder them. Specifically, the work of Jacques and Potemski (2014) states that these new stringent standards and teacher VAMs will need to be used to create variations that are “applied in real-world contexts.”

**Educators’ VAM Data and Improving Instruction**

VAMs for educators and the data produced from them are multifaceted and challenging, and come with several strengths, weaknesses, and questions about where to go from here. A major challenge teachers face includes how they can and should be using the VAM data to improve their classroom instruction. In one point of view that attempts to help guide educators in how to use VAMs, Bel Hadj et al. (2013) suggest that for educators who share students in a specific grade and perhaps for several subjects, communication between educators is vital. They explain further that it is common for students, particularly those in higher grade levels and/or in special education programs and classes, to have more than one teacher who instruct them in particular subject areas; often teachers co-teach courses or overlap in areas of study even in separate classrooms (2013). When situations such as these arise, it can be quite challenging to bridge students’ VAM data with the corresponding educator. Through organization and communication, teachers can work together to use the data and incorporate it into their lessons. The use of syllabi and lesson plans that connect this data and review the information to be taught is one suggestion that may benefit teachers and students alike (Bel Hadj Amor et al., 2013).

In practice, American public schools commonly do an ineffective job of methodically developing and evaluating teachers. Schools frequently fall short in efforts to improve the performance of ineffective teachers, and subsequently, of dismissing them (Weisberg, 2009). In reality, student growth would play a much more powerful role if it were used for teacher
improvement rather than as a component of teacher evaluation. In attempting to improve student achievement, it makes sense that a precise pathway is an indispensable tool. We need to know where we are now, where we want to be, and what key obstacles and opportunities lie between those two points. Meanwhile – notwithstanding the fact that evidence-based decision-making has become a common feature of the education landscape – CTE teachers are not familiar with that landscape. Ultimately, the goal of teacher evaluation is to improve teaching (Taylor & Tyler, 2012).

**VAMs and CTE educators.** CTE instruction is delivered in Massachusetts in a variety of ways. Most commonly, students participate in their technical program for long periods of time without interruption. The most common instructional structure is the “week about” where students are in their technical program for five consecutive days, all day long. Each technical program, like any academic program, has a state-developed curriculum framework. It is the responsibility of the CTE teacher to teach students the content and skills represented by these standards. As part of the Massachusetts Education Reform Act of 1993, the state was required to develop assessments in each of the 43 technical courses. This was never accomplished, and therefore, career and technical educators have been left to identify or develop their own measures of student achievement.

Goe and Holdheide (2011) raise another valid concern reiterating that standardized assessments are currently given in third through eighth grades and then again in tenth grade; this translates into most teachers not having VAMs as part of their evaluations. Further still, currently only mathematics, language arts and reading, and sciences are measured through these assessments, leaving out educators of other subject areas, including CTE teachers and the vocations they instruct (Goe & Holdheide, 2011; Jacques & Potemski, 2014). As reported in
Jacques and Potemski’s research (2014), there are over 140,000 CTE teachers across the United States who are vital in reducing dropout rates of high school students, as they provide them with real-world skills and opportunities. In their 2014 article, Jacques and Potemski cite data from the Association for Career and Technical Education (ACTE) reporting that high school students enrolled in vocational education and studies have an average graduation rate of 90% as compared to high school students in regular education systems who have rates slightly under 75% (n.d.).

With CTE teachers playing such a critical and exemplary role in America’s education system and to the students within it, finding a way to use VAMs in vocational instruction proves to be both essential and challenging.

Career and technical teachers traditionally are career changers who have left a private sector job where profit and loss was the sole determinant of performance. Educational pedagogy, including assessing student performance, is a foreign concept. Teachers in non-tested courses, including the 43 career and technical courses offered in Massachusetts, must identify DDMs. These measures are intended to represent an assessment that demonstrates student growth. Student data as it relates to teacher evaluation needs to be consistently reflected upon in the identification of the need for teacher improvement and the subsequent planning and professional development. Anecdotal data from personal experience observing and evaluating CTE teachers, as well as data from assessments, are disregarded and not used for reflection upon teaching and learning. This creates an environment whereby assessment is not utilized as a tool for reflection on teaching and student learning. If student outcomes do not result in teacher reflection, then instructional improvement, and thus increased student achievement, is unlikely to occur.

*Improving classroom instruction.* Findings from a study of Canadian teachers using new academic content standards, for example, demonstrated that because changing one’s own
instructional practices is “complex and demanding,” teachers require feedback to “learn to plan around the standards, develop complex instructional strategies, and create integrated curriculum materials” (Hargreaves et al., 2001).

The reason for employing an assessment and accountability system is to improve student learning of valuable content (Porter, 2002). For schools, these systems provide the benchmarks and strategies for constructing an effective assessment and accountability program that will positively impact instruction and improve student achievement. With the implementation of the Common Core, it becomes imperative to utilize VAM data to help students reach the established standards through collaboration with tested, Common Core subjects and the teachers of those subjects through the integration of practical examples (Lombardi, 2007). Educators in vocational settings who have mastery of their technical skills are challenged to incorporate Common Core standards into their classroom instructions; using VAMs and knowing what works for their students can aid in this process. Math, science, and language arts can all be adapted into vocational instruction that will perhaps clarify the areas that some CTE students may find troublesome; students will then be able to apply them to the skills they know and thus use them in real-world settings (Jacques & Potemski, 2014).

In 2000, the American Educational Research Association (AERA) developed twelve standards that identify the criteria that an effective assessment and accountability program should meet. Porter, in 2000, summarized these standards into guidelines for creating an effective accountability program that will strengthen instruction and improve student achievement.

1. The assessment and accountability program must offer a focused goal for student and teacher effort. If assessment and accountability can target effort, then they must target effort in a positive and clear direction. In light of accountability directives, it is imperative that school
accountability expectations represent an understandable, manageable set of targets to guide teacher efforts. These expectations should direct educators and students toward valued goals. The first step in this process is wisely developed content standards. These standards should emphasize balanced curriculum, mastery of critical concepts, and the ability to utilize those concepts and ideas to reason, communicate, and solve unique problems. Students must also master basic knowledge and skills. The assessments used in an accountability system must be aligned with these standards.

2. The accountability system should be symmetrical. To achieve high levels of student performance, students and teachers must work together. No teacher is so good that they can be effective without students who are motivated and willing to learn. Likewise, even students who are motivated and willing to learn must have adequate opportunities to learn. The accountability program should contain stakes that teachers and students share so that both have motivation to improve the same outcomes.

3. The accountability program must be fair. For students, fairness means that teachers provide a suitable opportunity to learn. For teachers, fairness requires availability of the resources needed to be successful. A fair accountability program depends on tests that are reliable and valid for their intended use. Also, any inferences about teacher effectiveness based upon data from the system must be consistent and accurate (Heubert & Hauser, 1999).

If students are to be held accountable, then teachers must make available an adequate opportunity to learn what they are being held accountable for (Porter, 1993). If teachers are to be held accountable, then the school must provide them with the resources they need to be successful.
To guarantee that an accountability program is as fair as possible, it must be evaluated over time. One component of this evaluation should focus on consequential validity. Is the program having the effect it was designed to achieve? Is the instruction getting better over time? Are judgments about students leading to improved levels of achievement among all students?

Teaching is a multifaceted process. In order to help students learn, a teacher must be cognizant of the needs and strengths of each student. They must recognize how students are understanding of recently taught concepts and how well they are developing increasingly advanced skills. In which areas have students accomplished proficiency, and which areas continue to challenge them? What is helping them learn, and what is interfering with their ability to learn?

The rationale behind how formative assessment data can help teachers is straightforward: a teacher gathers data about what students have learned, scrutinizes the data to see where students are strong and weak, and customizes what and how they teach so that students learn more.

**Summary.** In an MCAS Interpretive Guide (2011), Chester stated that VAMs should be considered as “another piece of data that educators may use to better understand their students’ performance. There is a story behind every student growth percentile, and educators are encouraged to seek out these stories” (p. 3). Educators, whether they are general education teachers or CTE teachers, should use VAMs to influence their classroom instruction. Communicating with other educators within the same school or district and organizing lesson plans may help to link the appropriate teachers with the VAM data that is produced. For CTE teachers, making their classroom instruction aligned with the Common Core, but placed in real-world scenarios, will help their students meet rigorous standards.
Conclusion

Chapter 2 reviewed the literature regarding student growth and VAMs. There are several definitions of student growth, which are defined in terms of teacher classroom and instructional practices, instructional leadership, and data gathering to inform school decision-making. The purpose, benefits, and criteria for student growth data, issues surrounding the use of student growth data, and models of gathering and analyzing data were also discussed. Data-driven decision-making plays an important role in evaluation and instructional planning, as data can provide benchmarking and metrics to indicate which areas require improvements in teaching, learning, and student achievement.

In the present study, the emphasis was to observe what types of data collection presently exist and what kind of evidence should be provided through a formative assessment process that attempts to enhance teaching practice, contributes to student learning, and assists in overall improvement design. Specifically examined were the extent to which DDMs improve CTE instruction, the relationship, if any, between DDMs and student achievement, and aspects of student growth that should receive the most attention to maximize its effectiveness for overall teacher improvement. The literature that was reviewed supported this purpose.
Chapter 3: Research Design

Introduction

Regular evaluation of teacher performance, including student growth data, provides an opportunity for educators to reflect upon and improve their practice. Career and technical teachers do not have the criterion-referenced standardized assessments that are available to math, English, and science teachers to provide them with feedback regarding the growth of their students. Instead, they must identify or develop their own measurements to establish student growth data. If we were better able to understand teachers’ needs related to using student growth data, we may be able to provide support toward teachers’ use of data for instructional improvement. Therefore, the purpose of this basic qualitative study was to examine how career and technical educators gather and use student growth data to impact student performance.

Utilizing a qualitative research approach contributed considerably to the study of continuous improvement, as it emphasizes discovery and captures various viewpoints and opinions through extensive, content-rich accounts of the process (Bloomberg & Volpe, 2012). The objective of the study was to understand the manner in which continuous improvement supports teaching and learning that occurs through an active process of sense-making and the concepts of intentionality, forethought, self-reactiveness, and self-reflectiveness (Bandura, 2001).

The central research question in this study was: How do career and technical educators measure and use student growth data to improve their instructional practice? This chapter provides an overview of the methodology used to study the experiences of CTE teachers relative to formative assessment, its influence on their practice, and the evaluation process.
Positionality Statement

Due to the nature of qualitative research, the researcher’s lived experiences must be considered (Peshkin, 1988). Recognizing and monitoring the shortcomings and biases and how they may influence the collection and interpretation of data is important (Merriam, 2009). My previous experiences may have influenced the course of this research; therefore, their effect was limited through the use of a field log and research memos that chronicled time spent, observations made, feelings, thoughts, perceptions, insights, and experiences, as well as tracking the methodologies utilized. My study sought to understand the ways teachers use student data to improve their own practice of teaching. This is a topic I have a great deal of interest in based on my current role of superintendent and evaluator, as well as my personal experience as an assessment developer and teacher. I have noticed through my own observations that many teachers use classroom assessments for summative purposes rather than formative. In my experience, while hiring CTE teachers directly from industry, I notice they have little to no understanding of teaching, causing me to be concerned about their ability to assess for purposes of gauging student growth or reflecting on how the data could be used for their own improvement. The topic for my dissertation study emerged from these observations and concerns.

Research Design

This study was qualitative in nature and was chosen as a study type to allow the researcher to gain a deeper understanding of teachers’ experiences related to educator evaluation using student growth data and how this mandated requirement could be used for the benefit of improved teaching and student achievement. Qualitative research offers thorough descriptions of settings and participants and permits additional investigation of important themes and issues.
regarding the topic of research (Creswell, 2003). This form of study strategy permits the researcher to have a greater depth of understanding of teachers’ perspectives. Creswell (2013) stated that qualitative data are suitable when it is necessary to explore a topic or identify variables. Several researchers have studied the use of value-added data for evaluation of teachers and the use of formative assessment; however, there is a gap in the research regarding empowering practitioners in the CTE classroom to voice their opinion. Qualitative research is used when the intent is to enable participants to share their stories, have their voices be heard, and minimize the unequal relationships that are often present between a researcher and the participants (Creswell, 2013).

Employing a qualitative research methodology permitted illumination and unanticipated viewpoints as well as the opportunity to gain greater insight and exploration of the meaning of participant’s experiences (Denzin & Lincoln, 2005). Qualitative research provides a focus on the participant’s viewpoint and offers broad, context-rich descriptions of the phenomenon (Denzin & Lincoln, 2005). Qualitative research is used as a means to investigate in a complete manner a phenomenon or a group of people that has not been sufficiently studied. This form of study provides identification of patterns and variables, which can lead to the formation of a hypothesis that could be the heart of future quantitative designs (Creswell, 2013). To avoid the influence of bias, a wide lens is imperative. Given this, it is understood that the qualitative model of research is suitable for the investigative purpose of this study exploring the teachers’ experience with evaluation, assessment, and reflection.

Qualitative research provides a practical choice for social science research, as the human nature of the participants are not detached from the data, but are recognized and labeled in a general manner instead. This allows the researcher to incorporate the intricacies that are a
part of human experiences (Creswell, 2007). Understanding the individual from their own point of view, from the perspective of their own unique experience, is the most real way of knowing them (Moustakas, 1956).

**Research Paradigm**

A paradigm, also described as a worldview, is a set of beliefs that guides one’s actions related to philosophical assumptions, epistemologies, ontologies, and research methodologies (Creswell, 2013). The paradigm that is used directs the researcher toward philosophical suppositions about the research and the choice of tools, instruments, participants, and methods used in the study (Ponterotto, 2005). This study most closely suits a constructivist-interpretivist worldview as described by Ponterotto (2005). In this worldview, the emphasis is on the individual constructing his or her own reality, which is hidden from the surface; only through the interaction of the researcher and the participant can meaning be constructed (Ponterotto, 2005). Creswell (2013) posits that meanings are varied and multiple, causing the researcher to look at the views of the participants in a broad sense, rather than creating specific or exact meanings of their views. Creswell (2013) further states that meanings are shaped through connections between the researcher and the participants, history, and cultural norms, resulting in a focus on the participants’ perspective.

Attempting to make sense of the experiences of CTE teachers relative to evaluation, student growth, and reflection on their own teaching practices, a constructivist-interpretivist view of reality was utilized. Constructivism was defined by Crotty (2003) as “the view that all knowledge, and therefore, all meaningful reality as such, is contingent upon human practices, being constructed in and out of interaction between human beings and their world, and developed and transmitted within an essentially social context.” Additionally, constructivism
stresses that meaning is shaped through “communal interchange” (Gergen, 1985). For this reason, I kept in mind the belief that CTE teachers construct what it means to be reflective and how they view their own evaluation as well as that of their students.

Deciding which research methodology to utilize is based on the researcher’s beliefs about ontology, epistemology, and axiology. These philosophical assumptions generate a predominant paradigm that provides the foundation for a study’s theoretical framework. Ponterotto (2005) states that ontology addresses the question of “what is the nature of reality?” (p. 130). Within this basic qualitative study, the ontological foundation is that there are many realities that are unique, grounded in each of us existing as spiritual and material beings (Vasilachis de Gialdino, 2009). Epistemology speaks to the question of how we know what we know (Ponterotto, 2005). Epistemology is defined by Kvale and Brinkman (2009) as “the philosophy of knowledge [which] involves long-standing debates about what knowledge is and how it is obtained” (p. 47). In the current epistemology, knowledge is not a “black-and-white” object or singular truth; it is “neither inside a person nor outside in the world, but exists in the relationship between persons and the world” (p. 53). Axiology looks at researcher values and ethics (Ponterotto, 2005). This study definitely incorporated axiology as part of its fundamental philosophical suppositions, given that the researcher and the participants each hold certain beliefs and worldviews that influence their ontological assumptions and the certainty in which they each live (Creswell, 2013). For this study, these philosophical assumptions led to a qualitative research methodology.

This qualitative study explored human perception of CTE teachers as it relates to their the use of student growth data for their own improvement. Specifically, this study aimed to gain deeper insight into how the collection of student data impacts their practice, as well as what data may be more beneficial. Using a qualitative research methodology to examine this provides ideal
discovery, enlightenment, and unanticipated insights, as well as the extraction and clarification of the meaning of experiences (Denzin & Lincoln, 2005). Patton (2002) specified that qualitative research allows new light to be shed based on the ontological view that there are many truths resulting from our perceptions and experiences.

Research Tradition

A basic qualitative approach was utilized, as it allows the researcher to better understand teachers’ use of student growth data for their own improvement from their own perspective (Creswell, 2013). Creswell (2009) recommends the use of interviews in an inductive method, stating that interaction with the participants assists in answering qualitative research questions. Merriam (2009) suggests that interpretive inquiry happens when the researcher makes sense of participant answers based on their own understanding. Specific strategies used by CTE teachers to measure students and their growth as a basis for reflection on their practice has not been previously identified. The research question used in this study was expected to provide understanding and answers through the use of semi-structured interviews. The posed problem aligns well with the purpose of the study and the choice of research design (Creswell, 2009; Merriam, 2009).

Participants

A suitable sampling strategy and procedure is vital in order to discover context-rich accounts that will lead to maximum insight and comprehension concerning the research question (Merriam, 2009). This study was resolute in its sampling strategy, using clear criteria and basis for the participants selected (Ezzy, 2002). Denzin and Lincoln (2000) specified that a sampling strategy that uses qualitative research should select a small sample size from an applicable audience as opposed to a large sample from a target audience. The sample size for a qualitative
study is reliant upon what the researcher would like to know, the reason for the inquiry, what is at stake, what will be beneficial, what will have credibility, and what can be accomplished with existing time and resources (Patton, 2002). Ritchie, Lewis, and Elam (2003) specified that there is “a point of diminishing returns where increasing the sample size no longer contributes new evidence” (p. 83). Principally, a “quality over quantity” approach was used for this study, since the researcher was most concerned with studying the intensity of the phenomenon of how CTE teachers experience student growth data and its use (Patton, 2002).

Wanting an outcome that illustrates comparable patterns among an assorted blend of participants necessitates that a sampling strategy of maximum variation be used (Patton, 2002). If a wide variety of experiences is studied between a variety of cases and patterns of relationship occur, we would be able to propose that those same patterns could occur in other settings or conditions as well, consequently adding to the trustworthiness of this research, as well as deepening the contribution to teacher improvement and student achievement (Patton, 2002).

Standish Regional Technical High School (SRTS), a pseudonym, is a career and technical high school in Massachusetts, employing 39 teachers in its vocational technical program, with another 20 teachers in the core academic courses, four school counselors, and approximately 15 additional employees who support teachers as para-professionals.

With the sought-after outcomes for the data-gathering being quality of information and similarity among diversity, this study included six participants. The participants were specifically invited to participate from the list of CTE teachers employed at the selected school. The phenomenon to be studied was their experience with the use of student growth data for their own improvement. Therefore, the participants needed to be employed at the selected school since the beginning of the implementation of the use of DDMs. That condition confirms that participants
could do as Creswell (2013) recommended when he said, “most importantly, they must be individuals who have all experienced the phenomenon being explored and can articulate their lived experience” (pp. 119-122). The second condition was that all participants were teachers who had experience with the new educator evaluation system. The purpose for this condition was that teachers who have already been evaluated using the new system may be more willing to discuss their experiences or may have a broader understanding of the use of DDMs that have been implemented at the school. Those individuals who are more agreeable or prepared to discuss their experience are key informants (Bogdan and Biklen, 2007). Teachers who have been employed for three years or less were not included in this study, as it proposed to look at experiences which have not been developed enough for this group of teachers. It was imperative to select contributors who have truly been involved in the process in their work environment. The teachers were chosen based on the desire to have a mix of experience in terms of years at the school and technical background in terms of the technical program within which they work. The researcher included both male and female participants.

**Recruitment and Access**

Potential interview participants indicated their interest by responding via email to a flyer. This was followed by an informational letter (Appendix A), which included a short explanation of the study, participant selection criteria, and time commitments. Informed consent documentation was included as an attachment to this letter (Appendix B). If the candidate was still interested, they were requested to read the informed consent attachment.

Participants had two opportunities to review the informed consent document: first, when the informational letter was provided to interested participants, and second, when the informed
consent documentation was reviewed just prior to beginning the interview, providing the chance to ask questions and acquire the participant’s signature in person.

**Protection of Human Subjects**

Patton’s (2002) ethical considerations were used as a way to ensure that an ethical attitude was adopted and the researcher was committed to an ethical relationship with the participants. Patton’s considerations were adapted in such a way that the researcher afforded information regarding (a) the purpose, (b) promises and reciprocity, (c) risk assessment, (d) confidentiality, and (e) informed consent. Additionally, the study strived to ensure accurate reporting.

It was important to confirm that prior to asking for a participant’s consent to participate, they were aware of what was being studied and how the study would take place. Patton (2002) indicated that the researcher should consider what details need to be provided so that the participant will understand the study and the hoped-for outcome. Ultimately, the participant should understand the contribution that the study will make to the study of educator improvement. This study provided the primary focus of the study to the participants in order to help explain the purpose of the research prior to them consenting to participate (Moss, 2004).

Patton (2002) suggests that the participant understand what could be gained by participating, as well as how the researcher will follow through on promises made (if any). For this study, the researcher was clear with the participants that no financial compensation would be given. The researcher provided an outline of the potential benefits of contributing to the study, including gaining perspectives about themselves.

Willig (2008) represents that it is the researcher’s duty to guard against loss or harm and to “preserve psychological well-being and dignity of the participant” (p. 19). In evaluating the
potential risk to the participant, the main possible risk was psychological. As the participants were asked to share personal experiences, it was possible that they might feel concern for negative consequences as a result of their responses. In the event this occurred, the researcher allowed the participants time to think about how they were feeling, and let them know that their perspectives were valuable and were not viewed judgmentally. They were invited to share to the extent they felt comfortable, and were reminded that the information was completely confidential. If, during the interview, the researcher sensed trepidation, the researcher took the conversation in a safe direction.

In order to maintain confidentiality in all respects, access to the data was restricted to the researcher. The researcher respected the participants in the research process, ensuring that actions followed ethical guidelines, specifically by pursuing Institutional Review Board (IRB) approval at Northeastern University before any data was collected. After obtaining approval, participants were recruited and afforded, in detail, the informed consent and purpose of the research. Any questions the participants had regarding the process were answered prior to giving their consent. (See Appendix B for a copy of the informed consent.) It was explained to each participant that they were able to withdraw from the study at any time without consequence.

Data Collection

To guarantee that the study was holistic, information was collected to provide data regarding the following:

(a) Contextual data, the context in which the participant resides;

(b) Demographic data, the participant’s profile describing who they are;

(c) Perceptual data, the participant’s perceptions concerning the subject of the study.
Contextual information allows for understanding the overall context regarding the participant. In a qualitative study, contextual information provides deeper understanding of the reality within which the participants live (Clandinin & Connelly, 2000). A deeper understanding of how the past and present influenced the lives of the participants’ results from the contextual information. This contextual information was significant because it helped to ensure maximum variation, one of the sampling strategies, which allowed for larger likelihood of transferability of the findings to other contexts.

Perceptual information refers to the participants’ suppositions and worldview related to the study (Bloomberg & Volpe, 2012). We are all affected by our experiences, and those experiences are likely to influence how we view the world in general and the events that take place (Bloomberg & Volpe, 2012). The decisions that are made are based on these experiences; therefore, it is important that this study comprehend the perceptions of the participants, as that understanding helps to shed light on the phenomenon as a whole (Clandinin & Connelly, 2000). Perceptual information was acquired through face-to-face interviews with the participants. Questions were designed and asked in such a way that the perspectives of the participants were completely understood, rather than trying to confirm the researcher’s expectations (Polkinghorne, 2007). Open-ended questions were used so that the participants knew that their perceptions were respected, allowing them to give their own meaning to the questions as it related to their own experiences (Polkinghorne, 2007).

Demographic information provides greater understanding of where the participants came from, consequently helping in the development of their assumptions, perceptions, and worldview (Bloomberg & Volpe, 2012). Demographic information correspondingly allows for the
measurement of the maximum variation of the participants, to improve the probability of transferability (Bloomberg & Volpe, 2012).

Semi-structured conversational interviewing was the primary source of data collection for this study. The primary purpose of conversational interviewing is to obtain descriptive information from the participant (Herman-Kinney & Verschaeve, 2003). The interviews, which consisted of open-ended questions, were designed so that the participants told stories about their experiences. The participant and researcher then took these stories and created patterns and meaning of the experiences in a shared manner, thus employing a constructivist method of inquiry (Bujold, 2004). Corbin and Strauss (2008) specified that the meaning and knowledge that is constructed as a result of the experiences and events is more important than the experiences or events themselves.

Additionally, artifacts related to student growth and educator evaluation were collected from participants. These included documents such as lesson plans, assessment instruments, and educator evaluation documents, including their self-assessment, action plan, and formative and summative assessments.

The interviews, as mentioned earlier, were semi-structured using standardized demographic questions and open-ended interview questions (see Appendix D), as well as informal conversational interview questions that were constructed real time during the interview based on the participant’s responses to the standardized questions so as to give opportunities for descriptions (Bloomberg & Volpe, 2012; Patton, 2002). Two face-to-face interviews were conducted with each participant individually. Each participant was given a choice of three different dates and times for the interview, with an understanding that other choices were available if the initial choices were not convenient. Interviews were conducted in the school’s
conference room, a neutral location. The first interview was for the purpose of gathering informed consent and demographic data, as well as the collection of data. When meeting at a pre-arranged time and place, the informed consent documentation was reviewed with the participant, the participant’s signature was collected, and a second copy was given to the participant for their records prior to beginning the interview.

Creswell (2013) suggests that the researcher starts the conversation with an everyday type of question, such as “how are you today?” The interview began with general questions to build rapport between the participant and the researcher and put them at ease. Specifically, participants were asked what they hoped to gain through their involvement and what motivated them to participate in the interview. Questions regarding demographics were included in this initial phase.

The second portion of the interview focused on the collection of data related to the research questions. Participants were asked to prepare for the interview by considering specific examples from their teaching that might help exemplify their experience. They were also asked to bring examples that represented their experience to the interview. Interviews are principal approaches to data collection in qualitative research (Marshall & Rossman, 2006). The open-ended format permits participants to “answer from their own frames of reference rather than from one structured by pre-arranged questions” (Bogdan & Biklen, 2007, p. 3).

Both the school and the participant were then provided with a pseudonym. This pseudonym was utilized from that point onward, and was linked to the information collected from the participant. It was explained that the pseudonym would most likely be used with direct quotations from the interview in the final dissertation. The audio recording device was tested and
then turned on. The audio files were transcribed. Notes were also taken by hand for reference in case of a need for follow-up and secondary questions.

Once a level of comfort was established, general questions regarding experiences with evaluation, student achievement, and self-reflection were asked. Next, the primary question of the study was asked of the participant: “please identify what types of student growth data would be useful for your own improvement.” Finally, clarifying and follow-up questions were asked as necessary. Effort was made to stay on track when the conversation took any deviations. When it became evident that the participant appeared to have described his or her experience fully, the researcher finished by asking if there was anything else pertinent or significant to share concerning this experience. Participants were cooperative and conscientious with their answers, occasionally offering personal anecdotes.

The final interview was for member-checking and entailed sharing interview transcripts, analytical thoughts, and drafts of the final report with the research participants in order to ensure their ideas had been represented accurately, and to ask clarifying questions.

“Member-checking is the gold standard” (Sandelowski, 2008, p. 502) to ensure accuracy relative to processes that are utilized in qualitative research. Member-checking is critical “to improve the accuracy, credibility, and validity of what has been recorded during a research interview” (Harper & Cole, 2012, p. 510) by the researcher. In this study, this method was used to improve the validity of the research findings. This approach aided in ensuring that there were no misconceptions between the researcher and the participant, and that what the researcher assumed paralleled the source of the data. By engaging the participant, researchers’ critical and interpretive findings are analyzed and judged (Sandelowski, 2008).
Among its many benefits, member-checking allows the researcher the ability to insert quality control into the principal data collection process. For example, participants were asked to expand on or clarify answers. Lincoln and Guba (1985) affirm how member-checking can also take place near the end of the study when analyzed data is reviewed for validity.

**Document Analysis**

For the study, the researcher requested and collected a number of documents that provided evidence and support for the research in the context of the phenomenon of interest. The documents examined and described below included the following: (a) educator evaluation documents, including self-assessment, goals, the educator plan, and formative and summative evaluations; (b) syllabi and lesson plans for two years; (c) formative and summative assessments; and (d) DDMs.

**Educator evaluation documents.** The new educator evaluation process in Massachusetts utilizes a multi-step approach. Included in the process is a self-assessment that results in the teacher determining strengths and weaknesses in their practice. These strengths and weaknesses are then utilized to develop at least two goals. Based upon these goals, the teacher then develops their educator plan, which represents the actions they will take to address the goals identified. Once the goals have been approved by the teacher’s supervisor, the evaluation process begins with periodic observations of the teacher in the classroom as well as a review of lesson plans and other documents. At the midpoint of the school year, the teacher is provided with a formative assessment of their performance. This assessment identifies areas of success as well as specific needs related to continued improvement. Finally, a summative assessment is provided, which ultimately determines whether the teacher’s employment is continued. More importantly, the
summative evaluation identifies areas of continued need for improvement and strengths demonstrated by the teacher.

**Syllabi and lesson plans.** All teachers are required to develop and submit syllabi and lesson plans. Syllabi are submitted at the beginning of each school year, and lesson plans are submitted every Friday. All syllabi and plans are stored in a central location and kept on file for three years.

**Formative and summative assessments.** Teachers provided examples of assessments they had utilized throughout the year. Examples included one-to-one questioning, performance tasks, reflective journals, and exit tickets.

**District-determined measures.** DDMs represent a particular assessment that is agreed upon by the educator and the evaluator as the basis by which a teacher’s impact on student growth will be determined as part of the evaluation system. The influence of DDMs on an educator’s evaluation is minimal. Teachers are rated as having “high, moderate, or low” impact based on the growth of students on the agreed-upon DDM. If a teacher has a “high” impact, they are placed on a two-year self-directed growth plan. If they have a “moderate” or “low” impact, their plan is dependent upon whether they are rated as “exemplary,” “proficient,” “needs improvement,” or “unsatisfactory.” If in either “exemplary or proficient,” they are placed on a one-year self-directed plan. If an educator is rated as “needs improvement” or “unsatisfactory” and has a moderate or low impact on student growth, they are placed on either a one-year directed growth plan or an improvement plan, which can be as short as 30 days. Examples of DDMs included were a pre-test and a post-test administered at the beginning of a unit of instruction and at the completion of the unit, achievement of industry-recognized certifications
such as computer networking (CISCO), a wastewater operator’s exam, a certified nurse aide (CNA), and mock interviews.

Data Storage

The data, including all raw audio, the interview protocol (see Appendix D), transcribed interviews, and other coding documents, were stored in a secure location and will be retained for three years, after which time they will be destroyed. The researcher is the sole person with access to the data. In order to uphold confidentiality in all respects, access to the data was restricted to the researcher. Again before data collection began, a pseudonym was given to each participant so that no personal or organizational information would be recognizable. This study worked to guarantee anonymity in all regards and uphold confidentiality.

Data Analysis

Open-ended data collection is the underpinning to qualitative research data analysis (Creswell, 2009). In qualitative research, meanings are developing, and therefore analyzing the data is a comprehensive process, since large quantities of data are needed in order to be reduced into distinguishable themes and patterns (Merriam, 2009). Conducting an analysis of the narrative by investigating the themes and patterns that were evident throughout the participants’ stories and identifying the patterns that arose between the participants is a concern to the researcher (Polkinghorne, 1995). Therefore, a thematic analysis was executed to investigate the relationships between the data.

For this research study, the researcher used thorough verbatim transcription of the interview responses in preparation for the data analysis. The researcher used Creswell’s (2009) process of data analysis, defined by these six steps: (a) organizing and preparing the data for analysis; (b) obtaining a general sense of the information and reflecting on its meaning; (c)
coding the data; (d) generating categories and themes for analysis; (e) representing the
descriptions and themes as narratives; and (f) interpreting the meaning of the data.

The data was organized for analysis. The interviews were audio-recorded so that data
could be transcribed word-for-word. The transcriptions were completed by the researcher
immediately after the interviews so that the field notes could be combined with the transcriptions
while ensuring the confidentiality of the participants.

Next, the researcher systematically read each transcript in its totality to gain a general
sense of the information. Reading each transcript provided the opportunity for reflection about
the potential meaning of the data. Creswell (2009) recommends writing notes in the margins to
document the researcher’s reflections. This step allows for active engagement with the data,
ensuring that the researcher is familiar with it (Swanson, 2005).

The section that follows identifies the detailed coding methods utilized. Coding methods
were chosen based on the procedural needs of the study and the continuous improvement
theoretical framework.

**Coding methods.** Interviews with participants were recorded, transcribed, and
scrutinized for developing themes in order to distinguish participants’ perceptions related to
teacher improvement through the use of student growth data. The coding methods that follow
were proposed to break the data apart in order to allow themes to develop and then reintegrate
and reorganize the data into a practicable number of groups for theory development. The
identification of coding methods in this section follows a linear path, recognizing that the actual
use of methods happened interchangeably and repeatedly throughout analysis.

First cycle coding methods employed included process coding, which is suggested as a
first cycle coding method based on the necessity to describe facilitated actions of teachers
(Saldaña, 2009). Process codes are used when the researcher would like to indicate action within the data (Saldaña 2009). In vivo codes were used as well to categorize participants’ words in case they represented connotation better than a code that was created. In vivo codes can promote consideration of differences in the quality of participation by teachers during interviews that indicate voice. In vivo codes represent the actual narrative as stated by the participant (Saldaña, 2009). It was necessary to determine if explicit phrases were exclusive to the school, or were simply common educational jargon to describe formative assessment or student scores, for example.

Structural coding was included to be sure that the data collected answered the research questions, as well as to organize data for comparison to interviews. Structural codes provide an overview of the data via linking to particular research questions (Saldaña, 2009).

Similar to other investigative approaches in qualitative research, document analysis necessitates that data be scrutinized and interpreted to elicit meaning, gain understanding, and cultivate empirical knowledge (Corbin & Strauss, 2008). Document analysis is frequently used in combination with other qualitative research methods to afford triangulation (Denzin and Lincoln, 2008).

Artifacts were coded during first cycle coding utilizing open coding. Open coding may be used, particularly if the analysis of documents is supplemental to other research methods employed in the study (Corbin & Strauss, 2008). The documents provided were lesson plans, assessments, and their own evaluation documents, including self-assessment, goals, educator plans, and the formative or summative narrative. Varied sources of data provide contextual detail, allow for triangulation, and create a more complete image (Creswell, 2003). The lesson plans provided insight and an example of how the teachers used assessment data to teach the
targeted curricula. The documents were examined and coded to permit comparison and provide support of the themes identified from the analysis of interviews. Glesne (2011) advocates that documents such as lesson plans can either support or challenge data that is gathered through interviews and pose questions while providing pattern analysis. Lesson plan documents allowed for comprehension of the processes and order of the instruction and student learning objectives addressed within the instruction, activities students were engaged in, and materials needed to carry out the lesson. Using lesson plans as one of the documents provided an additional source of data to permit triangulation of all of the data gathered in this study. The lesson plans also provided awareness to help in investigating the use of assessment to inform planning. The codes used in other qualitative processes can be used to connect documents to data gathered by different methods (Denzin and Lincoln, 2008). Prior to theming the data, the research questions were divided into theoretical phrases. Themes capturing the connections and patterns in the data were explored before conducting second cycle coding analysis to be sure that categories that describe the data were developed.

During the second coding cycle, coding methods to organize and aggregate data that were broken apart by earlier coding methods were used. During second cycle coding, three coding methods were used: pattern coding to isolate similarly-coded data, focused coding to regroup the data conceptually, and theoretical coding to look for principal themes that provide a few overarching “central or core categories” (Saldaña, 2009, p. 163). These methods were applied to condense all the data and provide useful answers to the research questions. These overarching themes were intended to describe different experiences indicative of the teachers who participate in different uses of formative assessment and the evaluation process.
Document analysis was a corresponding data collection method to strengthen triangulation and theory development. Denzin and Lincoln (2008) draw attention to the benefits of using documents for theory building, a process that needs to incorporate comparative analysis. The constant comparative method as described by Denzin and Lincoln (2008) directed the data analysis, which was grounded in an inductive process targeting categorization of patterns and ascertaining theoretical properties in the data. The researcher compared document analysis data with other qualitative data and with codes for the purpose of organizing ideas and isolating perceptions that appeared to group together. Codes were grouped into functional categories, and these category codes were compared to transcripts from the interviews and data from documents by exploring the ideas mentioned in interview statements and documents.

Organization and analysis of the data was accomplished through the use of two spreadsheets. Each interview transcript was placed in the first spreadsheet by line number. The first column represented the numbered lines of the transcript. The second column contained key words from the transcript itself. The third column was used for process coding, the fourth for in vivo coding, and the fifth for structural coding. The second spreadsheet utilized the data from the first cycle coding in column one. Columns two through four represented pattern coding, focused coding, and theoretical coding, respectively. This resulted in the identification of principal themes, which are organized and described by research question linked to interview questions.

**Trustworthiness**

Trustworthiness raises the issue as to whether the study is plausible, accurate, and conceivable (Bloomberg & Volpe, 2012). Lincoln (1995) indicated that the intent of trustworthiness is to craft an ethical relationship with the text, the participants, and the researcher. In quantitative research, the theories of validity and reliability are encompassed by
trustworthiness. Validity refers to the degree to which something measures what it intends to measure. Reliability refers to the dependability with which it measures something over time (Lincoln & Guba, 1985). The key concepts most often identified for speaking about trustworthiness in a qualitative research study are credibility, dependability, and transferability (Bloomberg & Volpe, 2012). Credibility focuses on whether the researchers themselves are an exact depiction of what participants think, feel, and do (Bloomberg & Volpe, 2012). Dependability focuses on following the processes and procedures used to collect and interpret the data (Bloomberg & Volpe, 2012). Transferability concentrates on the capacity to apply the results to other comparable contexts or settings (Bloomberg & Volpe, 2012). This study addresses the issues of trustworthiness based upon the three main concepts (Lincoln & Guba, 1985).

Creswell (2009) suggested that “qualitative validity means that the researcher checks for accuracy of the findings by employing certain procedures” (p. 190). For this study, the researcher used a modified group of processes from Bloomberg and Volpe (2012) for guaranteeing credibility:

1. Researcher bias: the researcher ensured that all conceivable biases were explained to the reader. A uniform interview procedure was used during the process to track the researcher’s perceptions and biases.

2. Prolonged involvement and site information: the researcher provided accounts of the interviews, how long each lasted, and any other details that helped the reader gain a sense of what it was like to be in the room with the participant.

3. Triangulation of data: the researcher combined data from the interviews, the notes taken during the interview, documents collected, and the demographic, contextual,
and theoretical data gathered to show parallels between the varied data gathered, and to provide corroborating evidence.

5. Discussion of discrepancies or negative findings: the researcher presented findings even if they did not merge. As was expected, the significance of some experiences did not mesh with one another.

6. Transcription review: once the interview transcriptions were complete, the researcher sent them to the participants with an invitation to review them for accuracy.

For this basic qualitative study, the researcher used six teachers spanning different levels of experience and representing six different technical specialties within a suburban career and technical high school as the primary source of data. In this study, the researcher collected two forms of data including: individual interviews with each participant, and the collection of documents (i.e., lesson plans across multiple years and assessments).

Internal validity was attained through the use of axial coding, in which the text was re-read and reviewed to identify themes and isolate text that supported the ideas and categories identified through the open coding process. The representation of data through direct quotes from the participants assisted in providing validity and trustworthiness.

External validity was established within the theoretical framework of this study which combined the constructivist-interpretivist approach paired with continuous improvement theory. The external validity was additionally reinforced by prior research in the areas of formative assessment, value added measures, and educator evaluation. Throughout the research process, conducting interviews and document analysis met the accepted protocols to ensure validity and quality.
Ultimately, credibility for this study will examine “whether the researcher sees what he or she thinks he or she sees” (Kirk & Miller, 1986, p. 21).

Bloomberg and Volpe (2012) suggest that dependability in qualitative research is equivalent to reliability in a quantitative study. Dependability focuses on keeping track of the processes and procedures the researcher uses to collect and interpret the data. Bloomberg and Volpe (2012) state that there are three primary methods to safeguard dependability:

1. Provide an audit trail: this study provided an in-depth and thorough account of how data were collected, interpreted, and analyzed.
2. Make data available to others: this researcher will allow other researchers to examine the data collected for this study in its final form to confirm that confidentiality and anonymity were preserved.
3. Coding check: the researcher had a second reader code an interview to confirm consistency of codes.

Confirmability in a qualitative study equates to objectivity in a quantitative study (Creswell, 2013). Objectivity is particularly vital in qualitative research, since re-storying the participant’s experiences and life stories is a key component of the data analysis. Confirmability goes beyond credibility and researcher bias by not just noting the researcher’s biases, but by being clear about all possible biases so that the research can be wholly replicated by someone else.

This study intended to be exceedingly trusted and addressed potential issues of trustworthiness through credibility, dependability, transferability, and confirmability.
Limitations

All research studies have limitations. Some limitations are due to the methodology chosen, while others are caused by the study itself. Bloomberg and Volpe (2012) suggest that within qualitative research, the primary limitations result from (a) a restricted sample size, (b) the sample selection, (c) the techniques used for gathering data, and (d) researcher bias. Because qualitative research stresses data that is deep and rich, there is a smaller sample size than in quantitative research (Patton, 2002). To lessen the likelihood of this limitation, this study ensured that saturation and redundancy were attained to maximize the probability of transferability of the findings (Patton, 2002).

Which participants are chosen to be included is an important consideration in qualitative research, since a goal of qualitative studies is to maximize variation of participants (Patton, 2002). However, it is possible that the sample selection could be a limitation for qualitative research. This study minimized this possible limitation by choosing participants from different technical areas with differing levels of experience.

Interviewing presents potential limitations as the means of gathering the data. Participants generally respond differently from one another when being interviewed. Their ability to be articulate, perceptive, or cooperative varies (Bloomberg & Volpe, 2012). This study addressed these potential limitations by confirming that the participants were prepared for the interviews, knew what to expect, and were assured of confidentiality so that they were at as much at ease as possible and shared openly.

The greatest potential limitation for a qualitative study is researcher bias because qualitative studies are frequently limited by researcher subjectivity (Bloomberg & Volpe, 2012). To prevent this limitation from impacting the study, the researcher acknowledged all
assumptions, as well as made sure that the research plan had clarity, was not ambiguous, and was understood by the reader. The researcher ensured that the interview setting allowed for open discussion with the participants, that any biases of the researcher were hidden, and that the researcher remained open-minded so that the current knowledge could be expanded (Patton, 2002).

It is recognized that “there are no perfect research designs” (Patton, 2002, p. 223). While the researcher worked to warrant that the potential limitations related to qualitative research were lessened, these potential limitations are also what give qualitative inquiry its advantages.

Bloomberg and Volpe (2012) indicated that delimitations can exist within a study. These delimitations are intentional conditions or parameters imposed by the researcher to place boundaries on the scope of the study. The researcher has not put anything in place to minimize the impact of these limitations, instead including them intentionally as likely delimiters. In this study, these delimiters included the following:

1. The participants were all career and technical educators, given that this category is a primary focus of the study, although it is believed that this same study could be conducted with other non-tested subjects.

2. The participants were all from the same organization.

The delimitations were used as a method of controlling the scope of the study and were not intended to discriminate in any way.

Bloomberg and Volpe (2012) specified that “although qualitative researchers do not expect their findings to be generalizable to all other settings, it is likely that the lessons learned in one setting might be useful to others” (p. 113). Transferability allows for the ability to apply the
findings of the study to similar contexts or settings. Bloomberg and Volpe (2012) indicated that there are two main ways to ensure transferability:

1. Richness of description: this study provided rich descriptions that offer the reader a general and accurate depiction of the participants’ experiences, allowing the reader to have a shared experience.

2. Detailed background information: this study provided as much background or contextual information as was practical in order to offer the reader a shared experience without placing the anonymity of the participants at risk.

Transferability, in this context, is used in relation to the ability to generalize results to other locations (Trochim and Donnelly, 2006). Lincoln and Guba (1985) compare this qualitative language to quantitative external validity. It is hoped that the results of this study can be used by career and technical schools, administrators, and teachers as a means to improve teacher practice and ultimately student achievement.

Although teachers in any school are unique, this study examined the perceptions and experiences of the specific participants who have specific experiences in common. The information gathered from the participants’ perceptions can lead to greater understanding of other similar community career and technical educators’ perceptions of the use of student data for their own improvement towards achieving success for their students.
Chapter 4: Research Findings

Introduction

Career and technical schools find themselves in a unique position. They are not like traditional public high schools in that they focus on skills related to specific trades, which are much more difficult to assess using a standardized tool. Therefore, they have the opportunity and challenge to establish their own measures of success. Because of this situation, vocational high schools are sometimes left without specific direction related to standards and assessment. In other situations, vocational high schools are required to meet the same academic standards and follow the same state and federal mandates as all other public schools without guidance from regulatory agencies. Given this dilemma, they often look to their various stakeholders for input and guidance. While many have identified the qualities of effective teaching (Porter & Brophy 1998; Mortimer, 1994), studies related to information valuable to teachers regarding the improvement of their practice are lacking. Because of this dearth of research, this qualitative study was conducted in order to better understand how career and technical educators gather and use student growth data to better impact student performance. Through purposive sampling, a small group of teachers from a CTE high school in the Northeast participated in interviews, sharing their experiences and perspectives of formative and summative assessment of students and the use of this data for their own improvement and evaluation with the researcher.
Research Questions

The following central research question guided this qualitative study: what types of student growth data are most relevant and useful to career and technical educators as a part of their evaluation process?

In addition, this study sought to answer three related sub-questions:

1) How do educators within a career and technical high school measure student growth?
2) How do career and technical educators make sense of student growth data to improve their practice?
3) How do career and technical teachers gauge the effectiveness of their teaching?

Description of Context

Standish Regional Technical High School (SRTHS)\(^1\) is a career and technical high school in Massachusetts, employing 39 teachers in its vocational technical program with another 20 teachers in the core academic courses, four school counselors, and approximately 15 additional employees who support teachers as para-professionals. The school offers 13 different technical programs in a “week about” system, whereby students participate in their technical programs for one week and then have their academic coursework the other week. SRTHS is one of 28 regional vocational schools in Massachusetts. Additionally, there are 13 comprehensive school districts in the state which offer vocational-technical studies in a similar format.

\(^1\) A pseudonym.
Description of Participants

The study involved a total of six participants: Greta, Mark, John, Kristin, Jim, and Kevin. Each participant shared information about his or her personal background and why they chose to leave their trade and become teachers.

Greta. Greta indicated that early in her career as a nurse, she always felt an affinity towards working with other support health providers to mentor and guide them. Given this affinity, she decided that becoming a nurse educator would be the best way to fulfill her desire to teach others.

Mark. Mark shared that he became interested in teaching and instructing when he was in the military in the early 1990s at South Weymouth. He became an instructor for the basic reserve intelligence training program, which trains Navy personnel and intelligence specialists. He went to school for instructor training, which led him to become comfortable in his role as teacher and spurred him to pursue teaching as a career.

John. John shared that he always enjoyed working with kids; when working in a position as a manager, a couple of the employees suggested that he would be good at teaching. Teaching kids and adults was always in the back of his mind. The opportunity arose for a career change when he moved to Cape Cod as a para-professional in vocational education at another technical school. John added that he didn’t know much about vocational education until working as a para-professional, which was very eye-opening for him and solidified the desire to teach.

Kristin. Kristin admits that becoming a teacher was purely accidental. She had been a stay-at-home mom who was ready to get back into the workforce. Having majored in environmental science in college, she searched for jobs related to her experience and education

2 Pseudonyms.
and an advertisement for a para-professional position in the environmental technology program at SRTHS came up. Her husband was a teacher at a vocational school as well, so she thought she would give it a try.

Jim. Jim had been a cabinetmaker and felt that at a certain point he wanted to change direction and be in a position where he could train the next generation of workers.

Kevin. Kevin was working at another school system as the network manager technician, fixing issues with computers and networks. He did this for a number of years until one of the administrators at the school asked if he would like to become a teacher based on his ability to relate to students and explain what he was doing. After some reflection, he decided to take the position, and has been a teacher ever since.

Participant Demographics

The participants were diverse. Two of the participants were female, and four of the participants were male; they ranged in age from early thirties to early sixties. Each of the participants was a full-time vocational teacher at SRTHS for the 2014-2015 school year, and the participants’ experience at SRTHS ranged from four to 20 years. Four of the participants had experience working as a teacher in technical education prior to working for SRTHS. Educationally, three of the participants had a bachelor’s degree, including one participant with a master’s degree. Professionally, each of the participants continues to identify themselves as tradesmen (plumber, nurse, landscaper, etc.), rather than as a teacher.

Findings

Theme development was guided by continuous improvement theory as the conceptual framework of this study. The researcher examined participant answers to the interview questions as they were associated with instructional pedagogy, student engagement, assessment of student
knowledge, and skill and reflective practices. Table 1 shows the alignment of the themes to the research questions.

Table 1:

*Theme Alignment to Research Questions*

<table>
<thead>
<tr>
<th>Research question</th>
<th>Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRQ: What types of student growth data are most relevant and useful to career and technical educators as a part of their evaluation process?</td>
<td>T1: Use of varied student data that focuses on the measurement of skills learned is effective in informing educators to be reflective. T2: Using student data requires time and planning in order to modify classroom instruction.</td>
</tr>
<tr>
<td>RQ1: How do educators within a career and technical high school measure student growth?</td>
<td>T3: Using formative assessments that focus on skills and knowledge in formats such as performance tasks, industry credentials and standardized standards-based, criterion-referenced assessments provides measures of growth.</td>
</tr>
<tr>
<td>RQ2: How do career and technical educators make sense of student growth data to improve their practice?</td>
<td>T4: Use of formative assessment has a positive impact on reflection and planning of instruction, resulting in varied teaching methods that address educators’ opportunities to continually improve.</td>
</tr>
<tr>
<td>RQ3: How do career and technical teachers gauge the effectiveness of their teaching?</td>
<td>T5: Use of criterion-based formative assessments with a standard established for minimum performance is beneficial in reflection on teaching effectiveness and practices.</td>
</tr>
</tbody>
</table>
Theme 1: Use of varied student data that focuses on the measurement of skills learned is effective in informing educators to be reflective. The first major theme is based upon the goals and objective of education, which is to effectively and efficiently teach every student. Every participant identified how the use of student data could improve their instructional practices and provide an effective process for modifying their instruction for the purpose of teaching their students. Greta described instruction that focused on student learning that emphasizes identifying and addressing student misconceptions, which help her students understand the content being taught. Kevin stressed that tracking student growth “works regardless of student ability and learning style, allowing some students to take their time, while at the same time pushing others.” Kevin also expressed the benefits of using student performance as a basis for informing instruction: “I have had students who have shut down in the past, stopped trying, and feel overwhelmed, begin to attempt work that is essentially above their achievement level simply because I modified how I taught.”

Jim stated that examining formative assessments that encompass all of the activities undertaken by students caused him to modify his classroom structure in a way that promotes collaborative learning. Jim used discussion to comprehend where the students were in understanding information before moving on with instruction. He subsequently created stations that gave students the opportunity to ask questions among themselves. Kristin expressed that “use of student performance data engages my students; it helps to guide differentiated instruction and assessments” and “puts the fun into learning” for both her and her students. She had students use graphic organizers to distinguish the different traits of the organisms they were examining. As such, the graphic organizer was a strategy for both student and teacher to gain understanding of the organisms. Mark saw the use of student growth data as a tool that helped him realize that
he needed to make the content more tangible and less abstract to his students. He also saw his students become more involved and achieve higher test scores as a result of modifications made based on student data. Mark allowed students to use videos both as a means of learning as well as a mechanism to demonstrate progress on their assigned task so that understanding throughout the process of constructing the pipe to defined specifications could be gauged. John identified improved student interest and a greater knowledge of the content as a result of examining student growth data. He also indicated that he was able to “more effectively include the various learning styles represented by his students.”

**Theme 2: Using student data requires time and planning in order to modify classroom instruction.** Teacher participants were sincere about the stress and time required to implement formative assessment, particularly as a component of their own evaluation. Kevin stated that “a lot of teachers see a lot of these pieces as more work and time consuming, they’re not seeing I think as much of the benefit as they could.” John shared:

Sometimes it is difficult to take the time necessary to crunch the numbers. Sometimes that can be frustrating, when you’re doing things that sometimes aren’t so easily documented, that can be a disadvantage, or a downfall, a frustrating part of the system.

Participants Jim, Kristin, and Mark stated that while they see the value of looking at student growth for a variety of purposes, it seems as though it’s one more thing on their plate without anything being removed. Their time is finite, but what they’re being asked to do doesn’t seem to have limits. Kevin stated that a drawback to looking at student growth is that “it’s additional record-keeping, grabbing that pre-test information every week, recording it, even though it’s not going in the grade book. You have to keep track of that information and it’s an additional task that needs to be done.”
Findings from the interviews were supported by the documents reviewed. In all of the documents examined, there was significant use of detailed, teacher-developed resources, including demonstrations via video, PowerPoint presentations, and classroom visuals such as posters. In addition to these materials, wide-ranging modeling and questioning strategies were indicated as being utilized regularly. In reviewing lesson plans, a great variety of change was seen between teachers. A few made significant changes, while other teachers’ plans were identical from one year to the next. Deeper examination of those plans that were modified represented significant reflection on the success of instruction. In the case of Kristin, changes were more focused on timelines rather than methods of delivery. Greta’s plans changed significantly between years. She modified modes of delivery of the content and individualized methods of assessing student understanding. What was missing from the lesson plans and assessments was any indication of revision or re-teaching from week to week based on student performance against learning objectives. In a comparative review of syllabi from year to year, no modifications were seen. The document analysis confirmed that the school provides significant professional growth opportunities, but lacks courses on improving the use of formative assessment.

**Theme 3: Formative assessments focus on skills and knowledge in formats such as performance tasks utilizing pre- and post-tests.** Gathering data about students through performance tasks is a vibrant and involved learning experience that engages the students at various capability levels. During the individual interviews, the participants in this study spoke about the learning experiences and the belief that the use of performance assessment allowed them to incorporate more focus on areas of need in their planning, instruction, and assessment.
John credited evaluating student performance in real-world activities related to the technical area as:

…producing learning that relates more to the students, resulting in the students becoming more interactive with the learning process and gaining better understanding and recall, which in turn provides a more realistic snapshot of the students’ growth and subsequently provides more relevant data for my own improvement.

Kevin summarized the benefit of formative assessment as a tool to prevent teaching material that students are already familiar with:

I pretty much know, like for instance, we had a chapter on mobile devices. Generally, everyone did quite well on the pre-test, and there was no information dispensed. They know mobile phones, they know the smartphones. All the little details associated. And this testing that we have in this curriculum, is very difficult, very difficult. All the answers are very similar, so it’s hard to pinpoint the exact answer they’re looking for, so—but since they knew so well with the mobile phones in that pre-test, I was able to say, ok, let’s bypass certain aspects of this chapter, and pinpoint certain areas that are certainly more complex.

Data gathered through the interviews and a comparison of lesson plans from consecutive years support the theme that formative assessment provides opportunities for enriched learning experiences.

**Theme 4: Formative assessment has a positive impact on reflection and planning of instruction, which results in varied teaching methods that address educators’ opportunities to continually improve.** Regardless of the recognized stress and time demands on using formative assessment in the technical classroom, teachers were dedicated to using student growth
because of its encouraging impact on their own growth and subsequently, student learning. The benefits and constructive effects of formative assessment recognized and supported through interviews included greater student engagement, targeted instruction that fulfills the educational needs of all students, and the chances for differentiated instruction.

Greta identified student outcomes as the basis for trying different methods of delivering content and skills. Kristin indicated that “students felt rushed and had to do too much on their own after school” based upon her use of an end-of-the-year student survey. Mark indicated that he made minimal changes to his plans because “they were a result of many years of use and reflection and already worked as well as they could.”

In relation to assessment as a tool to be reflective and result in changes to instruction, Mark states:

I think that I have been doing the right stuff for the most part, for a long time. I’ve made minor tweaks, I’m not afraid to change my curriculum, blow up a lesson plan, challenge myself so that I can try to get the instruction across at the students in a different way. It really hasn’t, other than changing how I perceive at the end of the year—have my students learned what I think they need to learn, and if they haven’t, I have to figure out whether it’s something I’m doing on my end, or if it’s something that’s just with the students not being able to take that information in and do something with it. And if so, I have to again determine, is it possible to try to teach them in two or three different ways, because every student learns differently, and I think that’s a challenge, that’s never going to stop being a challenge.

**Student engagement.** Consistently, all participants identified student engagement as one of the constructive impacts formative assessments has on student learning. John specified
formative assessment and the resultant targeted instruction as making learning fun for his students. Jim described the engagement as “enthusiasm in the shop.” Mark stated, “students seem to get a better understanding of the content and show more interest.”

Meeting learning needs of students. An effective and useful instructional strategy should exhibit that it provides for the learning needs of the students. During the interviews, all six of the participants stated a belief that formative assessment is an effective tool. Kristin believed formative assessment facilitated a way for her to identify and assist challenged students to grasp the concepts and have success in her technical program. Kevin and John were both resolute that formative assessment had a positive effect on student learning as manifested in the grades of their students’ as well as the fact that there were fewer discipline issues. Greta stated, “formative assessment helps to simplify differentiation in the classroom instruction, which allows me to meet the needs of all students.” Jim credited formative assessment with creating instruction that meets the numerous diverse learning styles of the students. Data gathered through the interviews suggests that formative assessment results in a multi-dimensional methodology to teaching that meets the varied learning needs of all students.

In reviewing evaluation documents, four of six participants identified better use of student assessment as an area of weakness and included improvement in this area as a goal. Professional development was identified as the action within the educator plan as the mechanism to achieve the identified goal. Success toward this goal was achieved in varying degrees, as observed by summative evaluations. In all instances, it was recommended by the evaluators that teachers continue to include this goal in the future. When asked why they felt they may not have fully achieved the goal of using student growth data, all four participants who identified this as a goal felt as though they hadn’t had enough professional development. For example, Kevin stated:
“Although we’ve had some professional development on what constitutes a DDM we haven’t been shown how to calculate growth. I mean what represents acceptable growth.” Moreover, they felt that the concept of using student data requires significant training and time for that training, which they did not have. When asked what impact the use of student growth data for their own improvement had on their practice, Mark stated:

To be honest, none. I can't say that using student data, specifically DDMs, has caused any changes in my teaching. In order for there to be an impact, it would require training on the analysis, requirements, time to implement, and time to actually consider.

Most participants agreed they would benefit from professional development that focuses on using formative assessment in the technical classroom. Another common thread identified through member-checking revealed a lack of professional development that specifically targets development and analysis of student growth data. When asked what they would like to see from the requirement for the use of student data, teachers offered advice on what is needed to successfully implement the use of student growth as part of the evaluation for all teachers. They also emphasized the understanding of the use of the same data to be a reflective practitioner. John felt more training for administrators and teachers was needed so that they understand this process is not meant as a way to punish teachers for things they are doing wrong, but instead provides a means to give and examine specific feedback on areas to improve. Greta also felt more time to train administrators and staff was needed:

A lot of the things we’re using to measure student growth haven't been introduced or required for that purpose in the past, and therefore [are] hard to actually implement. I found it difficult to take the scores I obtained because I wasn't told how to calculate improvement.
Theme 5: Use of criterion-based formative assessments with a standard established for minimum performance is beneficial in reflection on teaching effectiveness and practices. The format of assessments was varied, including classroom participation, multi-step assignments and projects, and traditional paper-and-pencil tests, which included a pre-test and post-test. Teachers struggled with identifying a basis for determining acceptable growth as a means to reflect on their own effectiveness. They perceived that over time, they would have a better understanding of reasonable growth expectations as they saw more data. Each teacher participant believed formative assessment was valuable to their technical program teaching and had a beneficial influence on their instruction. When discussing testing during the interviews, the perceptions of using student growth as identified by their selected DDM alone and its effect on evaluation and their own performance in relation to established criteria were mixed, as were the teachers’ opinions about the evaluation system in general.

Two of the six participants believed using formative assessment in their classrooms provided them the ability to identify deficiencies in student understanding of concepts and therefore target specific topics and strategies that needed to be reviewed utilizing a change in pedagogy, whereas DDMs and student growth represented such a large instructional period that they provided little insight into the effectiveness of instruction or student understanding with any specificity. Greta saw formative assessment as a tool to help identify where she needed to make modifications to better prepare her students for success on assessments targeting specific standards. Other participants were not as convinced based on the perception that the formative assessments they used did not resemble the skills that were deemed as important in their particular industry, both in format and content. One participant emphatically stated, “I believe using student performance and growth helps our students learn, but should not be used as a basis
for evaluation.” Interviews showed that the participants’ belief in the worth and advantage of formative assessment as an approach overshadowed any effect on evaluation or their own performance, known or unknown, and therefore would not impact its use. On the other hand, the use of student growth as identified through DDMs was seen as less valuable. Teachers indicated that these were still “one-shot assessments” that may show growth over a long period of time, but do not provide constructive feedback for their own improvement.

During member-checking, teachers indicated little concern for DDMs as they relate to their evaluation. Initially, there was a great deal of apprehension, since there were many unknowns and misconceptions regarding DDMs and their use as well as their influence on evaluation and possibly continued employment. Once teachers understood the guidelines regarding the use of DDMs for evaluation, their apprehension diminished.

John alludes to the decrease in anxiety and increase in trust when talking about DDMs:

I do know that many faculty were—had a lot of anxiety. And I think when you trust your administrators and when they show care—when they care about what you’re doing, and how your kids are doing, the anxiety goes away.

As far as the use of DDMs for improvement, based on the review of DDMs identified by teachers and their evaluation documents and self-assessment and goals, most teachers perceived that the assessments represented by DDMs looked at too big a body of instruction and were too far removed from the instruction. There was little to no inclusion of DDMs in improvement goals or planning documents.

Mark shared:

It could be construed as something, as another tool or mechanism to get rid of teachers. Sometimes you can rely too much on MCAS scores and a senior final, for example, or a
senior project and—sometimes you can only motivate a student so much, they’ve got to
take ownership of what they’re doing, it’s not a perfect world. You’re not going to get a
hundred percent participation, a hundred percent effort, and—which is frustrating from
my—an adult standpoint, but sometimes that should not be the end all as far as
measurement against a teacher’s ability to do their job, because there are some things that
are just out of their hands when it comes to that—to me, that could be a negative point, to
get rid of, or to punish a good teacher who’s trying to do the right thing, but he might
have students that are just not willing to take it to the next level. There are too many
things that interfere with students that may have nothing to do with the teacher.

Echoing a similar perspective, Greta states:

I’m torn, because I mean it will show growth, obviously, because I will have taught the
material, at the post-test, I just don’t feel like it does very much for education. I don’t
think that it’s going to change the way I teach. I really use—I do a lot of quizzing in my
classroom and I call them homework quizzes. And I think they give me more information
than what a final exam, pre- and post-[tests], will. I do occasionally give a homework
quiz that—it’s funny, I kind of use it as a motivator, you know, because homework
quizzes are always before the tests on a unit or a chapter or a section…To me, my goal,
I’m confident that I’m a good teacher. Sometimes I want to know, are they getting the
difficult material. To me, a quiz does that way better than a pre- and post-final.

Mark primarily used project-based assessments that required students to successfully
complete a procedure using the appropriate process focused on safety, sequence, tools used, and
the quality of the product. A standard was established that must be met before a student could
proceed. Mark indicated “this assures that a student demonstrates a minimum level of
competency before they move on. It provides me with a level of comfort regarding their competency.”

Kevin utilized a software application that he developed that was responsive to student performance. As a student answered questions correctly, the difficulty of the questions increased. This allowed him to “gauge how my students are doing while allowing them to proceed at their own pace based on their understanding.”

Several teachers used traditional, textbook-developed, objective paper-and-pencil assessments. In all instances, when asked about the use of these types of assessments, teachers identified time as the primary basis for selecting this format.

In the process of exploring how teachers use the assessments given as represented by their lesson plans, it is evident that re-teaching the concepts is not occurring. Lesson plans that represent week-to-week plans do not indicate that concepts were re-taught. Results of the assessments do not correlate with a representation that students understood the concepts and were ready to move on, in many instances.

**Conclusion**

The purpose of this basic qualitative study was to use interviews of teachers and analysis of documents in a regional technical high school to find out about the instructional and assessment practices of CTE teachers and their views of the effects of formative assessments on their practices. Ultimately, the intent was to obtain insight regarding the use of formative and summative assessment in CTE classrooms from the teachers’ perspective as it relates to reflection on their own performance and practice. Through the process of interviewing the teachers, they had the chance to share their perspective of the impact that the use of student data on their teaching, and subsequently, student learning. The data gathered represented that the
participants felt formative assessment to be worthwhile by adding to the tools they had available to enhance their classroom instruction. Nearly all participants agreed that there was significantly more time and planning needed to incorporate assessment effectively, but thought the benefit to the students’ learning experience made the time worthwhile. All participants saw formative assessment as a mechanism to meet the needs of all students through differentiation. Participants appreciated the commitment of resources and the support provided by the school administration; however, many of the teachers felt as though more professional development was needed regarding formative assessment.

The overall findings indicate that the participants generally consider formative assessment as having a positive influence on their teaching and ultimately, student learning. The participants identified many similar acknowledged benefits to students, including an increase in engagement, better recall of the curriculum, and a greater depth of understanding of the concepts taught. Participants perceived using student performance data as a mechanism to justify differentiating instruction and meeting the varied learning styles and multiple intelligences their students represent. Participants did not see the value of growth data based upon DDMs, given that the data was based on too large a component of instruction. All participants indicated the perception of increased amounts of stress in planning for and implementing the use of student data into their planning and instruction, identifying time and need for their own training to be a significant cause to their stress. Throughout the interviews, the participants agreed that the burden and anxiety they initially felt from the Department of Elementary and Secondary Education had been reduced substantially by the school’s administration. Relief from the pressure and expectations has allowed teachers to willingly develop and implement reflective practices into their classrooms. Despite the stress and time requirements of implementing the use
of student data into their planning in CTE classrooms, participants overwhelmingly perceive that formative assessment is advantageous to their students’ learning and is an effective and meaningful teaching practice.
Chapter 5: Discussion of Research Findings

Regular evaluation of teacher performance, including student growth data, provides an opportunity for educators to reflect upon and improve their practice. Career and technical educators do not have the criterion-referenced standardized assessments that are available to math, English and science teachers to provide them with feedback regarding the growth of their students. Instead, they must identify or develop their own measurements to establish student growth data. The purpose of this qualitative study was to examine what types of student growth data currently exist for educators within a single career and technical high school located within the Northeast, and how the teachers within this school collect and make sense of student growth data to improve their practice. Informed by the theoretical framework of continuous improvement, this study sought to answer the following central research question:

What types of student growth data are most relevant and useful to career and technical educators as a part of their evaluation process?

In addition, this study sought to answer three related sub-questions:

1. How do educators within a career and technical high school measure student growth?
2. How do career and technical educators make sense of student growth data to improve their practice?
3. How do career and technical teachers gauge the effectiveness of their teaching?

Although there has been significant research on student performance, there has been very little research on teacher use of student performance, specifically growth, to improve teacher practice in non-tested subjects, particularly in CTE. The lack of this research led to the design of this study in order to gain a better understanding of how CTE teachers are using data to improve their own performance.
It is difficult to understand student growth from the end of one year to the next without measuring academic achievement in between specified time frames. Therefore, how can educators measure what has been beneficial? Statewide accountability assessments serve an important purpose, but they are not administered in CTE programs, and therefore do not provide feedback that could be used to inform instructional decision-making. To be useful to teachers, assessments must go beyond simply providing summative data. Student performance data must also be formative, providing guidance that helps teachers know that their instructional strategies are effective while providing feedback for continuing adjustments. For student growth data to be beneficial to teachers, and for it to be worth the significant effort needed to learn to interpret and utilize what they learn, data systems must include many sources of data gathered and scrutinized regularly. Assessment should provide better roadmaps for teachers to guide the decisions they make regarding instruction. The data essential for more accurate decision-making must come from systematically employing varied student performance data at the classroom level.

The purpose of this study was to explore the experience of CTE educators in the use of student growth data to influence their instructional practices. Integral to this is the importance of educators recognizing the need to develop better processes for gathering, producing, and analyzing student performance data in varied forms in order to allow teachers to better utilize student growth to improve teaching and learning.

Discussion of Major Findings

The findings of this study are the result of the analysis of data gathered through interviews and evaluation of documents, including lesson plans, evaluation documents, and formative assessments. Three research questions guided this investigation of how formative assessment impacts career and technical educators’ reflection on their practice. Five themes emerged relating
to the research questions that were the focus of this basic qualitative study. These five themes provide the framework for the discussion of findings.

**Theme 1: Use of varied student data that focuses on the measurement of skills learned is effective in informing educators to be reflective.** When teachers were asked about the types of data that they gathered and used to understand the existing knowledge and skills of their students, they identified that they used numerous, varied sources and methods to track their students’ growth. Included in the definition of student performance data were a wide array of formats that are usually collected in schools, including unit tests, quizzes, portfolios, reading and writing journals, conference logs, and performance event grades. Teachers also cited the use of performance-based assessments and projects of both short duration (such as a one-day project) and longer duration projects that may encompass several weeks of instruction. They also use industry certifications and comparison of data across years as a basis of measuring student growth.

**Theme 2: Using student data requires time and planning in order to modify classroom instruction.** While evidence was seen of systematic techniques to assemble and investigate data and convert them into evidence that could be used to offer direction for instructional decision-making related to curriculum and delivery, there was considerable need to make such practices more common within classrooms. Teachers acknowledged that students generate a large quantity of work in school each year, but only a small portion of that work is used for instructional guidance. Teachers wishing to use data more successfully need time, training, technology, and support. For technical teachers to engage in data usage more regularly, they must recognize the traditionally ingrained ideas of what it means to be professional educators. The dominant perception is that teachers are only working while they are with
students. Due to their lack of professional educator training, career and technical educators in particular – as well as all teachers – must recognize that they need to invest significant time in analyzing data derived from formative assessments.

**Theme 3: Using formative assessments that focus on skills and knowledge in formats such as performance tasks, industry credentials, and standardized standards-based, criterion-referenced assessments provides teachers with the needed data to be reflective.**

Teachers indicated that they were willing to develop techniques of data collection within their shops that depend on a group of activities, projects, or other ways of measuring student learning. The data collection targeted identifying students’ learning and understanding. This data was then used to guide teaching practice in multiple ways. It allowed teachers to assess the effectiveness of their chosen approaches and determine whether they want to modify their delivery system (for example, whether to offer individual or group attention). The advantage to teacher-driven and teacher-designed data collection processes is that it allows teachers’ decisions to be both active and recursive. This is reflected on the individual student level and on the class level, and allows for the examination of teachers’ own exchanges with their students to get a clear perspective of how students grasp the content, as well as how students are reacting to the approaches the teachers have used.

**Theme 4: Use of formative assessment has a positive impact on reflection and planning of instruction, resulting in varied teaching methods that address educators’ opportunity to continually improve.** When teachers in this study talked about how they were using student data for instructional improvement, they focused on five major ways in which they do so, although admittedly in a limited manner. Most importantly, they used student performance data to inform their instruction. Many teachers reported that they used data to decide what to
teach. Second, they used data explicitly to pinpoint struggling students and identify how they might modify instruction for these students. Third, they used data to guide their own needs related to professional development. Fourth, they used data to develop their own goals and plans to meet those goals for themselves and their students. Teachers described how they used data to align their lessons with standards. Specifically, a few teachers mentioned that they used data to help them understand where students were in their understanding in relation to the standards. Fifth, data were used as supportive documentation in conversations about students with parents and administrators.

**Theme 5: Use of criterion-based formative assessments with a standard established for minimum performance is beneficial in reflection on teaching effectiveness and practices.** A specific assessment format that was most suitable for use in either the evaluation process or for teachers’ own reflection was not identified as a result of this study. Career and technical educators felt that growth data that could be tied to their instructional practices and the standards to which they were teaching were most relevant and useful. These were primarily ongoing, formative assessments that they could use as periodic check-ins while students progressed through a project or as part of a culminating activity. One of the major benefits of having more detailed information about individual students is the opportunity this produces to atomize teaching toward sub-groups, or even individual students with particular needs. Several teachers mentioned that they used student performance data to place students into groups depending upon the delivery model and intended outcomes.

**Discussion of Findings in Relation to the Literature Review**

This section discusses the findings presented in Chapter 4 in relationship to both the literature presented in Chapter 2 and additional sources that help make sense of the findings. The
literature discussed is presented as it relates to the research questions and resultant themes. The context for this study is similar to other CTE contexts discussed in the literature with respect to the similarities between participants in this study and other career and technical educators. These similarities include that most career and technical educators come to teaching from another career and have no formal educator training prior to becoming a teacher. Career and technical educators, because they come from industry, may not be as familiar with the concept of reflective practice as learning communities. Career and technical educators do not have access to state-wide standardized assessments similar to teachers of other non-tested subjects such as art, music, and physical education (Goe and Holdheide, 2011). All teachers, like those in this study, have the need for data to improve their practice, including regular formative assessment to improve student understanding and engagement (Boston, 2002).

The context for this study is also unique from current literature with respect to the fact that less is known about how teachers of non-tested subjects can gain feedback on their students’ performance using both summative and formative assessments (Goe & Holdheide, 2011). Career and technical educators need to design their own assessments with established performance goals in their own area of specialization, with their effectiveness based on attainment of these goals.

1.) **How do educators within a career and technical high school measure student growth?**

Two themes emerged in response to this first research question. The next section discusses each in turn, as well as how the findings both support our current understanding of how career and technical educators gather and use assessment data and create new insights into this topic. The literature presented in Chapter 2 and additional sources helps to make sense of the following findings related to these themes.
Theme 1: Use of varied student data that focuses on the measurement of skills learned is effective in informing educators to be reflective. Every participant identified how the use of student data could improve their classroom instruction. The literature speaks to the many ways educators can use student growth data to improve classroom instruction. Black and Wiliam (2006) cite the effect examining student growth data can have related to teachers radically changing their teaching style. The teachers recognized the value of group work and used this approach as part of their instructional process, but few used group assessments.

The participants of this study used both formative and summative assessments. The literature speaks to the value of both kinds of assessment. For example, Wiliam (2011) describes how both summative assessments (such as end-of-year standardized tests) and more informal formative assessments can provide important feedback to teachers seeking to improve their instruction.

The literature speaks to the dearth of standardized assessments available to teachers of non-standardized tested subjects. Teachers of CTE subjects were reluctant to self-assess their performance because they did not feel self-assured or were uncertain on how to assess themselves. This supports the findings of Hanrahan and Isaac (2001) about how teachers had problems when they were unsure of the process and could not be impartial about being reflective. At the time of this study, career and technical educators had only been using DDMs for self-assessment for a few months; with more time and practice, they might have felt more relaxed and assured about the process. Andrade and Du (2007) noted that teachers had encouraging experiences with self-assessment if they had adequate practice.

Teacher experience seemed to play an inverse role in how formative assessment was conducted in the shop. The newest teachers seemed to be the most cognizant of the need to
utilize formative assessment, but were less sophisticated in their techniques. Experienced teachers (those with ten years of experience or more) seemed a bit more complacent regarding the use of formative assessment, but more confident in their teaching skills. Wiliam (2011) indicated that the most effective teachers produced learning in their students at four times the rate of the least effective teachers. As seen through this study, career and technical educators do not always know which instructional practices are most effective, when to use them, and why a specific instructional practice works for a certain student but not another. This study further expanded on the literature that supported the understanding and importance of professional development and how formative assessments can be utilized in a CTE high school.

Many CTE teachers do not have a clear idea of what the terms “student growth” and “formative assessment” mean or how to implement effective formative assessments. The variety of assessment strategies was determined randomly, and the design focusing on the data extraction and evaluation was unsophisticated. Teachers in the study school are encouraged to plan their lessons to maintain student engagement, but often do not plan approaches to identify what their students already know about the concepts being taught. The creation and evaluation of questions to identify meaningful data takes training, as was shown by the participants.

The advancement and adjustment to teachers’ procedures were promoted by the action research of Bianchini & Solomon (2003). Action research objectives were utilized to improve teaching methods and enhance teachers’ discrimination of results seen through assessment practices used and the developmental practices gained throughout their teaching career. As a result, action research transformed educators into reflective practitioners and ultimately enhanced the knowledge base related to reflective practices.
Reflection is thought to aid action research, which allows educators to review procedures before, during, and after instruction in order to enhance the process of learning (Schön, 1983). Leitch and Day (2000), however, suggest that reflection is critical for the collaboration needed for improvement. In addition, Trauth-Nare and Buck (2011) believed that educators can utilize reflection through the collection of data about their methods versus acting as robots disseminating knowledge without exploration of outcomes. Even though formative assessment can lead to the alteration of classroom responsibilities and interactive expectations, James (2006) mentions that formative assessment should be deemed as a strategic device for educators. Similarly, relationships between students are important to the process of formative assessment and professional growth (Buck, Trauth-Nare, & Kaftan, 2010).

In a study by Marshall, Smart, and Horton (2011), teachers participated in a study for one year with the goal of improving the quantity and quality of inquiry practice. The results of this study showed teachers’ perceptions of growth in inquiry practice as measured by the use of open-ended self-reporting. The teachers reported the greatest growth in the areas of instruction, discourse, and curriculum. Their collective responses showed they perceived that their greatest challenges in leading effective inquiry-based teaching practice lay in assessment, while the other areas also presented some challenges in curriculum, instruction, and discourse. This area of assessment had the lowest overall mean. This fact, coupled with the teacher self-reports and observational data, confirmed that assessment issues could be considered the area of greatest challenge for the teachers (Marshall et al., 2011). Considerable time needs to be devoted to professional development to help teachers begin to transition toward being a reflective practitioner. The findings from the study revealed how the intervention of the professional development experience led to improved facilitation of inquiry-based practices, but it also
provided a clear indication of areas where teachers often struggle: development and use of formative assessment. Consequently, using formative assessment may be easier for teachers when given sufficient experiences and support.

A concern that must be considered in order to produce effective formative assessments or insightful class experiences for students (Ayala et al., 2008) is the understanding that professional development affords an opportunity to expose teachers to the significance of formative assessments. Most teachers in this study recognized authentic assessments as valuable sources of evidence to indicate student learning, but were anxious about their skills in designing assessments and rubrics, with significant concern about their ability to determine the technical accuracy of assessments. This is supported by numerous studies on classroom assessment, including the work of Bol, Stephenson, O’Connell, & Nunnery (1998), which consistently revealed that most teachers are inefficiently trained and unprepared to plan, administer, and evaluate the outcomes of different types of assessments. In general, teachers who were less equipped and capable in designing realistic assessments believed them to be challenging to develop. Additionally, teachers’ assessment formats were not well-associated with their instructional objectives and required low-level cognitive processing. Many teachers were unable to critically evaluate the quality of their own assessments without professional development (Bol & Strage, 1996). As identified by Wiliam and Thompson (2008), substantial advancement in educational outcomes will depend upon building the ability of current teachers. More specifically, effective professional development will enhance teacher quality related to assessment and reflective practices, which in turn will lead to improved student learning.

Support from colleagues and supervisors was frequently identified by study participants as integral to their professional growth and ability to be reflective. Each participant freely
identified that they noticed an improved relationship with their supervisor and welcomed the opportunity to collaborate and consult with other teachers, both within their department and across programs. These perceptions are supported by Bel Hadj (2013) who summarizes that through organization and communication, teachers can work together to use data and incorporate it into their lessons.

**Theme 2: Using student data requires time and planning in order to modify classroom instruction.** As revealed in this study, as a result of time limitations, formative assessment strategies were difficult to implement on a regular basis by teachers in the shops. As mentioned by a participant, the variety of formative assessment strategies they used was based on the time available to develop the assessments. Although participants identified the value of formative assessments, time was repeatedly identified as a critical factor, both as it relates to implementation as well as in terms of the time available for professional development. According to Little et al. (2003), time scheduled on a regular basis for interaction with other teachers and students promotes teachers’ discussion and reflection upon student data. Leusner et al. (2008) represent that the importance of dedicated time and opportunity for teachers to work together are critical if teachers are expected to utilize and reflect upon student data in a continual manner. Correlations in their study revealed a statistically significant relationship between time devoted for interaction among teachers and sustained formative assessment use. The allotment of time by administrators for teachers to collaborate demonstrates the importance of the use of formative assessment and encourages and enables teachers to implement a change in their use of student data (Fullan, 2002). The intent of providing time for professional development and the use of student data is to improve teachers’ instructional practices by encouraging collaboration and reflection related to the collection, analysis, and use of student-learning data. When time is
not provided for teachers to implement formative assessment, they revert to their comfortable experiences, which leads to stagnation (Fullan, 2002).

2.) How do career and technical educators make sense of student growth data to improve their practice?

One theme emerged in response to this second research question. The next section discusses this theme and how the findings both support our current understanding of how career and technical educators make sense of student growth data and how the findings create new insights into this topic. The literature presented in Chapter 2 and additional sources helps to make sense of the following findings related to this theme.

Theme 3: Using formative assessments that focus on skills and knowledge in formats such as performance tasks, industry credentials, and standardized standards-based, criterion referenced assessments provides teachers with the needed data to be reflective. While “data-driven decision making” has become the focal point within the institution of education, how teachers think about this data has a significant impact on how supportive and beneficial it is to teachers. Information acquired from assessments offers evidence and proof for reflection for teachers. The insertion of assessment linked to the current curriculum taught allows for support and modification of overall instructional planning for the school year. Educators tracked the comprehension of objectives more readily by understanding the learning curve of the students through unit planning and assessment performance. The inclusion of assessments within the curriculum assists the educator and students with teaching and learning. The teachers within this study depend upon commercially-developed strategies to formally uncover data regarding what students understand. Informally, they regularly utilize questioning techniques and “check-ins” as students work towards completing projects. The participants who approached the use of
data from the perspective of improvement evaluated and talked about student work with the intent of mining information that would enlighten their thoughts about students’ thinking, their own teaching practices, and learning expectations. Looking at data from the perspective of improving is exemplified by the use of wide-ranging forms of assessment meant to elicit students’ understanding and misconceptions. These assessments can have significance for the teachers as they also reflect upon expectations and reconsider what those expectations are and what they may look like in student work. Teachers who focus on improvement debated with other teachers about classroom practices that were required for students to make increases in performance, and they frequently asked questions of each other.

Mezirow’s research identified that self-reflection is fundamental to the process where learners confirm and act on their beliefs, interpretations, and values (Mezirow, 2000). Findings in this study identified that all teachers who recognized the value of using student data also saw that self-reflection was a component of the improvement process. Change is the result of examining, questioning, and revising an individual’s perceptions (Mezirow, 2000). Reflection means that teachers regularly review what works and what doesn’t work in their day-to-day lessons and in the subsequent student data. They then turn the data into helpful, unyielding statements that permits them to develop tangible goals to identify needed professional development and modifications to student instruction.

Wright, Horn, and Sanders (1997) documented that the most significant influence impacting student performance is the teacher, but more relevant to this study was their view that improving the effectiveness of teachers positively affected student achievement more than any other single factor. Therefore, the single best way to improve student achievement is through changing a teacher’s capacity to self-reflect, distinguish areas needing improvement, develop a
plan for improvement through planning, preparation and professional development, and finally, follow through on the plan. Evans (2001) discovered that teachers want to teach, unhindered, in a setting that is well-suited to their background, skills, and expectations, and that self-reflecting on their practice influenced teacher practice. Teachers need to be aware of which formative assessments are effective in providing feedback about instruction and be willing to modify and adapt their plan and implementation (Crumrine & Demers, 2007).

3.) How do career and technical teachers gauge the effectiveness of their teaching?

One theme emerged in response to this third research question. The following section discusses the theme and how the findings both support our current understanding of how career and technical educators gauge the effectiveness of their teaching and how the findings create new insights into this topic. The literature presented in Chapter 2 and additional sources helps to make sense of the following findings related to this theme.

**Theme 4: Use of formative assessment has a positive impact on reflection and planning of instruction, resulting in varied teaching methods that address educators’ opportunities to continually improve.** The participants indicated that they regularly offered feedback either verbally or written during small group or one-on-one discussions, and when exit tickets were used. In this study, teachers indicated that when they had students working in pairs or small groups, the students knew exactly what was understood and what material was unclear and why, which provided feedback for the educators on the effectiveness of their teaching. Participants indicated that it was challenging to provide timely feedback on traditional, paper-and-pencil assessments, but that feedback on other assessments, such as projects and interactive, hands-on activities, was easier and seemed to have greater benefit. As seen in this study, small groups afforded teachers a clearer picture of what students understood and provided better
feedback to students. Teachers indicated that they used outcomes of formative assessments to modify instruction for both individual students and the class. Formative assessment is a continuous process and encompasses a variety of methods of observing what students know and are able to do (Bowman, Donovan, Burns, 2001). A standards-based curriculum that recognizes student needs and differentiation permits for formative assessment functioning at its ideal level when filtered within instructional guidelines (Fisher, 2008). In the study by Mazur (2009), which focused on peer instruction models where students provide feedback for one another, it was shown that small group collaboration resulted in more discussion and feedback opportunities in comparison to whole class instruction.

In order for feedback to be effective, it must be identifiable, factual, and beneficial; subsequently, the feedback carries a requirement of action understood as necessary by the teacher. The feedback must also be timely. The sooner feedback is given, the better (Wiggins, 2012). When planning, consideration should be given to ensure students are getting feedback quickly enough that it remains relevant and fresh in their minds. Finally, feedback should be consistent. The benefit of feedback is only productive if the data given back to learners is continuous, reliable, and accurate (Wiggins, 2012).

Feedback is yet another tool that educators must master in order to improve student achievement. According to Hattie (2008), the greatest impact on achievement is the utilization of feedback. Feedback is the data that charts the progress of attempts to learn content or a skill. Feedback represents the assortment of notes after the experience, as well as affirmations, suggestions, and judgments (Wiggins, 2012).

The problem, said study participants, is that they only focus on what needs to be re-taught and to whom it needs to be re-taught; they don’t think carefully about why students did poorly in
certain areas, what went wrong instructionally, the problems with the assessment itself, or which strategies may improve results.

Assessments give career and technical educators valuable feedback on the effectiveness of new curricula and pedagogy. According to Hattie (2012), formative assessment tops the list of the most important practices that improve student outcomes. The review of over 250 studies by Black & Wiliam (1998) confirms this. Wiliam (2011) describes formative assessment as an assessment that functions formatively to the degree that proof about student success is prompted, understood, and used by teachers to plan their next steps in teaching that are possibly better than the choices they would have made without that evidence.

According to Wiggins (2012), the best feedback practices must be precise, relevant, well-timed, constant, and content-based. Students must have an understanding of what they will be learning and why it is important. Wiliam (2011) contributed that teachers are responsible to determine where students are in relation to their learning. Duckor (2014) echoed this sentiment, sharing that educators must effectively question students in order to be able to effectively assess for reflection related to the depth of understanding. Effective questioning consists of providing adequate wait time to consider responses and possibly ask clarifying questions that probe deeper into the students’ comprehension. Wiggins (2012) shared that the purpose of formative assessment is that students and teachers know without question what was understood and what needs to be re-learned. Wiggins (2012) also believed that teachers should continually pursue feedback on their teaching from students, colleagues, formative assessments, and by analyzing student work and subsequently modifying instructional practices.

According to assessment expert Stiggins (2005), some of questions that effective teachers should consider when thinking deeply about formative assessment data include:
- What made some items difficult for students?
- What are some possible sources of confusion?
- What do students’ wrong answer choices tell me about their errors and misconceptions?
- How did I originally teach this concept? What worked? What didn’t work?
- What are the best strategies for addressing the misconceptions?
- What are the best curriculum resources?
- How might students respond to an alternative instructional approach?

Stiggins (2005) represents that only formative assessments have the capacity to improve learning (as opposed to summative, standardized assessments), and that formative assessment is an ongoing, everyday process that provides students and teachers a continual flow of feedback to determine the next steps in learning. He also states that good formative assessment keeps students believing that “success is within reach if they keep trying.”

Ideally, he continues, formative assessments clarify the learning target for students, tell them where they are with respect to the target, and provide insights on how they can close the gap: “the locus of control resides with the student.” Students’ progress should be monitored and shared with them, adds Stiggins (2005), using clear performance criteria and student-friendly feedback. Sometimes formative assessments provide more accurate information on students’ skills, knowledge, and understanding than formal assessments.

Throughout the interviews of participants as well as the review of artifacts, it was evident that teachers primarily examined student performance through the lens of growth, but did not examine specific components of the assessments or specific student responses or actions to identify the cause of limited student achievement.
Teachers hold back from enthusiastically participating in the process of evaluating students for two reasons: a lack of confidence and a lack of meaning. The teachers in the study were fervent about their technical content and skills and were also committed to providing worthwhile instruction, but this same level of hunger and commitment was not seen in their assessment of students’ growth and achievement. Formal assessments were mostly summative with the intent of determining a grade. The principal interpretation of accountability strongly swayed teachers’ evaluation practices.

Participants of the study collectively agreed that student performance data, while valuable, should not be used in the process of educator evaluation. Based upon the review and analysis of interview transcripts and documents, it becomes evident that while career and technical educators see value in the use of formative assessment for their own use, they are in agreement with researchers regarding its use for teacher evaluation. However, they differ in their perspective in regard to its use even as a component. Education researchers have cautioned against using student data to evaluate teachers. The American Educational Research Association (AERA), the National Research Council (NRC), the American Statistical Association (ASA), and the RAND Corporation have all cautioned against using student growth data to make determinations about teacher quality. On the opposite side of the spectrum are proponents for the use of student performance for the purpose of teacher evaluation. According to Danielson and McGreal (2000), teachers should be involved in the scrutiny of their own classroom practices and the subsequent instructional decisions they make.

While the researchers claim that value-added models are better than the current model, that does not mean that they are appropriate for use for educator evaluation. Study participants
echoed the researchers’ recognition of the potentially undesirable consequences in the framework of evaluation that may result from the use of student performance data.

Since the early 1900s, educators have realized that teacher evaluation should be “based upon the results teachers are able to produce in students,” and therefore student performance should be a component of determining teacher performance, as it is ultimately how student learning is achieved (Danielson & McGreal, 2000; Marzano et al., 2011; Wright et al., 1997). The Brown Center on Education Policy of the Brookings Institute strongly advocated for the use of VAMs in teacher evaluation. They believed that the quantitative data resulting through VAMs could be useful to teachers (Glazerman et al., 2010). This belief is supported by the findings of this study, as participants have indicated that the data they have collected through the use of DDMs is useful.

Opponents of VAMs state that the use of VAMs to evaluate teachers is still untested, and therefore not yet valid. According to Newton et al. (2010), there are many variables that can influence a student’s performance. They identify factors in school, as well as factors at home and socially. Participants of this study expressed many of the same concerns.

The findings from this study have a strong connection with the literature presented in Chapter 2 related to formative assessment and improving instruction and VAMs and teacher evaluation.

**Discussion of the Findings in Relation to the Theoretical Framework**

This section discusses the findings presented in Chapter 4 in relationship to the theoretical framework presented in Chapter 1 to make sense of the findings. The context for this study is similar to other contexts studied using this framework. Career and technical educators serve numerous roles and have many stakeholders/customers (Jacques & Potemski, 2014).
DDMs reflect the central concepts of the continuous improvement movement inspired by W. Edwards Deming. Deming’s ideas motivated organizations to move past the idea of summative results to focus on incorporating quality cycles throughout the organization (Deming, 2000). The quality approach has made it easier to embed repetitive cycles of “plan-do-study-act” within the traditional school processes to guarantee that feedback is integrated into the system of reflection and ultimately evaluation.

The context for this study is also unique from other contexts studied using this framework. Most often linked to industries such as manufacturing, business, and healthcare, the field of education has been slow to adopt what has been shown to be a useful process for these industries; specifically, continuous improvement. One of the challenges to continuous improvement in schools is that, as compared with other fields, education has a comparatively weak basis in continuous improvement theory. That is, in careers such as medicine, social work, and counseling, practitioners have access to an assortment of assessment tools and processes that support their work with clients, and they are taught to use these clinical tools as part of their day-to-day work (Burkhardt & Schoenfeld, 2003). Instead, schools continue to look to the fad of the day and high-stakes accountability as levers for improving school, teacher, and ultimately student performance. Schools are not structured in ways that encourage continuous improvement. Teachers are often isolated, work is done in silos, the public demands quick results, and data isn’t examined frequently or quickly enough for it to meaningfully inform and change practice. By definition, continuous improvement is the act of integrating quality improvement into the daily work of individuals in the system.

1.) How do educators within a career and technical high school measure student growth?
Two themes emerged in response to this first research question. The next section discusses each in turn and how the findings align and differ from the continuous improvement framework.

**Theme 1: Use of varied student data that focuses on the measurement of skills learned is effective in informing educators to be reflective.** A continuous improvement approach to problem-solving necessitates using varied assessments to examine solutions to the desire to be reflective using student performance. Teachers must explore tried-and-true methods; choose one to use; and adapt, adopt, or abandon that method based on the results. Such a method requires that teachers have the freedom to take chances, test different potential solutions, and modify programs midstream (Loeb & Plank, 2008). Providing this freedom allows teachers to tailor data-based solutions tailored to the needs of their distinct circumstances.

The term “data-driven decision-making” (DDDM), while used regularly in education, appears more often to be applied in reference to policy decisions related to accountability rather than educator improvement. The ability of teachers to use student assessment data to determine student ability and educator effectiveness with the intention of utilizing this information to improve instruction should be the focal point of DDDM (Boudett, Murnane, City & Moody, 2005). Aimee Guidara, executive director of the Data Quality Campaign, expressed that the use of data should be similar to a flashlight, not a hammer. Data, when used well, can be used to shine a light on what is working. The idea of using data as a flashlight is critical to continuous improvement (Rosenberg, 2013).

Through this research study, it is evident that teachers believe that the use of student data is a valuable tool for their own improvement, and subsequently, the benefit of students. Less evident is the value of the use of student data for the purpose of summative educator evaluation.
Imagine a classroom with a well-meaning teacher who covers the curriculum but doesn’t understand why some students do not achieve at high levels, even though he or she works hard to help them. Compare this to the teacher who is able to recognize the individual needs of his or her students. The latter is more likely to have an instructional plan that has the potential to improve student competency.

**Theme 2: Using student data requires time and planning in order to modify classroom instruction.** The continuous improvement process requires time—teachers will need to study and utilize new instructional strategies, and they may need to work in partnership with and observe other teachers, while others may need to track improvement and collect data (Bernhardt & Hebert, 2010). Providing teachers the necessary time to utilize programs using a continuous improvement methodology may improve the probability of effective implementation.

Based upon this study, it is evident that there is a need for better and more frequent professional development related to the use of formative assessment. Ultimately, school and district administrators must guarantee that teachers have the knowledge, time, and tools to convert data into more effective instruction. Particularly for career and technical educators, who have little to no professional training related to teaching – especially in the area of assessment – support from leadership to incorporate continuous improvement is imperative. This support includes professional development, opportunities to collaborate with experienced teachers, and assistance in analyzing the collected data. The participants in this study represented a high level of trust in the leadership provided by the administration. The role of leadership in the execution of a new evaluation process is substantial and is integral to its success, and its importance cannot be understated (Halverson, Kelley & Kimball, 2004). Danielson and McGreal (2000) explored the issue of trust between the teacher and administrator. They contend that many teachers are
more knowledgeable about the content and skills they teach than the administrator evaluating them. They maintain that many administrators whose expertise is not in the content area they are evaluating are unable to provide specific supports. This may be even more apparent within CTE.

2.) What kinds of student growth data are most relevant and useful to career and technical educators as a part of their evaluation process?

One theme emerged in response to the second research question. The next section discusses this theme and how the findings align and differ from the continuous improvement framework.

**Theme 3: Using formative assessments that focus on skills and knowledge in formats such as performance tasks, industry credentials, and standardized standards-based, criterion-referenced assessments provides teachers with the needed data to be reflective.**

Based on this research, in some instances, data was simply collected for summative purposes (student grades). Most career and technical educators in this study began their careers having come directly from industry, and have had little teacher training. Competency-based assessment has emerged as an important skill development tool in CTE. Teachers use competency tracking to clarify skill-specific competencies in order to improve student performance and unify individual capabilities with school and statewide core competencies. A competency model is an authenticated judgment device, correlated to a specific group of actions, that describes key knowledge, skills, and abilities for performing those activities (Buford & Lindner, 2002). Competencies can be used as an assessment tool, as a tool to develop and modify curricula and instructional strategies, as a coaching and mentoring tool, and as a career development tool for teachers (Yeung, Woolcock & Sullivan, 1996).
CTE is unique in that it requires students to gain specific knowledge, but also to attain specified skills related to their technical areas. Businesses and industry look for specific technical knowledge and skills in the workplace from graduates of career and technical schools. Numerous standardized assessments and industry certifications exist for the purpose of providing both quantitative and qualitative data as measures of the knowledge and skills expected. Evaluating the success rates of students in attaining these certifications is one mechanism to measure continuous improvement compared to recognized occupational preparation and growth. Teachers’ use of data gathered through interviews with employers is yet another mechanism that career and technical educators use to assess the improvement of students graduating from their programs from year to year.

3.) How do career and technical educators make sense of student growth data to improve their practice?

One theme emerged in response to this first research question. The next section discusses this theme and how the findings align and differ from the continuous improvement framework.

Theme 4: Use of formative assessment has a positive impact on reflection and planning of instruction, resulting in varied teaching methods that address educators’ opportunity to continually improve. Making sense of data is a key function of DDMs. Feldman (1989) describes sense-making as the prospect “for members of an organization to understand and to share understandings about such features of the organization as what it is about, what it does well and poorly, what the problems it faces are, and how it should solve them” (p. 19). Data reflection references the structures teachers build to help themselves make sense of what the cause of problems may be and set goals for their instructional program.
A significant finding that arose from data collected in this study was the idea that teachers’ capacity or inclination to self-reflect on their practice was important in continuous improvement and affecting instructional practice. According to Costa and Kallick (2008), teachers want to be able to reflect, without interference, in a way that matches their learning style, values, and ideologies; additionally, self-reflecting on their teaching practices impacted their performance as teachers. The data here supported that finding. The teacher participants indicated that they self-reflected or increased their self-reflection as a result of their analysis of student performance. Teachers who indicated increased self-reflection perceived that they were continually improving.

Successful continuous improvement efforts necessitate that information is shared throughout organizations (Park et al., 2013). Teachers in continuously improving schools have opportunities to share best practices with other teachers; knowledge-sharing helps to support continuous improvement efforts.

Bringing continuous improvement to schools will necessitate a significant mindset shift. New ideas must be merged into teachers’ daily work, and policies and procedures within the school may need to change (Park et al., 2013). Further, teacher and administrator focus on continuous improvement promoted by the input of students, teachers, and administrators increases the prospect that changes will be successful (Wilka & Cohen, 2013).

Conclusion

One of the major themes of this study is that there is possibly both a broad range of data available to teachers, and numerous ways in which that data can be used for instructional planning, institutional planning, educator support, and instructional improvement. Most of the data available to teachers goes unexamined. Yet, data can provide a basis from which to develop
carefully chosen courses of action, and can help determine if past decisions have been worthwhile.

The study shows that the uses of data are sporadic and shallow. Test results are only examined superficially, and rarely are previous results considered to explore effectiveness. Targets are written into teacher improvement plans that are based upon perceptions. Teachers lack confidence in instructional planning based on the data because the teachers themselves recognize that they lack the skill to analyze the data, and the generalizations about students and instruction are problematic because of small sample sizes.

Using student performance data as the impetus to improving teaching, and subsequently learning, is particularly encouraging because it focuses the discussion around student learning and links many of the critical activities that impact those learning outcomes. Curriculum, pedagogy, professional development, time, and the organization of the classroom all influence the growth that students achieve. Even if the measures are somewhat inexact and replication is elusive, the resulting dialogue and trial-and-error process in itself creates beneficial change.

Assessments in general are an underutilized and potentially significant means for using student performance data to influence instructional improvement. Underlying the continuous improvement framework is the claim that methodical analysis of student performance data is a compelling mechanism to advance a culture of regular inquiry into the relationship between the instructional practices of teachers and the learning of their students.

The research question that directs this study focused on what types of student growth data are most relevant and useful to career and technical educators as part of their evaluation process. The individual interviews and review of planning, assessment, and evaluation documents provided answers to how teachers gauge their effectiveness.
Through evaluation, changing a teacher’s capacity to self-reflect critically, pinpoint needs for improvement, develop a plan for improvement, and then carry out that plan is the best way to improve student achievement. Data showed that participants acknowledged in various ways that student performance belonged as a component of teacher evaluation. Teachers believed that if teachers were getting good evaluation feedback, then student achievement should connect to teacher evaluation. Participants felt there had to be a relationship between student growth and teacher evaluation in some way, because teachers are seen as having the single greatest impact on their students’ performance.

While there were variations in the explanation of how this process occurs and of the factors that should be taken into consideration, all participants expressed some sense that there is a connection between teacher evaluation and student performance that needs to be reflected in the evaluative process. Summarizing the qualitative study, it is evident that teachers see value in the use of student data for their own improvement, but recognize the limitations to actual implementation.

**Limitations**

While teachers were uncertain as to the validity and reliability of their assessments, it is impossible to definitively comment on the reliability and validity of these individual assessments and whether teachers interpret and act upon them appropriately. Another limitation of this study was that the researcher supervised the teachers that served as participants, which could have weakened the study (Creswell, 2009). This could also have limited the detail or honesty of the teacher responses to the interview questions. While the researcher addressed this potential limitation prior to the study and stressed the amount of security and anonymity that would be provided regarding all feedback and responses, these responses may have been
tempered. The greatest limitation in this study was that it was limited to one school, and there were few participants. Given the small sample size and demographics of the participants in this study, claims cannot be made regarding the scalability or generalizability of this study.

Implications for Practice

The results of this qualitative study have implications for career and technical educators in Massachusetts. Using quantitative student data on the teacher evaluation instrument in the form of student growth as measured by DDMs gives teachers the opportunity to gain insight into the quality of their instruction and understanding by students. Therefore, the negative connotation teachers generally have toward the evaluation process may decrease.

Results of the qualitative study indicated that the use of student growth data on a teacher evaluation instrument, in conjunction with other qualitative components, and being transparent with all stakeholders might be more effective than using a teacher evaluation instrument consisting of solely qualitative, subjective, observational data.

Buy-in from teachers and staff is another implication in implementing change to the teacher evaluation process. Achieving cooperation and buy-in from the teachers may add to the success of the implementation. Convincing teachers to buy into using DDMs in this particular district has produced ratings that reflect teachers’ quality of instruction in supporting student learning gains and improving teachers’ performance and future professional growth. Teacher support is essential in bringing forth change to the teacher evaluation process (Taylor & Tyler, 2011). To reach the target of improving the learning outcomes of all students, career and technical educators must regularly have the opportunity to incorporate the use of data in reflecting on their practice.
This study was conducted using the theory of continuous improvement. It was through the lens of this theory that many beneficial themes developed, documenting essential perceptions regarding the use of student growth data on educator evaluation. The results were consistent with what the theories suggested and were supported by current research in the literature reviews.

This study could also potentially be used as a resource for career and technical teachers on the value of the use of student data for reflection, professional improvement, and increased student achievement. It is the researcher’s hope that career and technical educators read about the use of student data for their own reflection and overcome the impediments to make the needed changes to their own practice to improve the quality of education for their students.

**Areas for Future Research**

This study could be conducted across all technical schools in Massachusetts and include academic teachers in non-tested subjects. Because 2014 was the first time that teachers utilized student performance as part of evaluation, examining the continuous improvement and reflective practice of teachers in a longitudinal study to see if continuous growth through evaluation and self-reflection is sustained over multiple years and multiple evaluations could be a suggestion for further research.

An additional further study could explore the universality of the findings and the scalability of the role of student growth in teacher reflection and improvement in career and technical schools and its subsequent role in increased student achievement. Future studies could include using a survey for administrators, students, and higher education partners to gather more quantitative data related to perceptions of the use of student growth data in evaluating teacher improvement.
Summary

This investigation identified that career and technical educators see the value and role that formative assessment can play in their reflection on teaching and learning. As formative assessment relates to evaluation, indications from this study represent caution, apprehension, and a general sense that its use for that purpose is misguided. While the idea of formative assessment is not new, the use of DDMs for evaluation is in its infancy in Massachusetts. Findings suggest it has begun to have an impact in changing career and technical educators’ thoughts about their current practices related to reflecting on the effectiveness of their instruction. Educators of career and technical students are not convinced of the relevance of DDMs as a single one-time snapshot of the impact of their instruction such to cause a change their pedagogy. Additionally, there are misconceptions and angst about using students’ growth to evaluate educators’ effectiveness in teaching CTE courses. The use of student growth, whether for reflection or evaluation, represents change for many career and technical educators, experienced or novice. Sustaining commitment to change requires the influence of a collaborative work environment, along with the alignment of the organization and the processes that support and nurture teachers so that they can incorporate change into their continual professional growth.

This study identified time and continued demands as challenges to expanding the use of formative assessment, even though there is recognition of its value. Career and technical educators are focused on planning and carrying out their instruction as well as numerous other responsibilities. Changing the focus to reflective practices through the use of formative assessment will require a change in mindset as well as support and commitment of resources, specifically time and professional development. Career and technical educators receive minimal training on how to gather data, and even less on how to use data effectively to inform practice.
Training educators to utilize data in an effective manner may diminish their apprehension and result in a true opportunity for instructional improvement and better outcomes for students.

**Personal Statement**

My positionality statement references my past and current roles as a science teacher, assessment specialist, and administrator in a career and technical school district. As superintendent, I had to become familiar with and react to the DDM requirements imposed by the Massachusetts Department of Elementary and Secondary Education while I was researching teacher use of formative assessment for their own reflective practices. Career and technical educators, whether seasoned veterans or newly minted, are focused on their daily responsibilities and the needs of their students.

Career and technical educators have often not been trained to gather data when they first enter the role of teacher, nor is there adequate training on how to use data effectively to inform practice as they progress through their careers. While they are required to participate in coursework focused on pedagogy, including a course on assessment, true change in their practice has not been seen universally. With the mandate for the use of DDMs, formative assessment has been brought to the forefront of educator improvement through reflection on the impact of teaching practices on student achievement. Part of the shift in thinking that is required is to look beyond the atomized, one-time application of the use of DDMs and professional development specifically related to this one-time examination of the impact of teachers’ instruction. Teacher goals are developed each year and reviewed as part of the evaluation process. Infrequently are the goals based upon student achievement over time. Training teachers to employ cumulative data may lead to awareness over time related to the needs of students and educators’ own instructional successes and failures, and may generate successful strategies and methodologies
leading to continuous improvement. The concept of DDMs (more frequent use of formative assessment) can help teachers make this change.

Teachers and administrators have a responsibility for compliance with regulations and accountability toward stakeholders. Educational regulations continually evolve and will continue to evolve in the future, as can be seen by the recent passage of ESSA (Every Student Succeeds Act). We can view this change in regulation as an opportunity to demonstrate the importance of formative assessment and continuous improvement at the individual level. This, in turn, can lead to more significant use of reflection on practice by teachers, with the intended consequence of increased student achievement. As teachers continue to improve, so do student outcomes. The long-term result is the continued improvement of schools and the larger system of education.

Key to these improvements are increased opportunities for ongoing, targeted, individualized professional development and creative solutions to the time needed to implement meaningful formative assessment that leads to reflective practices.

What will sustain these reforms are the minute-to-minute, day-to-day decisions and actions of all teachers and administrators. Sustaining commitment to change requires the alignment of systems and structures that support individuals so that they can incorporate formative assessment and reflection into their daily routine toward the goal of continuous improvement.
References


Educator Evaluation, Massachusetts Department of Elementary and Secondary Education. Retrieved from [http://www.doe.mass.edu/edeval/](http://www.doe.mass.edu/edeval/)


Race to the Top Program Executive Summary. Retrieved from


Robertson, J. S. (n.d.). Accommodations and modifications of instruction. Retrieved from

http://people.uncw.edu/robertsonj/SEC210/Accommodations.pdf


Appendix A: Informational Letter of Invitation

Dear _____________,

I am contacting you via this letter because you are a CTE teacher at Standish Regional Technical School who has been teaching for more than three years (with Professional Status-tenure). Additionally, you have participated in at least one cycle of the new educator evaluation system and have selected District Determined Measures as the basis for determining your impact on student achievement/growth. As such, I am requesting your help for a research study, as part of my doctoral studies at Northeastern University which explores the use of student growth data for the improvement of instructional practice.

If you choose to participate in my research study, you will be asked to participate in two interviews that will last approximately 90 minutes total. All interviews will take place in a private location and will be audiotaped and transcribed.

In the first interview you will be asked to share your experiences as a teacher. During the second interview, I will share some of the meanings that emerge from the initial interview to check for accuracy and to clarify any misunderstandings.

Recordings and transcripts will be kept private, and all data will be kept on a password-protected computer or in a locked filing cabinet. The data will only be accessible to me and, after three years, I will erase all data.

To keep your information private, I will use a pseudonym rather than your actual names. Only your pseudonym will be used on all transcripts and study write-ups.

Participation in this research is voluntary. If you decide to participate, please contact me at your earliest convenience. My contact information is included below.

Sincerely,

Robert Dutch
6 Mizzen Lane
Bourne, MA 02532
Phone: (774) 238-8651
Appendix B: Informed Consent

Robert Dutch, a doctoral candidate at Northeastern University in Boston, is conducting a study which explores the use of student growth data for the improvement of instructional practice. As a person identified as someone who has been teaching for more than three years (with Professional Status-tenure) and you have participated in at least one cycle of the new educator evaluation system and have selected District Determined Measures as the basis for determining your impact on student achievement/growth, you are being invited to take part in the research study. This form will tell you about the study, but the researcher will explain it to you first. You may ask this person any questions that you have. When you are ready to make a decision, you may tell the researcher if you want to participate or not. You do not have to participate if you do not want to. If you decide to participate, the researcher will ask you to sign this statement and will give you a copy to keep.

Participation involves an audio-taped interview, totaling about 1 to 1 ½ hours, at a location and time convenient to you and the interviewer. No preparation on your part is required for any part of the process. During the interview, you will be asked specific questions regarding your experiences with the educator evaluation system, district determined measures and your use of student data for reflection on your teaching.

Before you agree to participate, it is important to understand that this study is designed to minimize potential risks, and therefore there is no foreseeable risk or discomfort to you. If you have any concerns or questions before, during, or after the interview, the principal investigator will make every effort to discuss them and inform you of options for resolving your concerns.

There will be no direct benefit to you for taking part in the study. However, the information learned from this study may help you and other CTE teachers utilize student achievement data in the process of becoming a better teacher.

Your part in this study will be confidential. Only the researchers on this study will see the information about you. No reports or publications will use information that can identify you in any way or any individual as being part of this project.

The interview will be audiotaped and verbatim transcripts will be produced, the purpose being to capture and maintain an accurate record of our conversation. Your identity will be kept confidential and any personal information such as your name and organization will be kept both confidential and anonymous. Your name and organization, unless otherwise authorized by you, will be presented in the final written report under a pseudonym. The audio recordings of the interview, as well as the verbatim transcripts, will be maintained in a secure location throughout the duration of the research process.

Your participation in this research is completely voluntary. You do not have to participate if you do not want to and you can refuse to answer any question. Even if you begin the study, you may
quit at any time. If you do not participate or if you decide to quit, you will not lose any rights, benefits, or services that you would otherwise have.

If you have any questions about this study, please feel free to contact Robert Dutch at 774-238-8651 or bdutch@uppercapetech.org, the person mainly responsible for the research. You can also contact Dr. Kelly Conn at kconn@neu.edu, the Principal Investigator.

If you have any questions about your rights in this research, you may contact Nan C. Regina, Director, Human Subject Research Protection, 960 Renaissance Park, Northeastern University, Boston, MA 02115. Tel: 617-373-4588, Email: n.regina@neu.edu. You may call anonymously if you wish.

_____________________________________________
Signature of person agreeing to participate   Date

_____________________________________________
Printed name of person above

_____________________________________________
Signature of person who explained the study   Date
to the participant above and obtained consent

_____________________________________________
Printed name of person above
Appendix C: Interview Questions

Interview Part 1: Background – Demographic questions

1. How many years have you been a teacher at Standish Tech?
2. How many years have you been a teacher in total?
3. What subject do you teach?
4. Why did you choose to leave your trade and become a teacher?
5. What do you hope to gain through participation in this study?
6. What motivated you to participate in the study?
Interview Part 2:

1. How does the new educator evaluation process affect your practice in the classroom?

2. Describe your experience with the use of District Determined Measures.

3. What are the strengths and weaknesses of the evaluation process?

4. Describe how you would compare the new evaluation process to the previous traditional evaluation.

5. Do you believe the evaluation process improved your instructional practice as a teacher?

6. How does participation in the use of DDMs affect your teaching?

7. What are the benefits of DDMs?

8. What are the disadvantages of DDMs?

9. What is your understanding of the role of evaluation?

10. Tell me about your experience of implementing the components of the evaluation system and work with it in a useful way?

   a. Can you think of an example that marked a turning point in your opinion regarding the new evaluation system?
   b. What are the ways in which it has been difficult to implement the system?

11. Thinking back on your career as a teacher, how has your use of student data changed?

   a. Is it better or worse now?
   b. What do you think caused this change?
   c. Has it changed your relationship to teaching pedagogy/theory, students, parents, supervisors?

12. Describe whether and to what degree the use of student growth data has helped you as a teacher to grow and improve student learning?

13. What has the most impact on improving your teaching?

14. Describe how the use of student growth data has helped you to grow and improve your teaching.
15. Describe your level of anxiety with the student growth model compared to the traditional evaluation model.

16. In what ways has the student growth model impacted the teaching and learning culture in your school?

17. What changes would you recommend if the evaluation system and student growth model were to continue?

18. You have been very helpful. Are there any other thoughts that you would like to share with me to help me understand your experience with evaluation, the use of student data in evaluation and self-reflection and your development as a teacher?
Appendix D: Interview Protocol

Interview Protocol: ______________________________________________

Interviewee (Title and Name): ______________________________________

Interviewer: Robert A. Dutch_______________________________________

Date:   _________________________________________________________

Location of Interview:  ____________________________________________

INTRODUCTION

Part I: Introductory Question Objectives (5-7 minutes): Build rapport, describe the study, answer any questions, review and sign IRB protocol.

You have been selected to speak with me today because you are a CTE teacher at Standish Regional Technical School who has been teaching for more than three years (with Professional Status-tenure). Additionally, you have participated in at least one cycle of the new educator evaluation system and have selected District Determined Measures as the basis for determining your impact on student achievement/growth. This research project focuses the use of student growth data for the improvement of instructional practice. Through this study, we hope to gain more insight into how CTE teachers use formative assessment. Hopefully this will allow us to identify actions, strategies, and use of resources that can be recommended for the purpose of improving the use of formative assessment for reflection on one’s own practice.

Because your responses are important and I want to make sure to capture everything you say, I would like to audio tape our conversation today. I will also be taking written notes during the interview. I can assure you that all responses will be confidential and only a pseudonym will be used when quoting from the transcripts. The tapes will be transcribed by a transcriptionist, but the pseudonym will be used to label the tapes. I will be the only one privy to transcripts and information and the tapes will be destroyed after three years.

To meet our human subjects’ requirements at the university, you must sign the form I have with me (provide the form). Essentially, this document states that: (1) all information will be held confidential, (2) your participation is voluntary and you may stop at any time if you feel uncomfortable, and (3) we do not intend to inflict any harm (allow time to review form). Do you have any questions about the interview process or this form?
We have planned this interview to last approximately one hour. During this time, I have several questions that I would like to cover. If time begins to run short, it may be necessary to interrupt you in order to push ahead and complete this line of questioning. Do you have any questions at this time?

A. Interviewee Background – My name is Robert Dutch and I am a doctoral student at Northeastern University. I am presently working on my dissertation. I am also the Superintendent of Standish Regional High School. I have been the Superintendent for four years. I have worked in the education profession for over 30 years.

**Interview Part 1: Background Information**

Objectives: “To put the participant’s experience in context and put them at ease.

1. How many years have you been a teacher at Standish Tech?
2. How many years have you been a teacher in total?
3. What subject do you teach?
4. Why did you choose to leave your trade and become a teacher?
5. What do you hope to gain through participation in this study?
6. What motivated you to participate in the study?

**Interview Part 2: The Details of the experience**

Objectives: To concentrate on the concrete details of the participants’ present lived experience in the topic area of the study.

1. How does the new educator evaluation process affect your practice in the classroom?
2. Describe your experience with the use of District Determined Measures.
3. What are the strengths and weaknesses of the evaluation process?
4. Describe how you would compare the new evaluation process to the previous traditional evaluation.
5. Do you believe the evaluation process improved your instructional practice as a teacher?

6. How does participation in the use of DDMs affect your teaching?

7. What are the benefits of DDMs?

8. What are the disadvantages of DDMs?

9. What is your understanding of the role of evaluation?

10. Tell me about your experience of implementing the components of the evaluation system and work with it in a useful way?

Can you think of an example that marked a turning point in your opinion regarding the new evaluation system?

What are the ways in which it has been difficult to implement the system?

11. Thinking back on your career as a teacher, how has your use of student data changed?

   a. Is it better or worse now?
   b. What do you think caused this change?
   c. Has it changed your relationship to teaching pedagogy/theory, students, parents, supervisors?

12. Describe whether and to what degree the use of student growth data has helped you as a teacher to grow and improve student learning?
13. What has the most impact on improving your teaching?

14. Describe how the use of student growth data has helped you to grow and improve your teaching.

15. Describe your level of anxiety with the student growth model compared to the traditional evaluation model.

16. In what ways has the student growth model impacted the teaching and learning culture in your school?

17. What changes would you recommend if the evaluation system and student growth model were to continue?

18. You have been very helpful. Are there any other thoughts that you would like to share with me to help me understand your experience with evaluation, the use of student data in evaluation and self-reflection and your development as a teacher?