Fall 10-2016

A Mixed-Method Investigation of Common Assessments Within a Suburban Secondary School

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A Mixed-Method Investigation of Common Assessments Within a Suburban Secondary School

by

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A Dissertation submitted to the Education Faculty of Lindenwood University

in partial fulfillment of the requirements for the

degree of

Doctor of Education

School of Education

A Mixed-Method Investigation of Common Assessments

Within a

Suburban Secondary School

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This dissertation has been approved in partial fulfillment of the requirements for the degree of

Doctor of Education

at Lindenwood University by the School of Education

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Declaration of Originality

I do hereby declare and attest to the fact that this is an original study based solely upon my own scholarly work here at Lindenwood University and that I have not submitted it for any other college or university course or degree here or elsewhere.

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Acknowledgements

I am overwhelmingly grateful for the support of family, friends, colleagues and professors. To Dr. Lynda Leavitt, my dissertation Chair, for her determination and necessary advice to complete this work. My selection of Dr. Leavitt, was easily, the most important and best decision made in this process. To committee member Dr. John Long, for his steady support, ushering me into the program and in the classroom. Dr. Kelly Dickinson, trusted counsel and intellectual on all topics related to school and life, whose role on the committee was invaluable to writing process.

While indebtedness to professionals is pronounced, personal obligation is deeper, longer, and necessary. I thank my parents for demonstrating and then inculcating inordinate determination and love of learning their whole lives. My wife of sixteen years Leah Irvin, who too often endured the unsustainable weight of home with unwavering professional and personal support. I cannot think of a better partner with unequaled heart and passion for parenting that I value first, last and always. My beloved children Ryland Irvin and Samantha that have challenged me to grow each and every day to be the father you both deserve; I hope you find a fraction of inspiration in this process that I found in you to complete this work.

Abstract

The purpose of this mixed method case study, on the continued implementation of common assessments developed within Professional Learning Communities (PLCs), was to investigate possible relationships between teacher collaboration, common assessments and End of Course (EOC) assessments. The researcher investigated the perceptions of teachers and administrators in a Midwest secondary setting on common assessment development and utilization on the culture of teaching and data-driven decision making.

The information from this study will provide the researched school district as well as others with insights into their implementation of PLCs and specifically the development and utilization of common assessments. In order to evaluate student learning in a classroom setting, the state of Missouri piloted SLOs in public schools in the 2016-2017 school year. Common assessments are a staple of the SLO process to foster collaborative use of assessment results and data-informed instruction to address student learning outcomes. Data collection included each of the EOC assessed academic departments, the researcher surveyed teachers and interviewed supervising principals and participating teachers. In order to evaluate common assessments, the researcher collected student achievement data through SLO pre-assessments EOC scores during the 2015-2016 school year. The study utilized the Pearson Product Moment Correlation Coefficient to conduct analysis of the two data points to determine the strength of the relationship.

Through evaluating common assessment utilization, this study intended to address potential modifications needed in common assessment and accompanying practices in the school's PLC setting. By completing quantitative analysis of common assessment scores

and qualitative data from surveys and interviews the researcher ascertained: Government and English PLC revealed a relationship between their instruction and corresponding assessments; Algebra had a modest relationship while Biology failed to connect classroom to assessments. Through qualitative data analysis, the researcher determined a need for continual professional development around assessment and data literacy to better support teachers with increased accountability of SLO implementation in future school years. Further, implications of the study could serve to assist schools in the implementation of SLOs and ancillary areas of assessment, teacher collaboration, and data use for school advancement and impacting student outcomes.

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Chapter One: Introduction

Education, in general, and schools, specifically, experienced ongoing and varying levels of public concern for high school graduates, indicated by a Phi Delta Kappa Gallup (2014) poll, where less than three-out-of-ten expressed the perception that graduates were college or career ready (p. 6). The recursive pattern of school reform and assessments became commonplace in the United States' schools during the generation preceding this writing, initiated with the No Child Left Behind Act in 2001 and re-adjusted by the Common Core State Standards (CCSS) and Race to the Top initiatives (Darling–Hammond & Falk, 2013; DuFour, DuFour, & Eaker, 2008; DuFour & Mattos, 2013). Assessments, and the pressure to increase student achievement, pushed schools to examine fundamental processes of testing, evaluation, curriculum, and student learning (DuFour et al., 2008; Hattie, 2015). Even with resistance and consequential rollback of CCSS and the accompanying assessments, Smarter Balance, the Partnership for Assessment of Readiness for College and Careers, and both internal and external stakeholders throughout education placed value in using tests as barometers of school success (Brookhart, 2015).

The legislation, Every Student Succeeds Act (ESSA), and the push for assessment at the local level, required greater literacy assessment by classroom teachers than previous legislation (Gewertz, 2015). More evidentiary for student learning than standardized testing, was the change in school culture that included collaborative settings for teachers to collectively create, administer, and analyze common assessments to make instructional decisions on results (Ainsworth & Viegut, 2015; Brookhart, 2015; DuFour et al., 2008; DuFour & Mattos, 2013). This era of school reform focused on assessment

and the backdrop for testing with a greater influence on schools and teachers than evidenced in previous time-frames. Student Learning Objectives (SLOs), a measure of targeted student growth during a particular time-frame, became an increasingly prevalent strategy and incorporated skills teachers utilized in Professional Learning Communities (PLCs), to build, administer, and understand results of assessments. SLOs in the state of Missouri mirrored the assessment-driven culture, with an increase in localized control on standards (Missouri Department of Elementary and Secondary Education [MODESE], 2014).

Researchers found a correlation between student growth, as measured by SLOs, and student success on large-scale assessments and other metrics of student achievement (McCullough, English, Angus, & Gill, 2015; MODESE, 2014). Nationally, 43 states incorporated some measure of student achievement into the teacher evaluation process (National Council on Teacher Quality [NCTQ], 2015, p. iv); while the Missouri Department of Elementary and Secondary Education's (MODESE, 2014) adaptation of the SLO model increased the need for improved collaboration, assessment literacy, and data analysis by teachers and school leaders across the state. Schools with functioning PLCs and a strong culture of collaboration in lieu of traditional instructional isolation had an advantage heading into an era where SLOs drove evaluation (Rhode Island Department of Education [RIDE], 2013a).

This research was pertinent to the field of education, as the increased focus on student outcomes provided schools, administrators, and teachers with information to alter the evaluation process of teachers within the new SLO model. This research provided information for those required to practice the edict of MODESE (2014, 2015a, 2015b,

2015c) to move forward with a deeper understanding of then-current practices in assessment, data analysis, and instructional practice early in its implementation. The research served to chronicle the way forward for schools in navigating new practices for teachers.

Statement of Problem

Visible evidence of student learning received increased emphasis in years recent to this writing, and focused on the improvement of measureable student academic performance in public schools. The isolated nature of teaching as a profession led to DuFour et al.'s (2008) pejorative phrase of "educational roulette," a label attributed to the haphazard nature of the unleveled world of teacher selection for students (p. 244). PLCs and foundational components of common assessments and data meetings resulted in an increase in the diversity of student experiences, regardless of the teacher within a particular course. The initial PLC reform movement was connected with SMART (Strategic, Measureable, Attainable, Results oriented, Time bound) goals and required teachers to teach a majority of students aligned to a prescribed goal (Ainsworth & Viegut, 2015; DuFour et al., 2008; Lipton & Wellman, 2012).

Many states legislated school improvement by various measures of student learning, including SLOs. SLOs called for growth to be measured and individual goals set for all students (MODESE, 2014). The SLO process became reality throughout Missouri after a pilot program occurred in the 2015-2016 academic year, and in the researcher's experience, SLOs functioned as an evaluation tool for decisions on teacher tenure and pay for teachers, with varying success. Teachers and school leaders had the opportunity to increase assessment literacy connected to the common assessment process,

results analysis, and corrective instruction (RIDE, 2013a). The aforementioned skills needed evaluation and support, as part of the evaluative process for teachers after only one year of piloting the SLO program. Schools noted each of the SLO assessment building blocks were years in the making, and some abandoned aspects of the SLO process after a difficult implementation process (Community Training and Assistance Center, 2013). Additionally, as teachers faced the expectation to become literate with assessment data, and responsive to instruction, how schools monitored SLO use and practice became a concern among stakeholders.

As educators learned how best to structure time for teachers to collaborate and create learning experiences for students and incorporate best practices during implementation of the learning experiences, administrators were alert to notice when teachers fell short of those standards. Pfeffer and Sutton (2000) detailed the significant concerns of schools that possessed an awareness of what worked best and were still unable to pursue the implementation of the methods for a myriad of reasons. School leaders were responsible for a teacher's level of understanding regarding assessment utilization in the researched setting.

Rationale

The researcher, as a previous teacher and administrator, observed multiple schools that employed common assessments with varied levels of implementation and utilization. MODESE (2014) initiated the use of SLOs throughout public schools as a pilot and planned to align SLO data to teacher evaluations in the 2016-2017 academic year. The intent of SLOs was to measure student outcomes by establishing a baseline assessment of a skill or content and re-assessing at the end of instruction (MODESE, 2014). The

educator assessment component of SLOs, developed by MODESE (2014), incorporated student data in the evaluation and compared the percentage of student growth relative to teacher established growth targets in each course for a prescribed period (MODESE, 2014).

SLOs, as a state initiative, received criticism from educators when implemented in Missouri, in spite of SLO use in other settings across the country. Teachers and administrators had specific needs for understanding data, collaboration, assessment, and corrective instruction to best navigate implementation of SLOs (MODESE, 2014). While SLOs provided criteria for evaluations of teachers, the best use was to insure instructional practice and student growth in a critical realm chosen by teachers (Donaldson et al., 2014).

Throughout the then-current literature SLOs manifested as a critical component in the development of common assessments and student academic success through measured outcomes. The researcher witnessed the local school reform process within one school through the adjustment of the daily schedule to nurture an increase in teacher collaboration during the common assessment process. While schools experienced varied levels of the knowing-doing gap, as detailed by Pfeffer and Sutton (2000), all schools benefitted from fidelity in application of common assessments and the SLO process.

The preponderance of research on teacher collaboration, common assessments, and teachers focused on measures of student outcomes and pointed to the need for those practices; yet schools too often disregarded evidence to practice less arduous processes (DuFour et al., 2008). Common assessments and subsequent instructional choice were among the most powerful tools utilized by educators delivered through PLCs (Lipton &

Wellman, 2012). Common formative assessments proved to be influential with regular and timely feedback that allowed teachers the time to adjust instruction and meet the diverse learning needs of all students (Ainsworth & Viegut, 2015).

Purpose

This study analyzed the perceptions of teachers and administrators on data-driven decision making, common assessments instructional design, the process of continual improvement, and the possible relationships between End of Course (EOC) exams and student common formative assessment scores. For the purpose of this study only specific courses, required by MODESE (2014, 2015a, 2015b, 2015c), and assessed by an EOC exam were included in the data collection. These courses were: Algebra I, Biology, English II, and Government. The researcher examined the perceptions of teachers and administrators on data-driven decision making, common assessments, instructional design, and the process of continual improvement. The information from this study provided the researched school district with insights into the implementation of PLCs and specifically the development and utilization of common assessments. A deeper understanding of several key skills and concepts for teachers had greater importance. Teachers and administrators needed to understand data, collaboration, assessment, and corrective instruction to navigate implementation of SLOs (MODESE, 2014).

Then-current literature supported the strong instructional and assessment connection for SLOs in the development of common assessments and academic success. The researcher experienced one school with a radically changed daily schedule to accommodate collaborative work, while another spent over thirty-two hours engaged in shared pedagogical labor. All schools benefited from fidelity in application of common

assessments. Common assessments delivered through PLCs and subsequent instructional choices (Lipton & Wellman, 2012) were among the most powerful tools utilized by educators. Common formative assessments proved to be influential with regular feedback and permitted teachers to adjust instruction to meet the diverse learning needs of all students (Ainsworth & Viegut, 2015). DuFour et al. (2008) investigated the use of common assessments and the combination of increased teacher collaboration in a PLC setting. The potential result of a collective focus on student learning, team-created assessments, and normed grading produced positive academic results (Garcia, McCluskey, & Taylor, 2015). Ainsworth and Viegut (2015) noted the power of alignment to learning standards, with information from common formative assessments, altered instruction in schools.

Hypotheses and Research Questions

With the history of the PLC model, use of common assessments, EOC testing, and SLOs emergence, a layered, nuanced approach was necessitated for this study. A random sampling of student secondary data from EOC test results in Algebra I, Biology, English II, and Government was collected. The correlation between EOC scores and the SLOs-based common formative assessment counterpart utilized the Pearson Product Moment Coefficient Correlation (PPMCC) to judge the strength of the relationship.

The hypothesis utilized in this study were:

H1: There is a relationship between student common formative assessment scores and End of Course exam scores in Government, with respect to the population of the study school district.

H2: There is a relationship between student common formative assessment scores and End of Course exam scores in Biology, with respect to the population of the study school district.

H3: There is a relationship between student common formative assessment scores and End of Course exam scores in English II, with respect to the population of the study school district.

H4: There is a relationship between student common formative assessment scores and End of Course exam scores in Algebra, with respect to the population of the study school district.

RQ1: How do teachers perceive data-driven decision-making as it relates to the development of common assessments?

RQ2: How do teachers perceive data-driven decision making as it relates to instructional design and implementation?

RQ3: How do administrators perceive data-driven decision making as it relates to common assessments?

RQ4: How do administrators perceive data-driven decision-making as it relates to the process of continual school improvement?

Limitations

Not all teachers made use or had experience with key axioms of this study including pre-assessment, data-driven instruction, and aspects of the SLO (Creswell, 2009). Relative to concerns of trustworthiness and credibility, the nature of qualitative research was inherently context and case-dependent, with the structure of coding and analysis (Creswell, 2009). Both qualitative and quantitative data focused on one school

district's EOC scores, interviews, and surveys from a finite number of teachers and building administrators.

Regarding instruments in the study, the SLO process was in its initial phase with the teachers in the study and provided some concerns regarding its credibility. This sample size (n = 12) possibly served to limit the transferability of the findings (Fraenkel, Wallen, & Hyun, 2015). Instruments of research for qualitative data interviews were not an issue of bias or coercion, as a third party interviewer conducted and secured audio recordings of qualitative data interviews. Interviewee's availability was limited to a one-day window, possibly limiting participants. Survey questions were available to participants over two weeks to allow extended participation opportunities. The assistant researcher scrubbed all personal information on all secondary data EOC scores and disallowed bias.

The researcher was an active participant in the PLC and SLO process in the school where the study took place. As an administrator in the building whose duties required observation and evaluation of some participants and the PLCs, the researcher acknowledged the challenges to the multi-phased position. Additionally, the concern of bias in interpretation of information and findings was evident. Further, EOC cut scores from MODESE (2014, 2015a, 2015b, 2015c) underwent calibration each year and provided modestly subjective standards.

Definition of Terms

Common assessment: Teachers working in a collaborative environment, to create assessments of agreed-upon, meaningful learning targets to reflect on trends in student learning and effectiveness of instructional practice (DuFour et al., 2006). For the purpose

of this study, any shared assessment, such as a pre-assessment or EOC was a common assessment.

Common formative assessments: Assessments for learning attached to a learning goal, collaboratively designed, and often collectively scored by a grade or course-level team. These assessments provided timely feedback to students and teachers concerning instructional impact. When students demonstrated the need for more support or enhancement in relation to the learning the objective, feedback was provided (Ainsworth & Viegut, 2015). For the purposes of this study, common formative assessments were a type of common assessment

Common summative assessment: Collaboratively designed evaluations were collectively scored and provided a measure of student learning and achievement and teacher instruction after a unit of study. For the purpose of this study, common summative assessments were a type of common assessment (Stiggins & DuFour, 2009).

Data-driven decision making: Educational practice of teachers and administrators to systematically collect and analyze various types of educational data, including input, process, and outcome to guide a range of choices to help improve the success of students and schools (Lipton & Wellman, 2012).

End of Course exam: State assessments taken each year in Algebra, English II, Biology, and Government throughout Missouri public schools. EOCs evaluated each student's advancement toward the Missouri Learning Standards (MODESE, 2014).

Missouri Department of Elementary and Secondary Education: State organization responsible for development and support for schools, administrators, and

teachers through professional development, standards, assessment, and certification (MODESE, 2014).

Professional Learning Community: Educators committed to working collaboratively in ongoing processes of collective inquiry and action research to achieve academic results for the students they served. PLCs operated under the assumption that the key to improved learning for students was continuous, job-embedded learning of educators (DuFour et al., 2008).

Pre-assessment: A test aligned with a summative assessment to demonstrate the content and/or skills students possessed at the beginning of a learning experience. This baseline informed the teacher of the students' learning gaps and assisted in planning future instruction (Ainsworth & Viegut, 2015). For the purpose of this study, SLOs required a pre-assessment.

Student Learning Objective: A quantifiable measure of each student's academic growth over a period of time, often a school year, used as part of a teacher's evaluation. SLOs required a pre-assessment of each student, setting a goal for learning by the teacher for each student, and then a summative assessment to evaluate the learning over the semester or school year (MODESE, 2014).

Third party interviewer: For the purpose of this study, the non-evaluative research assistant who collected specific data for the purpose of this study. The role included arranging times and conducting interviews of designated faculty, as well as scrubbing all identifiers before analysis occurred by the researcher.

Summary

This study investigated the perceptions of administrators and teachers of common assessments and the possible relationship between SLO-based pre-assessments and EOC scores in core academic subjects. The research provided insight into the first year of SLO use in Missouri within a top performing public suburban school district. Additionally, Chapter One provided discourse on the implementation of common assessments and the connection to then-current research. The results of this study provided guidance to the district, which hosted the research, and to other schools to assist administrators and teachers in the SLO process.

The researcher organized this dissertation into five chapters, a reference section, and appendices. Chapter Two includes a review of the literature on PLCs, data use in schools, assessment, SLOs, data-driven instruction, and the manner in which SLOs demonstrated student learning. Chapter Three describes the purpose of the study, research methods and questions utilized for the study, the research location and sample, rationale, data instruments, data analysis procedures, and overall design of the study. Chapter Four includes the analysis of both qualitative and quantitative data and results from the mixed method study implemented in this research, while Chapter Five includes the summary, findings, conclusions, and recommendations for further research.

Chapter Two: The Literature Review

The investigation of common assessments demonstrated multiple connections to varied topics throughout the research. This literature review provides necessary foundational information in the understanding of common assessments, in addition to providing a wide-ranging view of contemporary information on the topic. The topics in this literature review independently influenced a school's implementation, interpretations, and application of common assessments. The literature specifically addressed PLCs, data, assessment, SLOs, and data-driven instruction.

Professional Learning Communities

The PLC construct, since inception, had a defined purpose in schools. Sims and Penny (2015) stated PLCs had a wider approach to ensure student learning, rather than the narrower construct of a data team and a more comprehensive approach than provided by an individual teacher. The genesis of PLCs centered on the purpose to ensure student learning through improved teacher practice in a collaborative model (Ainsworth & Viegut, 2015). White and McIntosh (2010) remarked teacher collaboration in a PLC format necessitated purpose in setting goals, refined teaching and interventions, and raised collective expectations of student learning. Song (2012) concluded PLCs focused on teacher learning and collaboration, which led to high achievement in school settings. Research recent to this writing, in Miami area public schools, by Ronfeldt, Farmer, McQueen, and Grissom (2015), demonstrated veteran teachers improved student achievement significantly faster in schools with a strong instructional team collaboration.

School reform conducted through the PLC model resulted in different interpretations. Jacobson (2010) pointed to two reform models rooted relative to teacher

collaboration; teacher-driven with wide discretion for inquiry and the other a more authoritative, directed approach. The liabilities of the open model of teacher collaboration, described as loose reins, led to poor use of common planning time and navigation away from building directives (Jacobson, 2010). Teachers in more open models had more choice and greater professional growth than those working in more traditional models. Song (2012) noted the professional capacity in growth among teachers led to greater autonomy in the PLC setting (2012). Stewart (2014) believed the PLC model allowed a shift from sporadic and passive professional development to self-directed, needs-based high-quality professional development, focused on student learning outcomes. Student assessment data provided direction in professional development for teachers in a PLC (Stewart, 2014). DuFour and Mattos (2013) explained teachers' development as limited by the lack of content expertise of their evaluators, aided by a collegial PLC of content experts.

PLCs leveraged technology to navigate logistical and professional capacity limitations. Nielsen and Pitchford (2010) noted teachers collaborated and co-planned with other teachers in similar courses to assess student work, with technology to overcome lack of proximity. Blitz (2013) noted online PLCs had multiple benefits: increased pedagogical knowledge, growth in content knowledge, more diverse teaching practices, and greater meeting flexibility. Web-based PLC needs differed from traditional models. Web-based PLCs required greater facilitation, diversity of roles by members, and benefited when members supplemented an on-line process with face-to-face meetings (Blitz, 2013).

The PLC model, used to organize instruction and student supports, proved reactive to educator needs. DuFour (2004) observed schools not organized around the PLC model responded to struggling students by switching the student to a less rigorous course, which led to a haphazard classroom intervention response. Educational leaders within PLC schools looked to create structures to respond to student learning needs. Response to Intervention (RtI) systems imbedded with the PLC model demonstrated agility to meet student needs by screening student data to match student needs with supports (Gregory, Kaufeldt, & Mattos, 2016). PLCs provided a vigorous, systemic screening and response system to a chaotic setting, as well as connected teachers' instructional efforts to ensure a student's experience remained consistent because of instructional disparities between teachers (DuFour, 2004).

PLC schools adjusted the institutional vision to be more learner focused. Schools that practiced PLCs shifted the school design away from teacher behavior to attention on student learning and experienced a dramatic rise in demonstrated learning (DuFour & Mattos, 2013). In addition to a renewed student-driven approach, PLCs considered students individually. DuFour et al. (2008) proposed data teams move from attention on class averages to looking at each individual student's evidence of learning, by asking three questions: "What is it we want students to learn?", "How will we know if each student is learning each of the essential skills, concepts, and dispositions we have deemed essential?", and "How will we respond when our students do not learn?" (p. 184); a framework for schools to operationalize the principles of PLCs in schools.

The PLC model proved to mirror other reform efforts, with the blueprint only as successful as its implementation. Nielson and Pitchford (2010) noted PLCs engaged in

unfocused casual collaboration and lacked engagement in data use or instructional change, in a manner which did not support improved student performance. The nature of the dialogue and the dynamics of group interaction were important to PLC success. Low performing PLCs exhibited surface pleasantries and discussion of semantics in class mechanics, concerns outside of classroom teachers' control, and organizational skills (Nielson & Pitchford, 2010). DuFour and Mattos noted the importance of PLC group meetings were dependent on the team members empowered to take action and meet to weigh the correct issues (2013). Nielson and Pitchford (2010) stated PLCs were best engineered when each had substantial discussions on the organized methods to address student learning, and the data results from assessments on learning and resultant classroom modifications were based on the teacher's new learning.

Teacher collaboration within the PLC setting benefited the classroom setting. Based on substantive dialogues, teachers implemented corrective measures to address shortcomings, as exposed by the common assessment or shared best-formative practices (National Association of Elementary School Principals [NAESP], 2011). Nielson and Pitchford (2010) noted collaboration in school settings discouraged poor instructional choices, better supported new teachers in classroom work, and encouraged new competencies in assessment and pedagogy.

Teacher adjustment of instruction was a hallmark in PLC findings. White and McIntosh (2010) stated teacher collaboration in a PLC setting necessitated the setting of learning goals, refined teaching practices and interventions, and raised collective expectations of student learning. PLCs improved student learning metrics when teachers adjusted instructional practices (Ainsworth & Viegut, 2015). DuFour et al. (2008)

posited the PLC model of collaboration provided persuasive arguments to change teacher practice to a more demonstrated and instructionally-successful practice.

Common assessments continued to be a key aspect of the PLC landscape. Scrutinizing the results of common formative data was one the most important high-yield strategies PLC teams could engage (DuFour et al., 2008). Common assessment work informed, and then adjusted, a teacher's approach to adopt proven instructional practices to align with the results of the assessment (Ainsworth & Viegut, 2015). School leadership played a role in the application of common assessments in schools. Administrative support of the PLC model included multiple items, such as firm expectations on collaborative process, administering common assessments, and sequencing of content (DuFour & Mattos, 2013).

Research suggested teachers focused more within collaborative settings. Song (2012) highlighted classroom teachers' tendencies to dismiss hierarchal, top-down initiatives, unless teachers were empowered to make decisions in areas of assessment and time allotment (2012). DuFour et al. (2008) outlined three important concepts in PLC work: ensuring students learned, a culture of collaboration, and work focused on results. When a successful PLC shifted the school design to student performance from teacher behavior, schools experienced a dramatic rise in demonstrated learning. Emphasis of teacher teams necessitated a move from the collective focus on student learning to attention on each student. DuFour et al. (2008) proposed data teams move from attention on class averages to a focus on individual students' evidence of learning. Along with suggestions by Nielson and Pitchford (2010), stated PLC teachers implemented

corrective measures to address shortcomings exposed by the common assessment or shared best formative assessment practices.

Framework questions from PLC originator, DuFour (2002, 2004) provided discussion around PLC foundations and assessments. These questions served as a framework for schools to put the principles of PLCs into practice. DuFour et al. (2008) advocated for common assessments, to promote a similar classroom experience for students and to provide evidence of learning the essential course outcomes. DuFour & Mattos (2013) stated PLCs used assessment and data to advance student learning. PLCs focused on the results of common formative data accessed important evidence of student learning for both students and teachers. Common assessment work informed and then adjusted the instructional approach to highlight the best practices through results of the assessment (Ainsworth & Viegut, 2015).

PLC Issues

Researchers uncovered frailties of the PLC model in settings, based on limitations of personnel and poor operational tactics. PLC settings demonstrated a decrease in student learning for multiple reasons: lack of common planning times for members, a culture which lacked trust and collaboration, unsupportive leadership, and lack of data consideration or literacy (Sims & Penny, 2015). Teachers in PLC settings, at times, inhibited the growth of colleagues in some circumstances. DuFour and Mattos (2013) noted teacher development benefited from a collegial PLC of content experts and was limited by a lack of content expertise of the evaluators.

Data

School and teacher utilization of data increased in use and examination. Conley (2015) observed schools confronted with increased scrutiny, based on student assessment performance, which was formerly a benign tool of student learning evidence. Schools revamped both student assessment practices and teacher evaluation in response to the myriad of changes in state and many federal laws and funding measures (Makkonen, Tejwani, & Rodriguez, 2015). Two-thirds of states in the U.S. modified teacher evaluations and 30 states adopted the use of SLOs, to better measure efficacy of classroom teachers (Makkonen et al., 2015, p. 1). This process acknowledged the practice of collecting student performance data and data analysis as beneficial practices of school improvement (Ventura, 2010). Further, data utilization provided non-instructional insight for educators. Originators of the Data Quality Campaign (2014) stated school leaders must embed data use in institutional culture with the use of comprehensive quantitative information, such as student discipline, school attendance, and testing data, as a clear way to direct school improvement.

Data employment in schools was an important aspect during the preliminary phase in school improvement. Schools engaged in the work of PLCs needed to use assessment data as designed by course-level teams or annual state or national tests (Reeves, 2010). Additionally, school student information, such as demographics, discipline, and classroom engagement, should be weighed to understand where professional learning groups should begin to influence student learning (DuFour et al., 2008).

Data was a powerful tool in schools, but the use was inconsistent in the improvement of teaching, learning, and leadership. School leaders engaged with educators in the work of data teams disrupted long constructed practices of isolation (Kamm, 2011; Love, Haley-Speca, & Reed, 2010; Nielsen & Pitchford, 2010). Ventura (2010) detailed the use of data teams, which changed from teacher isolation to group collaborative in a consistent approach, when addressing key issues of core student skills (2010). Alignment in data use proved important in school settings. The U.S. Department of Education (USDOE, 2009) stated classroom level data use increased power of data utilization when coupled with similarly committed schools and districts with similar views on data. Leadership greatly supported the work of data usage in schools, and use of data provided an important tool for school leaders in construction of a common mission (Schwanenberger & Ahearn, 2013). Data use resulted in a new "model of professional practice in the twenty-first century grounded in the concept of collaboration" (Nielson & Pitchford, 2010, p. 179).

Data use and the professional learning community model sharply remodeled the work of educational leaders and leveraged an understanding of the PLC setting. DuFour (2002) noted the adjustment of principals in schools from the traditional model to an instructional leader model, with ritualized meetings and contrived periodic observations of teachers. The administrative shift placed too much emphasis on teacher activity and too little on student learning. DuFour (2002) called on administrators to adjust teaching practices to become lead learners instead of instructional leaders. School leaders in multiple roles worked with faculty to collaborate and promote the teacher's ability to work with assessment and subsequent data (Peery, 2010).

> Educational leaders needed to ensure teachers have developed the skills to convert student data to useful information to effectively plan for instruction and student intervention; to hold collaborative discussion structured for this purpose; to broaden the view of data to include student papers, products and performances; and to broaden the view of assessment to include assessment on the fly. (Wilhelm, 2011, p. 30)

Ainsworth and Viegut (2015) outlined administrative supports by recommending leadership meetings for grade and course-level teams, particularly in crafting common assessments.

Leadership best-orchestrated data use in schools by the elimination of competing interest and enforcement of expectations. Ventura (2010) stated the initial step for undertaking data usage in a school setting was to curtail the number of other initiatives and limit resources utilized for other then-current practices, to prioritize data work. Direct interaction from school leaders received support from researchers. School leaders should review minutes of each data team meeting with members of the team and meet with team leaders once every month (Peery, 2010). Data team leaders desired and needed support from school administrators in the event of team conflict, lack of cooperation, or personal issues (Ventura, 2010). Time allocation was another consideration of school leadership in conjunction with data teams. Data Quality Campaign (2014) stated a dearth of time was the greatest inhibitor to proper data usage and practice; while Schwanenberger and Ahearn (2013) noted schools should wisely protect time for data meetings in both subject-level data teams, as well as school-wide interdisciplinary data teams to look at large-scale quantitative trends.

The need for balance in teacher led work and central authority led to tension within PLC schools. Teacher-driven data team environments necessitated balance between centralized leadership with firm edicts and shared-to-full team autonomy (Campsen, 2010; Peery, 2010). Multiple levels of leadership influenced data teams at the classroom level and created a more level leadership paradigm with increased teacher capacity and empowerment (Psencik & Baldwin, 2012). A leadership infrastructure for data use provided a start, but further direction of the organization proved necessary. Campsen (2010) noted that after data team implementation, the issues leaders needed to address were sustained training focused on student performance and fidelity to initial data team principles and practices.

Data's role in schools and the work of educators within PLCs proved profound. DuFour et al. (2008) noted schools assessing student achievement focused on analyzing national, state, district, and school test data and begin to understand the data picture within the institution. The USDOE (2009) urged educational institutions to utilize data to "respond to students' strengths and needs" (p. 11). Schools utilized data to establish institutional priorities and subsequent administrative and classroom teachers' actions (Doubek, 2010; Lipton & Wellman 2012).

While data provided a valuable window into the progress of schools, data use was not without hazards or potential missteps. Hattie (2015) noted, "Schools are awash with data . . . we need better interpretations of the data" (para. 3). The USDOE (2009) noted teachers collected large amounts of data in a non-systemic manner and were unable to pinpoint data to increase student performance. Data failed to reflect gains in non-

cognitive areas or adequately portray work by teachers with students who grossly underachieved (Reeves, 2012).

Additional concerns around data pointed to data as an anonymous story, devoid of concern of individuals. Multiple studies (Daniel, 2008; Data Quality Campaign 2014; Kamm, 2011; Lipton & Wellman, 2012) correctly noted improper use of data, lack of thoughtful work with data, and poor initial training on data usage. Issues with the lack of congruence in goals or follow-through, poor structure and management for difficult conversations, and the ability to look at data were the most problematic (Lipton & Wellman 2012). Love et al. (2010) noted data teams without firmly established norms often blamed students for gaps in achievement. Lipton and Wellman (2012) addressed, teams engaged an individual, rather than through a team approach and failed to link data to corrective actions and interventions, which produced poor results. Teacher collaboration proved to be less likely to change teacher instructional practices, if not accompanied by teacher data utilization to sustain adult learning (Nielson & Pitchford, 2010).

Types of Data

Data supportive of learning was generated at the classroom level, rather than large-scale data. Levels of data from assessment allowed schools to address student performance from multiple tiers: national, state, district, school, grade-level, and classroom (Brookhart, 2015; Lipton & Wellman, 2012; U.S. Department of Education [USDOE], 2009). Research from the USDOE (2009) also supported interim or benchmark assessment data and building-created formative assessment data, as well as attendance records. Brookhart (2015) valued classroom-level formative assessment data

over all-school report cards and state or interim tests. DuFour et al. (2008) posited local formative assessment data allowed the learner greater involvement in the learning process and resulted in the data for student understanding of and diagnosis of learning. Assessment data for formative assessments were more fluid and less quantifiable than other forms, such as exit tickets, a verbal response to a question, or drawing a picture (Brookhart, 2015). Further, research noted formative data disallowed aggregation of information, as the information was individualized and adjustable (Brookhart, 2015).

Data teams primarily used quantitative information for analysis. Love et al. (2012) observed teams utilized quantitative data expressed statistically in areas such as assessment scores, students' populations, and other numeric expressions. Application of quantifiable data further allowed schools to investigate and ascertain information with modification of data. Educators used quantitative data for comparisons in groups and expressed in means, medians, modes, stanines, and quartiles (Lipton & Wellman, 2012). Quantitative data expressed with organized clarity through frequency distribution, central tendencies, and visual expressions, such as charts and graphs, supported student learning (Lipton & Wellman, 2012).

Narrative, descriptive, and holistic were characteristics of qualitative data. Lipton and Wellman (2012) stated data teams made use of qualitative artifacts, such as student work, interviews, and educational documents. Doubek (2010) described qualitative data as offering greater value than quantitative data in the form of teachers' understanding on student learning and aspects of local assessment. Erkens (2016) demonstrated qualitative data artifacts were valued to affirm or contest quantitative data and to support deeper inferences or interpretation. Erkens (2016) also recommended each teacher who worked

within a collaborative team provide three-to-five random anonymous artifacts to engage in professional learning around assessment scoring and evaluation. Teacher teams benefited when work focused around specific standards, criteria, and student engagement around targeted use of qualitative samples (RIDE, 2013a).

Structure and Training

Varied components and activities of data teams promoted or inhibited the work. Data teams, defined as educators working collaboratively to improve instruction, ensure learning, and leadership for instruction, differed from historical teacher PLC teams, which possessed a larger scope (Besser, 2010). Framework and emphasis of teams supported productive engagement of teachers in team setting. Data teams focused on analysis of evidence of student learning, and subsequent educator instructional choices produced greater student learning (Besser, 2010). Actions of data teams included systemic action of educators to collect and analyze various types of educational data, including input, process, and outcome, to guide a range of instructional choices (Lipton & Wellman, 2012).

Data work necessitated professional development and teacher support similar to other initiatives. Campsen (2010) stated, school wide leaders, new to a data focus and data teams, needed initial professional development and autonomy to implement. Data teams served to be a faculty vehicle for leadership and ownership of the teaching process, which lessened the propensity of a top-down push for data and ensured instruction was teacher-designed (USDOE, 2009). Data utilization warranted investment by schools. By 2014, 41 states witnessed allocation of financial resources to data systems and implemented data related training (Data Quality Campaign, 2014, p. 3). Teams were led

by professionally trained data coaches to facilitate collaborative inquiry, promote data literacy, and further collective work with data (Love et al, 2010) further promoted efficacy with data.

The correct construct of data teams was specific, smaller, task-focused, and a shared topic. The USDOE (2009) recommended data teams include no more than one administrator, multiple teachers with a shared course or students, classroom supported professionals, and district personnel with a background in curriculum or instruction. To work collaboratively, teams needed shared interest. Research supported instructors of shared students, courses, or subjects comprised the roster of teacher teams (Besser, 2010; Schwanenberger & Ahearn, 2013). Team construction varied by setting and goal in schools. Love et al. (2010) stated high school data teams had a horizontal structure, based on course models or grade level, more frequently than a vertical construct. Vertical teaming configuration in a collaboration model focused on data and instructional practice and built around content matter in different grade levels (Ainsworth & Viegut, 2015).

Frequency of meetings differed between investigators of data team processes. Kamm (2011) stated, teams needed frequent meetings, every two weeks or more, to build assessments, analyze data, and share best practice. Hattie (2012) stated smaller groups best conducted data team meetings every two-to-three weeks. Schools constructed times before or after school, a common plan period, or one day dedicated to professional development (DuFour et al. 2008; USDOE, 2009). Conflict on how teams used time centered on debate on focus on long-term or short-term goals. Data teams experienced a tension between investing time needed for developing increased capacity in each

members' ability with data and completing the group's immediate task, often limiting the team's collective growth by overtly focusing on direct work (Lipton & Wellman 2012).

Collaboration of data teams required a particular purpose, mindset, and paradigm. "Collaboration and the use of data are independent practices," for both schools and teachers to engage (Besser, 2010, p. 2). Working collectively ensured only a shared setting and not production. A shared workload, task, or goal did not ensure collaboration in teacher team settings (DuFour et al., 2008). Data teams improved through a revised approach to a more mutual endeavor; from individual practitioner to members of a high-functioning group, in raising student achievement (Lipton & Wellman, 2012). Teams required a limited number of teacher participants committed to student learning through data analysis and introspective teaching practice (Love et al., 2010). Data teams moved past a shared assignment to a more flexible approach, focused on a colleagues need; a more balanced approach to individual and group attention (Lipton & Wellman, 2012).

Data utilization did not ensure a student's ability or correct practices for student learning. Data Quality Campaign (2014) stated teacher practice and large-scale policies had not promoted teacher data literacy and teachers underutilized data. Research supported increased teacher preparation and support to address concerns of data literacy. The USDOE (2009) recommended data teams train other faculty members to increase staff data literacy, likelihood of data utilization, and increase fidelity to resultant instructional choices. Schools trained or provided self-paced on-line opportunities for data team members and taught faculty quarterly in assessment, technology use, and data-literacy skills, to keep data skills honed (USDOE, 2009). Data Quality Campaign (2014) recommended states adopt data skills, pre-assessment of staff, on-going professional

development in data usage, and connecting data-informed instructional choices to teacher evaluations.

In addition to proper construction, teams needed regular training and professional development, focused on the interaction between data team members (Ainsworth & Viegut, 2015; USDOE, 2009). Schools benefited from school-site data facilitators to promote systemic use of data and faculty trained in use of data, while facilitators met with grade or subject teams or team leaders at least once each month (USDOE, 2009). During meetings, facilitators modeled usage and interpretation and adjusted instructional practices (USDOE, 2009).

Researchers promoted varied methods for training data teams. Systemic data training initiated in teacher-training programs and imbedded in teacher evaluation structures promoted initial understanding of data utilization for pre-service and early-career teachers (Data Quality Campaign, 2014). Professional development among school faculties proved to assist teachers in aspects of the institutions' data networks and promoted a data culture for faculty (NAESP, 2011). Data training information provided to teachers allowed for immediate application of informed instructional practice and promoted the use of information aligned to the instructional needs of the student (The Doing What Works Library, 2014). Promoting listening for understanding and methods on how to collect, summarize, prioritize, and apply information from data were areas of training for data groups (Lipton & Wellman, 2012). Additionally, data literacy training needed to be continuous and completed collectively by all members on the data team (The Doing What Works Library, 2014).

Schools implemented professional development to address faculty data literacy. Love et al. (2010) noted districts, which built capacity among staff, were intentional in providing principals, data coaches, and data teams with high-quality data professional development. Teachers trained to understand assessment data, particularly the format of test question and how assessments were evaluated, witnessed improved student scores (Love et al., 2010). PLCs also needed an administration which supported differentiated professional development integrated into a teacher's day (DuFour et al., 2008). Valuable professional development needed to demonstrate a change or evidence of improvement in teacher practice. Teachers in a PLC were able to identify teacher needs, relative to professional development needs and implementation of training (DuFour et al., 2008).

Data Team Process

A systemic approach to team interactions and analyzing data assisted teams to increase time spent in collaboration. Teams in the data field needed required a process in place to engage in the work of increasing student learning (Lipton & Wellman, 2012). Researchers concluded high-functioning data teams should first establish the foundational norms and behaviors needed to work in a collaborative teaching setting and continually revisit those guidelines (Erkens, 2016; Love et al., 2010). Initial meetings focused on establishing norms to guide the work of the data team, as a critical first step for teams to allow work in conversations about data (DuFour et al., 2008; Kamm, 2011; Lipton & Wellman, 2012). Critical initial protocols included the shared belief in student efficacy and agreement on team roles, process, and expected action steps (Ainsworth & Viegut, 2015; Love et al., 2010). After teams established norms on how members communicated, teams selected which topics warranted discussion. Erkens (2016) alerted

school leaders against teams with established norms, which reflected cursory professional courtesies, such as timeliness and phone usage, instead of ensuring a culture of trust among members. High-performing collaborative teacher groups allowed for professional discourse and functional conflict in team setting. The depth and willingness to engage in possible conflict during deliberation and sustained focus of data teams influenced the members' level of success in weighing substantive information (Lipton & Wellman, 2012).

Sorting through the maze of information provided to data teams created structures of "concepts, theories, and interpretive frames of reference" (USDOE, 2009, p. 11). Multiple researchers created data cycle visuals to demonstrate the workflow and framework for data teams (Besser, 2010; USDOE, 2009). These visuals assisted teams in understanding the recursive process and nature of data use and influence on instruction (Besser, 2010; USDOE, 2009). Hattie (2012) stated data teams needed structured, unambiguous steps to disaggregate data, firm structured conversation, and strategies to measure student learning. Data team members needed the following skills: non-judgmental listening to fully understand what was being stated, intentional wait time which allowed for more complex thinking, paraphrased statements to build relationships and improve cognition, and productive inquiry (Lipton &Wellman, 2012)

Data collection. After establishment of norms for ideal interaction, teams engaged in the collection of multiple data sources about student performance from available assessment data, to make informed instructional choices on trends in student learning (Brookhart, 2015; USDOE, 2009). The most complete view of a student's learning needs included data from yearly national or state exams, interim district

assessments, and performance at the classroom level, both formative and summative in nature (Brookhart, 2015; NAESP, 2011).

Sources, such as statewide assessments or district, building, or classroom testing, were appropriate and longitudinal in nature and yielded long-term data around tightly framed instructor inquires of what students had or had not acquired in the length of the course (USDOE, 2009). Brookhart (2015) indicated data, such as assessment results, data team logic models, and data team meeting minutes, should be recorded and available for use by teams. Researchers cautioned against overreliance on mature data, which altered instructional decisions and proved too outdated to warrant informed action (USDOE, 2009). For example, data from previous school years proved unreliable in some studies, to provide actionable information for classroom teachers (Lipton & Wellman 2012).

Educators immersed in use of data needed direction as to which data provided the most information for instructional action. The most difficult work data teams undertook was not collection or analysis of data, but rather the actions educators applied in instruction to adjust student learning (Nielson & Pitchford, 2010). Data teams attempted to implement revised teaching practices and other interventions rooted in assessment data. Data gathered from assessments prior to instruction proved to be a proactive intervention, which led to greater student gains in future learning (Gregory et al., 2016). Gregory, Kaufeldt, and Mattos (2016) illustrated multiple areas of student data educators utilized: student biographical profile, pre-learning skill-based screening, and diagnostic pre-assessment, as well as formative and summative assessments.

When data collection took place, dissemination choices and patterns emerged within schools. Shared use of some or all collected information with internal and external entities was key to any school-led reform rooted in data (Malone, Mark, Miller, Kekahio, & Narayan, 2014). Data teams worked to ascertain common patterns and trends in student understanding or possible misunderstandings during academic performance (Wilhelm, 2011). State and district-level assessments associated with data systems allowed for easier tracking than classroom-level assessment, but all instructors benefitted from an ability to disaggregate information by assignment or student (USDOE, 2009).

Data analysis. Following the collection of data, teams created a hypothesis to explain the student performance and interpreted the data results. Marzano (2013) stated high reliability schools ensured "data are analyzed, interpreted, and used to regularly monitor progress toward school achievement goals" (p. 42). Data Quality Campaign (2014) posited, states should "promote, support, and incentivize districts and schools to use time and resources in new ways that foster data use" (p. 2). Initial data analyses with large-scale (national, state, school district) summative assessments were useful for only policy decisions and not instructional choices (Brookhart, 2015). These broader assessments tended to provide information, but not at the most operative scope, since this type of assessment lacked clear individual curricular targets and made instructional adjustments difficult (DuFour et al. 2008). Data from CCSS assessments, such as the Smarter Balanced test or PARCC, produced data to support indirect, less localized instructional questions and research (Brookhart, 2015). MODESE (2014) introduction of SLOs received support by research, which suggested teachers who met the SLO goals typically demonstrated higher growth on state assessments. Further, data from large-

scale assessments demonstrated misleading information when analyzed incorrectly or as standards shifted, such as through correction to cut scores; adjustments or modified achievement-level descriptors led educators to make false conclusions (Brookhart, 2015).

Large-scale assessment data were useful to instructors when teachers aggregated groups of students, such as calculating percentage of students who scored in a category of proficient, and groups of students in the same or different cohort (Brookhart, 2015). Conley (2015) noted the myriad of large-scale assessments prior to the CCSS challenge were often testing the same concepts in non-novel formats and overly focused on non-integrated, discreet content and facts. CCSS influence on assessment focused more on skill with reasoning and the application of content, not content as the final goal (Darling – Hammond & Falk, 2013).

SLOs emerged as a collective attempt to merge data with teacher input and were described by educators as a quantifiable measure of each student's academic growth over time, often a school year, and often used as part of a teacher's evaluation (MODESE, 2014). SLOs included a reflective analysis of historical data and a pre-assessment of each student, setting a goal for learning by the teacher for each student, and then a summative assessment to evaluate the learning over the semester or school year (MODESE, 2014; RIDE, 2013a). The SLO process was rooted in data analysis of historical trend data to target where students struggled in courses, to address historical underperformance (MODESE, 2014).

Data teams facilitated an understanding of what the data meant and how to create goals based on the data. Data teams also focused analysis of teaching and learning around the evidence data provided (Besser, 2010). Psencik and Baldwin (2012) noted the

discussion on steps teachers used to alter instruction included data analysis of student results, trends in assessments from multiple areas, and further reflection on instructional practice. Collaborative teacher teams often selected SMART goals (Ainsworth & Viegut, 2015; DuFour, 2008; Lipton & Wellman, 2012). The USDOE (2009) recommended data teams set district, school, or classroom SMART goals (Ainsworth & Viegut, 2015; Lipton & Wellman, 2012) or specific questions at the start of data analysis, to assist in navigating volumes of data.

Lipton and Wellman (2012) described the utilization of data by teachers as a "collaborative learning cycle" (p. 25), where information was analyzed, implemented, and the process reinitiated. The USDOE (2009) recommended a recursive approach to data use: After instructional intervention, teachers reengage in the gathering of classroom-level data on the success of the intervention to support or initiate reevaluation, based on collected evidence. Meeting structure permitted the cyclical use of data for teachers. Ainsworth and Viegut (2015) proposed the use of short data meetings after a pre-assessment or in the middle of a unit to adjust teaching practices, based on the data yielded from pre-assessment.

Data groups needed comprehensive and integrated data throughout the institution and its constituencies. Vendors established communication programs, which allowed administrators to display and disseminate timely and relevant information to staff and external stakeholders with greater ease, based on educator needs (Lipton & Wellman, 2012). Technology allowed schools to illuminate and protect the data retrieval process. Ideal data programs addressed articulation with archival systems, balance of access and security concerns, and cost (USDOE, 2009). The USDOE (2009) stated schools which

invested in software allowed for ease of access and management and encouraged staff to share and understand data for more data-grounded decisions and instructional modification.

The importance of data received amplification when displayed and organized in a manner which allowed teams to see data from a different viewpoint and with greater lucidity. Often displayed in a 'dashboard' view, featured information was easily accessible and viewable (Malone et al., 2014). Well-designed data displays allowed greater communication and attention to the information and allowed data team members to safely shift away from individual concerns over personal vulnerability (Lipton & Wellman, 2012). The proper visual representation of data allowed for a quick assertion of student learning and notification of perspective gaps between group members (Doubek. 2010). Clarity proved critical in data systems in support of data teams. Proven data practices included: omission of irrelevant information, consideration of a hierarchy of importance of information, and display of multiple perspectives and levels of data (Lipton &Wellman, 2012). Displays were incorrectly utilized when system set-ups and software were used erroneously. Lipton and Wellman (2012) noted data teams erred when unclear data displays lacked data relationships, were based on poorly selected data value ranges, and attempted to incorporate an overwhelming amount of information in one display.

Clear and coherent use of information was critical to student success, and thus to school success, most especially, data displayed from common assessments (Malone et al., 2014). Data tracked from common assessments possessed the most credibility of student progress. Erkens (2016) noted common assessments provided a level of data validity and

more comparative data than comparable classroom assessments. Erkens (2016) further advocated aggregation of data from common assessments along the lines of school, classroom, teacher, student, or learning target, to uncover trends and outliers.

Data team meeting. Meeting conventions and regulated steps to assist teams in data work proved necessary by teams to format the group work. Data teams required firm structures, such as schedules, protocols, and process cycles of using data (Erkens, 2016; Nielson & Pitchford, 2010). Data teams prepared by setting pre-meeting agendas, armed with a clear topic and recent data, which led to an action plan (USDOE, 2009) and benefited from standards of physical settings and deliberate reflective practices. Team protocols kept teams concentrated on evidence of instruction in the classroom and subsequent student learning (Brookhart, 2015). Procedural disciplined teams with reliable formats, in stable school and team settings, were better able to improve student learning and to experiment with instructional practice (Ainsworth & Viegut, 2015). Data teams necessitated measured practices in arrangements, processes, and speed of deliberation to more fully weigh evidence of student learning. The data analysis meeting process for teams included purposeful seating arrangements to provide equal-access to information, clear data-display through charts or graphs, mandated wait-time to ingest the pertinent data, and agreed upon protocols for dialogues (Ainsworth & Viegut, 2015; Brookhart, 2015; Lipton & Wellman, 2012). Ainsworth and Viegut (2015), proposed data teams needed measured protocols, which fostered a slower process of data evaluation and guarded against moving from data to a proposed solution too quickly. Leadership in data teams suggested the data team facilitation leader adhere to practices of leadership, calculated toward the group's success. Team leadership included the

assignment of roles, such as school-based data facilitator, data team leader, and a recorder (Brookhart, 2015; USDOE, 2009).

Additional sources of data-assisted teams to navigate the process of analysis. Brookhart (2015) noted teams needed multiple data sources to inquire fully and reason deeply. Lipton and Wellman (2012) stated data teams utilized triangulation and the process of looking at information from multiple views or sources, to best understand the data. Triangulation increased validity and credibility of inferences drawn by teachers from the data and allowed for greater reliability of additional sources (USDOE, 2009). Further depersonalization of student and teacher data was a data team protocol (USDOE, 2009). Brookhart (2015) reported use of a two-part logic model for problem identification and planning of potential answers to problems. The protocol included problem identification as evidenced by data, reasons the problem existed, proposed solutions to the problem, and needed steps by educators or school system (Brookhart, 2015).

The particular organization of information mattered in how data teams analyzed material. Disaggregated of data into subsets permitted the discernment of undiscovered trends, pockets of success or struggle, or equity concerns in a cohort (Lipton & Wellman, 2012). Data use in individual or sub-groups strands allowed schools to purposefully measure and address lesser-detected constitutes. After explicit commitments to issues of equity were articulated, data analysis by race, income, or assignment of Individualized Education Plans allowed educators to address issues of inequity (Datnow & Park, 2015). The literature from Datnow and Park (2015) also engaged in equity discussions around honors and Advanced Placement course enrollment of students, specifically in the area of

socioeconomics. Disaggregation of data allowed educators greater awareness of individual components or strands in an assessment and a particular cohort, such as gender, race, socioeconomic class or other subgroups (Lipton & Wellman, 2012). Data use required constant refreshing to ensure application rooted in equitable practices. Datnow and Park (2015) cautioned educators' use of outdated data to maintain entrenched long-term ability-based grouping, since this method increased the gap between White students and minority students. Instead, research promoted frequent seeking of then-current assessments and data to rationalize grouping (Datnow & Park, 2015).

Instruction and student achievement proved valued exercises and use of data team time, rather than clerical and management issues. Lipton and Wellman (2012) found successful data teams avoided anecdotal-based reasoning for more data-sourced discussion. Teacher group time devoted to assessment data and classroom pedagogy required at least "85 percent of collaborative time" (Daniel, 2008, p. 13). Teams were often derailed by "tangential issues, such as debates over good versus bad test items" (Wilhelm, 2011, p. 28). Additionally, teams ignored assessment results and implications. Brookhart (2015) noted data teams' diluted efforts when teams became entrenched in issues outside of the scope of the data group's control.

Collaborative teacher groups initiated work with discourse and functional theories on student results from assessment data. Data teams took an inquiry approach, utilized data to create a hypothesis around student learning, and then investigated a hypothesis (USDOE, 2009). The data-driven hypothesis led to teachers' adjusted practice, and researchers noted test data inherently yielded results which allowed for interpretation,

corrective action, and improvements in classroom practice, or the common assessment necessitated revision (DuFour, 2004; White & McIntosh, 2010). Jacobson (2010) concluded scrutinizing the results of common formative data was the most important, productive practices PLC teams-collaboratively engaged. The data teams yielded greater student results and led to discussions centered on an organized method to address student learning through the lens of data assessment results. Data-driven discussions based on common formative assessments were used by data teams to understand the then-current state of student learning and centered on evidence of student learning (Love et al., 2010).

At Adlai Stevenson High School in Lincolnshire, Illinois, school administrators in the high-performing school asked teachers to craft course-essential outcomes; thereby, de-cluttering content for each class to allow for a larger data yield. The essential curriculum provided clearly attached course outcomes and subsequent instructional corrections, based on data (DuFour, 2002). Teachers' common assessments in relation to shared course benchmarks provided direction to evaluate the results in a collaborative setting. Researchers noted the principal's role evolved from conventional instructional leader to providing resources, access to data, praising success, and confronting inactivity in PLC settings with staff. The focus of data shifted from class average to the percentage of students who failed to meet the agreed upon SMART goal (Schwanenberger & Ahearn, 2013). DuFour (2002) detailed the same data shift from class average to the percentage of students which did not make the agreed upon SMART goal. The school implemented immediate corrective interventions and supports for students who failed to demonstrate proficiency (DuFour, 2002).

Data goals. The literature addressed the following components of successful data teams: clarity of successful outcomes, timeframe, provisions for monitoring progress, and defined team roles and responsibilities (Lipton & Wellman, 2012). Clear outcomes were a priority, and researchers pointed out the need for clear targets and performance goals. Lipton and Wellman (2012) concluded, when data teams "collaboratively grapple with and agree on the problem definition, there is greater commitment to the subsequent action plan" (p. 48). Measurable goals allowed the educator to understand progress, often through a numeric representation. Love et al., (2010) suggested the desire to have attainable goals allowed success and further momentum of the team to build on the initial success. Results-oriented objectives "focus on outcome rather than inputs and results rather than intentions" (DuFour et al., 2008, p. 17). Time-bound targets specified the 'when' of the SMART goal and provided a time component when the team assessed data work. Then-current literature uniformly pointed to SMART goals as a key pillar of PLC work used to gauge the group's work and success (Erkens, 2016; Lipton & Wellman, 2012; Ventura, 2010).

Data teams explicitly instructed students to support learning from analyzing the students' own results, relative to learning objectives. Principals used school data for instructional gains by instructing students to scrutinize data results and to establish new goals (NAESP, 2011). Teachers witnessed significant gains when the team easily understood data from assessment results with clear learning goals and allowed students to provide feedback on understanding of the learning goals from the students' perspectives (Hattie, 2012; NAESP, 2011; USDOE, 2009). While the process of self-evaluation and

interpretation of data took instructional time, the practice proved to be a high-yield instructional strategy (DuFour et al. 2008; Marzano, 2006).

Measureable goals for student learning warranted data team consideration. Collaborative teams established SMART goals to measure change in student outcomes (DuFour, 2010; Lipton & Wellman, 2012: U.S Department of Education, 2009). Strategic and specific goals developed by individual teachers or course teams aligned to building or district goals or additional items addressed by the data team (Lipton & Wellman, 2012; USDOE, 2009). Data teams created goal-driven feedback, which allowed assessment of data, team-work, and proved measureable (Lipton & Wellman, 2012; U.S. Department of Education, 2009). DuFour et al. (2008) noted teams needed to set SMART goals to determine a level of proficiency for the pool of assessment takers. In detailing the need to pre-assess to gauge a baseline, MODESE stated, "Teachers need to know how well prepared their students are for the course content" (MODESE, 2014, p. 2). Well-designed data teams ensured each student was making progress toward learning goals (Besser, 2010). One concern with traditional SMART goals was in the process, which failed to insure fidelity to one of PLC's tenets; to ensure every student learned by making a goal based on a large population, in lieu of each individual student (Wilhelm, 2011). SMART goals should also address each individual student who missed the determined level of proficiency, as determined by data team goals (Wilhelm, 2011). Another adaptation of SMART goals related to groups of students, based on student pre-assessment, with differentiated strategies for groups to advance the students' collective proficiency (Doubek, 2010).

Best-practices for data procedures and tools for under-performing schools allowed for corrective action and an opportunity to reform the school trajectory. In the domain of PLCs, collaborative use of data from common assessments and clear and coherent use of student assessment information were critical to student success; and thus, to school success (DuFour, 2008). Erkens (2016) asserted teams that utilized common assessments provided focused supports for students in a manner which addressed the achievement gap. Data Quality Campaign (2014) noted a closing of the achievement gap when schools focused on data literacy of teachers. While data teams most often focused results on common formative assessments, summative assessment data provided feedback to teams (Doubek, 2010). Data revealed collective gaps in student performance when data was disaggregated by socioeconomic status, gender, and race or IEP status.

Assessment

Assessment became a divisive topic in schools in the decade preceding this writing. In 2013, 22% of America considered increased testing to benefit a school, while 36% thought it detrimental (Gallup, 2014, p. 11). Feedback to teacher and learners in response to student performance served to provide purpose to assessment in the effort to improve performance (Doubek, 2010; Hattie, 2012). Assessment allowed for measurement and improved understanding of students' relative position in relation to learning targets (McMillan, 2013). Research by DuFour et al. (2008) supported the practice of teachers to assess more frequently and to utilize multiple methods during each instructional session. The value of assessment feedback, employed by teachers and schools, as quantified by Hattie (2012) was summarized as feedback with an effect size of almost twice the amount of comparable instructional practices. Hattie (2012) further

promoted the value of feedback, stating feedback was the "among the most common features of successful teaching and learning" (p. 129) for student achievement. Gregory et al., (2016) stated, "Feedback is one of the essential tools for using assessment data to inform the instruction process" (p.163). The premise of assessment-supported educators to determine the influence of instruction on the students' learning found further support (Ainsworth & Viegut, 2015). Schneider, Egan and Julian (2013) noted feedback included only items aligned with learning targets and failed to include nonessential material.

Common assessments were the lynchpin of PLC teams and the PLC process (Erkens, 2016). The origins of PLC in DuFour's Stevenson High School initiated an inquiry framework to incorporate the assessment process. DuFour's fundamental question of "How will we know when each student knows it?" spoke to assessments, specifically common assessments, so students had a similar classroom experience which led to teacher collaboration on student results. Without common assessment as a practice, teacher collaboration discontinued functioning as a PLC (DuFour et al., 2008). Ainsworth and Viegut (2015) confirmed common assessments were the reflection of a process rooted in the collaborative endeavors of same-course teachers and reflected an attempt to address the power standards connected to course curriculum. DuFour et al. (2010) concluded common assessments were employed only when exact assessment standards, instruments, and evaluations were utilized. Well-crafted common assessments were a high-yield strategy intervention teacher teams implemented (DuFour et al., 2008; Stiggins & DuFour, 2009). Stiggins and DuFour (2009) described common assessments as either formative or summative, and allowed teachers an increased understanding in the success and struggles in curriculum and teaching practice across multiple classrooms.

Mixed and multiple formatted assessments proved the best architecture. A common approach to assessment in schools required a shift in viewing assessments from a single large-breadth approach to increased frequency of assessment over fewer learning targets, a balanced assessment practice constructed on variety and frequency, and a more collaborative culture (DuFour et al. 2008). Erkens (2016) described balanced assessment practices as multiple summative assessments with several formative assessments to inform teachers and students. Additionally, Erkens (2016) stated a concrete number of assessments were too rigid, but practice of more formative than summative assessments proved ideal to support student learning and classroom instruction (2016). Rhode Island Department of Education (RIDE, 2013b) and Guskey (2010) furthered the call for increased frequency of formative assessments with much tighter content, relative to summative assessment.

Assessment numeracy from researchers varied but followed a trend of multiplicity. Marzano (2006) explained, teachers witnessed increasing gains in learning as teachers increased the frequency of assessments, with the largest jumps at a rate of formally assessing twice per week. Research recommended, during a grading period, a minimum of four-to-five assessments for each topic or strand to measure student learning (Marzano, 2006, p. 14). Multiple assessments of a single concept or essential learning increased accurate teacher inferences of student learning. "Growth in student learning is not always discernable from a single assessment strategy" (p. 32), was echoed by Psencik and Baldwin (2012). Doubek (2010) advocated for teachers to have balance in assessment by devising multiple ways for students to demonstrate command of skills and content. Common assessment procedural errors included unsupported top-down

mandates, tests which served only to measure and not support learning, and assessment data with needed but unaltered teaching practices (Erkens, 2016).

Researchers identified common assessment construct parameters for teacher utilization in assessment production. Stiggins and DuFour (2009) stated, common assessment necessitated fidelity to learning targets and needed sufficient length to allow accurate conclusions about student learning and achievement. Teachers initiated assessment work and addressed curriculum and the strands of curriculum to build test and other assessments (Ainsworth & Viegut, 2016). Erkens (2016) posited instructional design, which followed summative assessments, resulted in a greater connection to course essentials.

Researchers cautioned schools on the concern of surplus content as an impediment to the assessment process. Marzano (2006) noted course content overload impeded standard-based assessment process and the need for schools to decrease content expectations to adequately assess. Researchers (Ainsworth & Viegut, 2015; Ventura, 2010) identified priority standards, which included critically important course or grade-level concepts and skills embedded within the center of all assessments deeply learned by students.

DuFour et al. (2008) reported the process of initiating assessment with the question around an outcome approach of what students should know and be able to do. The common assessment construction process included four protocols: connect desired learning targets to existing assessments, jigsaw production from group members, group-build the test by progressing through learning targets, and single-team-member build with all members involved in test material audit (Erkens, 2016).

Common assessments allowed teachers across each course to identify trends and patterns in student performance, and provided a reflective view in teaching. Psencik and Baldwin (2012) reported on public schools in Douglas County, Georgia, which initiated work to align class instruction with Georgia Performance Standards via common assessments. The process utilized in Georgia called for members of classroom teachers, instructional coaches, and district officials to write the common assessments over the summer and create a rubric to evaluate those assessments (as cited in Psencik & Baldwin, 2012). Additionally, at Stevenson High School, each course included two common assessments per semester and created standardized evaluative tools for each (DuFour, 2002). When teachers did not share the same course with other teachers and lacked collaborative opportunities, teachers connected over skills in lieu of content (Erkens, 2016). Erkens' (2016) singleton plan detailed a whole-school focus on skills option, vertical teaming across multiple grade levels, connections built by teachers throughout multiple buildings, or the plus-one model where an additional teacher became a member of an existing team with different course content.

Assessment Literacy

While classroom teachers administered innumerable assessments, proficiency in assessments and the purpose of assessments proved elusive. McMillan (2013) concluded classroom instructors were deficient in the evaluation of student learning because of shortcomings in assessment creation and interpretation of testing results. Problems, such as incompatible depth of knowledge of questions in relation to curriculum and instruction, as well as inadequate professional development on assessment, were evident (Schneider, Egan & Julian, 2013). Concerns over assessments produced issues around

intent and the manner in which teachers adjusted instruction based on the results. Black, Harrison, Hodgen, Marshall, and Serret (2010) found common assessments built by teacher teams demonstrated a disconnect between the intended purpose of an assessment and its implementation. Erkens (2016) warned of teacher-created assessment concerns with invalidated results, inaccuracy, and student disengagement. McMillan (2013) related assessment concerns focused on assessment architecture, instructional inferences, and increased student-efficacy.

Targeted, intentional professional development improved teacher performance on assessments. Love et al. (2010) noted districts built capacity among school staff, specifically by providing principals, data coaches, and data teams with high-quality professional development. Teachers observed improved scores when trained to understand the test question format and how assessments were evaluated (White & McIntosh, 2007). PLCs required the school administration to support a differentiated professional development model integrated into the school day (DuFour et al., 2008). Valued professional development must demonstrate a change in teacher practice with documentation of the teacher's initial level in the particular area and in the needs of assessment literacy. Teachers in a PLC were able to identify faculty professional needs and methods of implementation with correct training and support for assessments (DuFour et al., 2008). Black et al. (2010) suggested assessment literacy improvement process be initiated with an audit of teachers' skills on assessments and occur over multiple years. Research from Ainsworth and Viegut (2015) noted, when faculty gained greater assessment literacy, the gains improved multiple capacities in diversity of assessment, multiplicity of measurements, accuracy of assessment selection, and potential

adjustment of assessment. Purposeful assessment work demonstrated the most proven teacher professional development for assessment literacy: collaboratively creating, implementing, and acting on assessments for the classrooms (Erkins, 2016).

The goal of assessment literacy sought to permit teachers to align teacher expectations of student learning through learning targets into assessment practices to reflect and foster students' performance (DuFour et al., 2008; Stiggins & DuFour, 2009). Brookhart (2015) further stated goals of developing assessment literacy included understanding specific learning targets for measurement through assessment, discerning the operational information behind the numeric data assessments produced, and the ability to weigh information to make sound instructional choices. Randel and Clark (2013) determined teachers needed better understanding of concepts and principles in assessment, as well as the manner to use information taken from assessment instruments. An initial component of assessment practices for teachers were learning targets, one of the most influential routines teachers followed to support learning and boost student achievement (Erkens, 2016). Ainsworth and Viegut's (2015) illustrated initial steps for foundations of assessment literacy to pinpoint the purpose of assessment and selection of the best-assessment format to achieve the purpose.

Assessment creation formed the foundation for data analysis of student assessment. Assessment reliability, when tests delivered consistent results over multiple measures, and assessment validity, the extent to which an assessment measurement aligned with its purpose, were critical aspects of the assessment process (Ainsworth & Viegut, 2015; Conley, 2015). Ainsworth and Viegut (2015) posited teachers needed to know the varied objectives and types of assessment to choose the correct type to meet the

goal of the assessment. Erkens (2016) asserted assessment literacy included examining student assessment materials for error analysis and responses on distractor questions for informed instructional adjustments, based on student's incorrect answers. High-reliability assessment creation allowed educators to make instructional inferences and classroom-level decisions, based on the performance of students (Ainsworth & Viegut, 2015). Shepard (2013) related the professional collaboration around assessment insured more focused instruction, informed adjustment of instruction and assessment validity.

A key aspect of learner feedback was the promptness in delivery of the feedback to the learner. Multiple researchers demonstrated, the need for timely feedback to students allowed students to connect the assessment feedback to the work or assessment completed (Hattie, 2012; RIDE, 2013a; Ventura, 2010). Technology proved to be an important tool to provide feedback to learners in both the aspects of speed and quality of information. Numerous investigators stated, technology utilized during assessment allowed for quick and frequent feedback to students and more responsive instructional decisions and efficiency (Andrade, 2013; Conley, 2015). Pellegrino and Quellmalz (2010) stated, when used in assessment, technology allowed for greater ability to integrate information and instruction, problem solve, and promote deeper thinking.

Types of Assessment

Varied assessments provided needed information about learners to schools and teachers. Stiggins and DuFour (2009) noted three types of educational assessments: classroom, school-level, and institutional-level. Classroom assessments needed to be frequent and provide diverse balance of both formative, to drive instructional choices, and summative, to determine the accountability and depth of learning students

experienced (DuFour et al., 2008; McMillan, 2013; Stiggins & DuFour, 2009). DuFour et al. (2008) stated, enhanced assessments addressed fewer essential skills and content more frequently and demonstrated learning in multiple methods.

Researchers considered the construction of bookend assessments of learning experiences for students, in the form of pre and post-assessments practices, gained increased prominence. Ainsworth and Viegut (2015) noted two mandates regarding pre-assessment: alignment with learning targets of the unit and the pre-assessment should be created after a common post-assessment. Additionally, Nielson and Pitchford (2010) proposed teachers create pre-assessments with clarity of directions and expectations to eliminate negative bearing on results and consequential instructional choices. Erkens (2016) proposed pre-assessments should be brief, purposeful, and designed to cover an amount of material of an approaching unit of study, which allowed collaborative teacher teams to make instructional choices.

Besides assessment mechanics, teachers considered a student's literacy, vocabulary, and processing issues during pre-assessment (Nielson & Pitchford, 2010); factors which clouded the clarity of the students' demonstration of content knowledge or skill in pre-assessment. Ainsworth and Viegut (2015) and Dubek (2010) noted key benefits from common pre-assessment results allowed teachers to plan approaches to differentiated instruction at the start of a unit. Several researches noted some caveats to content-driven pre-assessment. Gregory et al., (2016) posited pre-assessment based on content not yet taught was low-yielding practice relative to student learning and served to discourage students (2016). Similarly, Ainsworth and Viegut (2015) noted, pre-assessments utilized reading of documents at a Lexile level matched to the reading in the

post-assessment. Pre-assessment in social sciences proved best managed by addressing skills and not content (Ainsworth & Viegut, 2015). Ungraded, but diagnostic pre-assessment assisted teachers in understanding student readiness, only when the assessment was used in a formative manner and teacher practice was modified based on assessment results (Gregory et al., 2016).

In addition to informing teachers about student preparedness, pre-assessment needed to leave the learner in the frame of mind to continue learning. Hockett and Doubet (2014) stated pre-assessment often served only as a data point to compare a subsequent post-assessment and created a deficit mindset and pejorative tag for students and teachers. A pre-assessment geared toward motivation to learning and assessing student readiness for learning targets proved adept at fostering future instruction (Hockett & Doubet, 2014). After the pre-assessment provided teacher and student the needed information and outlook, teachers were able to consider the learners' readiness and adapt instructions.

Formative assessment. Studies in the field of assessment, recent to this writing, inclined toward interest in formative assessment. Formative assessment involved the greatest volume of research and interest in the 21st century (Marzano, 2006; McMillan, 2013). Formative assessment was one of the most instructionally powerful strategies teachers could implement, ranked fourth out of over 150 instructional practices on student achievement (Hattie, 2012, p. 130). Formative assessment promoted student learning at a similar level as individual tutoring, particularly with students described as low-performers (DuFour et al., 2008).

Researchers supported, best practices of formative assessments occurred in a recursive manner when the learning occurred, while the summative became evident at the end of the learning cycle to demonstrate mastery of the subject (Lipton & Wellman, 2012; Stiggins & DuFour, 2009). Multiple experts lauded the measureable change in learning from formative assessments. Properly implemented formative assessment proved to foster some of the largest learning gains for students (Ainsworth & Viegut, 2015; Hattie, 2012). Hattie (2012) quantified formative assessment as permitting two years' worth of student achievement increases within a school year (2012). Formative assessment, formal or informal, followed by differentiated student instruction, based on demonstrated student capabilities, promoted student learning (Gregory et al., 2016). Properly implemented formative assessment extracted attained knowledge and made learning more visible to teacher and student (Clark, 2012; Hattie, 2012). Well-designed formative assessment provided evidence and feedback for learning, which led to response and modification in instruction to better approach a learning target (Ainsworth & Viegut, 2015; Lipton & Wellman, 2012; Ventura, 2010). Researchers identified key components of formative assessment: connection to learning goals, feedback, student self-assessment, and collaboration (DuFour et al. 2008; Gregory et al., 2016). Ainsworth and Viegut (2015) noted formative assessment allowed students to use feedback to track and regulate the students' own learning to close gaps in understanding. Feedback in formative assessment guided and provided instruction on improved performance on assignments and enhanced student learning at a higher rate than praise or punishment (Clark, 2012). This in-time and incremental feedback permitted meta-cognition and pondering of successful learning strategies (Ainsworth & Viegut, 2015).

Another aspect of assessment, experts supported, was the students' own understanding of the students' learning through reflective self-assessment. Marzano (2006) stated, the practice of students' tracking of improvement and self-assessment proved a powerful form of feedback. Self-assessment proved a powerful instructional tactic, which allowed students to compare the performance against a learning target and make adjustments (Brown & Harris, 2013). Self-ratings, rubric-based performance, and self-estimate of performance were three main areas of self-assessment practices identified by Brown and Harris (2013). Clear learning targets allowed students to self-assess in the same manner a teacher would assess, which led to greater self-efficacy as learners (Clark, 2012). Brown and Harris (2013) noted when self-assessment received support by exemplar work, modeled high-level work, and teacher feedback, academic performance increased. Ainsworth and Viegut (2015) and DuFour et al. (2008) noted student self-assessment practices of goal setting and setting goal-based strategies for learning encouraged self-directed learners.

Assessment research during the 20 years preceding the writing continued to support collaborative assessment used in a formative manner. The use of common formative assessments proved paramount in school educational accountability (DuFour et al., 2008). Brookhart (2015) stated, results from common formative assessments were the "most instructionally actionable of all assessment data about student learning" (p. 84). DuFour et al. (2010) stated, "Frequent common formative assessment is the most powerful tools in the PLC arsenal" (p. 14) and influenced student achievement at 0.90, when an effect size of 1.0 was equal to advancing the student's learning by approximately a full grade (Hattie, 2009, p. 266).

Although implementation presented challenges, experts broadly supported assessment used in a collaborative mode across classrooms, and not in just one classroom. Ainsworth and Viegut (2015) stated common formative assessments differed from classroom formative assessments; the creation of common formative assessments and implementation in collaborative setting in the same window of time by multiple instructors in order to connect on efficacy of students learning and instruction. Multiple researchers suggested the practice of course or grade-level team use of common assessments to gauge student learning and measurement of specific teaching strategies in the instructional cycle (Ainsworth &Viegut, 2015; Brookhart, 2015; DuFour et al., 2008; Lipton & Wellman, 2012; Stiggins & DuFour, 2009). The use of common formative assessment by teachers resulted in actionable information for teachers to intervene and improve instructional practice to improve learning (Brookhart, 2015; DuFour et al., 2010; Gregory et al., 2016; Hattie, 2012). Nielson and Pitchford (2010) asserted common assessments warranted a formative purpose and intent to adjust future instruction. Experts in the assessment realm provided structured questions and considerations after formative assessment. Nielson and Pitchford (2010) developed a series of questions to undertake after an initial pre-assessment or any formative assessment focused on trends, error patterns, and historical interventions the student may have experienced.

The issue of performance assessments also provided additional challenges and benefits teachers needed to consider. Assessments, which required performance by students to demonstrate understanding increased in use with the CCSS, aligned assessments from Smarter Balanced Assessment Consortium and the Partnership for Assessments of Readiness' for College and Careers (PARCC) (Darling-Hammond &

Falk, 2013). Objective assessments were more difficult to utilize, but had greater benefit to students. While multiple states found scoring was conducted reliably during implementation of performance-based common assessments with the use of common rubrics, scoring of open-ended assessments was more difficult to evaluate than selected response questions (Darling-Hammond & Falk, 2013). Teachers assigned more complex assignments, like writing and conceptual problem solving which fostered student achievement when assessments were performance-based or had open-ended questions (Darling-Hammond & Falk, 2013).

Purpose, population, and nature of testing drove researcher-suggested constructs of common formative assessment. Assessment length for a common formative assessment was dependent on the number of learning standards to be assessed, the amount of time devoted to each standard, and provided enough actionable information for educators to make instructional choices. (Ainsworth & Viegut, 2015). Assessment format was most dependent on the purpose of the educators. Constructed-response proved to provide the most evidence for demonstrating student cognition and informing next instructional steps, while selected-response provide greater reliability, efficiency and objectivity (Ainsworth & Viegut, 2015). DuFour, DuFour, Eaker, and Karhanek, (2010) proposed the use of released test items from the state or national level assessments. Selected response questions required a specific construct to be of the most service to teachers. Ainsworth and Viegut (2015) concluded selected-response questions substantiated as more instructionally friendly for feedback, when the question construction included incorrect answers connected with common student errors or misunderstandings, to allow teachers to connect missed questions to instructional

correctives. Rodriguez and Haladyna (2013) concluded selected-response test questions required suitable linguistic difficulty, should avoid options with negatively worded framework, and incorrect answers to provide instructionally tractable information. Incorrect answers, considered plausible distractors, provided a connection to students' misconceptions and potential instructional correctives (Ainsworth & Viegut, 2015; Erkens, 2016). Helpful for its allowances for connection to corrective steps, some research was less laudatory to selected-response test questions. Conley (2015) stated selected–response questions were insufficient to fully demonstrate student understanding and a poor indicator of skills students would need to be college-and-career ready in the 21st century. Schneider et al., (2013) warned of the negative suggestion effect when students chose incorrectly on multiple-choice questions and held on to the misconception.

Implementation of a comprehensive, connected common assessment program necessitated a balanced approach of inclusion and exclusion of assessment tenets. Nielson and Pitchford (2010) concluded teams must determine a direction on how teacher groups would make use of common formative assessments after team protocols were in place and prior to assessing students. Proper implementation of common assessment took three-to-five years and included precise test structure, accurate analysis of results, and differentiated instruction for where students were in the learning process (Ainsworth & Viegut, 2015, p. 242). Examination of the implementation of common assessments supported a school leadership-focused approach to fewer conflicting, disconnected initiatives, coupled with professional development for collaborative assessment development (Ainsworth & Viegut, 2015). Common assessment implementation often was an initial undertaking of schools in reform attempts. Campsen (2010) stated, school-

wide leaders in an elementary setting began the school reform process with implementing common assessments before seeing student standardized reading scores improve over 25%, in a period of 10 years (p. 127). Professional development for the common assessment process, as stated by Ainsworth and Viegut (2015), included insuring alignment with priority standards, devoted time for staff through providing substitutes, and stipends for after-school time to create assessments, and common assessments as part of all administrative meeting agendas.

Interim assessment. As large-scale assessments, such as PARCC and state-mandated ACT tests took root in the U.S. in the decade previous to this writing, researchers investigated interim assessments and the usefulness of the practice. The design of interim assessments called for implementation in between pre-assessments and summative assessments and provided guidance for instruction or alerted the teacher to concerns of student learning (Brookhart, 2015; Erkens, 2016; Riggan & Olah, 2011). Interim assessment employed aspects of formative assessments, to inform both students and teachers. Schools utilized interim assessments to gauge progress toward success on a large-scale assessment and identify gaps in content and students who were likely unprepared for subsequent assessment (Brookhart, 2015; Schneider et al., 2013). Erkens (2016) noted core subject areas of content, such as math and social studies were most often the subject of interim assessments. Riggan and Olah (2011) examined elementary schools and found that interim assessment practices led to re-assessment and more information about student misconceptions and content gaps. DuFour et al. (2008) posited teacher-practiced re-assessment provided students with additional chances to demonstrate the extent of learning and replace the grade using the most successful approach to the

essential content. Difficulties in how to best make use of interim assessment narrowed the helpfulness of use for schools. RIDE (2013b) stated the limited assessment literacy of teachers on the accuracy of test alignment to standards, the needed frequency of testing, and the resultant limited influence on instruction challenged the use of interim assessment. Further research found interim assessments were limited in providing information to classroom teachers regarding focused concerns, which could assist in informed instructional shifts (Riggan & Olah, 2011).

Summative assessment. Despite researchers' acclaim of formative assessment, summative testing proved the style most often employed in classrooms. Summative assessment demonstrated a lower effect size on student learning and possessed more restricted parameters than formative assessment (Hattie, 2012; Marzano, 2006). While formative included all assessments and provided information to teachers and students, summative assessment demonstrated a narrowly constructed definition and occurred at the end of the learning period (Marzano, 2006). Ainsworth and Viegut (2015) added common summative assessment served to report comparable data across multiple classrooms, unlike some common formative assessment. Summative assessments, qualitative in nature, such as portfolios and rubric-based work, were more likely to be used by teachers to drive professional instructional decisions and student skill development (Lipton & Wellman, 2012).

Subjective methods of summative assessment demonstrated value in line with some aspects of formative assessment. Performance or constructed-response assessments, commonly employed, made use of a normed scoring guide and a formative component to inform teachers about the success of instruction (Doubek, 2010; Nielson &

Pitchford, 2010). As with assessment construction, evaluation of assessments benefited from a collaborative approach. Multiple authors supported collaborative scoring to ensure an objective and calibrated evaluation of student performance on constructive-response questions on assessment (Ainsworth & Viegut, 2015; Stiggins & DuFour, 2009). Rubric or criteria-focused grading mandated normed scoring by teams through calibration and group grading (Erkens, 2016; Gregory et al., 2016; White & McIntosh, 2010). Ainsworth and Viegut (2015) recommended all team teachers score the same three tests to initiate calibration, through previously established scoring criteria, and then compare scores.

End of Course exam. National large-scale assessments inspired regional accountability measures at the state level through standardized assessments. The state of Missouri, through MODESE (2015b), implemented large-scale assessments to secondary students in 2008 in varied courses. MODESE (2015b) aligned tests with core-course content and skills expressed though state-level grade-level expectations and addressed the following purpose, "EOC testing information is used to diagnose individual student strengths and weaknesses in relation to the instruction of the MLS (Missouri Learning Standards), and to gauge the overall quality of education throughout Missouri" (MODESE, 2015b, p. 4).

At a cost to some aspects of instruction and student learning, the mean scores of standardized tests improved in schools with purposeful preparation. Common formative assessments crafted to mirror language, structure, and difficulty of standardized tests improved scores on the large-scale assessments (Ainsworth & Viegut, 2015). Researchers noted a change in the focus of classroom instruction, with negative results

for student learning as schools adjusted assessment format to selected-response test formats at the expense of constructed responses or performance assessments (McMillan, 2013; Schneider et al., 2013). Further, researchers discussed adverse consequences of large-scale assessments to excessively push classroom instruction in preparation for tests, to improve results at the expense of deeper learning experiences, with a narrowing curriculum (Conley, 2015; McMillan, 2013). Students had limited ability in classrooms focused on large-scale assessment preparation, to employ content application and an inability to transfer content students encountered (Conley, 2015). Further, researchers noted a substantial disadvantage in large-scale tests in which the turnaround interval disallowed informed and improved teacher instructional choices (Ainsworth & Viegut, 2015; DuFour et al., 2008).

Benefit of assessments. Assessment, implemented and utilized with collective fidelity to research, proved a significant tool for instruction. Teacher-developed common assessments promoted equitable student experiences by working to allow universal access to congruent essential learning targets, relative to skills and content (DuFour, et al., 2008). McMillan (2013) stated, "CA (classroom assessment) is the most powerful type of measurement in education that influences student learning" (p. 4). Ainsworth and Viegut (2015) noted the common assessment process built solid assessment instruments and also created a network for teachers to utilize for interdependent support and counsel. Common assessments allowed for PLC teams to jointly look at positives and negatives of student assessment results and implications for further learning (Ainsworth & Viegut, 2015).

The common assessment process promoted teacher growth in areas of assessment literacy and deeper content knowledge in course material. Common assessment construction also allowed for job-related, imbedded teacher professional development centered on essential student learning (Erkens, 2016). Common assessment utilization functioned as locally-driven action research on the success of teaching practices in individual schools, grades, and teams (DuFour et al., 2008). Further, DuFour et al. (2008) noted the common assessment implementation process amplified the professional capacity of teachers in subject area content and a greater focus on student learning outcomes.

As a locally-authored assessment, common assessments were malleable to the instructor's purpose. Common formative assessments allowed for multiple formats: closed-ended elected responses and more open constructed responses, with varied length in answers, which provided rich data for instructional decisions (Ainsworth & Viegut, 2015). Previous studies pointed to the ability of common formative assessments to provide teams of teachers with understanding of the students' grasp of the unit's learning targets and subsequent adjustments (Ainsworth & Viegut, 2015; DuFour et al., 2008). Erkens (2016) stated increased utilization of formative assessment led to lesser use of instructional corrections post-assessment. Common assessments differed from summative large-scale assessments similar to the Missouri EOC exams, as common assessments provided well-timed and reliable information of student learning in the hands of teachers (Ainsworth & Viegut, 2015).

Issues with common assessment. On the contrary, some experts believed the use of common assessment had possibility for poor implementation and employment.

Brookhart (2015) concluded industrially-produced common assessments lacked alignment to classroom instruction and were not instructionally actionable. Common assessments in the form of large-scale assessments provided little in terms of instructional information and faced critique by researchers, as possessing limited utility (Ainsworth & Viegut, 2015).

Instructional decisions that preceded and followed assessments were an area often critiqued by experts. Brookhart (2015) concluded utilizing large-scale (national, state, school district) summative assessments was not valuable for instructional choices. Schools too often made changes to curriculum and instruction based on outdated large-scale assessment results, with the incorrect student population (Ainsworth & Viegut, 2015). Andrade (2013) noted common assessment data were not utilized in a precise enough fashion for instructional decisions to support further learning.

Researchers saw evidence of missteps with assessment in multiple areas. Gewertz (2015) warned of the option of using multiple interims to replace a single summative test, allowed by the passage of ESSA legislation in late 2015. The author argued interims often were misaligned with then-current curriculum and lacked proper sequence (Gewertz, 2015).

Researchers argued for discontinuation of assessments, which did not provide instructional decision worthy information. Several studies noted assessments produced data too indiscriminate and nullified any formative components for educators to implement, and teachers required more classroom formative assessments (Brookhart, 2015). Teams made poor instructional inferences when tests contained assessment errors, such as unclear directions or expectations misaligned to instruction (Ainsworth &Viegut,

2015; Nielson & Pitchford, 2010). One concern in implementation of common assessments was student error, which disallowed actionable feedback; and assessments, which required revision to allow students to demonstrate learning and provide actionable information to teachers (Psencik & Baldwin, 2012). Classroom instructors needed to augment common assessments with informal and formal individual classroom assessment of student learning. Teachers under-responded to student progress, as demonstrated by assessment with exclusive reliance on common assessment data; collaborative assessments proved too infrequent for consistent monitoring of student learning (DuFour et al., 2008). Rose (2010) noted trends in 21st Century skills measured by assessment of cooperation, multiple media modalities, and creativity. Additionally, Rose (2010) identified concerns for the ability and practices of traditional common assessments to identify specific skills, such as those required by future-forward schools.

In addition to clarification of problems, researchers noted areas of restoration to improve the process of common assessment. Erkens (2016) stated, collaborative teams needed to identify errors and connect specific learners to matched instructional corrections. Most importantly for student learning, educators regarded assessment data in a way which informed and altered instructional practices utilized by teachers positively influenced by student learning (Ainsworth & Viegut, 2015; Schwanenberger & Ahearn, 2013). Content-based assessment proved less communicative and linked to enduring corrections that benefited student long-term learning. Ball and Christ (2012) acknowledged skill-based assessment best identified then-current student deficits and connected corrective instructional steps.

Instructional Decision-Making

Brookhart (2015) stated, "Modifying curriculum and instruction and finding out how students are learning is a central process in a school" (p. 105). Assessments required teachers to have an instructional response and interventions to the student performance to promote change in understanding and thinking of the student (Hattie, 2012). Murphy and Holmes (2014) noted assessment data adjusted science course instructional planning for long-term student learning, while researchers highlighted a possible shift in teaching practices and change in content sequence or depth. Multiple researchers stated post-assessment data yield allowed collaborative analysis of instructors and produced multiple strategies to address skill deficits and enrichment of students (Ainsworth & Viegut, 2015; Gregory et al., 2016).

Researchers noted common assessments as a tool of selection for students who required needed supports. DuFour et al. (2008) discussed common assessment work as a tool to promote teachers to systemically address students in need of more time and support for learning, by addressing the question "What happens when some students do not learn?" (p. 216). Within a Response to Intervention (RtI) model, common assessment served as a universal screening to determine future interventions for students who fell below an established cut score (Ball & Christ, 2012; Guskey, 2010). In a post-assessment environment, student learning proved unpredictable, and the provision of more time and corrective supports to insure student learning was needed (Wiliam, 2013).

Participation in the common assessment process allowed teachers to identify what instruction worked best in the collaborative setting. PLCs improved student-learning metrics when teachers adjusted teaching practices in a collaborative setting (Ainsworth &

Viegut, 2015). DuFour et al. (2008) posited the PLC model of collaboration provided persuasive arguments to change teacher practice to a more demonstrated, instructionally-successful practice of a colleague. Researchers concluded assessment served an important role in the application of interventions for teachers who employed multiple instructional models (Ainsworth & Viegut, 2015; Gregory et al., 2016).

Assessment feedback led to an altered teaching strategy when students demonstrated, through assessment results, the need for instructional change and correctives (Wiliam, 2013). Hattie (2015) stated post-assessment feedback proved critical for instructional decision making for teachers:

> Far and away the most effective teaching intervention we found was …the quality of the feedback teachers receive about their impact. Expert teachers assess the visible impact they have on their students, constantly monitor learning and seek feedback about their teaching, and then evaluate and adjust their teaching methods based on these findings. (para. 8)

Use of common assessments by teachers attested to the instructive value when results provided evaluation in relation to teacher-shared benchmarks. The benchmarks allowed teachers to provide ideas and successful learning activities after demonstrated collaborative success and setbacks (DuFour, 2002). Ainsworth and Viegut (2015) demonstrated, after assessment, teachers selected research-based strategies, directly aligned with instructional inferences, as dictated by student assessment performance. Post-assessment instructional interventions received support by the research of Ainsworth and Viegut (2015) and included: small group or individual correctives based on

demonstrated need, teacher-think aloud on analysis of questions, and scaffolded content with a graphic organizer.

Data teams with demonstrated improvement of student learning understood the process of monitoring and evaluating embedded, timely, and systemic interventions and acceleration (Besser, 2010). Nielsen and Pitchford (2010) pointed to a shorter instructional cycle to allow for quicker assessment data and subsequent instructional changes and supports. Teacher's conventional unit planning required adjustment to allow for improved assessment practice. Research pointed to a needed 10% to 20% extension of a learning unit's time to accommodate instructional corrections and additional assessment practices (Guskey, 2010). Ainsworth and Viegut (2015) proposed a bridge period, in between units of study or assessments, to allow teachers and students required time to allow for interventions, enrichment, and re-assessment, as needed and demonstrated by assessments. These bridge times varied from two-to-five class periods and permitted time to address gaps in content or skill acquisition for students (Ainsworth & Viegut, 2015). Gregory et al. (2016) illustrated teams' post-assessment took steps to discover student error patterns and then planned enhancement and interventions by regrouping students for re-teaching, or readjustment of task.

A pattern of formative assessment followed by feedback and corrective classroom activities, followed by a second formative assessment was recommended by Guskey (2010) to insure correctives had the intended outcome for learners. Erkens (2016) stated collaborative teaching teams utilized a one-to-five day window after a common assessment to review content or provide enrichment prior to similar reassessment. Ainsworth and Viegut (2015) further noted the data from subsequent formative

assessment or summative assessment proved the learning occurred after instructional adaptations.

Instructional correctives identified by assessment warranted particular structures, as clarified by researchers. Attempts to reteach material needed to come to learners in a novel approach and not simply a continued visitation on previously attempted strategies (Ainsworth & Viegut, 2015). Researchers supported multiple re-teaching strategies, such as peer-tutoring, small group based on particular error from assessment, feedback, novel direct instruction, and think-alouds (Erkens, 2016; Guskey, 2010). Erkens (2016) noted enrichment permitted students with demonstrated mastery of learning goals with an opportunity to engage with the material in a more complex manner. Schwanenberger and Ahearn (2013) reported an advantage of academic institutions when schools leveraged then-current brain information, research on best practices in instruction, and practice of teaching in a more collaborative setting. In mastery learning settings, Guskey (2010) endorsed teachers' adoption of instructional practices of peer tutoring and cooperative learning with varying student learning styles to address concerns revealed by assessment results.

Student Learning Objective

A teacher's influence on the instruction of students was best measured by evidence of changes in student learning (Hattie, 2012; RIDE, 2013a). Makkonen, Tejwani, and Rodriguez (2015) noted multiple best practices of instruction influenced the creation of SLOs: distinct learning targets, and formative assessment process with subsequent instructional decisions based on assessment results. In an era of raised concerns for teachers' worthiness and school accountability, SLOs emerged as an answer

to promote measureable student outcomes in regions of the U.S. Based on national, state, or local learning standards, SLOs required a rigorous assessment with two data points, comparable across classroom settings, which demonstrated advancement toward learning goals (Goe & Holdheide, 2011; RIDE, 2013a). The intent of SLOs were to create a measure of teacher-engineered learning gains by utilizing two measures of student growth, a pre-assessment and summative post-assessment, in the interim period of a semester or school year (MODESE, 2014).

The genesis of SLO utilization in Denver, prior to 2000, led to a connection to merit pay and higher student achievement **(**Lachlan-Haché, 2015**).** Brookhart (2015) noted the utilization of SLOs as a summative assessment for faculty members through teacher evaluation and formative information for students' learning. SLOs became a tool to gauge and evaluate teacher influence by student growth measured in over 30 states, as a response to the federal educational program, Race to the Top (Lacireno-Paquet, Morgan, & Mello, 2014, p. 1).

Several states only implemented SLOs in subject areas not already assessed by state-wide standardized tests, because of the cost or difficulty of measurement with traditional standardized tests (Goe & Holdheide, 2011; Lacireno-Paquet et al., 2014). MODESE (2014) in instituted SLOs and defined success on a per-student basis. Individuals at MODESE (2014) permitted an individualized approach to student learning goals in all courses, as delineated by the teacher. The personalized process allowed greater flexibility than in some states, which had more mandates in both assessments and targets. Rhode Island reported summative assessments used for SLOs varied in

comparison with other states, which allowed increased choice in assessment format: student projects, research papers, or unit or final test (RIDE, 2013a).

In another essential competency for teacher assessment literacy, SLOs required a pre-assessment or equivalent. Some states did not require a pre-assessment in all areas, if teachers were able to acquire baseline information in another manner, such as through use of other assessments (RIDE, 2013a). Pre-assessments could help teachers identify student deficiencies among the most important content standards. MODESE (2014) suggested teachers utilize a pre-assessment to establish an initial data point and to identify gaps in students understanding, relative to essential skill and content in the course.

Examination determined SLOs had the intended push to improve teachers and classroom instruction throughout the U.S. Many states made use of SLOs as a manner to identify efficacious teachers, as research supported the connection between success in SLO measurement and achievement on state-level assessments and other measures of achievement (MODESE, 2014; McCullough et al., 2015). Makkonen et al. (2015) observed the connection between a high performing teacher in both student surveys and administrator evaluation, resulting in high scores on SLOs.

The National Council on Teacher Quality stated over 43 states used evaluation of student achievement to evaluate teachers (2015, p. iv). States who utilized SLOs for teacher evaluation found the continuum of teacher evaluation expanded; and thus, granted greater information of professional standing of classroom teachers (McCullough et al., 2015). SLOs extended beyond the initial intent of evaluation to initiate discussion around teacher placement and compensation. Several states used SLOs to factor in evaluation,

merit pay, and retention decisions (Lacireno-Paquet et al., 2014; McCullough, et al., 2015). Twenty-three states used student achievement to inform decisions on tenure for educators, in the effort to make those decisions more objective (NCTQ, 2015, pg. V). Tennessee's revised teacher evaluation programs included a formula of 35% measured student growth and 15% student assessment data (DuFour & Mattos, 2013, para. 11), as components of a teacher's summative performance.

SLOs support in research connected to clarity of purpose in instruction and assessment. Schools with SLOs created a school-wide data mission and encouraged teachers to narrow focus on assessment and instruction (NAESP, 2011). Students experienced gains when instruction and assessment in classrooms focused on a required skill and content was clearly articulated (NAESP, 2011). SLOs created ancillary benefits, such as an increased focus on data-driven teaching choices, focused teacher professional growth, increased data and assessment literacy, and collaboration among educators (McCullough, et al., 2015). Lachlan-Haché (2015) observed that teachers engaged in promotion of an instructional focus on analysis of student data, student achievement long term, and a positive change in teaching strategies increased student learning. MODESE (2014) recommended teachers use the SLO process to track student progress with formative data between pre-assessment and summative assessment and adjust instruction based on those interim results. Lachlan-Haché (2015) observed the SLO process and found, after five years teachers perceived SLOs to have improved the teachers' evidence of student learning and to be worth the investment of time and effort.

The SLO development and implementation benefited from the collaborative process required by teachers (MODESE, 2014; RIDE, 2013a). While 23 states allowed

SLO development by individual teachers instead of teams, most states promoted collaboration, while three states required development of SLOs by team or grade level (Lacireno-Paquet et al., 2014, p. 3). Teachers approved of the SLOs process, as classroom educators gained additional control on objectives and assessment creation, as opposed to other school reform efforts, which were more centralized (Goe & Holdheide, 2011). SLOs allowed classroom teachers to calibrate and adjust goals for subgroups in general education settings, such as students with Individualized Educational Plans and English Language Learners (MODESE, 2014; RIDE, 2013a).

States varied in approach to the SLO process, often in the area of administration. Three states required school-wide SLOs, which featured heavily centralized efforts and was dependent on the building principal for development and implementation (MODESE, 2014; Lacireno-Paquet et al., 2014). Multiple states assisted in administrator approval processes of SLOs by creating rubrics to more evenly assess the SLOs (MODESE, 2014; Lacireno-Paquet, et al., 2014). In recognition of SLO reliance on assessment validity and reliability, many researchers and governing entities supported state or industry created tests. Goe and Holdheide (2011) recommended schools utilize existing assessment to bypass concerns with teacher assessment literacy. Donaldson et al. (2014) noted the task of assessment creation and revision proved challenging, related to time, cost, and needed level of leadership and teacher ability in assessment.

States generated standards and stipulations on a SLOs framework to create varying structures (Lacireno-Paquet et al., 2014). Additionally, states required alignment with national or state standards, and demanded an assessment display of reliability and validity (Lacireno-Paquet et al., 2014). Missouri's approach demonstrated more teacher

reliance and choice. MODESE (2014, 2015c) recommended a common assessment and created a continuum with prioritized large-scale testing formats, rather than more locally created tests in a single teacher setting. Twenty-one state departments of education required an evaluator to approve SLOs, with Missouri's initial requirement of building or district leadership to provide guidelines for approval authorities (MODESE, 2014; Lacireno-Paquet et al., 2014, A19).

In spite of SLOs widespread reform application, findings on SLOs illustrated varied changes in teachers' practice. McCullough, et al., (2015) stated SLOs had the biggest professional change on inexperienced teachers and far outpacing the influence on veteran teachers in the same setting. Donaldson et al. (2014) also concluded non-tenured teachers perceived the investment in SLO work as woven into normative instructional planning and assessment practices. Further, administrators placed greater value in the accuracy of SLOs to measure teacher growth of student learning than teachers who were more likely to acknowledge external factors as the reason for student learning (McCullough et al., 2015).

Concerns with Student Learning Objective

Researchers noted multiple concerns with employment and exercise of SLOs (Lacireno-Paquet et al., 2014; McCullough et al., 2015). Critiques centered on teacher autonomy to set lower than needed targets and a teacher's inability to manage the assessment and data aspects. Teacher-created, assessed, and calibrated learning targets called into question the integrity of the process and a conflict of interest for teachers in practice to grade themselves (McCullough et al. 2015). Makkonen et al. (2015) noted teachers set less rigorous targets, based on assessments created to generate high scores

with low-level questions. Under-performing public schools in the Charlotte, North Carolina, area used SLOs to factor on merit pay for teachers and administrators, with mixed results after several years of work until the program eventually discontinued (Community Training and Assistance Center, 2013). SLO utilization required proper supervision to assure continued alignment with intended use.

Schools required both a culture of collaboration and utilization of assessment from teachers. School without a strong culture of data usage and teacher collaboration struggled with the implementation and utilization of the SLO process (McCullough et al., 2015). The American Institute for Research (2013) stated hurdles for SLOs centered on concerns for the quality and rigor of teacher-created assessments. Goe and Holdheide (2011) expressed that states and the respective education departments' harbored concern with reliance on classroom teacher assessment literacy to build assessments in subject areas with no existing standardized assessment. School governance agencies moved to a centrally controlled assessment quality to combat concerns over local creation of assessments. Lacireno-Paquet, Morgan, and Mello (2014) noted many states addressed teacher-created assessment limitations by mandating the list of testing options available to schools be prepared by an external entity. Fourteen states mandated utilization of large-scale assessment for SLOs (Lacireno-Paquet et al., 2014, p. A33). Initial implementation of SLOs and accompanying assessments provided weak evidence of validity in the assessment tools (Goe & Holdheide, 2011).

Researchers raised concerns over the price of the SLO process to schools. Donaldson et al. (2014) demonstrated discontent among teachers, specialists, and administrators in Connecticut during the piloting of SLOs, based on lack of professional

development and adjustments to a traditional teacher evaluation model. The needed step of SLOs to establish student growth targets after pre-assessment also proved problematic to teachers (American Institute for Research, 2013). Makkonen et al. (2015) and McCullough et al. (2015) noted the cost of time to collaborate for teachers and the effort to implement; and concerns about rigor of SLO assessment proved a challenge to student growth measures. Lachlan-Haché (2015) examined the SLO start-up process in Austin, Texas, in 2008 and found most teachers perceived the SLO process to be too costly in both time and effort. Teacher collaboration efforts proved arduous for both classroom teachers and administrators and took three to eight hours on average to create each SLO (McCullough et al., 2015, p. or para. # needed here)

Summary

There was a generous amount of research and subsequent literature on PLCs, methods of assessments, and data use for instructional decisions developed. This review weighed the following, to fully vet the aforementioned topics: framework of PLC model (DuFour et al., 2008), data team structures and leadership (Reeves, 2010), data team processes, data collection and analysis (Lipton & Wellman, 2012), concept of assessment (Ainsworth & Viegut, 2015), formative and summative assessment (Erkens, 2016), instructional decision making (Guskey, 2010), and Student Learning Objective (MODESE, 2014).

In the decades since the inception of the PLC model, aspects of collective teacher efforts evolved into the SLO model combining the collaboration, assessment, and data. PLC and assessment offered mature literature as a result of years of researched implementation, and the connection with SLOs made both more relevant at the time of

this writing. Missouri schools and Missouri teachers appeared in new SLO landscape with the need to be grounded in concepts of collaboration, assessment, and data use. This study added to previous research findings to further educate teachers and educational leaders. Chapter Three explains the methodology of the research, including the hypotheses and research questions, and describes the data gathering instruments and data analysis procedures. Chapter Four and Chapter Five display results of the study, with analysis and suggestions for further research.

Chapter Three: Methodology

This study investigated the use of common assessments within the construct of PLCs and gauged the assessment of student performance and aspects of teacher collaboration in the initial application of SLOs in Missouri. The researcher selected a mixed-method case study research design, with data collection within a secondary high school in the Midwest, which experienced a decade of PLC implementation. One aspect of the research included examination of student scores on the state-mandated EOC assessments and the perception of teachers who taught the following courses: Algebra I, Biology, English II, and Government. Another population utilized by this study was teachers of the aforementioned courses and the supervising administrators of those departments.

The collection of qualitative data for this mixed-methods study took place through interviews of school officials for richer, more descriptive information. Data underwent coding analysis for emergent themes. The study used quantitative data from teacher surveys, as well as SLO-based pre-assessments and standardized EOC test scores to discern a potential relationship. The connection between the assessment work undertaken in the PLC environment, as told by educators, and common assessment measurements of student growth from pre-assessment to EOC scores, was the intention of the analysis.

Purpose of Study

The purpose of this mixed-method case study on the continued implementation of common assessments developed within PLCs, was to examine the perceptions of teachers and administrators on data-driven decision making, common assessments, instructional design, and the process of continual improvement, and to establish a possible relationship

between EOC exams and student common formative assessment scores. The quantitative aspect of this study utilized the PPMCC to determine the extent of the potential relationship between formative and summative assessments used in EOC-tested courses. The information from this study provided the researched school district with insights into the implementation of PLCs, and specifically, the development and utilization of common assessments. The aforementioned understandings proved critical for teachers to possess with regard to the introduction of SLOs to Missouri and the move from pilot to full-implementation.

The researcher, a previous teacher and administrator, observed multiple schools that employed common assessments with varied levels of implementation and success, as defined by student-learning metrics. These experiences served as the genesis for this study. Common assessments were a key element of SLOs throughout schools within Missouri (MODESE, 2014). MODESE (2014) initiated a pilot use of SLOs throughout public schools, with plans to align data from SLOs to teacher evaluations in 2016-2017. The educator assessment in use, at the time of this writing, incorporated student data and compared the percentage of student growth relative to teacher-established growth targets in each course. Teachers and administrators needed to understand data, collaboration, assessment, and corrective instruction to navigate implementation of SLOs (MODESE, 2014).

Throughout then-current literature SLOs were noted as critical in the development of common assessments and academic success. The researcher experienced one school with a radically changed daily schedule to accommodate collaborative work, while another spent over 36 hours engaged in shared pedagogical labor (D. Demarest, personal

communication, May, 25, 2016). All schools benefitted from fidelity of application of common assessments. Common assessments delivered through PLCs and subsequent instructional choices (Lipton & Wellman, 2012) were among the most powerful tools utilized by educators. Common formative assessments proved influential with regular feedback, and allowed for teachers to adjust instruction and meet the diverse learning needs of all students (Ainsworth & Viegut, 2015). DuFour et al. (2008) investigated the combination of common assessments and increased teacher collaboration in a PLC setting, and observed increased student performance. The potential result of a collective focus on student learning, team-created assessments, and normed grading produced positive academic results (Garcia et al., 2015). Ainsworth and Viegut (2015) noted the power of alignment to learning standards with information from common formative assessments to alter instruction in schools. Common assessments were a prominent tool for student learning and overall school improvement.

Teacher survey information provided data on teachers' perceptions on the value of the PLC model, use of assessment in course-based learning communities, influence on instruction, and data use in the classroom. Administrative interviews provided information on supervisory assistant principals' insights and support for instructional leadership, assessment use and literacy, and data utilization. Teacher interviews supplied data in an open-ended format and provided depth of information on topics similar to the survey supplied. The qualitative responses from teacher interviews solicited teacher perception of PLC influence on instructional design, common formative assessment process, data use, and the SLO process.

Methodology

As the researcher served as the assistant principal and evaluator for the teacher participants in this study, EOC course instructors independently chose to participate in the study. All teachers of EOC courses created pre-assessments attached to a SLO to track student outcomes with two data points, the common pre-assessment and the summative EOC.

Teachers submitted survey results connected to common assessments electronically and anonymously, with no identifying information. Fraenkel et al. (2015) stated a survey could possibly allow significant information to be garnered for research. The researcher developed the survey from previous research on PLCs and common assessment (see Appendix A). Survey data collection took place though Google forms and aggregated on a spread sheet within the Google program for analysis.

The researcher interviewed administrators and utilized a digital recorder to assist in later transcription of school leaders' perceptions of the common assessment process and school improvement (see Appendix B). Administrator interviews provided the assistant principals' perceptions on the utilization of common assessment scores and the school improvement process. Interviews were demonstrated to be one of the most critical tools employed by qualitative researchers for data collection (Fraenkel et al., 2015). A minimum sample size of three, and a maximum sample size of four, administrators were sought for qualitative data, with a total of three participants interviewed by the researcher.

Teachers in courses of the selected EOCs participated in a purposive convenience sample for response to interviews and surveys, to gain insight into their perceptions of

common assessments, data-driven decision making, and instructional choices. The researcher obtained a list of all EOC teachers at the participating institution and invited all faculty on the EOC list to participate in the research study, via email. Teachers registered through a Google calendar, shared among the teachers and the neutral third-party interviewer. The researcher anticipated a minimum sample size of 15 and a maximum sample size of 25 teachers of EOC courses to participate in the study. Teachers submitted a consent form (Appendix D) to the third party interviewer. The neutral third party conducted teacher interviews on campus with participating teachers, transcribed interview data, and scrubbed all identifying information before analysis (see Appendix C). The researcher coded and later analyzed the qualitative data collected from the teacher surveys, teacher interviews, and administrative interviews. The hypotheses were addressed by the data analyses of pre-assessment data and EOC scores.

The researcher selected a purposive convenience sample to "obtain a sample . . . uniquely suited to the intent of the study" (Fraenkel, Wallen, & Hyun, 2015, p. 428). A sampling of EOC test results took place, derived from secondary data generated by students previously enrolled in the respective EOC assessments in the spring of 2016, specifically Algebra I, Biology, English II, and Government. The scores from pre-assessments and EOCs had all identifiers scrubbed to de-identify students. A tool created by the Social Psychology Network (2016) for researchers executed random sampling of the data. The researcher selected student secondary data from the EOC scores and used a random sample of 50 participants, recommended by Fraenkel, Wallen and Hyun (2015), as a minimum sample to generalize the quantitative results. After completion of EOC testing in the spring of 2016, the randomizer was applied to select fifty students from

each EOC area, along with a corresponding pre-assessment score. The PPMCC determined a potential relationship between the pre-assessment and EOC data sets. Lastly, the researcher used the researched quantitative and qualitative data to investigate the application of common assessments in the school. The hypotheses and research questions for the study are described in the next sections.

Null Hypotheses

Null H1: There is no relationship between student common formative assessment scores and End of Course exam scores in Government, with respect to the population of the study school district.

Null H2: There is no relationship between student common formative assessment scores and End of Course exam scores in Biology, with respect to the population of the study school district.

Null H3: There is no relationship between student common formative assessment scores and End of Course exam scores in English II, with respect to the population of the study school district.

Null H4: There is no relationship between student common formative assessment scores and End of Course (EOC) exam scores in Algebra, with respect to the population of the study school district.

Research Questions

RQ1: How do teachers perceive data-driven decision-making as it relates to the development of common assessments?

RQ2: How do teachers perceive data-driven decision making as it relates to instructional design and implementation?

RQ3: How do administrators perceive data-driven decision making as it relates to common assessments?

RQ4: How do administrators perceive data-driven decision-making as it relates to the process of continual school improvement?

The Research Site and Participants

The Assistant Superintendent of Curriculum and Instruction of the researched school approved this study, prior to IRB approval in summer of 2015. The research centered on a Midwestern public ninth through 12th grade high school in suburban St. Louis County, Missouri. The school served approximately 2021 students, with over 130 full-time faculty members in the 2015-2016 school year (MODESE, 2015a, p. 1). Nineteen percent of the researched schools' students received free or reduced lunch at the high school, with a student body represented by 52% male and 48% female (MODESE, 2015 b, p. 1). Formal teacher collaboration began in the researcher's school in 2005, across all subject areas, with teachers meeting weekly for 54 minutes on Wednesday afternoons and on district-scheduled professional days multiple times each year. Individual participants provided different perspectives, based on diverse proficiencies, as teachers had varied experiences in the school and the profession. A Lindenwood University doctoral graduate and public school teacher participated as the neutral third-party interviewer to conduct the teacher interviews and handle data. Each EOC exam connected to a course, which connected to grade levels, as sophomores comprised the bulk of the assessed student population.

Relationship to participants. The researcher established multiple connections with the subjects of the study, as the assistant principal who worked in the researched

district. The researcher was a colleague of the administrators and an evaluator for some of the teacher participants in this study. Teachers submitted survey results with no identifying information on the survey, with the exception of the teachers self-identifying a specific academic department. Teachers anonymously and electronically submitted all responses. All departments had participants in the study, negating the ability to identify participants through teaching responsibility. Interviews of all teachers occurred with the help of a non-evaluative third-party interviewer, in a neutral on-campus setting, with data scrubbed of all identifiers, such as name, departmental content, and course titles, before analysis by the researcher began. Further, all teachers received a numerical identifier. For example, the first teacher on the list received the identifier, 01, and the second name on the list received number, 02. The pattern continued until all interview participants' names received an assigned a number. Similarly, each interviewed administrator received a numerical identifier to support removal of all identifications, resulting in Administrator 1, Administrator 2, and Administrator 3 as pseudonyms. Student data (common assessment scores and EOC exam scores) were scrubbed of identification by the department chair and given identifier numbers (i.e., s1, s2, s3, in no particular order, and through use of the randomizer from Social Psychology Network (2016)). Only one teacher from the science department participated in the interview aspect of the study. After that teacher expressed concern for confidentiality to the third-party interviewer, the third-party interviewer elected to exclude the data and informed the researcher of the omission.

Data Collection

After obtaining permission to conduct the research in the school district, through the district appointed representative, the researcher obtained a list of all EOC teachers at the participating institution. During the 2015-2016 school year, all faculty on the EOC course list at the researched school received a solicitation to participate in a survey and interview. This mixed-method study included secondary quantitative and primary qualitative sources. The methods of data collection in this study included qualitative information in the form of administrator and teacher interviews and teacher surveys. Quantitative data utilized included EOC scores and pre-assessment scores from SLOs in EOC-administered course assessments during the spring of 2016. Teachers of courses who administered EOC tests in spring of 2016 received surveys electronically. The respondents rated statements in the survey utilizing a Likert-type five-step scale represented by descriptors. Strongly agree, agree, neutral, disagree, and strongly disagree selections showed teacher perception on common assessment topics. Teachers submitted web-based responses anonymously in Google forms and the researcher analyzed the data.

The researcher conducted administrative interviews in a face-to face meeting with assistant principals during the winter of 2016. The researcher was a professional colleague of the assistant principals, with no evaluative role. The research interviewed three assistant principals in the high school, who evaluated teachers in EOC-administered courses, to provide administrative perceptions of the common assessment process. Each interview occurred at the researched high school in the offices of the administrator and utilized an audio recorder with concurrent voice-typed entry into a Google Document.

Teachers volunteered for interviews until a minimum number participated, and interviews were conducted by a third-party interviewer. The non-evaluative staff member compiled data from the teacher interviews and scrubbed all data of possible identifiers before the researcher conducted analysis. All participants provided consent, and each participant received a $5 gift card to a local merchant for their participation.

The teacher interviews occurred at the high school in a multi-purpose conference room with the audio recorded and the data processed in a similar manner as the administrative interviews. To ensure the accuracy of the transcription of the digital audio recording, the third party interviewer audited the Google document created to store the interview data. After the assurance of accurate entry, the non-evaluative third party scrubbed the digital audio recording of all names, course information, and/or mention of course content, prior to sharing with the researcher.

The quantitative measurement tool: End of Course exam. MODESE (2014, 2015a, 2015b, 2015c) test construction of predominantly multiple choice questions mirrored other standardized tests in benefit and liability and cast a wide net for student testing. MODESE (2014, 2015a, 2015b, 2015c) constructed multiple choices questions on all EOC tests and performance events that necessitated solving problems and creating written work with a content-based performance assessment in Algebra I, Biology, English I, and English II EOC assessments (MODESE, 2015b). All Missouri high school students participated in the Algebra I, Biology, English II, and Government assessments, since the 2014-2015 school year (MODESE, 2015b). For students who completed Algebra I EOCs prior to high school, MODESE (2015b) required the Algebra II test as the required high school mathematics assessment for accountability purposes for schools.

MODESE (2015b) established EOC student achievement in four tiers to indicate performance on assessed content and skills: below basic, basic, proficient, and advanced. Scores from EOC tests conducted in the spring were available to the school district in June of 2016. The third-party interviewer, for anonymity of students who generated the secondary data, scrubbed all secondary data from each EOC test.

Data Analysis Procedure

To ensure the reliability and validity of the study results, the researcher initiated a systematic process for analysis to organize the qualitative data, with the generation of codes. Fraenkel, Wallen, and Hyun (2015) noted, "Researchers prefer to use codes and themes as aids in organizing content and arriving at a narrative description of findings" (p. 483). The researcher read the transcripts of the interviews multiple times to uncover codes from teacher and administrator interviews. All information was digitally color-coded, based on the connection to a specific theme. The researcher implemented a rudimentary cut and paste technique to collect segments of the transcripts connected by the same code and aligned with particular research questions. The researcher assumed the responsibility for all data coding, interpretation, and analysis.

The researcher conducted a descriptive analysis and comparison of outcomes for the assessment results. The potential data pool included all students with submitted common pre-assessment scores, as required by SLOs and the EOC in the spring. The researcher analyzed the quantitative data with the PPMCC to determine a possible relationship between the common assessment, pre-assessment and EOC. Fraenkel et al. (2015) stated, "When data for both variables are expressed in terms of quantitative scores, the Pearson's *r* is the appropriate correlation coefficient to use" (p. 208). With the

PPMCC, an *r* score between 0.5 and 1.0 indicated a high correlation, an intermediate correlation manifested between 0.3 and 0.5, and a low correlation below a 0.3, with a 0 indicating no correlation (Bluman, 2013, pp. 531-539).

Summary

The researcher utilized a mixed-methods research design, which sourced data from interviews, surveys, and analysis of assessment results, to further understand the connection between common assessments and teacher collaboration over data-driven decision making. Chapter Three began with the rationale for the research design and methodology of the study. A summary of the problem and purpose concerning this mixed-method study was provided. Furthermore, Chapter Three established the research questions and hypotheses, as well as identified the sample selection. Additionally, the entry included a description of the research context and the participants for the chosen study. The researcher noted description of procedures for data gathering and the tools used for data analysis. Chapter Four includes results and analysis of the research questions and hypotheses of this mixed-method research project. Chapter Five includes conclusions of the study, as well as recommendations for future research.

Chapter Four: Results

For the purpose of this study, the researcher selected a mixed methodology. The qualitative data included open-ended teacher survey responses, anonymously submitted via Google Forms. A neutral third party conducted teacher interviews and scrubbed data of identifiers, which the researcher coded for common themes. Teacher and administrator interviews addressed two of the qualitative research questions and provided data for analysis. Additionally, to determine a possible relationship between the SLO-mandated pre-assessment and EOC scores from Algebra I, Biology, English II, and Government coursework, a PPMC was applied to data to address the research hypotheses. All EOC student scores in the four subject areas aligned with a pre-assessment score and became the potential data pool, with the research sample selected by a randomizer.

Null Hypotheses

Null H1: There is no relationship between student common formative assessment scores and End of Course exam scores in Government, with respect to the population of the study school district.

Null H2: There is no relationship between student common formative assessment scores and End of Course exam scores in Biology, with respect to the population of the study school district.

Null H3: There is no relationship between student common formative assessment scores and End of Course exam scores in English II, with respect to the population of the study school district.

Null H4: There is no relationship between student common formative assessment scores and End of Course (EOC) exam scores in Algebra, with respect to the population of the study school district.

Research Questions

RQ1: How do teachers perceive data-driven decision-making as it relates to the development of common assessments?

RQ2: How do teachers perceive data-driven decision making as it relates to instructional design and implementation?

RQ3: How do administrators perceive data-driven decision making as it relates to common assessments?

RQ4: How do administrators perceive data-driven decision-making as it relates to the process of continual school improvement?

A total of 19 of a possible 28 (67.85%) teachers of EOC courses participated in the survey and 12 (42.85%) teachers participated in interviews. The respondents rated each survey statement using a Likert-type scale, wherein strongly agree, agree, neutral, disagree and strongly disagree selections indicated teacher perception on topics related to common assessments. Teacher and administrator interviews provided the researcher with additional insight. Interview narrative responses originally received labels with codes from 12 teachers and three administrators, who responded to the interview questions, which provided data for the study research questions. This data emanated from the transcript of audio recordings of the interviews, collected by the third-party interviewer during the qualitative data interview process. Teacher responses emerged within specific themes, including: (1) collaboration, (2) assessment, (3) instruction, (4) individual

practice, (5) grading, and (6) data. Administrators' data response codes included (1) administrator's role, (2) utilization, (3) assessment literacy, (4) PLC process, (5) individual practice, and (6) data.

Research Question 1

How do teachers perceive Professional Learning Communities and the development of common assessments?

The researcher collected and analyzed the data generated by the following measures, to answer RQ1: Teacher interview questions one, two, three, and four (see Appendix B), as well as the survey question regarding the percent of time PLC teams spent in activity developing common assessments. To address the research question, responses to additional teacher survey questions were examined (see Table 1).

Table 1

Teacher Perceptions: Data-Driven Decision-Making, Related to Development of Common Assessment-Survey

Survey question	Mean Score
It has been worth the investment of lost instructional time to administer common assessments.	3.6
The development and implementation of common assessments resulted in the consistency of course objectives within different classrooms regardless of the instructor.	4.3
My professional learning community believes formative common assessments are important for student learning.	4.2
It has been helpful to establish Student Learning Objectives with my P.L.C. team.	4.1
Teachers in a professional learning community create assessments aligned with student learning objectives.	4.3
Student Learning Objectives will cause my P.L.C. team to addresses student assessment data in more frequently.	4.0

The questions listed, with the mean-scored response, were responded to through use of a Likert-scale. Survey mean scores reflected a numerical value of five for response of 'strongly agree' with descending values, end with one for 'strongly disagree.' Teachers referred to the intent of the common assessment process throughout analysis of the quantitative and qualitative data. As indicated by survey data, all 19 (100%) respondents strongly agreed or agreed with the prompt, 'The development and implementation of common assessments resulted in the consistency of course objectives within different classrooms regardless of the instructor.' T1 exclaimed during the interview that the purpose of common assessments were 'to make sure that every kid is getting the same thorough education that is the ultimate goal.' These responses indicated teachers perceived the importance of students having a "guaranteed and viable curriculum" regardless of their instructor (Marzano, 2013, p. 1). Analyzed data conflicted with teachers' value of common assessment process, in relation to the cost of other pedagogical practices. Three respondents (15.80 %) disagreed or strongly disagreed, and three additional teachers (15.80%) were neutral to the statement, 'It has been worth the investment of lost instructional time to administer common assessments.' Additionally, only four (21.05%) strongly agreed with the investment in common assessments.

Teachers also noted the time allocation devoted to the process of creating shared assessments, as noted in Figure 1. Nine of the 19 respondents (47.36%) selected 71%, or higher, of PLC time dedicated to the development of common assessments, while another seven (36.82%) indicated 31% to 40% of PLC time was utilized for creation of shared assessment. Two (10.52%) indicated teachers' development of common assessment took

the majority of PLC time and noted participation in the same PLC. The researcher concluded this finding showed possible needed adjustment in PLC practice to permit application of additional practice of data analysis and instructional adjustment.

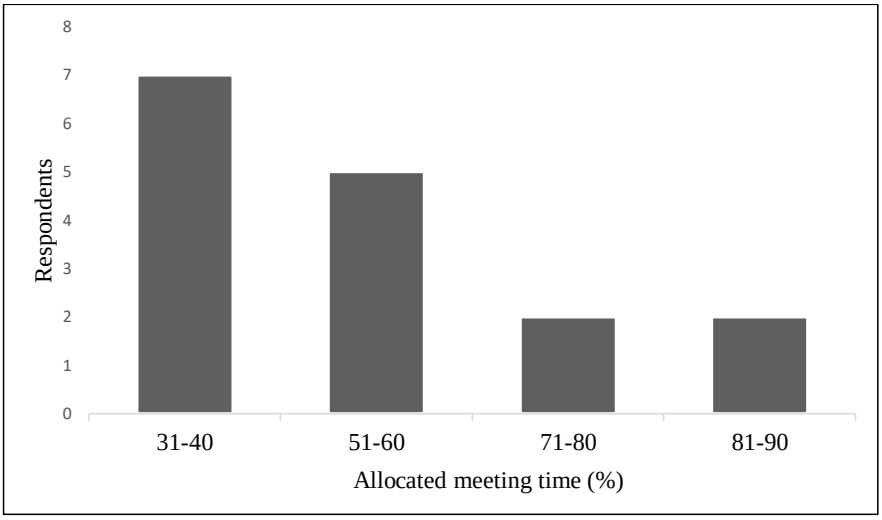

Figure 1. Percent of time PLC team spent in developing common assessments.

Teachers generally supported collaborative use of common formative assessments, with all but two (10.5%) who agreed or strongly agreed with the survey statement, 'My professional learning community believes formative common assessments are important for student learning.' T7 expressed, during the interview, an observation of the collaborative approach early in the process 'before they take the assessment we collaborated' and T12 supported 'we design our formative assessments together.' Teachers concurred on the creation and use of common formative assessment that revisited key student learning targets and allowed teachers to better understand instruction through data. T12 stated, 'We have spent a lot of time this year focusing on our SLO goals, so creating pre-assessments, interim assessments.' T2 further commented

during the interview, 'We also designed the interim assessments that were pertaining to that pre-assessment . . . and then we had four interim assessments, and then the students will take their final assessment that mirrors the pre-assessment.' T2 continued to document the action of the PLC, as they 'give the assessment and bring back our data and talk and another commented on the purpose . . . to decide the best ideas and the best practices.'

Many teachers noted the value of common formative assessment as a tool to uncover student relation to learning targets and feedback on instructional effectiveness. T3 commented during the interview, a common formative assessment's purpose was 'to try to measure how well they're doing' as T8 agreed, 'We will use formative assessments to assess whether they are learning or not.' T9 commented, 'We make a common formative assessment . . . a gauge of where our students are performing at the beginning of the unit.' A participant also concurred on the extensive instructional opportunities of common assessment utilization. T3 stated:

> we will come back again after that assessment and discuss whether or not anything, any strategies that we implemented, what the differences are between our students or one teacher's students and the other students and then how well we perform that formative assessment in any type of nuances or differences that each teacher has had in that process.

The employment of SLOs under MODESE (204, 2015a, 2015b, 2015c) mandated during this study pushed the common assessment implementation process for teachers. 'It has been helpful to establish Student Learning Objectives with my PLC team,' witnessed 17 teachers (89.47%), who responded either strongly agreed or agreed on the

survey. All but one teacher (94.7%) agreed or strongly agreed with 'Teachers in a professional learning community create assessments aligned with student learning objectives.' During the interview, T2 described an observation when SLOs inspired the need to 'create kind of this overarching scope of assessments,' and T12 noted, 'We designed an entire an entire assessment strategy based off of our SLO.' T5 expressed, 'We build our assessments in a way that will hopefully best measure whether or not the students achieved those learning objectives.' The same teacher summarized the recursive nature of data-driven decisions and assessment, 'We definitely use student learning objectives to shape our assessment and then we use the data to kind of assess our own assessments.'

Many teachers commented on the need for common assessment work to have historical roots, properly constructed around student results. Participant T3 voiced, 'We discuss any types of prior shortcomings we've had with students in the past;' while T10 added, PLC work 'based on results from past years as well.' T1 further suggested, 'Based on our prior years' experience and also based on last year's testing we know that our students struggle with [subject] questions.' Additionally, T4 observed and expressed during the interview, 'We have a handful of common assessments, which we do reference and try to continue to improve on to net the most success and gained success, year-to-year.'

Study participant T1 discussed assessment changes, 'So based on you know last year this is not a good test.' Others noted a more forward looking perspective when building assessment and accompanying instructional responsiveness. T2 asserted, assessment needed to address 'a skill that they are going to need to know not only their

freshman year but also their sophomore junior or senior year.' T1, in support, expressed, 'It's at the freshman level we're hoping to give them a good ground work so that they're successful through four years.'

On the future, T7 noted, 'I don't know what it'll be next year. It is something different every year.' Other teachers' acknowledged, the content side of testing proved more assessment friendly than skill. T3 stated, 'Content objectives are a little bit easier to measure just because it's you can sort of quantify that on a test.' T9 noted, 'Important content or AP style questions' were part of assessment construction and evaluation process.

Another group of teachers aligned common assessments around the EOC assessment to improve the summative test in the spring. T8 stated, formative assessments were in fact 'EOC practice tests.' T1 voiced, 'Our PLC is very focused on it making sure that our students can pass all of our assessments, because all of our systems are designed in order to help our kids be successful on the end of course exam.' T7 further commented, 'The objective is to pass the EOC. And as hard as that is to say, it's part of life in the state of Missouri and it's not going to go away.' An additional summary view of T1 noted, a 'very high stakes year because of all the testing.'

Many teachers discussed the process of common assessment construction in relation to assessing skills or course content. T7 noted, 'We talk about what needs to be on it, how we want to assess them;' while T9 concurred, 'We try to decide the skills that need to be taught to our students.' One teacher further outlined, 'We've been focusing on enhancing student learning skills versus content knowledge so that's really shaped how

we've created our formative assessments.' T11 distinguished, 'Sometimes a skills based idea can be applied . . . or sometimes it's very content specific.'

Several teachers noted the assessment of skill potentially imbedded in content allowed assessments to marry the concepts. T8 stated, during the PLC process 'they're doing the same thing but just with a different book or a different assignment. They don't realize that they're still doing the same thing and once they've mastered that we try to move on.' Multiple teachers noted the focus of assessment and instruction led to student achievement. T12 observed and described to the interviewer, 'We come up with an instructional activity or strategy to help them in that area so we've really been working this year on their synthesis skills and we have seen a jump and improvement after coming up with some common practice activities.'

Teachers involved in the creation of common assessments and the assessment questions also looked forward, based on assessment data. T8 observed:

> [J]ust like we do with all of our tests, we take it, we look at the ones they got right. We look at the ones they got wrong. We look at the style of the question. Was it the question itself? Was it the answers? Why did they get it wrong? And modify the next quiz or the next test to make up for what they missed or what they got right.

T8 added in response to interview question, #2 (see Appendix B) 'The kids were really bombing the [subject] questions, so we had three quizzes based on that formative assessment for the next unit where we can focus.' T7 suggested an adjustment in instruction, 'We try to differentiate as much of the lesson as we can based on the needs of the students.' Further, T10 adjusted assessment construct and questions based on student

assessment result, ‘We'll talk about how we need to modify it for this year, changes we would want to make based on our students for the current year.’

The SLO process accelerated the use of assessment data as witnessed by survey responses from 16 (84.30%) teachers, which either strongly agreed or agreed with the statement ‘Student Learning Objectives will cause my P.L.C. team to addresses student assessment data in more frequently.’

Many teachers worked in their PLCs to ensure evaluating common assessments calibrated to yield worthy data. Teachers noted the connection between common grading practices and data utilization. T5 summarized, ‘In terms of grading and data utilization we definitely make sure that we're putting the same weight on assignments.’ One PLC started to ‘grade it individually and then come back’ to collaborate, as similarly stated by T2. T9 agreed, ‘We will grade them separately and then we come back to meet in our PLC and decide who did best, who didn't do as well.’

Grading of student work indicated varied approaches to evaluating common assessments. T1 stated, the PLC had ‘on going conversations so that each of our students is being graded similarly,’ while T6 added, ‘We also do some collaborative grading to make sure we are all . . . focusing on the same portions of the essay, giving them the same weight.’ Further, T4 noted the process in the PLC, ‘We will come back as a group, look at some of the sample free responses, the highs, the lows, the mediums. And then we will try to, sort of, normalize it.’ Other teachers noted the absence of the grading process in the PLC process and claimed isolated evaluation of student work by teachers. T10 expressed during the interview, ‘We don't do any grading during that time,’ while T6

stated, ‘Grading, we all do on our own, so that doesn't take up too much of our LLC [. . . Learning Community].’

Research Question 2

How do teachers perceive data-driven decision making as it relates to instructional design and implementation?

The researcher collected and analyzed data from the following measures to answer RQ2: teacher interview questions one, two, three, and four (see Appendix B, and survey questions regarding percent of time PLC team spent in activity analyzing assessment data, sharing best instructional practices, planning curriculum, and discussion of managerial topics. To address the research question, additional teacher survey questions addressed the research question. The questions listed, with the mean scored response, used a Likert-scale response (see Table 2). Survey mean scores reflect weight of five for response of ‘strongly agree’ or one for ‘strongly disagree.’

Teachers acknowledged the connection between both PLC and classroom work to information from assessments in initial survey questions and interviews. Almost 58% of teachers strongly agreed (n=11), while the remaining agreed (n=8) in survey format to question prompt, ‘Working in a Professional Learning Community environment has improved my classroom instruction.” Additionally, 19 (100%) teachers strongly agreed or agreed to the statement, ‘Teachers should analyze assessment data to identify students who need additional time and support.’

Table 2

Teacher Perceptions: Data-Driven Decision-Making, Related to Development of Common Assessment-Survey

Survey question	Mean Score
Working in a P.L.C. environment has improved my understanding of assessment types and the data they produce.	4.3
Working in a Professional Learning Community environment has improved my classroom instruction.	4.5
It is important for P.L.C. teams to develop common assessments constructed around student's mastery of the Student Learning Objective.	4.2
The development and implementation of common assessments resulted in changing my instructional design.	3.6
The development and implementation of common assessments increased the instructional rigor.	3.4
Teachers should analyze assessment data to identify students who need additional time and support.	4.6
Teachers, when meeting as a professional learning community, use assessment data to identify instructional best practice.	4.1
Teachers should individualize instruction based on assessment data.	4.2
Teachers, when meeting as a professional learning community, individualize instruction based on assessment data**.**	3.4

Teachers noted the collective purpose of improving student performance in their PLC setting through data proven instruction. T5 stated, the goal to 'mirror what other educators are doing in their classrooms.' The interview of T3 yielded, 'We participate in a professional learning community; we all come to a common agreement on what would be necessary to improve student's learning.' Similarly, T10 stated, 'work together designing assignments; designing different activities to meet our instructional goals.' T2 noted, the work the PLC engaged in were 'common activities that we want to implement

whether it is a writing prompt, document analysis, whatever type of strategies we are working on for that particular unit.' T8 summarized the collective approach to instruction, 'The idea of being able to bounce ideas off one another with people who are familiar with our material.'

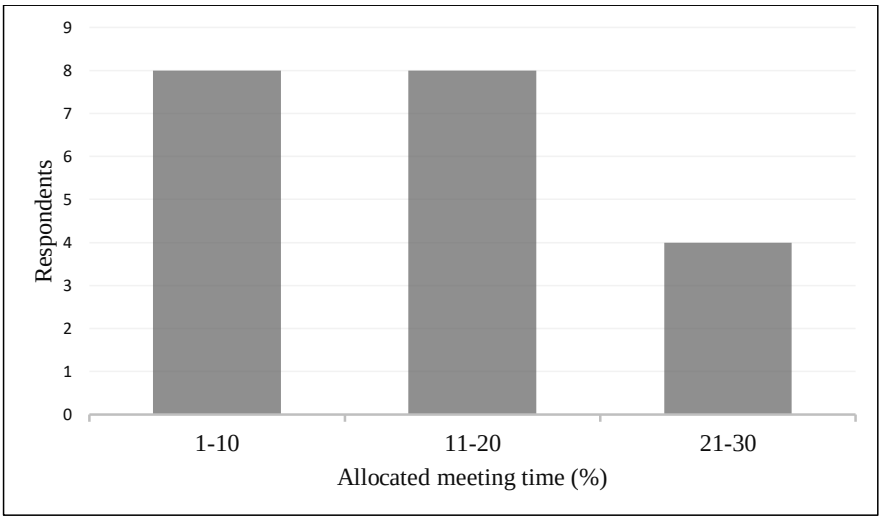

Figure 2. Percent of time PLC team spent in analyzing assessment data.

While teachers supported the idea of the connection of assessment, data, and instruction, PLC time allocation responses indicated a different picture. As noted in Figure 2, no PLC team data demonstrated significant time (more than 50%) on analyzed results from assessment, with 13 (68.42%) respondents who reported less than 20% of time spent in PLCs on data analysis. As a group, teachers did not invest substantial time in data analysis from assessments in the PLC setting.

Most survey respondents strongly agreed or agreed with the survey statement, 'Working in a PLC environment has improved my understanding of assessment types and the data

they produce.' T2 noted, the PLC acted to 'report our data to the group to identify those areas' for correction. T4 explained,

> Free responses are a little trickier but in terms of multiple choice we can really gather an awful lot of data from that. And then we look to see sort of the weaknesses in terms of their interpretation of questions whether it was a preparation issue, a reading issue.

T6 observed, longer view with a 'very cyclical [approach] as far as discussing strengths and weaknesses, creating assessments based on those strengths and weaknesses, analyzing the data and then using that data to, again, build on those strengths and weaknesses.'

All but one of the (94.73%) teachers surveyed agreed or strongly agreed with the statement, 'Teachers should individualize instruction based on assessment data.' T6 stated, 'We take that data and individually look at individual student achievement.' Other teachers looked for trends in data to inform instructional choices. T8 observed an aggregate view of 'the percentage of kids that got stuff right and the percentage of kids that got stuff wrong' with T12 in support 'which area the students are having the most trouble.' T2 outlined the attempt to see 'if there are trends you know amongst the classes, . . . is this something that I, my particular students, are struggling with or is this something that all sophomores are struggling with.'

While operating in a collaborative environment, several teachers outlined the ability to make individualized pedagogical decisions in the PLC framework. T5 stated, 'We may be teaching things in a different manner but we are all still stressing the same things on basically the same days.' In support, T2 noted, 'It is left up to the individual

teacher to figure out how that is going to best fit their classroom;' and 'So, if you have a lower classroom or a higher achieving classroom the strategies that are actually used to teach that common . . . whatever maybe is left up to the individual teacher.' T7 concurred, student population influenced the PLC alignment of instruction 'we look at the makeup of our classes.' Several noted this flexibility allowed for professional development and classroom sovereignty. T4 observed, 'We have a professional learning community that develops teachers but also encourages individualization.' A similar sentiment from T5, '[We have a] lot of the conversations that we have in our professional learning communities and [I] filter some of that information and then use it to shape my instruction.' T12 stated, the practice of PLC participation and individual choice, 'I take a lot of those ideas and shape my daily lessons,' and T8 noted, teacher independence and the lack of administrative mandates, 'so it doesn't come down from above.' T11 summed up the autonomous practice, 'I usually don't use the exact same lesson because I like to kind of tweak it to my personal style.'

Teachers supported the survey question, 'Teachers, when meeting as a professional learning community, use assessment data to identify instructional best practice,' with 15 (78.94%) strongly agreed or agreed responses. T6 advocated for the teacher to teacher support, 'I hear you're struggling and teaching this specific concept. Here is something that I do that . . . . has shown growth in student understanding.' Many teachers noted the willingness to adjust instruction and adopt best practices based on assessment data. T11 commented on the data process in the PLC:

> We come together after that to look at how did our student's perform? What areas do we need to work on? In what areas are we strong? And in the areas we need to work on we make sure we create things to address that.

T6 concurred, 'We use that data to then shape our instruction, change our instruction if necessary and to identify different weaknesses as well as strengths in student academic achievement.' T8 observed, 'We worked together to design our lessons to use best practices so that all students are engaged and able to learn at their best ability.' T9 agreed with the importance of a collective look at data-proven instruction, 'We talk about why one teacher might have done better than another teacher and how we can teach that topic a little bit better.'

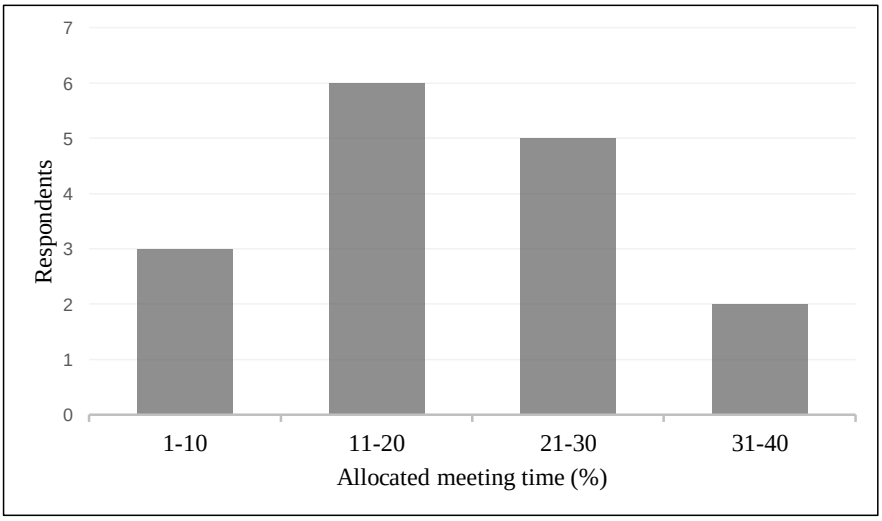

Figure 3. Percent of time PLC team spent in sharing best instructional practices.

In contrast, survey data indicated 47% of teachers (n=9), who shared PLCs, devoted less than one-fifth of PLC meetings to sharing best instructional practices. The survey respondents reported a clear disconnect between data-demonstrated instruction

and PLC time allocation. Further, teachers responded to the survey question, 'Teachers, when meeting as a professional learning community, individualize instruction based on assessment data,' with the lowest mean score (3.42) of the survey. This again contrasted to value expressed in collaboration around data use and best practice and actual engagement in the work.

Teachers noted how faculty and students made use of data for instructional purposes. T6 discussed data and instruction in a casual framework, 'whether it's informal data like just you know what you are picking up on from students individually in the classroom, as well as formal data.' T8 concurred on varied manners of collecting data, 'We've been collecting data through formative assessments - either short quizzes or it might be Socrative or Kahoot to decide whether students are achieving.' Conversely, some faculty engaged in the practice of data tracking in more formal, larger time increments. T8 further noted, 'After each quarter I use an assessment tracker to determine what kids know and what kids need to be retaught and that helps guide the instruction.' T11 supported, the 'assessment tracker this year has really helped to implement whether students are achieving where they need to achieve.' Faculty stated, the challenge of data use to inform teaching and learning and not to remain abstract. T11 continued, 'I asked them what they thought an achievable goal was for them . . . that way it's more meaningful, I think. It's not just a bunch of numbers on a spreadsheet.'

Survey data reflected a wide dispersal of responses to PLC time devoted to planning of classroom instruction, as evidenced by Figure 4. The majority of responses reflected less than one-third of the time in collaborative groups devoted to focus on

teacher or curriculum planning. Noting these results, potential adjustment to PLC directives and audits on collaborative practices merit consideration.

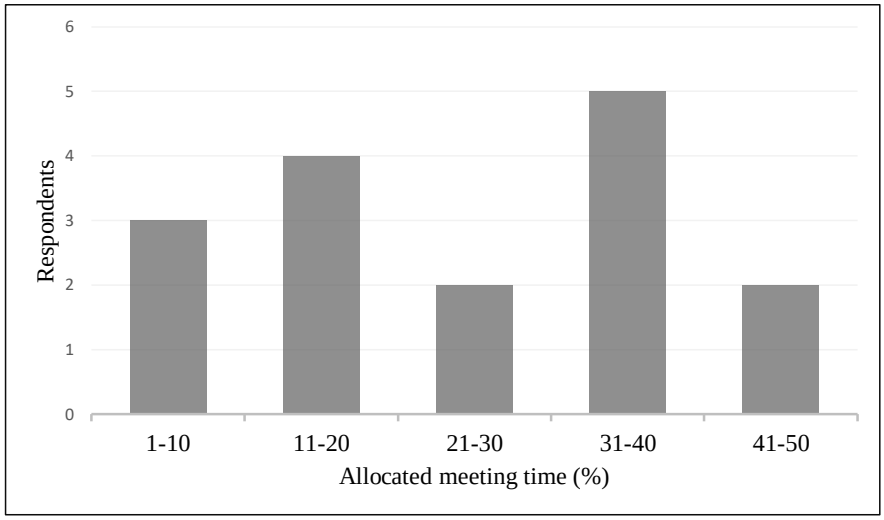

Figure 4. Percent of time PLC team spent in planning curriculum or instruction.

The lack of congruence in the responses from faculty on the use of PLC time for planning of teaching practices also witnessed support from the survey questions with opposition to the practice of instructional adjustment based on assessment. Similarly, six respondents (31.57%) were either neutral or disagreed with, 'The development and implementation of common assessments resulted in changing my instructional design.' Further divergence on teacher responses and away from research edicts emerged in later questions. 'The development and implementation of common assessments increased the instructional rigor,' witnessed nine (47.36%) respondents in neutral, disagree, or strongly disagree categories. This finding, of a lack of instructional adjustment and increase in course rigor, in response to common assessment linked with data and how PLC utilized

time in a collaborative setting, indicated a misalignment with research supported foundations of PLCs and common assessment.

Figure 5 demonstrates the narrowest group of responses from teachers on the use of time in PLC settings. While the majority of teachers surveyed indicated that discussion of non-instructional matters took a minimum amount of time, some conceded to a longer period. Two respondents (10.5%), both from the same PLC, shared an allocation of 21% to 30% of PLC time to administrative concerns and the opportunity for a 'Discussion of managerial or logistical topics.' The observable, higher percentage disallowed other more pedagogical and data options for PLC time for the course team in that subject.

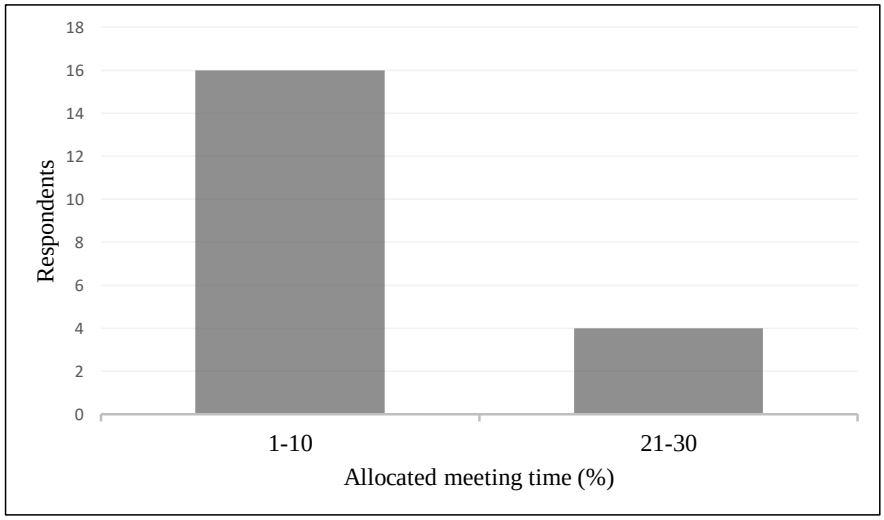

Figure 5. Percent of time PLC team spent in discussion of managerial or logistical topics.

Interviews indicated teachers viewed and responded to data both individually and collectively when evaluating results. The interview with T9 provided, 'So we use it to

also single students out on our own, offer extra suggestions to those students who are struggling so if we find that one student continues to struggle over time then we will give extra, extra help.' T8 holistically observed, 'We look at the percentage of kids that got stuff right and the percentage of kids that got stuff wrong.' T2 outlined a view of aggregated data, 'If there are trends you know amongst the classes to see, is this something that I, my particular students, are struggling with or is this something that all sophomores are struggling with?' A group of teachers had an individual lens when looking at student data and accompanying instructional choices. T8 noted, 'We have a remediation specialist who sits with kids and tries to figure out . . .' individual concerns on the assessment. T6 commented, 'We take that data and individually look at individual student achievement, as well as the different skills that have been put in place.' T9 distinguished, 'We can move them from a 2 to a 3, and a 3 to a 4, a 4 to a 5 . . . we are able to assess whether our students are moving up the ladder or not.' In agreement, T2 expressed, 'What are we going to do to target struggling students or even students who are excelling over the top?'

PLC teams devoted less time to data analysis, as indicated by surveys, than other tenants of common assessment. Seventeen of 19 (89.5%) teachers indicated PLC time devoted to data analysis less than 30% of the time the group met, while eight placed it at between 11% and 20% percent. In addition to time devoted to data analysis, the quality of the work came into question. T7 supported the observation with the statement, 'We are not very strong in using our data in our PLC.'

One objective of the SLO process of using data points to increase measured understanding of student learning had modest support among survey responding teachers.

The survey question, “Student Learning Objectives will cause my PLC team to addresses student assessment data more frequently” had tepid support with four who strongly agreed (21.05%) and three (15.78%) who reported as neutral respondents.

Interviews provided data on teachers engaged in the use of SLO and data. T5 noted, ‘Student learning objectives really shape the data that we try to achieve.’ T7 outlined, ‘We look at every single test by using Moodle, which allows us to break down every single question, every single kid.’ Once armed with data around the PLC-declared SLO, teachers took instructional action to address measured interventions. T1 stated, ‘This kid . . . specifically still struggling on this or . . . a group of kids who are still struggling . . . how can we kind of curtail the next discussion or writing prompt to really help them?’ A group of teachers demonstrated a looping of a skill in their SLO to give multiple data pictures and opportunity for instructional response. T1 further stated, ‘We started teaching the very first unit . . . and we've built in prompts, questions and discussions throughout the entire year to give them as much practice with that as possible.’

Participants noted the struggles of the SLO process, as it related to both assessment and data. An observation from T5 noted, ‘Sometimes the assessments don't always do that or they gave us data that could be used in a different way but didn't necessarily fully match our student learning objectives.’ T5 further stated the needed remedy, ‘So in that instance we’d have to go back and redo an assessment.’ A group of faculty related the initial year as a learning year and the need to progress in coming school years. T1 observed, ‘This is the first year we have done it so we will see how well

it works;' and T2 agreed, 'Student learning objectives were new this year so they were a bit of a trial and error.'

Research Question 3

How do administrators perceive data-driven decision making as it relates to common assessments?

To address this research question, the researcher analyzed responses from administrator interview questions one, two, and three (see Appendix E), with three different assistant principals at the high school. From the interviews, a pattern emerged in the administrators' perception of school leadership and subsequent common assessment work. A dichotomy of hierarchal, task-driven approach and a more democratic, instructive tactic materialized.

Common assessment work necessitated various roles from administrators in the researched building. Some aspects proved more collaborative and others more reflective of the hierarchal nature of the principal-teacher relationship. Administrator 1 stated their task included 'holding those groups accountable for meaningful conversations and work that leads toward increased student learning.' Administrator 3 commented school leaders were 'to make sure that all teachers are attending their PLCs, that the PLCs are productive and beneficial to all participants.' These comments indicated a more robust, authoritative, supervisory view of building administrators in the role of support for common assessments. Additional data demonstrated a less managerial view described by Administrator 1 in the common assessment process, PLCs were 'cohesive and self-governing and . . . they've been doing this for years.' Administrator 1 additionally

asserted. 'Modern Language is pretty self-governing and has been for years and [they] do so out of necessity.'

Administrators saw their role, in the common assessment process, as one of partnership in setting the stage for application of assessments, by supporting teachers to work collectively. Administrator 2 noted the school possessed 'a strong learning community culture,' while Administrator 1 stated, 'Departments are encouraged to collaborate.' Administrators also supported teachers in the common assessment process with establishing expectations of implementation of shared assessments. Administrator 3 claimed their roles were 'to make sure all teachers are using the common assessments,' while Administrator 1 noted common assessments were 'used in all departments.' Administrator 1 further noted a department the assistant principal supervised utilized, '*Evaluate* [web based assessment and data analysis tool], which is a common formative assessment, will use given every month.' Further, Administrator 2 outlined expectations for common assessment use by PLC teams, 'PLCs meet to plan common assessments for units and final exams.'

School leaders noted a role in the task of ensuring the quality and purposeful utilization of the common assessments. Administrator 3 stated PLC administrators were 'to make sure the assessments are of high rigor and aligned with the standards' while a second focused on the task to 'evaluate exams.' Administrator 2 noted, the 'results of these common assessments are then evaluated and instruction is changed as a result . . .' in the effort to align common assessment data and revised instruction.

Addressing the assessment literacy of teachers demonstrated to be an aspect of the common assessment process. Administrator 3 observed, 'My role is to support teaching

in PD [professional development], time, and advice,' while Administrator 1 noted the task of 'working with a small group of teachers with an assessment.' As supported by then-current literature, assessment work from Administrator 2 included a 'plan to address both formative and summative work.' Administrator 1 demonstrated a more measured involvement in the work of assessment literacy and stated, 'That's ongoing. They are pretty good about it now.' A similar encompassing comment concurred with the work mentioned by Administrator 2:

> I think that teacher's ability in this area varies. Depending on the leadership in your PLC, how effectively the data from those assessments are used, can vary. I also believe that with the introduction of SLOs has helped to refocus on PLCs on data analysis and that connection.

Research Question 4

How do administrators perceive data-driven decision-making as it relates to the process of continual school improvement?

To address this question, the researcher analyzed responses from administrator interview questions four and five (see Appendix E), with three different assistant principals. From the interviews, a particular pattern emerged in the administrators' perception of data utilization and school improvement. School leaders perceived their role as one of facilitator; assessment of teacher's readiness, preparation of teachers through data training, provision of model work of SLOs, and generalized support of classroom work around data use. Administrators' perception of school improvement and subsequent common assessment work witnessed a wide spectrum of engagement with the process.

The use of data provided multiple, varying responses from assistant principals in a year when data use became engrained by the SLO process. Data use, as supported by some teacher survey data, was limited in relation to other PLC tasks, such as building common assessments. Administrator 2 reflected a similar perception, 'making sure you are knowledgeable' about data, and Administrator 3 in affirmation, stated teachers 'are not comfortable in data use.'

Leadership in data use from building administrators engaged principals in multiple facets of support and assistance. Comments from the interviews reflected the new period of data emphasis required by SLO implementation during data collection. Assistant principals provided additional support for faculty in data use as Administrator 3 stated the process generally called for more 'help [to] figure how to use the data.' Administrator 2 related the more independent practice of teacher data work: 'They [teachers] have to continually monitor and adjust based on where their students are relative to the content.'

Several school leaders commented on a need to ensure teacher competency through preparation. Administrator 2 stated the need to 'provide training,' as Administrator 3 agreed, 'Being present to support teachers if they . . . need more training.' In addition to training, leaders reported other more direct supports as Administrator 2 stated, 'Work hand and hand with the teachers is key,' and Administrator 3 continued, 'Being able to model for them, provide training and also providing resources of examples.'

Leadership also took on a more ancillary and laissez-faire approach in particular departments in data utilization. Administrator 1 differentiated support for PLC groups,

which attained sufficient levels of data use with the aid of technology: 'Math for me, it is easy with *Evaluate. Evaluate* spits out the data you need.' The department's history of data use facilitated a less authoritative leadership style for this particular leader in the PLC setting.

SLO in year one provided challenges and opportunity for school leaders relative to school improvement. Administrators noted the need for their own preparation to support the process of school improvement and SLO implementation. Administrator 1 identified leaders must have 'Knowledge, PD [professional development]' Administrator 3 expressed, 'I think that administrators have to be trained themselves,' and Administrator 2 agreed, [administrators] 'also have to completely understand the process.'

Administrator perception included a strong preference for school improvement initiated by teachers. Administrator 2 stated, 'Identifying teacher leaders in this area is imperative to being successful.' Administrator 3 concluded, 'Allowing teachers to have time to put into practice what they have learned and also by meeting with peers supported the SLO process.' Similarly, Administrator 2 stated, 'Administrators work directly with the professional development committee to provide training, examples, and share and provide work time to help teachers through this process.' Conversely, principals' perceived evidence the school improvement process possessed a more hierarchal structure. Administrator 2 related a more collaborative but firmly patriarchal program for the SLO process, 'As we build a library of examples . . . and feel comfortable in holding teachers' hands through this process.'

Specific to SLO implementation, school leaders observed the ongoing process required time and refinement to alter school improvement. Several administrators described the SLO issue of selecting measurable standards. Administrator 2 noted, specific support was needed 'by helping them to identify standards they [teachers] teach [objectives] that are easily measured.' Administrator 2 further summarized the shared concern and offered a solution:

> Some of the teachers I work with are struggling this year in that they chose something that is hard to quantify in terms of incremental improvement. We've found that instead choosing something, in this first year of doing it, that is more concrete than, say, writing technique, makes this component a bit more palatable.

Despite these challenges, Administrator 3 concluded, 'Teachers will become more and more comfortable with this process.'

Null Hypotheses

Each subject area in this study had a summative EOC test created and scored by MODESE (204, 2015a, 2015b, 2015c). MODESE (2014) designed the tests to be administered by public schools to ensure accountability to the Missouri Learning Standards. Missouri public school teachers piloted the use of SLOs in the 2015-2016 school year, with one component of the process to create a pre-assessment. In the researched school, courses required to administer a common pre-assessment, and also have an EOC test attached, created two data variables for this study. The researcher used PPMC in order to analyze the possible relationship between SLO-based pre-assessment scores and EOC scores and to establish the potential strength of the association between two variables. Bluman (2013) stated the *r* score from the PPMC coefficient determined

to be between 0.5 and 1.0 indicated a high correlation, a medium correlation between 0.5 and 0.3, and between 0.3 and 0 indicated no correlation (pp. 531-539).

Null H1: There is no relationship between student common formative assessment scores and End of Course exam scores in Government, with respect to the population of the study school district.

The scatter plot (see Figure 6) revealed the observable relationship between common assessment data and summative Government EOC scores.

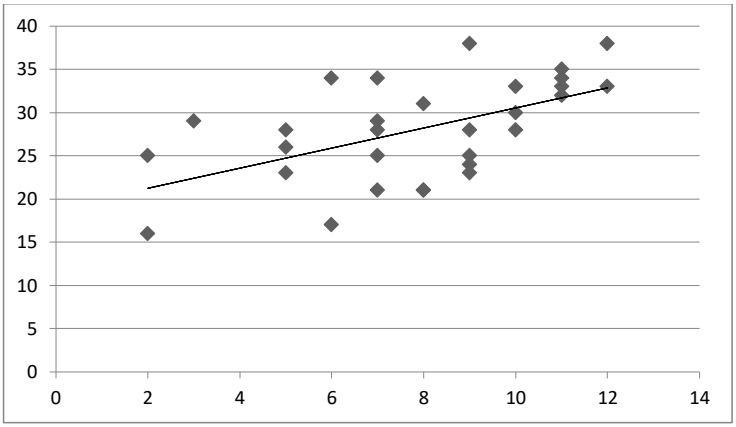

Figure 6. Government common pre-assessment and EOC: PPMCC. n = 50; $r = 0.514$; r-critical = 0.273; $\alpha = 0.05$.

Scores graphed in a tight linear alignment with the regression line revealed a visually strong correlation between the variables. Upon analysis of the graphed points, the data revealed an r-score of 0.514, which indicated a significant high correlation existed between variables. Consequently, the researcher rejected the null hypothesis, as the r-score exceeded the value of r-critical, and indicated a high relationship between common pre-assessment and Government EOC scores.

Null H2: There is no relationship between student common formative assessment scores and End of Course exam scores in Biology, with respect to the population of the study school district.

The scatter plot (see Figure 7) revealed the observable relationship between common assessment data and summative Biology EOC scores.

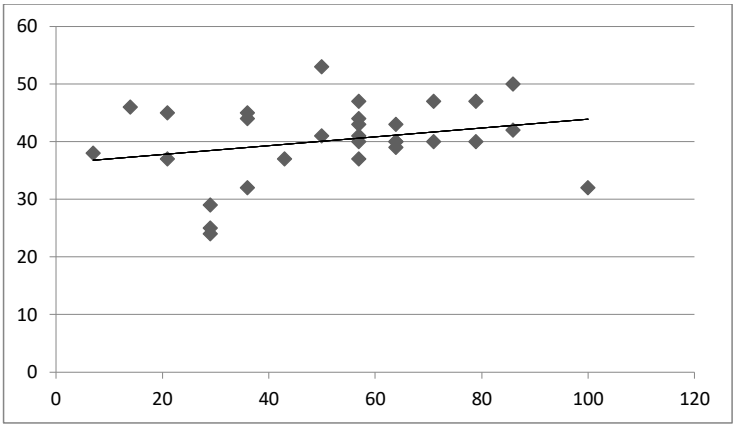

Figure 7. Biology common pre-assessment and EOC: PPMCC. n = 50 r = 0.179; r-critical = 0.273; α = 0.05.

Scores graphed in a tight linear alignment with the regression line, revealed a visually strong correlation between the variables. Upon analysis of the graphed points, the data revealed an r-score of 0.179, which indicated a non-significant low correlation between variables. Consequently, the researcher failed to reject the null hypothesis as the r-score did not exceed the r-critical and indicated there was a non-significant low relationship between common pre-assessment and Biology EOC scores.

Null H3: There is no relationship between student common formative assessment scores and End of Course exam scores in English II, with respect to the population of the study school district.

The scatter plot (see Figure 8) revealed the observable relationship between common assessment data and summative English II EOC scores.

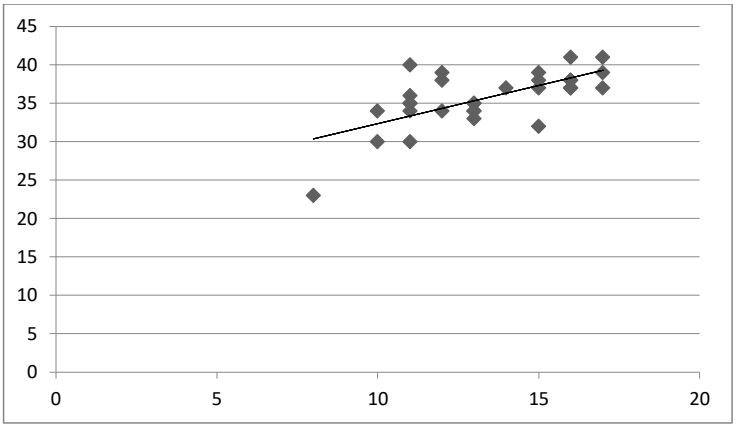

Figure 8. English common pre-assessment and EOC: PPMCC. n = 50 r = 0.559; r-critical = 0.273; α = 0.05.

Scores in a tight linear alignment with the regression line, revealed a visually strong correlation between the variables. Upon analysis of the graphed points, the data revealed an r score of 0.559, which indicated a significant high correlation between variables. Consequently, the researcher rejected the null hypothesis as the r-score exceeded the r-critical and indicated a significant high relationship between common pre-assessment and English II EOC scores.

Null H4: There is no relationship between student common formative assessment scores and End of Course (EOC) exam scores in Algebra, with respect to the population of the study school district.

The scatter plot (see Figure 9) revealed the observable relationship between common assessment data and summative Algebra EOC scores.

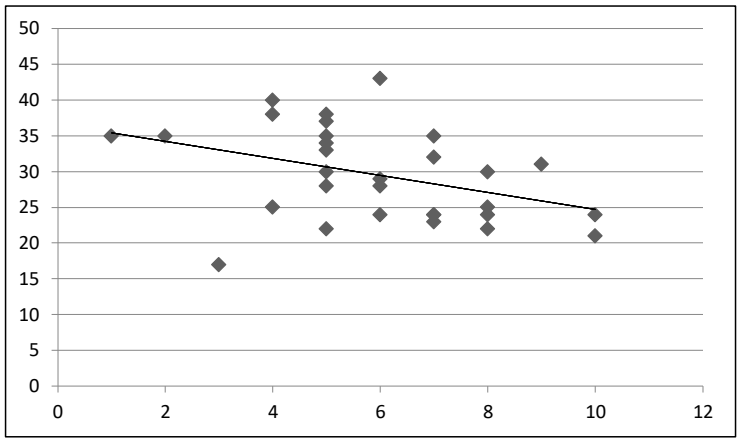

Figure 9. Algebra common pre-assessment and EOC: PPMCC. n = 50 r = -0.328; r-critical = 0.273; $\alpha = 0.05$.

Scores graphed in tight linear alignment with the regression line, revealed a visually strong correlation between the variables. Upon analysis of the graphed points, the data revealed an r-score of -0.328, which indicated a medium correlation between variables, though of an inverse nature. Consequently, the researcher rejected the null hypothesis as the r-score exceeded r-critical and indicated a significant, inverse, medium relationship between common pre-assessment and Algebra EOC scores.

Summary

This mixed method research demonstrated varied success of the PLC communities to use common assessments and instruction to improve student performance on EOC tests. Closer examination of the four pre-assessment results and EOC scores revealed although PLCs had mature common assessment routines, the teacher groups did not have consistent positive, significant relationships between common assessments and EOC results. This research showed the need to better connect assessment, data, and instruction in some settings. The feedback from administrators provided potential guidance as to where the leadership could facilitate teachers in the work of common assessments. Administrator interviews emphasized the detached nature in some PLCs in a year with new demands on teachers for increased data and assessment literacy. Teachers' responses revealed the need to possess greater understanding of formative assessment and data to inform instruction. Teachers' perceptions, as indicated in surveys, related the importance of such practices, but interviews and some survey data suggested teachers did not seem to engage in those practices with fidelity. Quantitative data also showed diverse correlations, which suggested pockets of high performing PLCs and common assessment utilization. Furthermore, there were differences noted between PLC teams and the use of the common assessment processes, as supported by qualitative data.

Students required a more consistent approach to the instructional experience for students' performance to connect pre-assessment and summative EOC test with a pattern of growth and strengthened academic success. Chapter Five provides the reader with a discussion of the results, and with recommendations for schools, administrators, and

teachers to utilize common assessments in the SLO framework, as well as recommendations for future studies.

Chapter Five: Discussion and Reflection

To measure what students learn in each classroom across the state, Missouri's MODESE (204, 2015a, 2015b, 2015c) initiated the use of SLOs for teachers during the 2016-2017 school year. For the purpose of this study the researcher investigated a Midwestern suburban public high school's implementation of the use of SLOs during the pilot academic year of 2015-2016. The study focused on the continued application of the common assessment process developed in PLCs, connected to SLOs. To gauge the common assessment process, the research examined the perceptions of teachers and administrators on data-driven decision making, common assessments instructional design, and the process of continual improvement, measured by surveys and interviews in the spring of 2016. The researcher analyzed student common formative pre-assessment scores and the possible relationships with EOC exams in Algebra I, Biology, English II, and Government.

The information from this study provided the researched school district with insights into the implementation of PLCs and, specifically, the development and utilization of common assessments. The study intended to examine the potential gap between research-supported common assessment practices and what the study's data revealed, with regard to the practices as perceived by teachers. By analyzing a possible relationship between the assessment data points, the researcher hoped to reveal discrepancies in assessment practices and results of EOC testing. The researcher hoped to determine possible reforms in assessment and instructional practices at the researched school to improve student performances on upcoming SLOs in future school years.

Hypotheses and Research Questions

The research questions and hypotheses utilized in this study were:

RQ1: How do teachers perceive data-driven decision-making as it relates to the development of common assessments?

RQ2: How do teachers perceive data-driven decision making as it relates to instructional design and implementation?

RQ3: How do administrators perceive data-driven decision making as it relates to common assessments?

RQ4: How do administrators perceive data-driven decision-making as it relates to the process of continual school improvement?

H1: There is a relationship between student common formative assessment scores and End of Course exam scores in Government, with respect to the population of the study school district.

H2: There is a relationship between student common formative assessment scores and End of Course exam scores in Biology, with respect to the population of the study school district.

H3: There is a relationship between student common formative assessment scores and End of Course exam scores in English II, with respect to the population of the study school district.

H4: There is a relationship between student common formative assessment scores and End of Course exam scores in Algebra, with respect to the population of the study school district.

Discussion

RQ1: How do teachers perceive data-driven decision making as it relates to the development of common assessments?

Volumes of research demonstrated common assessments as one of the most important collaborative practices in PLC settings. (Ainsworth & Viegut, 2015; DuFour, 2008; Erkens, 2016). As cited in Chapter Two, the practice of analyzing data results by PLCs from common assessments demonstrated significant improvement in student learning (DuFour, 2008). Over one-third of teacher respondents to the survey question provided by this study, PLCs were 'worth the investment of lost instructional time to administer common assessments,' indicated a neutral or oppositional opinion. This schism indicated a number of teachers lacked an appreciation or fully understood the value of common assessments.

As noted in Chapter Two, Stiggins and DuFour (2009) supported common assessments as a practice to allow deeper understanding of teacher strategies and student learning across multiple classrooms. A lack of importance and commitment in common assessments supported isolation, over collaboration and a potential link to pedagogical support for teachers. This study's teacher participants noted the tool of common assessments raised the credibility of assessment work and supported better informed instructional decisions, centered on dependable data. Research asserted, common assessments promoted educators' abilities to make valid and credible inferences from student performance assessment data (Ainsworth & Viegut, 2015).

Additionally, data pointed to a meager outlook connected to the development and implementation of common assessments to raised instructional rigor. These responses

indicated some teachers perceived the common assessment process negatively, related to instructional design and implementation rigor. Also disconnected with research was the lack of support for adapting instruction based on student performance, by almost one-third of teachers who responded. Modest support for formative assessment connection to student learning indicated another departure from research. Meta-analysis by Hattie (2012) ranked formative assessment as one of the top five instructional practices for student learning (p. 130). Further research from DuFour et al. (2008) demonstrated formative data was the most useful for teachers for promotion of student understanding and diagnosis of learning. These findings indicated a lack of assessment fundamentals connected with formative assessment; understanding where learners were and adopting instruction based on that understanding. Research found common assessments best informed and led to an adjustment in a teacher's use of proven instructional practices in response to the results of the assessment (Ainsworth & Viegut, 2015; Erkens, 2016). PLC teams, in this study, devoted less time to data analysis than then-current research suggested, which indicated a need for future professional development.

In the pilot year of SLO utilization teachers often ensured students gained awareness of their own demonstrated performances thorough tracking assessment results. One objective of the SLO process of using data points to increase measured understanding of student learning had modest support among responding teachers. Survey data linked SLOs' connection to assessment and data in a tepid manner and suggested needed experience. Teams utilized common assessments and provided opportunities for customized supports for students in a manner that addressed gaps in achievement (Erkens, 2016). Tiered data in the SLO model demanded teachers address

all students in a manner which previous SMART goals did not. Research showed a need for principals to support the move from the aggregated data connected to SMART goals to individual student data (Schwanenberger & Ahearn, 2013).

Common assessment implementation and associated work received uneven application. The disconnect on the value of common assessment, as evidenced by the science department's oppositional perceptions of common assessments, while other departments were more unified in support of common assessments. Other departments, such as English and Algebra, made regular use of common formative assessments, as well as adjusted instruction in response to assessment data. The Biology PLC also reported inordinate time on creation and refinement of common assessments; more than other groups, as well as the least amount of time on data utilization. This significant separation inhibited subsequent data use and instructional adjustment. Noting these results, the researcher suggested potential increased professional development and administrative support on assessment and data literacy for all participants. To implement the needed improvements, research from Erkens (2016) stated the professional development around assessment literacy was operationalized through collaboration to create, implement, and act on classroom assessment. The tools of SLOs of assessment and data collaboration provided instructive work for teachers and PLCs in the future; as Black et al. (2010) noted, assessment literacy improvement process took several years.

RQ2: How do teachers perceive data-driven decision-making as it relates to instructional design and implementation?

The researcher noted multiple findings regarding data and instructional design during the implementation in this study. Teachers involved with this study appeared to

the researcher as inspiring professionals, who utilized multiple tools available to guarantee student learning, as demonstrated by assessment evidence. Data, use as noted by teacher survey data, was an area of growth. Research from the (USDOE, 2009) advised schools to make use of assessment data to better understand students' assets and liabilities, relative to content and skills measured by the assessment.

Teachers unable to provide documented evidence of student learning warranted changes in practices to ensure student performance in the new environment of SLOs. The systemic and structural components of the researched school's PLC program revealed a connection to the resultant data and supported findings of the research. Teachers described a loose construct of PLCs, which provided collaborative teams with modest oversight and individual teachers who exhibited autonomy in the classroom. The researcher concluded the possibility of an improved system with administrative and PLC adjustments to maximize the investment and needed performance in some of the school's PLCs. The loose oversight of under-performing PLCs contrasted to research, which specified school leadership to certify teachers had the ability to utilize data to adjust instruction and supports for students (Peery, 2010). Some teachers made use of assessment data trackers, but lacked uniformity across departments or grade-level. Teacher collaboration warranted more structure and uniform steps in the process to support the work in a manner that moved groups forward on data analysis and instruction.

PLC teams demonstrated varied understanding and ability to navigate implementation of data-driven decision making and instructional design. Hattie's (2012) research-identified teams necessitated use of clear process for dialogue, metrics of student learning and data break down. Such systemic training of PLC leaders in this

Midwest school district would better support collaborative work around common assessments and more clearly reveal where additional administrative supports were needed.

After ten years of PLC practice in the researched school, teachers generally perceived work in assessment and data improved by collaboration. The recursive relationship between instruction, assessment, and data warranted consistent emphasis to best utilize common assessments. Then-current teacher practices, as indicated by research, needed to refresh core understandings and focus PLC work. Research demonstrated post-implementation, PLC team leadership needed focus on principles of data work, student learning, purposeful assessment, and data analysis (Campsen, 2010).

The researcher found common formative assessments connected too many themes of this study. Formative assessments functioned as pre-assessments for SLOS and formative assessment construct generated information to allow PLCs to amend teaching strategies. Common formative assessments results provided the most classroom instructional information about student learning to teachers (Brookhart, 2015). While most teachers surveyed reported common formative assessments as 'esteemed,' the use of data and adopted instruction lacked alignment with the perceived value. The researcher believed the use of common formatives to be one of the biggest areas of growth for teachers in the school's PLCs, connected to EOCs. Particularly, the Biology pre-assessment provided the least actionable data for the Biology PLC to act on and demonstrated by the lowest *r*-score among the four EOC areas.

RQ3 & RQ4: How do administrators perceive data-driven decision making as it relates to common assessments and the process of continual school improvement?

The school devoted significant time, at the end of an abridged school day, most every week, and on half-day professional days to the common assessment process to pilot SLOs, as noted in administrators' interviews. As Schwanenberger and Ahearn (2013) suggested, schools judiciously protected systemic time for data meetings among teachers. Additionally, research from Ainsworth and Viegut (2015) demonstrated the need for school leadership to craft devoted time for staff to create assessments, with support though release from student supervision. In the same year as SLO implementation, the school implemented an advisory program, inclusive of teachers, who met one day each week with an additional prep time, noted by the adjusted school day schedule. Research supported a more focused approach with limited initiatives and narrowed professional development around common assessments (Ainsworth & Viegut, 2015).

Based on responses to this study's questions, administrators were involved in the common assessment process and valued potential outcomes. Research described direct administrative support on the utilization of common assessment as imperative. Ainsworth and Viegut (2015) recommended grade and course-level team leadership meetings to focus on common assessments. Additionally, research from DuFour and Mattos (2013) revealed benefits of administrative support, with strong expectations on collaboration and administration of common assessments. Administrator participants varied in description of the support of and leadership styles among PLCs and common assessments. Administrators unanimously supported common assessments, with adjustment in the principal's role, 'Depending on the leadership in your PLC.'

Administration focused on ‘attendance’ in one setting while another witnessed ‘holding these groups accountable for meaningful conversation’s and work that leads to student learning.’ Based on study results and research, justification for increased professional development and clarity of expectations, as well as monitoring of expectations of collaboration and work product existed (Ainsworth & Viegut, 2015; Hattie, 2012). Noting these results, potential increased professional development and administrative support on assessment and data literacy for staff were deemed essential.

While administrators specified engagement in data work, this study indicated a need for greater administrative support for teachers in the collaborative utilization of data. Research from the USDOE (2009) promoted the inclusion of an administrator on data teams. Further research from Wilhelm (2011) endorsed educational leadership to promote teachers’ skills in data work to inform instruction, intervention, and formative assessment. Further, research supported school leaders who assisted the faculty to promote an ability to work with assessment and subsequent data (Peery, 2010).

Examples of appropriate teacher support for assessment and data practices were evident in interview data, with exemplar work and direct training. Administration stated the need to identify and develop teacher leaders to support the common assessment and data process. Research from Peery (2010) stated school leaders should meet with team leaders once every month. While some faculty professional development included shared exemplars of SLO data utilizations, no such comprehensive meetings took place in the 2015-2016 school year. The researcher recommended increased support for data utilization for teachers in the form of direct support for work with data.

Ho1: There is a relationship between student common formative assessment scores and End of Course exam scores in Government, with respect to the population of the study school district.

The results of this study may assist in crafting pre-assessments, purposeful data use, and subsequent instructional choices for teachers. Through examining the result of the SLO-driven pre-assessments in the fall and winter of the 2015-2016 academic school year and EOC scores, evidence of a significant relationship between those scores existed in the U.S. Government course. The relationship between common assessment and summative EOC scores were communicated by the scatter plot and used to conduct a PPMCC analysis. The statistical analysis demonstrated a significant relationship between two assessment variables. This relationship, with an *r*-score of 0.514, pointed to a pre-assessment proven potentially predictive of student performance and classroom instruction, that supported the learning related to the content and skills the EOC assessed.

Ho2*:* There is a relationship between student common formative assessment scores and End of Course exam scores in Biology, with respect to the population of the study school district.

The researcher analyzed the results of the qualitative data and assessment data and found Biology was the least aligned with research-supported PLC common assessment practices. The scatter plot used to visualize the PPMCC detailed the observable relationship between the SLO common pre-assessment and summative EOC score, with a related, non-significant r-score of 0.179, a low, observably only, correlation between variables. The researcher noted the Biology data produced the lowest of the four *r*-scores after statistical analysis. The researcher noted the Biology data produced the score

closest to zero of the four *r*-scores after statistical analysis, indicating the least linear relationship. Additionally, it was important to note 2015-2016 was a pilot year for the SLO process and likely many revisions to associated practices followed in all PLC groups. Research cited, five years after implementation teachers believed SLOs enriched teaching and were worth the outlay of time and effort (Lachlan-Haché, 2015). In spite of the caveat of SLO-novelty, the lack of a significant relationship between assessment data points indicated a need for improvements in SLO selection, pre-assessment practices, and data utilization.

Ho3: There is a relationship between student common formative assessment scores and End of Course exam scores in English II, with respect to the population of the study school district.

Analysis of the results of English II assessment scores indicated a significant high relationship between EOC and pre-assessments. The *r*-score of 0.559 noted the strongest relationship between the two data points, in comparison of the four EOCs examined. The researcher believed this difference resulted from the multiple divergent practices of the English PLC teams. The connection reflected the work of the English II PLC favorable response to common formative assessment survey questions, pre-assessments, and SLO connection directly to the EOC test. Love et al. (2010) observed the practice of understanding students' standing relative to intended learning targets were grounded in common formative assessments repeatedly used by data teams. The English department at the researched school was the top scoring team on EOC exams for several years prior to this study and conducted a formative practice EOC one week prior to the summative exam, to provide students with needed remediation. The research showed the assessment

and data literacy around common assessments of this group to serve as a resource for other subject areas.

Ho4: There is a relationship between student common formative assessment scores and End of Course exam scores in Algebra, with respect to the population of the study school district.

The Math department made use of *Evaluate*, a web-based assessment tool that provided actionable data to adjust instruction, as a common formative assessment tool. *Evaluate* was utilized for years, prior to this study, and administered monthly to provide guidance to adjust instruction. The results from the PPMCC analysis produced an *r*-score of -0.328, a medium, significant, inverse correlation. The researcher recommended further investigation surrounding assessment-based instructional interventions, as well as a closer inspection of the scope of SLO. Algebra PLCs selected an SLO content-based assessment over Linear Equations, Inequalities, and Quadratic Equations. These concepts, while essential concepts in the study of Algebra, did not spiral throughout the course.

Recommendations for future research

The researcher recommended future study during the 2016-2017 school year designated as 'full implementation' of SLOs among a larger sample size, with both qualitative and quantitative methods of research. As teachers refine the use of assessment and data around SLOs, continued quantitative analysis of pre-assessment scores and the possible relationship to EOC scores should continue, to inform classroom instruction. Other schools would benefit from this mixed-method study to uncover where common assessment improvements could occur within the SLO framework. The researcher

acknowledges the challenge of measuring a program in a pilot stage of adoption to then find promising results.

The small sample size utilized in this study served as a limitation to the findings of this study particularly, in the Biology PLC. The small amount of qualitative data gathered in that setting indicated the need for further study to acquire a greater volume of information, with participants from the science department. Further research would benefit with greater insight into the process through in-depth data gathering techniques. Minutes from PLC meetings and other forms of documentation related to the PLC alignment and research-proven practices around common assessment would provide greater understanding into the data analysis and instructional choices by teams. Additionally, analysis of the pre-assessment with respect to the relationship to course curriculum essentials and the EOC results would prove beneficial. The pre-assessment analysis would lend itself to building the data-related relationship between administrators and teachers to address both the scope and assessment attached to SLOs.

Conclusion

As the state of Missouri entered into the first full year of SLO use, in relation to teacher evaluations, common assessment work became even more critical than in previous years. Additionally, navigation of common assessment foundations, such as teacher collaboration, data analysis, formative aspects of assessment, and instructional adjustment, required much of teachers and school leadership. The required connectivity of these concepts necessitated assessment-savvy teachers and schools that provided evidence of student learning on identified standards, to prepare students for college and career settings. Therefore, the researcher concluded all educators, administrators and

teachers alike, should continue to build a strong foundation in PLCs and take ownership of the research surrounding these topics, to further navigate the SLO terrain of collaborative assessment and data.

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Appendix A: Teacher Survey Questions

1) Working in a Professional Learning Community environment has improved my classroom instruction.
Strongly agree Agree Neutral Disagree Strongly disagree

2) Working in a P.L.C. environment has improved my understanding of assessment types and the data they produce.
Strongly agree Agree Neutral Disagree Strongly disagree

3) It has been has worth the investment of lost instructional time to administer common assessments.
Strongly agree Agree Neutral Disagree Strongly disagree

4) It is important for P.L.C. teams to develop common assessments constructed around student's mastery of the Student Learning Objective.
Strongly agree Agree Neutral Disagree Strongly disagree

5) The development and implementation of common assessments resulted in changing my instructional design.
Strongly agree Agree Neutral Disagree Strongly disagree

6) The development and implementation of common assessments increased the instructional rigor.
Strongly agree Agree Neutral Disagree Strongly disagree

7) The development and implementation of common assessments resulted in the consistency of course objectives within different classrooms regardless of the instructor.
Strongly agree Agree Neutral Disagree Strongly disagree

8) My professional learning community believes formative common assessments are important for student learning.
Strongly agree Agree Neutral Disagree Strongly disagree

9) Teachers should analyze assessment data to identify students who need additional time and support.
Strongly agree Agree Neutral Disagree Strongly disagree

10) Teachers should individualize instruction based on assessment data.
Strongly agree Agree Neutral Disagree Strongly disagree

11) Teachers, when meeting as a professional learning community, use assessment data to identify instructional best practice.
Strongly agree Agree Neutral Disagree Strongly disagree

12) It has been helpful to establish Student Learning Objectives with my P.L.C. team.

Strongly agree Agree Neutral Disagree Strongly disagree

13) Teachers in a professional learning community create assessments aligned with student learning objectives.
Strongly agree Agree Neutral Disagree Strongly disagree

14) Student Learning Objectives will cause my P.L.C. team to addresses student assessment data in more frequently.
Strongly agree Agree Neutral Disagree Strongly disagree

15) What percent of your P.L.C. time has your team spent:
Developing common assessments?
1-10% 11-20% 21-30% 31-40% 41%-50 51-60% 61-70% 71-80% 81-90%
Analyzing assessment data?
1-10% 11-20% 21-30% 31-40% 41%-50 51-60% 61-70% 71-80% 81-90%
Sharing best instructional practices?
1-10% 11-20% 21-30% 31-40% 41%-50 51-60% 61-70% 71-80% 81-90%
Planning curriculum or instruction?
1-10% 11-20% 21-30% 31-40% 41%-50 51-60% 61-70% 71-80% 81-90%
Discussion of managerial or logistical topics (non-instructional)
1-10% 11-20% 21-30% 31-40% 41%-50 51-60% 61-70% 71-80% 81-90%

Appendix B: Teachers Interview Questions

1) Describe your process of instructional design and implementation after participating in a professional learning community.

2) Describe the professional learning community process before and after students complete a common formative assessment.

3) Describe what occurs in a professional learning community meeting. Include creation of assessments, grading, data utilization and next steps.

4) Explain the implementation of Student Learning Objectives in your P.L.C. relative to assessment and data.

Appendix C: Informed Consent

Lindenwood University

School of Education
209 S. Kingshighway
St. Charles, Missouri 63301

Consent for Administrator Interview

A mixed-method exploration of goal-setting, student motivation and achievement in reading within a large St. Louis County school district.

Principal Investigator: Matt Irvin Email: mri011@lionmail.lindenwood.edu

Participant: _____

Contact Information – Phone: _____ Email:_____

Dear Administrator,

1. You are invited to participate in a research study conducted by Matt Irvin under the guidance of Dr. Lynda Leavitt. The purpose of this research study is to explore the mixed method investigation of common assessments within a secondary suburban setting.

2. a) Your participation will involve a one-on-one interview regarding perception of PLC and common assessment development and utilization, data-driven decision making and continuous improvement. Interviews will be conducted by the researcher and will occur in a mutually agreed upon location.

   b) There will be up to 5 administrator participants, with a potential maximum of 30 adults. The amount of time involved in your participation will be between 20-30 minutes, and you will receive a $5 gift card to a local merchant for your time.

3. Your participation will contribute to the knowledge about common assessment development and utilization, data-driven decision making and continuous improvement.

4. Your participation is voluntary and you may choose not to participate in this research study or withdraw your consent for your participation at any time.

5. You may choose not to answer any questions that you do not want to answer. You will not be penalized in any way should you choose not to participate or to withdraw.

6. Everything will be to done to protect your privacy. As part of this effort, your identity will not be revealed in any publication or presentation that may result from this study. Due to the limited number of individuals being interviewed, individual characteristics could inadvertently be identified.

7. Interviews will be recorded for the purposes of accurate transcription.

8. If you have any questions or concerns regarding this study, or if problems arise, you may contact the Investigator, Matt Irvin at mri011@lionmail.lindenwood.edu or the Supervisory Faculty, Dr. Lynda Leavitt at lleavitt@lindenwood.edu. You may also ask questions or state concerns regarding your participation to the Lindenwood Institutional Review Board (IRB) through contacting Marilyn Abbott, Interim Provost at (636)949-4846.

I have read this assent form and have been given the opportunity to ask questions.
I assent to my participation in the research described above.

_____
Teacher's Signature Date

_____
Teacher's Printed Name Date

_____ _____
Signature of Investigator Date Investigator's Printed Name

Appendix D: Informed Consent

Lindenwood University

School of Education
209 S. Kingshighway
St. Charles, Missouri 63301

Consent for Teacher Interview

A mixed-method exploration of goal-setting, student motivation and achievement in reading within a large St. Louis County school district.

Principal Investigator: Matt Irvin Email: mri011@lionmail.lindenwood.edu

Participant: _____

Contact Information – Phone: _____ Email: _____

Dear Teacher

1. You are invited to participate in a research study conducted by Matt Irvin under the guidance of Dr. Lynda Leavitt. The purpose of this research study is to explore the mixed method investigation of common assessments within a secondary suburban setting.

2. a) Your participation will involve a one-on-one interview regarding perception of PLC and common assessment development and utilization, data-driven decision making, instructional design and implementation. Interviews will be conducted by the department chair and will occur in a mutually agreed upon location.

   b) There will be 10 to 25 teacher participants, with a potential maximum of 30 adults. The amount of time involved in your participation will be between 20-30 minutes, and you will receive a gift card valued at $5 to a local merchant for your time.

3. Your participation will contribute to the knowledge about common assessment development and utilization, data-driven decision making, instructional design and implementation.

4. Your participation is voluntary and you may choose not to participate in this research study or withdraw your consent for your participation at any time.

5. You may choose not to answer any questions that you do not want to answer. You will not be penalized in any way should you choose not to participate or to withdraw.

6. Everything will be to done to protect your privacy. As part of this effort, your identity will not be revealed in any publication or presentation that may result from this study. Due to the limited number of individuals being interviewed, individual characteristics could inadvertently be identified.

7. Interviews will be recorded for the purposes of accurate transcription.

8. If you have any questions or concerns regarding this study, or if problems arise, you may contact the Investigator, Matt Irvin at mri011@lionmail.lindenwood.edu or the Supervisory Faculty, Dr. Lynda Leavitt at lleavitt@lindenwood.edu. You may also ask questions or state concerns regarding your participation to the Lindenwood Institutional Review Board (IRB) through contacting Marilyn Abbott, Interim Provost at (636)949-4846.

I have read this assent form and have been given the opportunity to ask questions.
I assent to my participation in the research described above.

_____
Teacher's Signature Date

_____
Teacher's Printed Name Date

_____ _____
Signature of Investigator Date Investigator's Printed Name

Appendix E: Administrator Interview Questions

1) Describe the use of common assessments in your building and an administrator's role in the process.

2) Describe teacher assessment literacy in your building and an administrator's role in that process.

3) Explain the P.L.C. process at your school and the administrator's role in the process.

4) How might an administrator provide leadership and support to teachers regarding data usage from assessments?

5) How might an administrator provide leadership and support to teachers regarding the development and implementation of S.L.O.'s?

Appendix F: NIH Certificate

Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **Matthew Irvin** successfully completed the NIH Web-based training course "Protecting Human Research Participants".

Date of completion: 06/30/2015

Certification Number: 1791255

Vitae

Colleges and Universities

1993: Bachelor of Science in Education, Comprehensive Social Studies from Missouri State

2001: Masters of Educational Leadership from the University of Missouri-St. Louis

2014: Educational Specialist in Educational Administration from Lindenwood University

2015-present: pursuing Doctorate of Education in Educational Administration (expected graduation date in December of 2016) from Lindenwood University

Teaching and Employment History

1993-1997: Social Studies teacher and coach at Kirkwood High School

1997-2008: Social Studies teacher, coach, and administrator at Mary Institute and St Louis Country Day School

2008-2010: Social Studies teacher and coach New Trier High School

2010-2015: Social Studies teacher, coach, instructional coach at Kirkwood High School

2015-present: Assistant Principal Lindbergh High School

Honors

2005/2011/2012: St Louis Rams High School Football Coach of the Year

2007: Publication in Nike Coach of the Year Manual *Leadership training*

2012: Missouri Coaches Association Coach of Year (football)