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# Teacher Perceptions About Using Collaborative Inquiry in Professional Learning Communities

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This is to certify that the doctoral study by

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Walden University
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Abstract

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MS, Central Michigan University, 2005

BS, Hampton University, 1977

Project Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

A large suburban school system in the mid-Atlantic United States identified the Data Wise Improvement Process (DWIP) as a systemic strategy to achieve the district-wide goal of student achievement for college and career readiness. Elementary science teachers marginally participated in school-based instructional team meetings to analyze student data. The purpose of this qualitative case study was to understand teacher perceptions of working with colleagues in a collaborative learning environment focused on shared student data. Adult learning theory, social constructivist theory, and collaborative inquiry practices served as the conceptual framework for this study. Data were collected through an electronic web-based survey with five Grade K–5 science teachers and a focus group with four Grade K–5 science teachers. The data were examined through inductive analysis, and seven themes emerged: (a) teachers have a working knowledge of DWIP and collaborative planning, (b) teachers' new skills and knowledge impact their individual practice, (c) teachers' colleagues display adverse behaviors in collaborative sessions, (d) central office personnel impact teachers' collaborative inquiry processes, (e) teachers value student data for flexible decision making, (f) teachers identify supportive principal behaviors related to collaborative inquiry, and (g) teachers identify adverse principal behaviors related to collaborative inquiry. Based on the findings, a 3-day professional development module was created to enhance teacher and school administrator collaboration regarding student work. Positive social change may occur through a shared commitment of teachers and school administrators focusing on collaboration around student data for improved teaching practices and student outcomes.

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# Dedication

I dedicate this scholarly work to my parents, Charles B. and Elizabeth C. Bethea Ashford. Although these great individuals are deceased, I honor their parenting stewardship with this significant accomplishment. I thank God for my parents who have always encouraged me to be the best Linda in everything I do!

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Section 1: The Problem

## The Local Problem

For the past several decades, state and federal education agencies have placed expectations on classroom teachers to engage in data-informed practices (Lewis & Holloway, 2018; Mandinach & Schildkamp, 2021; Smith & Holloway, 2020). However, since 2002, efforts to encourage teachers to use student data to improve teaching and learning have increased (Close et al., 2018; Wachen et al., 2018). As school districts implement new standards for learning, school personnel are expected to place more emphasis on collecting and using student data to assess instruction and measure students' progress (Van Geel et al., 2019). The student Adequate Yearly Progress mandates of the federal No Child Left Behind Act of 2002, the Race to the Top Fund of 2009, and the Common Core State Standards (CCSS) of 2011 have become central to teacher accountability based on the utilization of standardized test data (Pak & Desimone, 2019).

Policymakers determined that student achievement is positively impacted when educators practice data-driven decision making to inform instruction (Mandinach & Schildkamp, 2021). Data-driven decision making by classroom teachers involves the use of multiple data sources to identify students' successes and challenges relative to learning objectives (Schildkamp et al., 2019). However, teachers might not be knowledgeable about how to make use of various data sets to inform instructional practices (Schildkamp, 2019). Additionally, Mandinach and Schildkamp (2021) stated that many teachers do not appear to be trained in how to use student assessment data.

An increasing number of school systems require teachers to collaborate around data for informed decision making (Abrams et al., 2021). Additionally, teachers are expected to demonstrate data literacy from collaborative inquiry with colleagues (Boudett et al., 2020). Collaborative inquiry is an approach to transformative professional learning that contributes to a positive change in classroom and school culture (Osmond-Johnson & Fuhrmann, 2022). According to Mora-Ruano et al. (2019), student achievement can be improved through teacher collaboration around student data. Data-driven decision making provides teachers with opportunities to address instructional and student learning deficits (Prenger & Schildkamp, 2018). Teacher collaborative practices that focus on student data analysis and instructional decisions make a significant contribution to student achievement (Dogan & Adams, 2018).

Effective teacher collaboration results from leadership that builds the capacity for dialogue and action pertaining to instruction, curriculum, students, and assessments and supports instructional teams to maintain meaningful collaboration (Cansoy & Parlar, 2018). An overwhelming task exists for school leaders in getting instructional teams to systematically work together effectively and efficiently to utilize data-processing strategies (Cosner et al., 2018). According to Johnson et al. (2018), teachers tend to work in isolation and lack motivation to collaborate with colleagues regarding instructional decisions that impact student learning.

The purpose of the current study was to understand teacher experiences of working with colleagues in a collaborative learning environment focused on shared student data. After observations of instructional teams and conversations with school

district teacher support personnel, elementary science teachers revealed that they are minor participants in collaborative team meetings designed to examine and discuss student data that informs instruction (Instructional Specialist, personal communication, February 18, 2018). Moreover, a review of the literature on teacher data use indicated limited research regarding teacher collaboration around student data. To close the gap in recent literature, I explored elementary science teachers' experiences of collaborative inquiry.

Section 1 of this study includes a description of the research problem identified in the school district and the rationale for the study based on evidence of the problem at the local level and in the professional literature. Additionally, the purpose of the study, definitions of terms used throughout the study, significance of the study, and research questions are presented. Moreover, a review of literature includes the study's conceptual framework of adult learning theory, social constructivist theory, and collaborative inquiry. Section 1 ends with implications related to the study and a summary.

## Definition of the Problem

A large suburban school system in the mid-Atlantic United States identified the Data Wise Improvement Process (DWIP) as a systemic strategy to achieve the 2016–2020 academic years' (AY) district-wide goal of student achievement for college and career readiness. The DWIP is a multistep, collaborative inquiry process developed through the Public Education Leadership Project of Harvard University to assist educators in improving instruction and learning through student data analysis (Boudett et al., 2020). In the school district where the current study took place**,** the DWIP was piloted

during the 2010–2011 AY with 10 district schools. By the end of the 2012–2013 AY, 21 schools adopted the DWIP.

The school district offered 11 DWIP professional development sessions for select district schools, Grades K–8, during the 2014–2015 AY (School Improvement Specialist, personal communication, April 6, 2018). Each school was required to send a minimum of three school personnel, including the principal, to one 3-hour DWIP session (School Improvement Specialist, personal communication, April 6, 2018 ). There are 208 schools in the school district, and educators are assigned by school administrators to work on instructional teams to plan for instruction. In elementary schools, each instructional team is composed of grade-level teachers and specialists. The number of instructional team members varies based upon whether the school (a) has self-contained classrooms in which a teacher facilitates instruction in all core subjects, (b) is departmentalized by subjects, or (c) exists with a combination of both classroom structures.

The instructional teams are assigned days and time periods for collaborative planning sessions that have been built into the school's master schedule. During the allotted planning time, instructional team members are expected to develop achievable action plans that will improve instruction, enrich student assessment rigor, and encourage excellence in student achievement. The study site school district adopted collaborative inquiry as data inquiry and promoted school data teams for the purpose of using and analyzing student data to inform instruction (School Improvement Specialist, personal communication, April 6, 2018). The problem at the time of the current study was that elementary science teachers marginally participated in school-based instructional team

meetings to analyze student data (Instructional Specialist, personal communication, February 18, 2018).

## Rationale

### Evidence of the Problem at the Local Level

As a school district outreach educator attending 14 elementary schools' school improvement meetings and teacher collaborative planning sessions, I observed science teachers as infrequent participants in the analysis of student data. The school district's science department personnel made teacher observations in collaborative team meetings and had conversations with teachers. The observations and conversations by the district's science department personnel were determined to be evidence that elementary science teachers do not feel adequately trained on DWIP to analyze student assessment data (Instructional Specialist, personal communication, February 18, 2018). Additionally, DWIP training was not available for all teachers in the district. Prior to the 2014–2015 AY, DWIP training was offered every other year beginning with AY 2010–2011 (School Improvement Specialist, personal communication, April 6, 2018).

During the 2013–2014 AY, the school district transitioned to the CCSS. The district's Department of Curriculum and Instruction provided several teacher professional development pilot sessions on CCSS during the 2013–2014 and 2014–2015 AY (Literacy Coach, personal communication, February 9, 2018). The collaborative planning sessions for schools became a systemic focus for reading and mathematics literacy and Partnership for Assessment of Readiness for College and Careers tests to support the transition to CCSS (Literacy Coach, personal communication, February 9, 2018).

The district's science department prepared for the implementation of the Next Generation Science Standards (NGSS) during the 2014–2015 and 2015–2016 AY with teacher professional development by grade levels (Instructional Specialist, 2018). Elementary science teachers in self-contained classrooms experienced an overlap in training for two new curriculum standards (CCSS and NGSS) during the 2014–2015 AY. However, with the full implementation of the NGSS as the science curriculum for the school district during the 2016–2017 AY, elementary science teachers were required to contribute to and learn from collaborative work sessions to make appropriate changes in assessment and instruction to advance science education (Instructional Specialist, personal communication, February 18, 2018).

**Evidence of the Problem in the Professional Literature**

According to Khalid et al. (2021), assumptions are made that teachers know how to utilize student data. Teachers generally determine the level of success of student learning through scores of teacher-prepared assessments or textbook tests (Khalid et al., 2021). The presence of varied student performance assessments associated with state testing and new national curriculum standards requires classroom teachers to utilize the results to make improvements to instruction for student achievement (Schildkamp et al., 2019). Khalid et al. (2021) noted that teachers require support to accomplish the task of improving instruction through data use. The emergence of collaborative team structures and professional development focused on disaggregating data for instructional decision making could prove supportive for educators. Datnow (2020) suggested that few studies have focused on how teachers collaboratively interact with data to inform instruction.

Additionally, M. K. Burns et al. (2018) found that there was limited research on the combination of professional learning and data use. However, within the last decade there has been a surge in teacher professional development around data utilization and analysis (Hargreaves, 2019).

## Purpose

The purpose of this project study was to explore elementary science teachers' perceptions about using collaborative inquiry to analyze student data in professional learning communities.

## Definitions of Terms

The following terms were used throughout this study:

*Collaboration*: A practice in which teachers routinely communicate with one another regarding individual classroom experiences to promote student achievement and support professional growth and development (Darling-Hammond et al., 2018).

*Collaborative inquiry*: A systematic approach for educators to collectively define and resolve professional issues through shared inquiry, problem solving, and active reflective processes (Quinn et al., 2019).

*Collective teacher efficacy*: Awareness that professional learning can be achieved through the acceptance of colleagues' expertise for the collective goal of student success (Donohoo, 2018).

*Data-driven decision making*: The use of student data to support learner-centered instruction that is appropriate for individual and class academic needs (Schildkamp, 2019).

*Data literacy*: The knowledge and skill set for teachers that include the ability to use and analyze data, content knowledge, and pedagogical content knowledge (Beck et al., 2019).

*Data use capacity*: The environmental structures within an organization that promote and sustain the utilization of data (Farley-Ripple et al., 2019).

*Data Wise Improvement Project*: The facilitation of educators through collaborative data inquiry processes to continually advance and maintain improvement of teaching and learning (Boudett et al., 2019).

*Professional development*: Essential knowledge and skill-generating activities that are designed to equip educators to meet the academic needs of students (Darling-Hammond et al., 2018).

*Professional learning community (PLC)*: A group of educators who participate in a definitive and continual process that enables them to collaborate through inquiry and action research for student achievement (Moulakdi & Bouchamma, 2020).

*Teacher collaborative inquiry*: A cyclical process designed to promote teacher discussion as classroom practitioners working toward improved student learning (Yancovic et al., 2019).

*Teacher network*: A catalyst for building capacity for data use (Farley-Ripple et al., 2019).

*Teacher self-efficacy*: The reflective awareness of the ability to facilitate instruction for every student (Corry & Stella, 2018).

*Vertical team*: An organizational structure of different grade-level teachers designed to encourage effective collegial relationships, support professional growth, make relevant contributions toward school improvement, and foster appropriate student transition (Trabona et al., 2019).

## Significance of the Study

The results of this qualitative study could be of significance to the participating teachers and school communities to determine professional development needs of adult learners related to student data analysis. The impact of this study could be demonstrated through school improvement efforts to build and maintain effective collaborative attitudes and behaviors among personnel. Furthermore, this study could add to the body of research on how elementary science teachers interact with data to impact student and professional learning, thereby promoting social change that affects teachers' skills in analyzing student data and working and learning in professional collaborative structures.

## Research Questions

As part of professional responsibility, teachers individually use student data to determine student progress in relation to instruction. In response to the study site school district's master improvement plan related to data utilization and analysis, some school principals assigned personnel to plan, coordinate, and lead student data meetings. In other schools, teams of teachers were expected to meet to discuss student data and collaboratively plan for appropriate next steps. Consequently, teacher perspectives on collaborative inquiry experiences were explored in the current study. The purpose of this study was to explore elementary science teachers' perceptions about using collaborative

inquiry to analyze student data in PLCs. The following research question (RQ) and subquestions (SQs) guided this study:

RQ: What are elementary science teachers' perceptions about using collaborative inquiry to analyze student data in professional learning communities?

SQ1: What are the barriers to using specified student data analysis methods?

SQ2: What are the human and organizational supports for using specified student data analysis methods?

## Review of the Literature

In this literature review, I present research relative to teachers' interaction with student data in a collaborative professional learning structure. The scholarly sources suggested that adult learners' experiences impact personal learning, social constructivism is an emergent perspective on learning, and collaborative inquiry is an essential process for teacher learning and improvement of professional practice. The review of literature also includes research related to the organization and perspectives of teacher team structures including PLCs.

## Conceptual Framework

The conceptual framework for this study was grounded in adult learning theory, social constructivist theory, and collaborative inquiry practices. The rationale for including two theories was based on teachers' experiences as adult learners (see Ajani, 2019) making sense of the experiences to produce knowledge (see Etmanski et al., 2018) in collegial environments focused on using student data to make informed decisions regarding instruction (see Boudett et al., 2020). I combined the theories and practice of

collaborative inquiry because teachers bring prior experiences, knowledge, and expertise into learning environments to create new understandings through social interactions.

**Adult Learning Theory**

Knowles's theory of andragogy focuses on six principles concerning adult learners: (a) a need to know the reason for the learning activity, (b) an ability to be self-directed, (c) a variety of work and personal experiences, (d) a readiness to gain relevant knowledge, (e) a sense of motivation to learn meaningful information, and (f) an internal motivation (Knowles et al., 2020). D. Ferreira and MacLean (2018) asserted that adults display a readiness to learn when a life situation indicates a need to know. Professional development that supports the dual role of educators as technicians and intellectuals requires consideration of how teachers learn and transfer learning into practice (Ajani, 2019). Etmanski et al. (2018) and Holland (2019) suggested that attention to adult learning styles is a key factor in collaborative environments to produce individual transformation and reflection.

Participants in several studies of a teacher learning and leadership program reported that effective collaboration among teacher participants was achieved through the attention that was paid to adult learning styles, specifically teachers' styles (Baker-Doyle, 2021). Teachers bring a diverse skill set, knowledge, education, teaching, and training experiences to the education environments (Keay et al., 2018). To determine an adult learner's best fit in a collaborative learning environment, it is essential to acknowledge and incorporate a participant's knowledge, experiences, and perspective to promote active reflection and improvement (Housel, 2019). R. Burns (2020) and Kolleck (2019)

emphasized that teachers, like other adults, will be open to new ideas if there are connections to present knowledge. Additionally, de Joeng et al. (2022) purported that collaboration with other teachers was the primary influential activity for professional learning. Weddle et al. (2019) asserted that teachers will participate in collaborative practices if there is cordial collegial sharing and opportunities to debate in a nonthreatening manner to arrive at a consensus. Additionally, collaborative inquiry supports professional learning through experiences that are relevant, reflective, adaptive, reciprocal, and iterative (Carpenter, 2018).

**Social Constructivist Theory**

Vygotsky and Piaget have been credited as the primary researchers and developers of constructivist learning theories. Vygotsky is the originator of the social constructivist theory (Vygotsky & Cole, 1978), and Piaget developed the cognitive constructivist theory (Piaget et al., 1929). The premise of the cognitive constructivist theory and the social constructivist theory is that the learner is actively engaged in knowledge acquisition by constructing meaning from their experiences (Alt, 2018). Cognitive constructivism emphasizes that knowledge is created by the individual within the learning context and takes on personal meaning for the learner (Knowles et al., 2020). The cognitive constructivist theory of learning, also known as cognitive constructivism, contrasts with a traditional view of learning in which the learner is a passive receiver of knowledge (Akinbobola & Bada, 2018). According to Piaget et al. (1929), cognitive constructivism suggests that thinking precedes language for cognitive construction. An

individual learner who creates concepts from existing knowledge that is meaningful and relevant to the learner characterizes the cognitive constructivist theory.

A study of 303 science teachers was conducted to identify perceptions of constructivist pedagogical practices on self-efficacy (Alt, 2018). The study findings indicated that the constructivist learning environments in contrast to traditional lecture environments promoted knowledge construction through higher order thinking skills and reflection on knowledge to complete an inquiry-based task. Additionally, Alt (2018) found that the constructivist learning environment supported self-efficacy as a result of student reflection and interpretation of individual learning capabilities. A learning environment that incorporates inquiry-based teaching methods appears to support individual thinking as identified by the cognitive constructivist theory.

The social constructivist theory originated by Vygotsky (Vygotsky & Cole, 1978) purports that social interaction is essential to the thinking processes and sense making in the development of knowledge. The social interactions among learners and guides are centered on sharing, comparing, and debating (Vygotsky & Cole, 1978). According to Diep et al. (2019), social constructivism is evidenced through learners assisting one another to construct meaning through mutual means. Learning through social constructivism involves (a) experience in knowledge construction through exploration and experimentation, (b) experience in gathering multiple perspectives, and (c) experience in social and emotional learning (Cocquyt et al., 2018; Datnow & Park, 2018; Jones et al., 2019). According to Barak and Green (2021), the social constructivist theory promotes meaningful learning through engaging social activities and collaboration. The

shared learning experiences of learners through the exchange of perspectives and connecting activities are characteristics of social constructivism that seem to support collaboration.

**Collaborative Inquiry**

There are several descriptions of collaborative inquiry for educators. Jimerson et al. (2021) found in a study about an elementary school that the optimal environment for the development of educators' professional skills is a collaborative, student-data-informed environment with intellectually stimulating content that builds on prior knowledge. Similar to Jimerson et al.'s assessment of a collaborative environment, Yancovic et al. (2019) described collaborative inquiry as an essential learning support structure for educators to enhance professional practice through the exploration of students' responses to instruction. Findings from a qualitative case study of upper elementary teachers in four schools revealed that collaborative inquiry is sustained through teacher choice related to professional learning path and pace (Datnow & Park, 2019). Additionally, emphasis on the requirement for teachers to collaborate with colleagues using evidence of student work along with possession of deep content knowledge and flexibility in pedagogical applications is necessary for teachers to make sound instructional decisions (Boudett et al., 2020). Furthermore, Priestley and Drew (2019) concluded from their study of teachers in Scotland that collaborative inquiry is defined as a dynamic teacher partnership devoted to professional learning and improvement grounded in curriculum, pedagogy, and assessment.

Collaborative inquiry frameworks are similar in structure as a cyclical process and a socioconstructivist environment for teacher learning (Pino-Yancovic et al., 2022). Collaborative inquiry creates a socially contextual environment that produces interactivity among stakeholders including teachers and administrators (Yancovic et al., 2019). In a qualitative study of higher education stakeholders, including deans and alumni, Xing et al. (2019) found that collaborative inquiry practices established optimal conditions that resulted in transformative learning among participants. The social connections between teachers and colleagues during collaborative inquiry provide a foundation for vicarious professional experiences and positive affective states of being (Yancovic et al., 2019). Collaborative inquiry reflects an organizational structure whereby teachers enhance professional learning and practice through the collective examination and analysis of instruction-related data.

The theories of adult learning and socioconstructivism, along with the practice of collaborative inquiry, served as the conceptual framework for the current qualitative case study. The research questions central to this qualitative case study focused on Grades K–5 science teachers' perceptions of collaborative inquiry in the analysis of student data in PLCs. The conceptual framework and research questions guided the study, and teacher perceptions were explored to gain insight into teacher behaviors regarding collaborative inquiry with colleagues. The open-ended structure of the research questions supports an inductive approach to produce knowledge that would increase an understanding of teacher perceptions, thereby addressing a gap in teacher practice. The research questions

addressed factors that impact teachers as adult learners in a socioconstructivist environment focused on collaborative inquiry.

## Review of the Broader Problem

To conduct the review of literature, I accessed online scholarly search engines, including the Education Resources Information Center (ERIC), Sage Premier, and Pro Quest Central in the Walden University Library, and the U.S. Department of Education website. I focused on literature related to *data utilization by teachers*, *teacher professional development*, *teacher collaboration*, *collaborative inquiry*, *communities of practice*, and *professional learning communitie*s. I continued the literature search until I was unable to locate additional relevant sources, indicating that the literature search was comprehensive.

An understanding of collaborative inquiry for educators can begin with an understanding of collaboration. According to Dewitt (2019), collaborative learning communities allow for the establishment of two foundational elements of an interdependent relationship: trust and shared responsibility. Trust between individuals in a codependent relationship fosters collaborative behaviors that are essential to meet the desired outcomes (Schwabsky et al., 2020). Shared responsibility is referred to as the joint perspective and actions of individuals to cooperatively work toward achieving goals (Krammer et al., 2018). The practice of collaboration through trust and shared responsibility appears to be a prerequisite for collaborative inquiry.

## Collaboration

Teacher collaboration is the interaction of educators for professional development and instructional improvement. After a study of 14 elementary schools, Spillane and Shirrell (2018) concluded that collaboration in schools is a strategy to promote teacher improvement and effectiveness that is influenced by physical proximity. Compared to Spillane and Shirrell's description of collaboration as a strategy, Liu and Hallinger (2018) emphasized collaboration as the strategic collective and cooperative work of teachers to promote teacher efficacy and school improvement. Collaboration within teacher teams is designed to systematically analyze and improve their professional practice (Boudett et al., 2020). Teacher collaboration provides opportunities for individual and collective development toward professional practice and school improvement.

Researchers determined that collaborative activities in the work environment have produced significant organizational learning (Johnson et al., 2018). Teachers benefit from dialogue and problem solving in collaborative experiences with colleagues as they make decisions that can change teacher practice, advance student learning, and support peer processing of new understandings and professional learning (Johnson et al., 2018). Collaborative activities among educators are catalysts for the advancement of professional development and practice.

### *History of Teacher Collaborative Practices*

The origin of teacher collaboration was in response to the Education of All Handicapped Children Act of 1975, now recognized as the Individuals with Disabilities Education Act of 2004 (Blanton et al., 2018). Through the legislative mandate of Public

Law 94-142 of 1975, special education and general education teachers were required to collaborate to foster least restrictive learning environments for students with disabilities (Individuals with Disabilities Education Act of 2004, 2019). Since the early 1980s, teacher collaborative practices have expanded to further overall student population achievement and school improvement (Garcia-Martinez et al., 2021; Hargreaves & O'Connor, 2018). Special education and general education teachers potentially present a model of teacher collaboration.

### *Collaborative Structures*

Teacher collaborative work groups exist in many forms and for various reasons. Elementary and secondary schools created teacher collaborative structures for grade levels and subject disciplines to plan and advance instruction. Local education agencies are promoting teacher collaborative structures for building teacher capacity and student data purposes (Blake & Gibson, 2020; Hargreaves, 2019; Hubers et al., 2019). Additionally, teachers work in collaborative teams with other educators to support school improvement efforts (Garcia-Martinez et al., 2021). Literature suggested that teachers' collaborative practices were integral in (a) sharing teacher perspectives regarding professional practices, (b) negotiating meanings of new learning and professional practices, and (c) evaluating teacher and student learning (de Joeng et al., 2022; Johnson et al., 2018; Muckenthaler et al., 2020). An understanding of previous research studies on teacher collaborative structures provides insight into the context of teacher work environment interactions for the benefit of student achievement and professional

learning. The various teacher collaborative structures seem to amplify the importance of collaborative relationships within the school.

Special education teachers are expected to collaborate with each other and the general education and content-specific teachers in schools. Weiss et al. (2018) indicated there are three models for collaboration: (a) multiprofessional, (b) interdisciplinary, and (c) transdisciplinary. The multiprofessional collaboration type is concerned with individuals trained in special education fields working together within the discipline to assess student needs (Solvason & Winwood, 2022). Interdisciplinary collaboration focuses on several disciplines being represented in meetings for improved student learning (Weiss et al., 2018). The transdisciplinary collaborative approach includes classroom teachers, special education teachers, and special services personnel sharing expertise and exchanging knowledge about students for educational advancement and intervention (Rausch et al., 2021). Although the teacher collaborative models are based on specific teacher criteria, each of the three special education teacher models provides an environment for teachers to demonstrate expertise, thereby creating a professional learning environment for all participants. Additional organizational models support teacher collaboration.

Three organizational models allow for teacher collaboration: (a) common planning teams, (b) critical friends groups, and (c) PLCs (Antinluoma et al., 2018; Love & Crowell, 2018; National School Reform Faculty, 2018). An examination of each teacher collaborative model led to an understanding of the collaborative structure that supports the conceptual framework of this study that is grounded in adult learning theory,

socioconstructivism, and collaborative inquiry. The specific characteristics for each teacher collaborative model were presented.

Common planning teams are composed of teachers who share the same students or are on the same grade level to assess and discuss the needs of their students (Love & Crowell, 2018). During common planning sessions, also referred to as coplanning, teachers collaborate on instructional sequence development for classroom implementation (Alsarawi, 2019). Coplanning involves equal sharing of professional expertise and agreement on final decisions by co-teachers (Alsarawi, 2019). Alnasser (2020) found in a study of four cooperatively taught elementary classrooms a limitation that two of the general education teachers made decisions regarding content without the special education teachers input during the coplanning sessions. The limitation found in Alnasser's study could present lack of parity among participants in coplanning sessions. However, in a case study of novice and veteran science teachers, Eshchar-Netz and Vedder-Weiss (2021) concluded that coplanning conversations supported teachers' professional learning. Coplanning appears to provide opportunities for teachers to share perspectives, learn from one another, and make decisions in preparation for teaching the same groups of students.

Critical friends' groups are organized to provide teachers with structured time and protocols for reflective discussions to improve teaching (National School Reform Faculty, 2018). Blake and Gibson (2020) asserted that trust amongst teacher participants is the essential element of a critical friends' group to promote non-judgmental feedback and critique of peers' professional practice. Blake and Gibson found in a collaborative

action research study of four secondary school teachers, that teachers participating in critical friends' groups were empowered to assist peers in individual learning management. The premise of the critical friends group appears to be based on collaborative learning amongst colleagues as friends.

A PLC is a model for school personnel to learn from each other and work together (Antinluoma et al., 2018). However, several interpretations of the term, PLC, exist**.** PLCs are collaborative structures wherein school team members conduct ongoing collective inquiry of student assessment data and action research to assess and inform instructional practices (M. K. Burns et al., 2018). Boudett et al. (2020) elaborated on M. K. Burns et al.'s (2018) perspective of PLCs with a suggestion that personnel from schools of education can support the development of data literacy for school team members**.** The inclusion of institutions of higher education in a school PLC is consistent with the assertion that community members are integral in the establishment of a PLC as found in seminal studies archived by the American Institutes for Research (Osher et al., 2018). Although consistent with M. K. Burns et al. (2018), another interpretation of a PLC emphasized active reflection by teachers on their instructional practice to improve teaching (Schaap & deBruijn, 2018). Additionally, school leaders are considered essential members of a PLC with the responsibility of sharing the vision for the school, promoting decision-making by teachers, and fostering a susceptible culture for collaboration to take place (Schaap & deBruijn, 2018). PLCs are effective for building skills and developing knowledge for teachers (Boudett et al., 2020; M. K. Burns et al., 2018; Schaap & deBruijn, 2018). Based on the multiple perspectives associated with PLCs, the elements

of focused collaboration around student data, participant reflection, and collegiality amongst diverse team members are essential in the development and sustainability of effective PLCs. A final teacher collaborative structure is presented.

School districts and individual schools have organized instructional personnel into collaborative groups for the singular purpose of participating in data driven decision-making (Jimerson et al., 2021; Schildkamp et al., 2018). Teachers are grouped into data teams to impact classroom instruction and to increase opportunities for teachers to learn from one another (Schildkamp et al., 2018; Spaulding & Smith, 2018). According to Boudett et al. (2020), teachers are expected to become data literate as they engage in collaborative inquiry with fellow educators. Teacher collaborative groups in schools are being considered as a potential solution to build capacity in data use for instructional improvement (Kippers et al., 2018). Boudett et al. (2020) have referred to collaborative inquiry as data inquiry wherein teams of educators analyze student data with the intent of making recommendations for subsequent curricular and instructional actions and follow up. Teacher collaborative groups organized around student data can promote teacher data literacy.

Each of the previously described collaborative structures is designed for a specific purpose that requires teachers to collaborate to achieve that purpose. Teacher collaboration centered on data supports the development of teacher data use for instructional decision-making (Abrams et al., 2021). According to the collaborative structure descriptions, collaborative inquiry that supports data-driven decision-making appeared to occur in teacher data teams and PLCs.

## Data Driven Decision Making

Data-driven decision making is the use of student data to support learner-centered instruction that is appropriate for individual and class academic needs (Prenger & Schildkamp, 2018). Data-driven decision making, also referred to as data-based decision making (DBDM), is the process of making informed decisions using data derived from varied sources (Kippers et al., 2018). DBDM is further defined as a systematic means of using existing data to improve student achievement through three processes: (a) analysis of data sources, (b) application of analysis results to improve teaching, curricula, and school performance, and (c) evaluation of improvements (Schildkamp, 2019). School systems support data-driven decision making through the investment in data software management systems, student assessments, and professional development (Pak & Desimone, 2019). However, school leaders are needed to guide teachers in the use of data to inform instructional action (Schildkamp, 2019). Data-driven decision making, or DBDM for educators, can be described as a systematic process that employs various data sources to inform instructional decisions.

### *Data Literacy*

Teachers should use appropriate data to inform instructional decisions. Data literacy is defined as the capacity and skill of educators to: (a) establish a purpose for data, (b) gather, analyze, and interpret data, and (c) respond appropriately with instructional behaviors (Park, 2018; Van Geel et al., 2019). Current research is absent of a consensus of specific teacher knowledge that undergirds data literacy (Kippers, et al.,

2018). However, there are several factors that have been considered essential in the development and sustainability of data literacy.

Boudett et al. (2020) stated that there is an expectation for teachers to develop data literacy using relevant data in collaborative work with other educators. In a qualitative study of a western, suburban school district, Park (2018) found that teachers attributed varied combinations of four factors for successful data use: (a) professional training, (b) modeling by leaders, (c) social interaction with colleagues, and (d) instructional reflection. Similarly, Jimerson et al. (2021) identified four essential elements for teacher data use in a study of an elementary school data team: (a) access to data systems, (b) allocated and structured time, (c) professional community, and (d) instructional leadership from school and district personnel. The findings of Park and Jimerson et al. showed two common catalysts for data literacy amongst teachers: (a) professional interaction with colleagues, and (b) instructional leadership from school system leaders. Knowledge of extrinsic factors that motivate teachers' data literacy development can provide insight to teacher attitudes and actions toward data-based decision-making.

### *Professional Interaction With Colleagues*

Interaction with colleagues through participation in professional conversations regarding student learning and instruction improves data use (Boudett et al., 2020). In contrast to the assertion by Boudett et al. (2020) that dialogue amongst teachers improves data utilization, Van Geel et al. (2019) proposed a three-prong framework of data literacy for individual teachers that addresses skills related to problem identification, data

acquisition and analysis, and process engagement and evaluation. Kippers et al., (2018) found in a mixed methods study of six secondary schools that data-driven decision making teacher interventions had a significantly positive effect on individual teachers' data literacy. Additionally, Kippers et al. asserted that teachers demonstrated growth in the ability to make instructional decisions as a result of data-driven decision making teacher interventions. Van Geel et al. suggested that teachers who demonstrate the ability to evaluate cause and effect while engaging in collaborative inquiry are considered proficient in process-focused skills essential for data-driven decision making. Individual teachers that display data literacy skills can make significant contributions to collegial interactions with regards to data-driven decision making.

PLCs centered on data utilization can support data literacy for individual teachers and teams of educators. Datnow and Park (2018) asserted that teachers who engage in collaborative data use support one another in making sense of the data. School faculty members that participate in data use interventions benefit through (a) reshaping individual and collective beliefs related to data, (b) recognizing and applying appropriate data to guide instructional delivery, and (c) providing opportunities for team members to demonstrate new knowledge about data (Hubers et al., 2019). According to Datnow and Park, effective data use in a collaborative inquiry context promotes data literacy by challenging cognitive biases that oppose professional learning. Abrams et al. (2021) conducted a mixed method study of 28 teachers and 15 principals in a single school district to determine the impact and functionality of collaborative inquiry around data. Abrams et al.'s study found that there is value in collaborating with peers; however, more

teacher support is needed to collect and effectively utilize data to increase data literacy. Data use interventions and collaborative inquiry processes with appropriate support seem to foster teachers' data literacy.

### *Instructional Leadership From School System Leaders*

School leaders can provide support for teacher's data literacy. Pak and Desimone (2019) qualitative study of an urban school district identified school principals and district level leaders as essential personnel to exhibit competence in data use and data-driven decision making as models for classroom teachers. School leaders can impact others by modeling the processes essential to the work of improvement (Boudett et al., 2020). School principals can facilitate faculty data use through (a) setting goals, (b) establishing a meeting time and an agenda for collaboration, and (c) leading teachers to inquire of the data (Liebowitz & Porter, 2019). School principals can participate in collaborative data use as a learner and effectively contribute to shared decision-making with staff (Brezicha et al., 2019; Datnow & Park, 2018). School leaders have an impact on building teacher capacity for collaborative data use to affect instructional improvement.

Leaders in the school district can also contribute to shared decision-making based on data. According to Jimerson et al. (2021), a district-level staff person can provide instruction and support in accessing appropriate data for use by teams of teachers or a mixed school personnel data team. Additionally, a skilled facilitator, such as a data coach can build teacher capacity in using data with research-based practices to encourage inquiry and guide participants to the intended outcome (Bolhuis et al., 2019; Kippers et

al., 2018). Clearly defined roles for school district leaders and educators in collaborative data interactions should be established for the development of teacher data literacy and data driven decision-making.

### *Affordances of Data-Driven Decision Making*

In addition to role establishment for collaborating participants, attention should be paid to meeting protocols and procedures. Prenger and Schildkamp (2018) suggested that school teams establish data norms that will govern member behaviors while working with data. Schildkamp et al. (2019) determined that the team norms should advance the processes of critical inquiry and individual reflection. Meeting norms are important to guide topics and comments while discussing data before decisions are made (Jiang & Chen, 2018). Additionally, meeting norms for data-based decision making supports the building of teacher capacity for assessment literacy (Boudett et al., 2020). Mueller and Vick (2019) found that teacher participants in student data meetings with norms have maintained a singular focus on student performance and subsequent instructional needs in contrast to other teacher meetings devoted to content, instruction, and resources. Data meeting protocols have the potential to support teamwork that advances teaching and learning connections about student data.

### *Collective Teacher Efficacy*

Data meeting structures and processes promote collective teacher efficacy (Donohoo, 2018) that is defined as awareness that professional learning can be achieved through the acceptance of colleagues' expertise for the collective goal of student success (Dewitt, 2019). When team members establish meeting protocols for collaborative

inquiry around student data, participants develop trust with members gaining knowledge of individual professional practices through interpreting student work (Weddle, 2020). Team meeting protocols support the establishment of courageous conversations to reduce difficulties associated with group decision-making (Segal et al., 2018). The implementation of team meeting protocols supports collective teacher efficacy for examining student work and establishing data-based decision making.

### *Barriers to Data-Driven Decision Making*

According to Kippers et al. (2018), educators have difficulty implementing some aspects of data utilization and analysis. The absence of relevant professional development is a factor in the struggle of teacher data use (Van Geel et al., 2019). Many educators do not possess effective team leadership and meeting facilitative skills (Boudett et al., 2020). Individual and collective team members' avoidance of conflict or lack of conflict resolution skills can inhibit effective data inquiry (Trabona et al., 2019). Also, a lack of trust and respect amongst participants deters successful collaboration (Antinluoma et al., 2018). The absence of professional development related to data utilization, data analysis and teamwork skills may contribute to ineffective data-driven decision making.

## Critical Analysis of Literature

A review of the literature revealed teacher collaboration as a primary influential activity for professional learning. Collaboration undergirded with adult learning principles promotes reflection and transformation of participants. Adults are engaged when the learning has significance or meaning to personal or work life.

The literature suggested that there is an interrelationship between cognitive constructivist and socioconstructivist theories and collaborative inquiry. Research purports that through cognitive constructivism learners actively construct meaning from present knowledge. Learners that construct knowledge as a result of social interactions and collaboration demonstrate socioconstructivist learning. The intersection of both the cognitive constructivist and the socioconstructivist theories is situated in the active participation of the learner in the learning experience.

Researchers conducted studies at elementary and secondary schools and determined that teacher collaboration exists in various school team structures that can support professional learning and instructional and school improvement. However, according to descriptions of collaborative structures, teacher data teams and PLCs best promote collaborative inquiry. PLCs specifically encourage collaborative inquiry through a focus on (a) student data, (b) individual reflection, and (c) collegiality.

Collaborative inquiry is considered a design for professional learning that supports individual and collective efficacy that can lead to student achievement and school improvement. Collaborative inquiry, also referred to as data inquiry and collective inquiry, is an approach for educators to collectively participate in school and classroom problem identification and resolution through data-based decision making.

Data-based decision making is a significant collaborative undertaking that requires participant engagement to advance collaborative inquiry. Although specific data literacy skills for participants are not delineated in the review of literature, collegial interaction and systemic leadership are significant contributing factors for effective data

utilization leading to increased data literacy. Individual teachers with data literacy skills and a team culture with meeting norms advance critical inquiry while building teacher capacity for data literacy, collective teacher efficacy, and shared decision making based on data.

Although active participation is essential for the collaborative inquiry process, literature suggested that there are barriers to collective data-based decision-making. Three elements were determined as obstacles to data-based decision making: (a) an absence of meaningful and applicable professional development, (b) a lack of trust and respect amongst collaborative inquiry participants, and (c) an absence of effective team leadership and meeting facilitative skills.

## Implications

A mid-Atlantic state located in the United States required local school systems to provide professional learning resulting in improved student achievement by the engagement of educators in collaborative inquiry that also promotes individual teacher and collective performance (Learning Forward, 2022). In response to the state's professional learning mandate, the study school district provided pre-service school-based training in the Data Wise Improvement Process as a collaborative inquiry initiative. Additionally, all new teachers in the study school district are introduced to collaborative planning strategies as a teacher team requirement for all schools.

Data for this qualitative project study was collected to answer the research questions, which explored elementary science teachers' perceptions of collaborative inquiry in the analysis of student data in PLCs. Based on project study findings from the

data collection and analysis, seven themes emerged, and the findings indicated that professional development could address marginal participation of elementary science teachers in student data analysis. Therefore, a 3-day professional development series, Becoming Wise about Data Wise Through Collaborative Learning, will provide elementary science teachers with the necessary skills to effectively collaborate with colleagues, including school administrators, around student data to positively impact teaching and learning.

The professional development project is a 3-day course in a virtual format in accordance with the study school district's COVID-19 policy limiting face-to-face professional development sessions. The organization of the professional development beyond one full day session allows for facilitation and learning as a manageable process (Bates & Morgan, 2018). The data from this project study determined the context for the final project.

## Summary

In Section 1, I discussed the problem and purpose for the qualitative study. I also discussed adult learning principles, socioconstructivism, and collaborative inquiry as the conceptual framework for this study. I described teacher group structures along with data-based decision making in a collaborative environment.

Section 2 describes the methodology to include the research design and approach, participant criteria and access, data collection, data analysis, and limitations of the project study. Section 3 provides the project genre, goals, rationale, review of literature related to the project genre, project description, project evaluation plan, and project implications.

Section 4 details reflections and conclusions with project strengths and limitations, recommendations for alternative approaches, scholarship, project development, leadership and change, reflection on the importance of the work, implications, applications, and directions for future research.

# Section 2: The Methodology

## Research Design and Approach

The purpose of this project study was to explore elementary science teachers' perceptions about using collaborative inquiry to analyze student data in PLCs. Central office personnel in the school system where the study took place reported that elementary science teachers are infrequent participants in school-based collaborative team meetings to analyze student data. Additionally, central office personnel identified that elementary science teachers do not feel adequately trained on DWIP to analyze student assessment data. Although DWIP training was offered within the school district every other year beginning with the AY 2010–2011 and ending AY 2018–2019, there was no evidence that the elementary science teachers' perceptions about using collaborative inquiry to analyze student data in PLCs had been explored or shared.

The research questions aligned with the conceptual framework grounded in adult learning theory, social constructivist theory, and collaborative inquiry practices. The conceptual framework was chosen to connect teachers' professional background knowledge and experiences in collaborative learning environments. In Section 2, I explain the reasoning for the research design and approach, participant criteria and access, data collection and analysis procedures, project study findings, and limitations of the project study. The qualitative project study and project could be of significance for social change to identify professional development needs of elementary science teachers related to student data analysis, which may impact student and professional learning.

## Overview of the Study

I used a qualitative approach for this project study to provide insight into the professional lives of the participating teachers to answer the research questions (see Saldana & Omasta, 2018). Qualitative methodology was chosen to gain an understanding of the participants' perceptions of their collaborative inquiry experiences and to make meaning of the use of collaborative inquiry of student data through teachers' perspectives.

A quantitative approach would have been selected if the purpose of the study had been to examine a relationship among variables and test hypotheses based on theories and extant research (see Crawford, 2019). Additionally, a mixed-methods approach would have been appropriate if answers to the research questions were dependent on both qualitative and quantitative research methods (see Nastasi et al., 2022). Creswell and Poth (2018) noted that qualitative methodology is appropriate for a study that is intended to obtain a multifaceted, comprehensive understanding of the problem that results in a vivid presentation of participants' voices. The current qualitative project study addressed the following research question and subquestions:

RQ: What are elementary science teachers' perceptions about using collaborative inquiry to analyze student data in professional learning communities?

SQ1: What are the barriers to using specified student data analysis methods?

SQ2: What are the human and organizational supports for using specified student data analysis methods?

## Research Design and Approach

### Research Design Decision

Historically, diverse designs have been recommended for qualitative studies (Durdella, 2019). Among the designs consistently suggested were ethnography, phenomenology, grounded theory, narrative, and case study (Creswell & Poth, 2018). The ethnographic design is used to study a bounded unit and includes a long term of commitment through immersion in a large group of study (Creswell & Creswell, 2018). The bounded unit in ethnographic studies is rooted in anthropological and sociological characterizations and shared cultural patterns to determine how the culture works (Creswell & Poth, 2018). The ethnographic design was not chosen for the current project study because the design did not align with the purpose of exploring elementary science teachers' perceptions about using collaborative inquiry to analyze student data in PLCs.

Creswell and Creswell (2018) emphasized that phenomenology is a design that enables the researcher to understand why individuals respond in a specific way to an event. The common meaning and states of a lived experience of a phenomenon or concept by individuals is the focus of phenomenological research (Saldana & Omasta, 2018). According to Creswell and Poth (2018), phenomenological researchers are interested in philosophical assumptions and reporting the nature of a human experience. I was not concerned with philosophical suppositions for the current qualitative project study.

Grounded theory is concerned with developing theory from research data obtained within an area of study (Creswell & Creswell, 2018). According to Coskun (2020),

objectivist grounded theory is dependent on the researcher recording several events, and constructivist grounded theory requires the researcher to continually compare several documents to reach saturation for theory development. The grounding of a theory was inconsistent with understanding the perspectives of the participants for the current qualitative project study.

Narrative researchers are interested in exploring the life of an individual by telling stories of personal experiences (Creswell & Poth, 2018). Stories of research participants can be collected through verbal accounts and autobiographical writings and pictures (Ntinda, 2019). The narrative design was not chosen because the participants' life stories were not the focus of the current project study.

The case study is an in-depth description and analysis of a specific case or multiple cases (Creswell & Poth, 2018). Yin (2018) described the case study design as a comprehensive research method that comprises multiple sources of evidence to triangulate the data. According to Schoch (2020) and Creswell and Creswell (2018), a qualitative case study is conducted to provide descriptions of a bounded unit related to an identified purpose. The bounded unit of a case study was consistent with the target population for the purpose of exploring teacher perspectives in the current qualitative project study, and the case study was the most appropriate design to address the research problem of this qualitative project study.

**Case Study**

The research design I chose for the current qualitative project study was the case study. There are three criteria for implementing a case study design: (a) the use of

research questions that can lead to an explanation or description of the phenomenon, (b) the lack of control the researcher has over behavioral events, and (c) the focus of the study on a contemporary event (Yin, 2018). The case study design aligned with the research questions that were answered to provide a comprehensive understanding of kindergarten through fifth-grade science teachers' perspectives on individual collaborative inquiry experiences in PLCs. As the researcher, I did not have any influence on teacher perspectives and behaviors in PLCs. The case study approach supported the exploration, description, and explanation of elementary science teachers' PLC experiences.

## Participants

### Target Population

The qualitative project study site was in the mid-Atlantic region of the United States. District G is a large public school district with a diverse student population of approximately 130,000 students from urban, suburban, and rural communities. Table 1 contains student demographics for District G.

**Table 1**

*District G Student Demographics*

| Race | Percentage of Student Population |
|---|---|
| Black or African American | 57% |
| Hispanic/Latino of any race | 34% |
| White | 4% |
| Asian | 3% |
| American Indian/Alaska Native | 0.3% |
| Native Hawaiian or Other Pacific Islander | 0.2% |
| Two or more races | 1.3% |

District G employs approximately 9,000 teachers. There are 208 schools in District G with Grades K–5. Campus O in District G was chosen as the qualitative project study site because it was identified as a school that has participated in off-site and on-site DWIP (School Improvement Specialist, personal communication, April 6, 2018). The study site has 33 Grade K–8 teachers and 577 students who reflect the population diversity of District G. The target population for this study was elementary science teachers with at least 1 full year of teaching experience in District G. Additionally, the target population was required to attend the teacher team sessions designed to share and analyze student data through collaborative inquiry.

**Criteria for Selecting Participants**

At the study site, there were 17 Grade K–5 teachers. All Grade K–1 teachers are required to teach science in the classroom, and Grades 2–5 are departmentalized. There

were two Grade K teachers, three Grade 1 teachers, and four Grade 2–5 science teachers at Campus O who met the participant selection criteria. The target population of Grade K–5 teachers was consistent with the study's purpose to explore elementary science teachers' perceptions about using collaborative inquiry to analyze student data in PLCs.

According to Schoch (2020), a maximum of four cases is sufficient to gain insight into the subject of study and answer the research questions. However, one school served as a single bounded case for the current qualitative project study. Selecting one school provided a more in-depth inquiry of each participant's perspective on using collaborative inquiry in a PLC.

**Gaining Access to Participants**

Access to project study participants required compliance with procedures established by Walden University and the study site school district. The first stage of the participant access process was to seek permission from the Walden University Institutional Review Board (IRB) to conduct the qualitative project study. The dual purpose of the IRB is to ensure that the project study complies with ethical human subject research practices and appropriate data collection procedures (Walden University, 2019).

Following Walden University IRB approval (03-03-20-0648440), I submitted an application letter to conduct research in the school district to the project study school district's Department of Research and Evaluation (DRE; see Appendix B). In addition, I submitted to DRE evidence of Walden University's IRB approval and my approved proposal with additional documents as required. Submission of the research application

letter and specified documents to DRE was the institutional review process for the study site school district (see Appendix C).

Once the school district's IRB granted permission to conduct research, the DRE provided me with a letter of conditional approval along with a letter of permission to conduct research. The letter of permission to conduct research was emailed to the principal of Campus O to sign. I forwarded the letter of permission with the principal's signature to the DRE after the letter was signed, as required by the DRE.

I obtained a list of Campus O Grade K–5 teachers' names and school district email addresses from the school website. Using my Walden University email account, per the instructions of the school district DRE, I sent an email (see Appendix D) to all Grade K–5 teachers working at Campus O meeting the participant selection criteria, which provided the purpose of the qualitative project study with an attached informed consent form.

The final stage of the participant access process involved participants' informed consent. Consistent with ethical human subject research practices, I created an informed consent form for potential participants. An informed consent form is provided to human subjects of research to apprise them of the research project and any risks associated with voluntary participation (see C. M. Ferreira & Serpa, 2018). The informed consent form included a description of the qualitative project study, an explanation of the purpose of the project study that included the procedures to follow, a statement of voluntary participation and refusal to participate, participants' rights, possible risks, and benefits of the project study. The informed consent form included information that participation in

the study was voluntary, responses would be confidential, and there would be no reprisal or effect on employment status for anyone choosing not to participate. The informed consent form contained a link to the web-based survey. At the end of the informed consent form, interested participants clicked on the survey link to indicate voluntary participation to begin the survey.

**Sampling Technique**

Purposive sampling is considered the primary sampling method used in qualitative research (Ravitch & Carl, 2019). The nonprobability purposive, or judgmental, sampling technique is used when the researcher understands the population and that the population will (a) have elements that are aligned with the purpose of the study (Babbie, 2021), (b) be relevant to the study's research questions (Crawford, 2019), and (c) be availabile to participate (C. M. Ferreira & Serpa, 2018). Purposive sampling was used to access potential participants at the current project study school site.

The purposive sampling technique was appropriate based on the desired qualities of the target population. Purposive sampling is used with the expectation is that study participants will provide contextually rich and detailed information to data saturation (Ravitch & Carl, 2019). Homogeneous sampling is a form of purposive sampling that focuses on study participants with specific characteristics (Andrade, 2020). The sampling technique for the current qualitative project study was the homogeneous method due to the selection of elementary science teachers employed in the same school district and school that participated in DWIP training. The results of the qualitative project study were used to identify and understand the perceptions of the selected teachers of Campus

O in District G, not the entire teacher population of District G or any other population to generalize.

**Participants**

Participant recruitment for this qualitative project study was conducted at the beginning of the COVID-19 pandemic. An initial recruitment email and several reminder emails were sent to the targeted population during a 3-month period to encourage participation before the teachers' summer break began. Five teachers completed the web-based survey, and four of the five teachers participated in the focus group to make up the sample for the qualitative project study. The collective demographic profile of the individuals who responded to the survey are shown in Table 2.

**Table 2**

*Collective Demographic Profile of Respondents*

| Number of teachers | Classroom teaching experience (years) | Level of education | Number of DWIP professional development hours | Number of collaborative planning professional development hours |
|---|---|---|---|---|
| 5 | 11–25 | Bachelor's and master's | 3.5–40 | 3–18 |

**Protection of Participants' Rights**

In accordance with ethical practices regarding human research subjects, the proposed study will be void of any vulnerable populations. According to Limes-Taylor Henderson and Esposito (2019), vulnerable populations are individuals in an at-risk and unequal power relationship with the researcher. The target population for this qualitative

project study was Grades K-5 science teachers at Campus O of District G. The target population of teachers as study participants was not a vulnerable population, therefore, there was minimal risk to the participants.

Additional efforts to minimize participants' risk were made through the anonymity and confidentiality of participants. Babbie (2021) suggested that anonymity should assure that participants' responses are not identified as belonging to them. The informed consent contained a statement that web-based survey responses will be collected in a password-protected spreadsheet and will not be identified as belonging to any specific participants. Each set of responses in the spreadsheet was given a pseudonym to ensure confidentiality and minimize loss of privacy (Walden University, 2019). Promising participants that any identifiable written or oral responses will not be made public will achieve the confidentiality of participants (Babbie, 2021). The informed consent contained a statement that described the confidentiality of responses identifying any participant will be maintained. The informed consent also contained a statement that explains a research study peer debriefer, not associated with the study school and chosen by the researcher, will review the survey responses with the researcher to develop focus group questions. The peer debriefer signed a confidentiality agreement.

Walden University requires that minimizing risks to participants include data storage (Walden University, 2019). During the qualitative project study, I stored study related data, results, and supporting documents on a private and secured digital hard drive on my home computer, as well as, saved printed copies of data and results as a preventative measure against technological issues. At the completion of the qualitative

project study, both the digital hard drive and the printed copies will be kept in a fireproof safe and a locked file cabinet in my home, respectively. In compliance with Walden University IRB ethical standards, I will destroy all study related documentation five years after completion of the study.

**Role of Researcher**

In the role of researcher, I served as the primary instrument for data collection and analysis for the qualitative project study. I informed the potential participants that I (a) am employed in the school district as an outreach educator in a non-supervisory position, (b) am not responsible for conducting formal or informal observations of any employee, and (c) will not identify or share any participant responses with others. I wanted to achieve rapport with project study participants through an etic perspective (Babbie, 2021). I provided full disclosure of myself as a non-supervisory employee in the school district to achieve researcher transparency and rapport with participants.

According to Ravitch and Carl (2019), the relational approach is a primary characteristic of qualitative research. The relational aspect of qualitative research requires the researcher to understand that the study data arises from co-created dialogue between the researcher and the participants as co-researchers. Crawford (2019) asserted that member checking, also referred to as respondent validation, allows participants to review findings to determine if the researcher's interpretation of study findings is accurate. The qualitative relational approach appears to value the input of the study participants beyond initial data collection.

As an employee of District G with 11 years of central office experience, I neither supervise nor evaluate any district personnel in my position as an outreach educator. I am responsible for providing school district teachers with guidance on the state and local environmental literacy standards and curriculum. Any project study participants who taught Grades K-5 in District G within the last 11 years may have participated in professional development sessions that I facilitated on science content or environmental literacy. I did not know of any participants from the school of study attending any professional development sessions that I have facilitated. I have not worked as a teacher at any school in District G.

As the researcher, I sought to be reasonably neutral and acknowledged my biases (Miles et al., 2018). One of my responsibilities relative to teachers is to design and facilitate environmental literacy professional development for school personnel in District G. As a professional development provider, I am interested in the types of professional development trainings in District G that have been designed by external providers and the impact of those trainings on teacher work life. The results of the qualitative project study helped me understand teachers' perceptions about using collaborative inquiry in professional learning communities. The knowledge gained from the qualitative project study will assist me in planning and facilitating in-school professional development for teachers.

According to Ravitch and Carl (2019), researcher reflexivity is the active self-awareness, assessment and addressing of biases, positionality and subjectivities during the research process. I documented my (a) biases, (b) fluctuating role and responses as an

observer and participant in the research process, and (c) modifications made based on project study analysis (Blanco & Rossman, 2021; Crawford, 2019). The documentation was handwritten in a journal specifically used throughout the study to promote researcher reflexivity. The practice of researcher reflexivity helped me focus on providing an in-depth analysis of the data by acknowledging my biases, values, and perspectives.

In addition to a reflexivity journal, I kept a research log. The research log was used throughout the study to record data related to the research setting, participants, occurrences, and conversations (Babbie, 2021; Yin, 2018). Case study research is dependent on abundant, detailed, and accurate documentation that has been consistently collected for the duration of a study (Creswell & Poth, 2018). The research log was used to help create vivid descriptions for meaning and understanding of the context in the study (Stake, 1995). According to Schoch (2020), a systematic approach to note taking by the researcher can be a means to check the alignment to the research questions.

## Data Collection

### Data Collection Methods

Qualitative research studies traditionally use a variety of data collection methods (Creswell & Poth, 2018). The qualitative project study consisted of two data collection methods: a web-based survey (Appendix F) followed by a focus group. A survey is a select data collection tool used in survey research when the purpose of the study is descriptive, explanatory, or exploratory (Babbie, 2021). The purpose of the web-based survey for the qualitative project study was to explore elementary science teachers' demographic information and professional development relative to collaborative planning

and DWIP. Focus groups are a common method used in educational studies when a qualitative explanation is desired to represent multiple participants' views, attitudes, and reactions related to the study topic (Moser & Korstjens, 2018). The purpose of the focus group for the project study was to come to consensus on the issues that were identified in the web-based survey (see Appendix F).

The purpose of this qualitative project study was exploratory in seeking to explore elementary science teachers' perceptions about using collaborative inquiry to analyze student data in professional learning communities. According to Braun et al.,(2020), a survey can be used to gather information for specific factors that are essential to a case study. Creswell and Poth (2018) asserted that the advantages of using a web-based survey for the qualitative project study are (a) no travel costs for participants or the researcher, (b) ample time to respond, and (c) participants can select the physical space to complete the survey.

The second data collection method was the focus group. Babbie (2021) suggested that focus groups are typically used when the study's purpose is exploratory in nature. The focus group was selected as a data collection method instead of individual in-depth interviews because of the potential of focus group dynamics that could provide optimal data in a limited timeframe (Babbie, 2021; Creswell & Poth, 2018). The focus group also afforded the participants and me an opportunity to create a flexible social context for self-reflection.

The informed consent included the option to complete the linked survey (Appendix F). The informed consent was emailed to eight prospective participants using

my Walden email account (Appendix D) and each proposed teacher's school district-provided email address. Follow up emails (Appendix E) to encourage potential participants to complete the survey were sent seven calendar days after the initial email and once per month over a three-month period. Five teachers clicked on the web-based survey link to indicate consent to participate in the study. There were no additional teachers that clicked on the web survey link after the fifth email message was sent.

**Survey**

I created an open-ended question web-based survey using Google Forms (see Appendix F). The web-based survey was designed to reflect anonymous responses regarding (a) work experiences, (b) readiness to gain relevant knowledge, (c) motivation to learn meaningful information, (d) acquisition of a diverse skill set, knowledge, and education, and I collaborative learning experiences to answer the research question and two subquestions. The participants anonymously completed the survey that automatically submitted their responses online. The survey utilized open-ended questions to collect data about each participant's demographic data and systemic training related to the DWIP and collaborative planning from 2010-2019 (see Braun et al., 2020). The DWIP was introduced as a systemic initiative for collaborative inquiry in the school district during the 2010-2011 AY.

The survey consisted of two sections: demographic and professional development related to the DWIP and collaborative planning. The survey included 10 open-ended questions (see Appendix G). Additionally, a request for participation in a focus group was included at the end of the survey. The survey questions supported the conceptual

framework and research questions as teachers were asked to provide data that might have influence in individual perspectives.

The first four survey questions were asked to determine possible influences of education and years of teaching relative to participants' responses. The first question asked the highest level of education achieved. The remaining three demographic questions asked the total number of years teaching and the number of years teaching in the school district and school, respectively. The level of education and number of years teaching could influence teachers' perspectives regarding collaborative inquiry based on individual knowledge and teaching experience.

Six survey questions were asked to determine participants' experiences related to the DWIP and collaborative planning. The school district introduced the DWIP and collaborative planning protocols during the 2010-11 AY. The first two questions asked about the approximate number of participation hours for respondents in DWIP and collaborative planning training. The teachers' number of participation hours in DWIP and collaborative planning training could impact perspectives as participants consider participation in collaborative inquiry in PLCs. The time interval of 3.5 hours is consistent with the school district's required minimum timeframe for one professional development session. The remaining four survey questions asked participants to list new knowledge and skills acquired as a result of the DWIP and collaborative planning training and to describe the impact of the professional development on professional learning communities' experiences and data-driven decision making. The teachers' professional

growth and development could influence perspectives as participants considered work and learning experiences related to collaborative inquiry in PLCs.

At the conclusion of the survey, the five respondents were asked to participate in a focus group. The purpose of the focus group was to obtain consensus on the issues that were identified from the survey. Respondents were asked to select an agreement or refusal response. Four respondents agreed to participate and were asked to provide their full name and the email address provided by the school district to receive information regarding the focus group and a thank you gift card. The participants' contact information was linked to a separate password-protected spreadsheet from the survey. The fifth survey respondent declined participation in the focus group and was asked to provide her school district email address to receive a thank you gift card.

**Focus Group**

A focus group, also known as a group interview (Ravitch & Carl, 2019), served as another method of collecting data related to participants' perspectives on using collaborative inquiry in professional learning communities. The goal of the focus group was to explore through discussion (Babbie, 2021) the participants' responses to the survey to gather additional data and develop consensus about topics related to the research questions. The participants' responses from the survey questions on DWIP and collaborative planning training sessions and related knowledge were reviewed to develop focus group questions.

My peer debriefer and I developed focus group questions that were aligned with the research questions and submitted through the IRB process for approval (Walden

University, 2019). Once the questions were approved, the focus group questions were presented to participants in a nondirective manner Yin, 2018) to produce consensus amongst participants.

I conducted one focus group interview with four participants in 64 minutes on the Zoom platform due to school closings and social distancing restrictions related to the COVID-19 pandemic. According to Sim et al. (2018), a researcher conducting a focus group for a single-case study should limit the group size to four to 30 participants. The target focus group size for this qualitative project study was eight participants. The focus group size of four is noted as a study limitation.

At the beginning of the focus group session, I thanked participants for completing the survey and agreeing to participate in the group session. I reminded participants that participation is voluntary and individual identities will be protected when the study's findings are reported (Creswell & Poth, 2018). Additionally, I sought and received permission from each participant to audio record the session on Zoom to guarantee accurate data collection. The purpose of audio recording was to provide the exact verbal interactions that occurred (see Crawford, 2019). I did not use any other recording device and I also documented the interview as planned with field notes of interactions and reactions.

During the focus group session, I asked the prepared focus questions while allowing participants to expound on comments that created additional questions. The additional questions provided further descriptions of teacher perceptions of collaborative

inquiry in professional learning communities. Each of the questions were significant to this qualitative project study:

- Based on participant survey responses about systemic training on DWIP and collaborative planning, I asked teachers to describe their professional collaborative experiences.
- Based on the conceptual framework for this study, I probed for more information when participants' comments appeared specifically related to andragogical principles (Knowles et al., 2020).
- Also based on the conceptual framework, I asked participants to elaborate on responses about sharing student work through social engagement (Boudett et al., 2020).
- Based on the literature review, I asked participants to expound on comments on professional interaction with colleagues (Donohoo et al., 2018) and instructional leadership from school system leaders (Cansoy et al., 2020; Muckenthaler et al., 2020).

At the close of the focus group session, I reminded participants of non-disclosure of their identities (Creswell & Poth, 2018). I also requested permission to contact each of them individually for clarity of responses and member checking (Crawford, 2019). Each study participant agreed to additional contact requests.

## Data Analysis

Data analysis in qualitative research involves the creation of processes that afford in-depth understanding of study findings (Lester et al., 2020; Stake, 1995; Yin, 2018).

Qualitative data analysis is referred to as an inductive process that is iterative, allowing the researcher to make cyclical movements between gathering data, comparing data, and noting patterns of data (Azungah, 2018). The iterative process involves data collection, writing memos, and data analysis (Miles et al., 2018). I conducted an inductive analysis of the raw data to understand participant responses, focus group interactions and reactions, took note of ideas taking shape, wrote reflexively, asked questions, made connections to various parts of the study, and identified emerging themes and patterns (Azungah, 2018; Creswell & Poth, 2018). According to Creswell and Poth (2018), there are five data analysis activities iteratively conducted during case studies: (a) managing and organizing the data; (b) reading and memoing emergent ideas; (c) describing and classifying codes into themes; (d) developing and assessing interpretations; and (e) representing and visualizing the data.

**Managing and Organizing the Data**

I began data analysis with the organization of the collected data into a form that was analyzed by hand and stored on the computer (Creswell & Poth, 2018). The Google survey responses were automatically recorded in a linked spreadsheet. Each row of survey responses was assigned the pseudonym 'Teacher' with a corresponding number from 1 to 5 resulting in Teacher 1, Teacher 2, Teacher 3, Teacher 4, and Teacher 5. The survey hyperlink to participants' contact information was deleted to remove personal identifiers. A second spreadsheet was created to organize the survey data into the following categories: (a) file name; (b) storage location; (c) data type; (d) collection date, and € collection source (Lester et al., 2020). I downloaded the focus group transcript

from Zoom and uploaded it to Google Docs for online storage. A third and final spreadsheet was created to organize and identify non-demographic responses in codes, categories, and themes. Additionally, a Google Doc was created for each participant's responses from the survey and focus group session. In preparation for any technological issues that could occur limiting my access to the Google survey, spreadsheets, and documents, I stored all data on an external hard drive and printed for storage in a locked file cabinet located in my home for five years as required (Walden University, 2019). I printed a second copy of the data for use during analysis. Additionally, both the research log and research journal with handwritten notes are stored in the locked file cabinet in my home.

**Reading and Memoing Emergent Ideas**

I continued data analysis by reading and rereading the data (Lester et al., 2020). Creswell and Poth (2018) suggested that scanning all the data helps the researcher to gain a sense of what has been collected without paying attention to details for coding purposes. After rapid reading of data, I reflected on the reading and made mental connections to what was presented by the data (Lester et al., 2020).

After making mental connections to the data, I actively engaged in the reading process by adding notes of insight and questions in my research log (Lester et al., 2020) and in the Google Docs file as annotations. I also reviewed the Google Docs file to memo interactions from the focus group. Additionally, the memos were cross-referenced in the spreadsheet designated for identifying collected data.

**Describing and Classifying Codes Into Themes**

Although data analysis is an iterative process, describing the data is an essential step after organizing and reading data in a case study (Creswell & Poth, 2018). I wrote detailed descriptions of the people and focus group interactions in the research log to create a means for understanding the phenomenon of the study (Creswell & Poth, 2018; Yin, 2018). The detailed descriptions helped to build context for the development and description of codes.

Coding is considered the core of qualitative data analysis (Creswell & Poth, 2018). Coding is described as the process of classifying chunks of data to give meaning for analysis and interpretation (Elliott, 2018). The coding process is concerned with placing text into categories that become part of a retrieval system (Babbie, 2021). I reread the data and made notes of possible codes found in the participants' responses. Williams and Moser (2019) asserted that researchers develop authentic coding methods as necessary. I was flexible in determining the coding methods that were suitable for the project study.

According to Miles et al. (2018), coding is specific to the researcher's thinking and data identification process. I created a Google Doc for each of the participant's responses and placed brackets around text that was irrelevant to the project study. According to Linneberg and Korsgaard (2019), researchers should consider research questions and the framework of the study to identify the coding method(s) for a study. I began coding by reviewing the research questions and conceptual framework of the study to identify the broad topics and search for any patterns in the data (Elliott, 2018; Lester et

al., 2020; Linneberg & Korsgaard, 2019). I coded relevant segments of text with broad topics and specific, expanded codes until a theme was developed (Creswell & Poth, 2018). The optimal number of themes, as suggested by Creswell and Poth (2018) is five or six themes that represent the collected data. However, I exercised flexibility to consider more than six themes if supported by the data.

The non-demographic survey responses represent the professional development experiences, knowledge, and skills of the elementary science teachers. The responses reflect their perspectives on collaborative inquiry in professional learning communities. The responses were reviewed and segments of text relevant to the research questions and conceptual framework were recorded as the first cycle of coding (see Table 3).

**Table 3**

*First Cycle Coding of Survey Nondemographic Data*

| Question | Code |
|---|---|
| 7 | Understanding of the cycle of data inquiry. Importance of data literacy. Know meaning of DWIP. How to use DWIP. How DWIP benefits students. More receptive of data. Data exists in many forms. Data is beyond unit test. Importance of analyzing student work collaboratively. Creating next steps for students. Working across content. |
| 8 | Review student work samples. Ask questions during collaborative planning. Cyclical collaborative planning. Different descriptions of collaborative planning. Gray area. Greater insight into working with colleagues. Plan vertically and horizontally. Better communication skills within groups. Work smarter. Drive student achievement. Protocols help focus. |
| 9 | Focus planning and instruction. Collaborative planning produces authentic teaching. DWIP can impact student learning. Great benefit or suffer. Plan for ongoing learning. Explore new research. More knowledgeable due to PLC. Need to continue DWIP. |
| 10 | Identify artifacts to produce quality data. Eliminate focus on pass/fail column for data. Effective teaching based on data. Waste instructional time without student data. Frustration for students without data. Track lessons for student impact. Re-teaching decisions. Understand formative and summative assessments. Team examination of assessments for re-teaching or change to curriculum practices. Increased focus on data. Adjust instruction daily. |

The focus group data also represent the professional development experiences, knowledge, and skills of the elementary science teachers. The responses reflect their perspectives on collaborative inquiry in professional learning communities. The responses were reviewed and segments of text relevant to the research questions and conceptual framework were recorded as the first cycle of coding described in Table 4.

**Table 4**

*First Cycle Coding of Focus Group Data*

| Question | Code |
|---|---|
| 1 | No true collaboration. Worked with grade level teams with a literacy focus. Data used for PD justification. Plan once per quarter with subject matter colleagues. Plan with 3rd-6th grades teachers during a half school day. Teachers told downfalls of their practice by administrator. Data focus on reading math and writing. Data walls required. No desire by teachers to participate. Uninvolved school administration. Infrequent talk about strategies that would work. |
| 2 | Eliminated teacher creativity. Data cycle produced better educator. Blueprint led to effective instruction. Provided means to collaborate with others. Enabled resource procurement. Teacher focus on students. Annoying data walls. |
| 3 | Established day/time for collaborative planning. Loss of individual planning time. Protocol with grade level team. Focus on incremental growth. Unbiased and objective focus on student work. Iterative data cycle. Unapplied student data. Administrative learning walks. Consistent data drill down. Expected data dives. |
| 4 | Administrator gives and discusses checklists. Principal mandated. Principal shared what was learned.in training. Grade level did not have any check and balance. No full commitment but holding each other accountable. Use DWIP with fidelity. Data cycle for improved instruction. Aligned with assessment standards. No checks and balances with new Principal. Principal's presence prompted engagement of PLC participants. |
| 5 | Mandatory view of school administration. Mistrust of principal. Principal eliminated inquiry. Principal secured substitute teachers for collaborative planning. School administration had limited view. Administration was new to school. Administrator would appoint teachers as staff trainers. |
| 6 | Not involved in decision making in PLC. Colleagues worked together for next steps. DWIP decisions related to activities. Decision making undertaken in leadership meetings. Decision making undertaken as individuals. DWIP decisions for literacy focus strategies. |
| 7 | Central office DWIP mandates and timelines. Constructive experience with central office grant program. Effective collaborative planning with program personnel. Coaches complemented collaborative inquiry. Positive impact on collaborative inquiry practices. |

**Developing and Assessing Interpretations**

Creswell and Poth (2018) described the interpretation phase as the process of making sense of the collected data by organizing the themes into broader abstract segments. I made connections of the major findings to how the research questions were answered. I also related the findings to the review of literature and included my perspective based on reflections about the meaning of the data. To complete the second cycle of coding, I summarized the codes from the first cycle of coding. Afterward, I combined both data sets from the survey and focus group to develop categories. I organized the categories into seven themes as shown in Table 5.

**Table 5**

*Second Cycle Coding of Combined Data Sets*

| Code | Category | Theme |
|---|---|---|
| • DWIP and collaborative planning are cyclical<br>• Important<br>• Purpose<br>• Beneficial<br>• Ask questions<br>• Communication with colleagues<br>• Different collaborative planning models | • Process<br>• Value of process<br>• Improve practice<br>• Collaborative work environment | Teachers have a working knowledge of DWIP and collaborative planning |
| • Planning<br>• Improved and effective instruction<br>• Authentic teaching<br>• Research<br>• Increased knowledge<br>• Teacher focus on students | • Work responsibilities | Teachers acknowledge new skills and knowledge impacts their individual practice |
| • Artifacts for data<br>• Look beyond pass/fail option<br>• Instructional time lost without student data<br>• Re-teaching<br>• Assessment differences<br>• Adjust instruction<br>• Individual data-driven decision making for content | • Value of student data<br>• Flexibility in decisions | Teachers recognize the value of student data for flexible decision-making |
| • Review student work<br>• Need for unbiased and objective manner<br>• Use of question prompts<br>• Interest on reading, writing, and sometimes math<br>• Infrequent strategies conversation | • Inconsistent student data review process | Teachers acknowledge collaborative sessions occur with participants' varied interests, behaviors, and expectations |
| • Secured substitute teachers during collaborative sessions<br>• Selected teachers as DWIP trainers<br>• Sponsored training conference attendees<br>• Conducted learning walks | • Supportive principal behavior | Teachers identify supportive principal behaviors related to collaborative inquiry |
| • Infrequent session participation<br>• Mandated checklists<br>• Had limited view of collaborative inquiry<br>• Pre-determined plan of action | • Adverse principal behavior | Teachers identify adverse principal behaviors related to collaborative inquiry |
| • Central office gave DWIP mandates and timelines<br>• Grant-funded program provided constructive experiences to complement collaborative inquiry<br>• Helped collect evidence of effectiveness with students | • Influence of Central Office | Teachers acknowledge impact of central office personnel in collaborative inquiry processes |

## Representing and Visualizing the Data

According to Crawford (2019), a thematic narrative is a preferred method amongst qualitative researchers for representation of a case study. I represented and reported the findings of the study in narrative and data display formats. The narrative includes detailed descriptions of the participants' background, experiences, and perspectives for vivid context (Crawford, 2019; Creswell & Poth, 2018). The participants' perspectives include direct quotes from the survey and the focus group. The data display is a visual representation of patterns and themes, attending to trends in the data (Saldana & Omasta, 2018).

## Assuring Accuracy and Credibility of Findings

The validity of a study refers to processes used by the researchers to check the accuracy and credibility of findings in a study (Ravitch & Carl, 2019). Yin (2018) suggested that a study is considered valid if data interpretation leads to conclusions that are an accurate representation of the people and settings in the study. According to Ravitch and Carl (2019) there are several validity strategies to establish credibility. I used the validity strategies of triangulation, member checking, peer debriefer, and discrepant cases.

### *Triangulation*

The validation strategy of triangulation employs multiple data collection methods, multiple data sources, multiple investigators, or multiple theories to challenge and confirm interpretations (Creswell & Poth, 2018; Ravitch & Carl, 2019). Triangulation is generally used to provide at least three ways to verify a data point, procedure, or findings

of a study. Data triangulation occurred in this study through multiple data collection methods and multiple data sources. The multiple data collection methods were the electronic survey and the focus group. The multiple data sources were represented by the initial sample of five participants that completed the electronic survey and the group of four individuals that participated in the focus group. I examined the similarities and differences among the survey and the focus group for elementary science teacher perspectives and influences on collaborative inquiry in professional learning communities.

### *Member Checking*

According to Stake (1995), member checking is a critical role that participants can assume for credibility of the findings and researcher interpretations. I included member checking to support validity of this qualitative project study through the participants' lens (Creswell & Poth, 2018). The focus group participants previously agreed to be contacted for member checking. I emailed each of the focus group participants a copy of the interview questions, their individual responses, and an overview of my understanding of their responses. The focus group participants were asked to examine the document to determine whether interpretations were accurate and reflective of their perspectives. All participants agreed the interpretations were correct. One participant made a comment to correct the spelling of a central office department. The focus group participants' feedback was documented in the research log to indicate one minor revision was needed and was noted as such in the final study.

### *Peer Debriefer*

A peer debriefer was used in this qualitative project study beginning at the point of data analysis of survey responses (see Appendix I). The peer debriefing technique is a validation strategy for the processes and findings of the research study (Creswell & Poth, 2018). As an external reviewer, the peer debriefer is familiar with the research process and collaborative initiatives and practices in the school district (Creswell & Poth, 2018). My chosen peer debriefer was a 17-year school district employee in the central office as an administrator.

Following the analysis of the survey responses with my peer debriefer, questions were developed for the focus group. I secured additional support from my peer debriefer to ensure accountability to the focus group process and to challenge my biases or assumptions (Ravitch & Carl, 2019). After the focus group session, my peer debriefer and I compared my interview notes to the transcript for accuracy and completeness of the data collected (Babbie, 2021). Additionally, my peer debriefer discussed biases and assumptions related to my role as researcher and participant in the focus group process. I emailed my initial data analysis to my debriefer to receive feedback. My peer debriefer confirmed the preliminary results.

### *Discrepant Cases*

Yin (2018) asserted that the search for discrepant evidence or negative cases is an essential strategy for strengthening validity in qualitative research. During the study, the discovery of discrepant or negative case evidence should be welcomed as a rival to challenge researcher assumptions and thinking (Yin, 2018). I looked for discrepant

evidence as I reread the data and after I coded the data and developed themes (Ravitch & Carl, 2019). I acknowledged negative case evidence regarding the participants' depth of DWIP knowledge in contrast to the marginal participation in the PLC. The discrepancy can be considered as an area for further study (Crawford et al., 2019).

## Data Analysis Results

The purpose of this study was to understand teacher experiences of working with colleagues in a collaborative learning environment focused on shared student data. The problem this qualitative case study sought to explore was the reasons for elementary science teachers marginally participating in school-based instructional team meetings to analyze student data. This section includes descriptions of elementary science teachers' perceptions of using collaborative inquiry to analyze student data in their professional learning communities. I conducted this qualitative project study to determine professional development needs of adult learners related to student data analysis in professional learning communities. The qualitative project study explored elementary science teachers' perceptions about using collaborative inquiry to analyze student data in professional learning communities along with the human and organizational supports for and the barriers to using specified student data analysis methods.

Survey and focus group questions were designed to answer the research question and supporting sub questions. Both survey and focus group datasets included teacher perceptions of their own collaborative inquiry training and professional experiences. Five teachers completed the survey and four of the five teachers participated in the focus group.

Seven themes emerged describing teacher perceptions of the most prevalent factors concerning collaborative inquiry in their PLCs. Table 6 shows each theme connected to an element of the study's guiding framework. There were two andragogical themes: (a) teachers have a working knowledge of DWIP and collaborative planning, and (b) teachers recognize new skills and knowledge impact their individual practice. In addition, two themes were related to social constructivism: (a) teachers acknowledge that colleagues sometimes participate in collaborative sessions with adverse behaviors, and (b) teachers acknowledge impact of central office personnel on collaborative inquiry processes. Finally, three themes regarding collaborative inquiry emerged during the data analysis: (a) teachers recognize the value of student data for flexible decision-making; (b) teachers identify supportive principal behaviors related to collaborative inquiry; and (c) teachers identify adverse principal behaviors related to collaborative inquiry.

**Table 6**

*Connecting Themes to the Conceptual Framework*

| Conceptual framework | Theme |
|---|---|
| Andragogical principles | Teachers have a working knowledge of DWIP and collaborative planning. |
| | Teachers acknowledge new skills and knowledge impacts their individual practice. |
| Social constructivism | Teachers acknowledge that colleagues sometimes participate in collaborative sessions with adverse behaviors. |
| | Teachers acknowledge impact of central office personnel in collaborative inquiry processes. |
| Collaborative inquiry | Teachers recognize the value of student data for flexible decision-making. |
| | Teachers identify supportive principal behaviors related to collaborative inquiry. |
| | Teachers identify adverse principal behaviors related to collaborative inquiry. |

Each of the seven themes was connected to a research question of the qualitative project study (see Table 7). Research questions for this qualitative project study were:

Research Question: What are elementary science teachers' perceptions about using collaborative inquiry to analyze student data in professional learning communities?

Sub question 1: What are the barriers to using specified student data analysis methods?

Sub question 2: What are the human and organizational supports for using specified student data analysis methods?

**Table 7**

*Connecting Themes to Research Questions*

| Research question | Theme |
|---|---|
| What are elementary science teachers' perceptions about using collaborative inquiry to analyze student data in professional learning communities? | Teachers have a working knowledge of DWIP and collaborative planning.<br><br>Teachers acknowledge new skills and knowledge impact their individual practice.<br><br>Teachers recognize the value of student data for flexible decision-making. |
| SQ1: What are the barriers to using specified student data analysis methods? | Teachers acknowledge colleagues sometimes participate in collaborative sessions with adverse behaviors.<br><br>Teachers identify adverse principal behaviors related to collaborative inquiry. |
| SQ2: What are the human and organizational supports for using specified student data analysis methods? | Teachers identify supportive principal behaviors related to collaborative inquiry.<br><br>Teachers acknowledge impact of central office personnel on collaborative inquiry processes. |

The research questions and the themes that support the research questions are described in the following narrative section of the qualitative study findings. Direct quotes from participants are provided to document professional learning communities experiences. Additionally, I am providing literature that supports the findings.

**Research Question 1: What are elementary science teachers' perceptions about using collaborative inquiry to analyze student data in professional learning communities?**

Research question 1 explored elementary science teachers' perceptions about using collaborative inquiry to analyze student data in professional learning communities. To answer research question 1, I examined the participants' responses from the survey and the focus group protocol in Table 8.

**Table 8**

*Survey Questions and Focus Group Protocol Aligned With Research Question*

| Survey question | Focus group protocol |
|---|---|
| Approximately how many hours of professional development sessions specifically related to the DWIP did you attend? | Describe the effect of collaborative inquiry practices on your capacity as a teacher. |
| Approximately how many hours of professional development related to collaborative planning did you attend? | Describe the effect of collaborative inquiry practices on your capacity as a PLC member. |
| State, in at least three sentences, any new knowledge and skills from DWIP PD. | Discuss how collaborative processes for decision-making have impacted teaching and learning. |
| State, in at least three sentences, any new knowledge and skills from collaborative planning PD. | Explain how the collaborative inquiry processes for collaborative planning has impacted student learning. |
| Explain, in at least three sentences, how the new knowledge and skills impact your PLC experience. | |
| Explain, in at least three sentences, how the new knowledge and skills impact your data-driven decision-making practices. | |

The knowledge base and skill set for collaborative inquiry and collaborative planning for each participant, as well as the acknowledgment of student data for flexible decision-making, influence the teachers' perceptions about using collaborative inquiry to analyze student data in professional learning communities. The three themes that emerged supporting the first research question were: (a) teachers have specific

knowledge of DWIP and collaborative planning; (b) teachers recognize collaborative skills and related knowledge impact their individual practice; and (c) teachers recognize the value of student data for flexible decision-making.

### *Theme 1: Teachers Have Specific Knowledge of DWIP Collaborative Inquiry and Collaborative Planning*

Theme 1 described individual teachers' knowledge about collaborative inquiry and collaborative planning. The Sociocultural Theory of Learning emphasizes that learning is created and constructed through social interaction (Vygotsky & Cole, 1978). Teams of educators can develop a knowledge base of DWIP through collaborative student data analysis activities designed to improve teaching and learning (Weddle, 2020). Study participants discussed individual knowledge related to DWIP and collaborative planning structures and processes based on collaborative work experiences. Additionally, study participants expressed an appreciation working with colleagues to examine student work and discuss instruction.

According to Hubers et al. (2019) there are three levels of knowledge related to teacher data use: (a) awareness level based on basic knowledge of data use practices; (b) how-to level includes proper implementation of steps to engage in data practices, and (c) principles level to include an understanding of the functional principles that undergird the practices for data use. Most of the participants identified the value of DWIP and provided examples of knowledge at the intermediate level. For example, Teacher 2 stated, "I learned the importance of analyzing student work collaboratively, across content, and creating next steps for individual scholars." The response of Teacher 2 indicated

experiential knowledge based on participation as a collaborative team member. Teacher 3 agreed with Teacher 2 and eagerly interjected participation in self-sought DWIP training "to understand for myself and others." Teacher 3 also discussed the cycle of data inquiry and the importance of data literacy. Specifically, Teacher 3 commented that DWIP knowledge was "like a blueprint" for improving instruction and becoming data literate provided focused on student learning. While Teacher 2 and Teacher 3 expressed differences in their intermediate DWIP working knowledge and experiences both participants concurred DWIP supports differentiated instruction and allows collaboration with others.

Furthering the discussion, Teacher 4 expressed knowledge of DWIP as an integral part of the educational process as "a learning tool and not just reflection" to impact student learning. The responses of Teachers 2, 3, and 4 demonstrate familiarity with DWIP processes and corresponding activities for collaborative data use. In contrast to the responses of Teachers 2, 3, and 4 at the intermediate level, Teacher 1 described DWIP knowledge at the awareness stage, "I know what DWIP is, how it is used, and how it benefits the students." Teacher 1 expressed a desire to learn more about DWIP application but recounted displeasure with the level of DWIP training.

All the participant responses appeared to be consistent with the participants' level of DWIP training hours as they described in the survey. Participants with the highest number of DWIP training hours expressed greater in-depth responses related to DWIP knowledge. De Simone (2020) discussed that teachers with lower levels of self-efficacy in using student data compared to colleagues with higher self-efficacy will likely

experience decreased levels of positive affect. Understanding the difference in DWIP knowledge levels amongst teachers can lead to inefficient and inappropriate data use and interpretation. Therefore, the level of knowledge for each member of a PLC focused on collaborative inquiry should be assessed to determine a readiness to gain relevant knowledge, to build teacher capacity for appropriate data use and interpretation and to promote collegial participation.

Collaboration in the school setting is described as a collective and cooperative work structure to promote teacher efficacy and school improvement (Liu & Hallinger, 2018). Collaborative planning for the study school district is a required teacher team structure. The study school district has identified a strategy aligned with the goal of outstanding academic achievement as embracing Data Wise as a continuous systemic improvement approach (PGCPS Bridge to Excellence Master Plan, 2017). Project study participants expressed familiarity with the collaborative planning process as set forth by the school district. Teacher 4 described the study school's organization of teacher teams into horizontal grade levels and vertical subject matter groups. According to Senn et al. (2019), horizontal teacher teams are organized for specific grade level teacher collaboration and coordination of varied subjects to improve instruction. Each grade level team, Grades K-5 in the study school is comprised of all teachers for each grade level, to include art, music, and physical education. As Trabona et al. (2019) noted, vertical team structures are important for collaboration amongst grade level teachers to impact school-wide improvement plans. Each subject matter team in the study school is made up of all grade levels that teach the subject. The school is departmentalized for core subjects,

which includes mathematics, reading, science, and social studies, beginning at the third grade. Therefore, the Grades K- 2 teachers are responsible for teaching the core subjects to their students.

The primary grades teachers decide on which vertical collaborative planning sessions to attend and report back information to their grade level colleagues. According to Gunning et al. (2020), a vertical PLC is an effective structure for science teacher collaboration on the development of science content across grade levels. Additionally, horizontal and vertical teacher teams are organized to promote instructional improvement and effective classroom practices (Kauerz & Coffman, 2019). Therefore, the study school provides each teacher an opportunity to participate in multiple collaborative sessions for student achievement.

I asked focus group participants about the impact their collaborative knowledge had on their participation in the school's collaborative PLCs. Participants eagerly discussed grade level and subject matter collaboration sessions with colleagues citing shared responsibilities for student achievement and school improvement. For example, Teacher 4 stated that the collaborative planning process "gave me greater insight into working with colleagues to plan both vertically and horizontally with different teams." During the discussion of shared work responsibilities Teacher 2 expressed satisfaction in working with colleagues through the DWIP instead of independently to "figure it out" while Teacher 3 commented on the benefit of teachers sharing in collaborative inquiry sessions to prepare for school-wide data wall displays to "make them more interactive." Participant responses suggested sharing knowledge and learning from others in

collaborative sessions helps teachers to build collective efficacy for student achievement and school improvement tasks.

According to Pino-Yancovic et al. (2022), teachers that actively participate in collaborative inquiry activities share knowledge as experts to address instructional needs. Teacher 3 mentioned that during collaborative inquiry sessions, faculty were responsible for collectively examining student work and deciding the professional development and resources needed for improving instruction. Teacher 2 and Teacher 4 agreed with Teacher 3's comments. Teacher 4 added that sharing knowledge in collaborative sessions enhanced communication skills with colleagues. Johnson et al. (2018) suggested teacher collaboration has the potential to increase job satisfaction by reducing anxiety associated with isolation from colleagues and burnout from work responsibilities All participants concurred there is an added value of collaborative sessions with different school teams to enhance the experience of working with colleagues, expressing appreciation for both collaborative planning and collaborative inquiry experiences.

In addition to positive responses regarding school-based teacher collaboration one participant expressed dissatisfaction with prior collaborative planning experiences. Teacher 1 referred to previous collaborative planning experiences that lacked teacher autonomy and creativity, which negatively impacted teacher engagement and lesson development in collaborative planning sessions. "This is still a gray area honestly. Each school describes collaborative planning differently (Teacher 1)." Additionally, Teacher 2 commented that limited teacher autonomy exists in collaborative sessions because of the school district's primary areas of academic foci on reading and mathematics through

literacy strategies. All participants agreed with Teacher 2 by affirmative head nods that collaborative planning and collaborative inquiry sessions are designed to discuss and decide on student improvement strategies in reading and mathematics. Therefore, Pino-Yancovic et al. (2022) suggested the establishment of collaborative cultures in schools appears to be most effective if teachers are given the opportunity to collectively choose the topic of focus for collaboration. All the study participants discussed the need for more autonomy and creativity in teacher collaborative experiences.

Although all participants seemed to show displeasure through facial and body expressions about the emphasis of math and reading in collaborative sessions, they continued to discuss knowledge gained by working with colleagues in collaborative planning and collaborative inquiry sessions. For example, Teacher 4 recalled quarterly planning sessions with other science teachers to examine how topics spiral through grade levels. Teacher 2 agreed with Teacher 4 and shared how the "Data Wise process was kind of cool to use with grade-level teams" through the reading data and the math data to focus on student writing. Teacher 2 elaborated that DWIP supported teacher talk on instructional strategies that could be used across content. Consequently, most of the participant responses suggested the collaborative sessions were valued professional learning experiences.

Additionally, Teacher 3 purported that using collaborative inquiry meeting protocols helped maintain the focus of all team members to ask questions during the data overview. Teacher 2 agreed with Teacher 3 and interjected the meeting protocols helped team members demonstrate objectivity in reviewing student work by using active

learning statements such as 'I notice' and 'I wonder.' According to Weddle (2020), meeting protocols provide guidance to promote structure for discussions based on instructional practices. Most of the study participants appeared to acknowledge meeting protocols as essential communication factors in collaborative sessions.

During the discussion of the impact of focus group participants' collaborative knowledge on PLC participation, the participants also expressed appreciation for working with colleagues in collaborative sessions. The responses of most of the participants suggested the collaborative sessions provided opportunities for participants to share knowledge and learn from one another for improved instruction and teacher professional development. Ouyang et al. (2020) assert that providing teacher with opportunities to participate in PLCs can contribute to knowledge building with colleagues. All participants expressed displeasure with the lack of autonomy and creativity in collaborative sessions regarding subject selection. Therefore, active participation in the collaborative sessions demonstrated teachers' readiness to acquire relevant knowledge for their professional practice. Participants then transitioned into a discussion on how collaborative knowledge and skills impact individual teaching practices.

### *Theme 2: Teachers Recognize Collaborative Skills and Related Knowledge Impact Their Practice*

Theme 2 described how teachers apply collaborative skills and knowledge to their teaching practice. As adult learners, teachers need to know the relevancy of the content they are expected to learn (Merriam, 2017). Teachers can become leaders of their learning through cycles of collaborative inquiry to address adaptive challenges in the

classroom (Pino-Yankovic et al., 2022). Focus group participants shared how knowledge and skills acquired through collaborative planning sessions influenced their teaching practice. Most of the participants described the positive impact of collaborative skills and knowledge in their classrooms. For example, Teacher 3 expressed that the collaborative planning experiences enhanced individual preparation for student learning and instruction. Teacher 3 also discussed that the result of collaborative planning emphasized the importance of creating authentic student-centered plans for instruction instead of simply doing the same things in your classroom. Similarly, Teacher 4 concurred with Teacher 3 by stating that, "the PLCs taught me how to plan for ongoing student learning with a group of colleagues." Therefore, it appeared that participants valued the collegial interaction during collaborative sessions to share ideas related to instruction and to make more informed decisions about their classroom practice.

The study participants agreed that planning with colleagues was beneficial informal learning from one another in preparation for individual planning and instruction. Specifically, Teacher 2 and Teacher 3 expressed appreciation for the additional impetus to provide differentiated instruction that occurred because of informal, collegial professional learning sessions. For example, Teacher 3 stated, "working through DWIP kept me teaching kids, not curriculum." Teacher 2 agreed with Teacher 3 and credited the mindset change to examine and apply student data to planning for effective instruction was a result of DWIP participation. The participant responses appeared to acknowledge participation in the DWIP process as the catalyst to collaboratively plan and provide improved instruction. Goddard and Kim (2018) suggested effective collaboration

amongst teachers could result in more student-centered instruction. Teacher 4 elaborated on the positive impact of content planning when science teachers shared differentiated instructional strategies in collaborative planning sessions to give students more options to explore in lessons.

Smale-Jacobse et al. (2019) described Differentiated Instruction (DI) as an educational strategy that considers students' individual readiness to learn, abilities, interests, attitudes and educational needs to give students multiple pathways to gain content knowledge. The focus group participants concurred that collaboration about, and use of the DI strategy helped them become more accountable to students in their learning experiences. Teacher 2 initiated a discussion of the school's focus on literacy expressing how working with colleagues in the collaborative sessions made it easier to identify potential literacy strategies that could be used across reading and math content. As Teacher 2 referred to literacy in reading and math, Teacher 3 emphasized personal experiences of implementing literacy strategies in science by following DWIP processes as a blueprint for effective instruction. Teacher 3 also discussed the benefit of inviting individuals into the classroom to observe literacy strategies in science instruction, confer, and collaborate on next steps based on student data and observations. Specifically, Teacher 3 explained the focus on literacy in collaborative inquiry "opened up my eyes on what I was really assessing."

According to Clark and Lott (2019), merging NGSS and literacy standards into an instructional plan for elementary students promotes reading, writing, and science knowledge and skills for elementary students. The responses of Teacher 2 and Teacher 3

appeared to demonstrate the transfer and application of DWIP into the classroom for science and literacy instruction. In response to Teacher 2's comments about literacy in science, Teacher 1 asked the group if teacher reflection, as part of the DWIP process, had any influence on planning for science instruction. As a group, through shared supportive body language, the study participants agreed that teacher reflection is necessary for lesson planning. Teacher 4 stated, "reflection was the hardest thing for me to do." Teacher 4 elaborated that prior to collaborative sessions, personal and honest critique of instruction was initially a challenge to plan for the next lesson and improve instruction. Teacher 2 agreed with Teacher 4 adding that reflection was a confidence builder for instruction. Additionally, Teacher 3 suggested that the DWIP inspired active reflection because the collaborative process revealed what was needed based on student assessment because "the data cycle was more about growth, not end points." Teacher 2 and Teacher 4 nodded in agreement with Teacher 3 while Teacher 1 remained silent after asking the initial question on reflection in science planning. The responses from Teacher 2, Teacher 3, and Teacher 4 appeared to indicate an understanding of DWIP-inspired teacher reflection on instructional practices, while Teacher 1 seemed to ponder the other participants' responses about the influence of teacher reflection for planning science instruction.

The overall responses from most focus group participants suggested that the informal work sessions for both collaborative planning and collaborative inquiry were meaningful experiences for their teaching practice. Focus group participants discussed how collegial interactions in the collaborative planning and collaborative inquiry sessions

helped them to learn about and apply differentiated instruction and literacy strategies to their science teaching practice. Additionally, most focus group participants concurred that active reflection behaviors from DWIP sessions were transferred into their classrooms to promote better lesson preparation.

Moulakdi and Bouchamma (2020) concluded that active teacher participation in PLCs increases the chance that teachers and students will benefit from the professional learning. During the focus group discussion on the impact of collaborative knowledge and skills on instructional practice, study participants expressed the influence of collaborative experiences on examining several sources of student data as the catalyst for flexible decision-making in their classrooms. Knowledge sharing in the collaborative sessions had a positive impact on the participants' classroom practices.

### *Theme 3: Teachers Recognize the Value of Various Student Assessments for Flexible Decision Making*

Theme 3 described how teachers use different types of assessment to support flexible decision-making. Focus group participants reflected on a consistent practice of collaboratively and individually examining student data from various assessment sources for meeting students' needs and informing instruction. Teacher 1 explained all student data is valuable to reduce teacher frustration in planning, instructional time and "teaching above students' skill sets." Teacher 2 interjected that prior to gaining collaborative knowledge and skills, the use of different assessments to inform instruction was an infrequent practice.

Admiraal et al. (2020**)** found that various students learning data could assist teachers in next steps for instructional decisions. Teacher 3 stated how frequently using lesson exit tickets "helped me identify my students needs and figure out where to go next for instruction." All participants agreed with statements through affirmative responses. Similar to Teacher 3's response about exit tickets, Teacher 4 added that the use of lesson exit tickets "helped me to develop a better understanding of the purpose of formative and summative assessments for instruction." Exit tickets are formative, five-minute student response tasks that teachers use after a lesson event to determine students' understanding and next steps for instruction (Fowler et al., 2019). Teacher 2 credited the use of exit tickets as the primary strategy used to "collect student data and adjust instruction on a daily basis" while Teacher 4 explained the use of exit tickets helped plan what areas needed to be retaught in the next class session. The student responses from exit tickets help teachers identify appropriate instructional strategies: (a) provide clarification of ideas, (b) reteach ideas, (c) provide extension activities, (d) offer practice options, (e) teach new ideas, or (f) redesign subsequent instructional activities (Marshall, 2018). Teacher 3 indicated that identifying lesson artifacts that would produce quality student data positively impacted data-driven decision-making practices. The study school's focus on student writing, as explained by Teacher 2, became a major form of assessment that was examined in collaborative sessions. Additionally, Teacher 2 stated students' writing samples were used in the classroom to inform instructional practices. Participant responses appeared to demonstrate an understanding of the influence of formative assessments on teachers' decisions related to daily, student-centered instruction.

Formative assessments can be used to quickly determine content understanding and to establish and maintain equitable and diverse lesson experiences (Fowler et al., 2019). Participants overwhelmingly concurred that using varied formative assessments, including exit tickets, were preferred indicators of student learning and instructional direction.

According to Bhat and Bhat (2019), student data can be applied to four areas of instruction: (a) feedback, (b) purposeful teaching, (c) adaptive instruction, and (d) learning time. Based on participants' responses to survey questions and focus group questions, the application of student data aligned with the instructional areas of feedback, purposeful teaching, and adaptive instruction. Teacher 3 expressed appreciation for the school district's repository of summative assessments for specific grades in support of the district-wide initiative to increase literacy in all grade levels. Specifically, the quarterly literacy assessments provided another way to "pull out student data to drill down to the skills and processes" (Teacher 3). With a different perspective from Teacher 3's comment. Teacher 2 explained there was anticipation that the overall assessment scores would be favorable every quarter.

Summative assessments, in contrast to formative assessments, are focused on reporting students' learning levels at a predetermined time (Dolin et al., 2018). Additionally, Teacher 2 recalled that "it was cool" to work with colleagues in DWIP sessions to examine student data from reading and math summative assessments to make decisions on students writing tasks. In contrast to Teacher 2's response, some teachers expressed frustration for the inability of other teachers to use the school district's

summative assessments for the literacy initiative. For example, Teacher 3 assertively stated “there were not any standards in Performance Matters for the lower grades that aligned with DWIP.” Teacher 2, in agreement with Teacher 3, expressed that little attention was given to literacy summative assessment development in the primary grades Based on participant responses, it appeared that the district’s literacy summative assessments were beneficial for some teachers while literacy summative assessments were non-existent for other teachers.

Furthering the discussion on the value of using multiple sources for student data, Teacher 3 added the school’s administrative push for data walls “were annoying and didn’t do anything for the practice.” Teachers nodded in agreement and Teacher 2 interjected that the school administrators’ purpose of each teacher’s data wall was to “have a visual of test score ranges from one test to the next.” Teachers who examine multiple sources of student data are more likely to make decisions that correspond to students’ learning needs (Wardrip & Herman, 2018). Teacher 3 stated that teachers could individually decide to place additional student data on their data walls that could include formative assessments. Based on teacher responses, it appears that mandated data walls were an insignificant factor in teacher decision-making related to using various student assessments.

Study participants shared their perspectives on using various student assessments to exercise flexible decision-making to meet students’ learning needs. The responses of the study participants indicate alignment with the three instructional areas of feedback, purposeful teaching, and adaptive instruction. The use of multiple sources of student data

by teachers should be related to the intended goals for school improvement as it is related to student learning (Schildkamp, 2019). In addition to the discussion of using various student data sources, study participants expressed perspectives om barriers and support for using specific student data analysis methods in collaborative inquiry sessions.

**Research Subquestion 1: What are the barriers to using specified student data analysis methods?**

Research subquestion 1 explored the barriers for using specified student data analysis methods in professional learning communities. I examined the participants' responses from the survey and the focus group session, as shown in Table 9, that negatively impacted the professional experiences of each participant in school teams for collaborative planning and collaborative inquiry activities that influence the teachers' perceptions about the human and organizational barriers for using specified student data analysis methods. Two themes emerged supporting the first research subquestion: (a) teachers acknowledge that colleagues sometimes participate in collaborative sessions with adverse behaviors and (b) teachers identify adverse principal behaviors related to collaborative inquiry.

**Table 9**

*Survey Questions and Focus Group Protocol Aligned With Research Subquestion 1*

| Survey question | Focus group protocol |
|---|---|
| Approximately how many hours of professional development sessions specifically related to the DWIP did you attend? | How does the organization of your school for collaborative inquiry impact your participation in the PLC? |
| Approximately how many hours of professional development related to collaborative planning did you attend? | How does the organization of your school for collaborative inquiry impact your teaching practice? |
| State, in at least three sentences, any new knowledge and skills from DWIP PD. | Describe the effect of collaborative inquiry practices on your capacity as a PLC member. |
| State, in at least three sentences, any new knowledge and skills from collaborative planning PD. | What were the checks and balances for collaborative inquiry in your PLC? |
| Explain, in at least three sentences, how the new knowledge and skills impact your PLC experience. | Explain the role of school administrators in collaborative inquiry in your school. |
| Explain, in at least three sentences, how the new knowledge and skills impact your data-driven decision-making practices. | |

### *Theme 4: Teachers Acknowledge That Colleagues Sometimes Participate in Collaborative Sessions With Adverse Behaviors*

Theme 4 identified unproductive behaviors of collaborative team members. Collaborative sessions for the school study site exist in two forms: (a) collaborative planning with grade level and subject matter teams, and (b) DWIP collaborative inquiry with grade level teams. Collaborative planning sessions are every other week and DWIP collaborative inquiry sessions are once every quarter.

When study participants were asked how the school organization for collaborative inquiry impacted participation in the PLC there was a discussion of adverse collegial interactions that occurred during DWIP collaborative inquiry sessions. For example,

Teacher 3 stated that sometimes working with other teachers during collaborative inquiry sessions was difficult, “like pulling teeth and a struggle a lot of times.” Additionally, Teacher 3 explained the challenge of working with co-workers in DWIP collaborative inquiry sessions was because some colleagues expressed displeasure of working through DWIP and perceived the process as simply a short-term mandate.

Teacher 1 concurred with Teacher 3 that because several team members felt mandated to participate in DWIP sessions that mindset contributed to the unproductiveness of the group. Teacher 2 concurred that the perception by some colleagues of DWIP as an additional task contrasted with the perception of the school leadership team of DWIP as an essential process for school improvement. The perspectives of most of the study participants aligned with the collaborative culture of Hargreaves (2019) contrived collegiality. The concept of contrived collegiality is described as predetermined meetings of teachers set through administrative power that result in less than authentic interactions amongst participants (Hargreaves, 2019). Additionally, Teacher 2 interjected that even though colleagues learned how to use DWIP through established protocols, the inconsistency of applying DWIP in collaborative inquiry sessions was frequently due to specific team members’ overwhelming personalities that limited other member contributions to discussions and group work. Teacher 2 further stated that it was difficult to engage team members in deeper discussions once specific team members voiced their opinions and positions on the topic of discussion.

Teacher 4 mentioned the collaborative inquiry sessions would often lead to groupthink because some colleagues were not fully invested in DWIP collaboration and expressed a desire to leave the session to complete classroom-related tasks. According to Reaves (2018), groupthink can occur because of time limitations and substantial pressure to make decisions. Teacher 3 commented that team members appeared to be fully invested in DWIP when the principal would visit a collaborative inquiry session and then complain about having to complete DWIP tasks in the principal's absence. Also, Teacher 2 mentioned that teachers held each other accountable to work together more in collaborative planning sessions compared to collaborative inquiry sessions. Teacher 1 agreed with Teacher 2 and interjected that the collaborative planning sessions provided check and balance for instruction amongst team members in contrast to the collaborative inquiry sessions that were characterized with teacher reluctance to fully participate. Each of the study participants agreed that collaborative planning sessions were less challenging for cooperation and collaboration in comparison to the collaborative inquiry sessions.

The responses by study participants suggested that difficulty in working through DWIP sessions appeared to be related to colleagues' lack of interest and accountability to one another to work through the DWIP process. Social constructivism identifies participants in a PLC as active, co-constructors of knowledge about their professional practice (Henderson, 2018). The study participant responses indicate social constructivism was more prevalent during collaborative planning sessions than collaborative inquiry sessions. Participants discussed additional barriers to productive collaborative inquiry sessions.

### *Theme 5: Teachers Identify Adverse Principal Behaviors Related to Collaborative Inquiry*

Theme 5 described how adverse behaviors from former school administrators negatively impacted collaborative inquiry processes. During the focus group discussion, all the participants expressed willingness to participate in collaborative inquiry sessions despite occasional adverse behaviors displayed by building administrators. According to Yousaf et al. (2018) there is a positive correlation of principals' staff development practices and teacher growth and work satisfaction.

All the study participants expressed dissatisfaction with the former principal's approach to collaborative inquiry. Teacher 1 specifically referred to collaborative inquiry sessions when the former principal engaged in finger pointing and accusations of teachers not completing the school's DWIP checklist. Additionally, Teacher 1 explained that the DWIP checklist was provided by the school administration as a check and balance for the collaborative inquiry sessions; however, team members did not embrace the checklist. Teacher 3 interjected that the checklist was ineffective for teacher collaboration. Teacher 1 immediately agreed with Teacher 3 and described the checklist as a catalyst for teachers to express dissatisfaction with DWIP and lack of trust in school leadership for collaborative inquiry. Teacher 3 stated that the checklist was used by former school administrators in a punitive manner if not completed. Specifically, Teacher 1 explained it was challenging to complete the checklist because the format was "based on standards or something different if we had visitors in the building." While the remaining participants agreed, the overarching response was that former school administrators emphasized

completion of the checklist without concern for the effort needed for completion and that the principal generally mandated the time and process for collaborative inquiry with the checklist.

Participants discussed additional challenges regarding collaborative inquiry associated with negative behaviors displayed by former school administrators. Teacher 3 mentioned the initial challenge of working through DWIP was attributed to former school administration behavior that "did not drive the conversation" in the collaborative inquiry sessions. Teacher 4 agreed with Teacher 3 and suggested that school administration appeared to be focused on the result of DWIP and not invested in learning the collaborative process while Teacher 2 interjected that the former administration "pushed annoying class data display walls" only to show pass/fail percentages as evidence of successful DWIP sessions. Specifically, Teacher 2 elaborated that the data walls were a time-consuming visual to prepare for others to look at the pass and fail percentages without the principal or others engaging in relevant conversations about the data walls.

Teacher 1 expressed that the former administrators presented the work of DWIP as a mandate and would share their captured notes from the central office DWIP training sessions as staff development. Teacher 1 also elaborated that during staff development meetings the former administration read slides from central office training sessions without clarification and dictated what was going to happen in the process of DWIP for the school. Similarly, Teacher 2 expressed that the former administration did not provide guidance for the specific faculty members chosen to facilitate collaborative inquiry training sessions in their stead. Teacher 4 interjected that the administrators "just weren't

versed in DWIP and would contradict what we learned and did in other collaborative inquiry training sessions." All study participants nodded in agreement with Teacher 4's statement. Hargreaves (2019) suggested teachers are prone to collaborate with more success when school leadership engages teachers in understanding school district policies and empowers teachers to take ownership in making changes.

The responses from participants seemed to highlight the importance of the principal's role in supporting staff through the collaborative inquiry process. Participants' responses suggested that teachers want meaningful collaboration with school administration to promote collective teacher efficacy for collaborative inquiry. Study participants also discussed supportive behaviors of principals and others regarding collaborative inquiry.

**Research Subquestion 2: What are the human and organizational supports for using specified student data analysis methods?**

Research subquestion 2 explored the human and organizational supports for using specified student data analysis methods. I examined the participants' responses from the survey and the focus group session (see Table 10) supporting the professional experiences of each participant in school teams for collaborative planning, collaborative inquiry and central office activities that influence the teachers' perceptions about the human and organizational supports for using specified student data analysis methods. Two themes emerged supporting the second research sub question: (a) teachers identify supportive principal behaviors related to collaborative inquiry and (b) teachers acknowledge impact of central office personnel on collaborative inquiry process.

**Table 10**

*Survey Questions and Focus Group Protocol Aligned With Research Subquestion 2*

| Survey question | Focus group protocol |
|---|---|
| Approximately how many hours of professional development sessions specifically related to the DWIP did you attend? | How does the organization of your school for collaborative inquiry impact your participation in the PLC? |
| Approximately how many hours of professional development related to collaborative planning did you attend? | How does the organization of your school for collaborative inquiry impact your teaching practice? |
| State, in at least three sentences, any new knowledge and skills from DWIP PD. | How do protocols for collaborative inquiry influence the structure of the PLC? |
| State, in at least three sentences, any new knowledge and skills from collaborative planning PD. | Explain the role of school administrators in collaborative inquiry in your school. |
| Explain, in at least three sentences, how the new knowledge and skills impact your PLC experience. | Describe the effect of collaborative inquiry practices on your capacity as a PLC member. |
| Explain, in at least three sentences, how the new knowledge and skills impact your data-driven decision-making practices. | Describe any influence of central office on collaborative inquiry processes in PLC. |

### *Theme 6: Teachers Identify Supportive Principal Behaviors Related to Collaborative Inquiry*

Theme 6 identified how supportive behaviors from former school administrators impacted collaborative inquiry processes. During the focus group discussion, all the study participants mentioned adverse behaviors of school administrators related to collaborative inquiry. Most of the participants also discussed supportive behaviors of school administrators related to collaborative inquiry. For example, Teacher 2 and Teacher 4 acknowledged that the former principal scheduled time in the workday for bi-monthly collaborative planning meetings and quarterly collaborative inquiry sessions. Teacher 2 explained that the principal transformed the work schedule in response to the school

district's requirement for teacher collaboration. Additionally, Teacher 4 credited the former Principal with providing substitute teachers for the time set aside for collaborative planning meetings and collaborative inquiry sessions. Teacher 3 concurred and mentioned that before school time and after school time was also scheduled to conduct DWIP sessions with work schedule adjustment perks for participants. Furthering the discussion, Teacher 3 also stated that the principal would occasionally attend a collaborative inquiry session as "the muscle" to encourage teachers to participate in the process. Also citing another example of principal supportive behavior, Teacher 3 stated that the new administrator required teachers to use DWIP to justify professional development and student academic needs for purchasing supportive resources while Teacher 2 interjected that the principal afforded opportunities for teachers to attend a recurring PLC conference devoted to collaborative inquiry. Most of the participants agreed with one another through verbal responses and affirmative nodding.

During the discussion of principal behavior, all the study participants remarked that the principal made the decision on who attended the central office DWIP training sessions. Teacher 3 elaborated that the staff representative would attend the DWIP training with the principal and return to school as a facilitator in the staff development training on collaborative inquiry. Teacher 2 remarked that it was beneficial to have faculty members serve as facilitators for DWIP training sessions at the school to receive in-depth training. Most of the participants agreed with Teacher 2's statement.

Participants positively described how the teachers appreciate the principal's establishment of structure for collaborative inquiry in the school. Donohoo (2018) asserts

principals who demonstrate responsive leadership help teachers develop a posture of diligent collective efficacy. The participants' responses suggest that the current principal demonstrated supportive behaviors to establish collaborative inquiry in the school through scheduling meeting days and times, supporting specific teacher professional development needs, and ensuring faculty received DWIP training. The participants also acknowledged the support for collaborative inquiry they received from central office personnel.

### *Theme 7: Teachers Acknowledge Impact of Central Office Personnel on Collaborative Inquiry Processes*

Theme 7 described how central office personnel supported collaborative inquiry. The study school district has adopted DWIP as the collaborative inquiry process and promoted school data teams for the purpose of using and analyzing student data to inform instruction (School Improvement Specialist, personal communication, April 6, 2018). When study participants were asked to describe any influence of the central office on collaborative inquiry processes, Teacher 1 responded that the school district gave an initial mandate to schools with guidelines to follow for collaborative inquiry. Teacher 1 further explained that the former school administration team would follow the suggestions in the guidelines for the faculty to implement during collaborative inquiry sessions. Teacher 4 responded with reference to the central office mandated DWIP trainings offered to selected principals and teachers. The response from Teacher 1 and Teacher 4 appears to align with a school district perspective that collaborative inquiry is a school improvement initiative with multi-level governance (Pino-Yancovic et al., 2022).

In support of the view of the central office as a governing entity, Teacher 2 introduced a former grant program office, the Minority Student Pipeline Math Science Partnership (MSP), that provided teacher professional development support to elementary and middle school science/math teachers as part of the school district's central office structure. Additionally, Teacher 2 stated, "the MSP experiences strengthened my professional practice." All participants expressed agreement with Teacher 2 through affirmative facial expressions. When I asked the participants if the grant program office was associated with collaborative inquiry processes, Teacher 3 explained that the MSP office staff integrated DWIP in their evening teacher professional development sessions. Teacher 3 referred to an MSP workshop session where participants had to reflect on the value of looking at student work collectively that "made DWIP resonate and connect on a higher level." Similarly, Teacher 1 reflected on an initial MSP workshop that introduced inquiry and learning how to constructively work within a professional learning community as an overwhelming experience that "opened my eyes to what a PLC was!" Additionally, Teacher 1 explained that the DWIP experience during specific grade level sessions at school was absent of authenticity in comparison to participating in the MSP grant program.

Teachers are motivated to learn in new environments if the learning is meaningful and relevant to current experiences (Appova & Arbaugh, 2018). Teacher 4 concurred with Teacher 1 and responded that the MSP was effective because of the instructional coaches for teacher professional development and the creation of teacher cohorts. Teacher 2, also in agreement with Teacher 1, explained that the MSP teacher cohorts

enhanced DWIP background knowledge as participants collectively worked through the Data Wise process during the evening workshops. According to Podolsky et al. (2019), adults, including teachers actively participate in learning activities where they can use their experiences as resources for new learning. Teacher 3 elaborated on the response of Teacher 4 stating that the MSP teacher coaches worked with teachers in school collaborative planning and collaborative inquiry sessions to look at student work, promote teacher reflection, provide feedback on instructional decisions and instruction, and recommend professional development resources to school administration for purchasing.

Participants suggested that the MSP grant program added value to their collaborative inquiry experiences through professional development sessions and school visits. Also based on the responses of the participants, I discovered that the teachers appreciated that the MSP grant personnel provided training opportunities to practice, reflect upon and receive feedback on DWIP implementation that were different from the central office DWIP training sessions and the school-based staff development sessions on collaborative inquiry.

Seven themes were identified during the data analysis of this qualitative project study. Each of the themes answered one of the project study's three research questions. Theme 1, Theme 2, and Theme 3 discussed the elementary science teachers' individual knowledge, skills and decision-making related to DWIP collaborative inquiry, collaborative planning and classroom practice which answered the first research question that focused on the study participants' perceptions about using collaborative inquiry to

analyze student data in professional learning communities. Theme 4 and Theme 5 addressed the unproductive behaviors of the elementary science teachers' colleagues in relation to collaborative inquiry which answered the first research sub question that addressed barriers to using specified student data analysis methods. The final themes, Theme 6 and Theme 7, discussed the supportive behaviors of the school and central office personnel related to collaborative inquiry which answered the final research sub question that focused on human and organizational supports for using specified student data analysis methods. Various validity strategies were employed to assess the quality of this qualitative project's study findings.

## Evidence of Quality

To ensure accuracy and credibility of my qualitative project study findings, I used several validity strategies (Ravitch & Carl, 2019). Triangulation occurred in this study through multiple data collection methods and multiple data sources to challenge and confirm interpretations (Creswell & Poth; Ravitch & Carl, 2019). I examined the similarities and differences among the survey and the focus group for elementary science teacher perspectives and influences on collaborative inquiry in professional learning communities. Member checking was conducted for study participants to determine credibility of the findings and researcher interpretations (Stake, 1995). All participants participated in member checking and agreed their individual perceptions were accurately presented and researcher interpretations reflected their perceptions. One participant noted a minor spelling change for a school district office. A peer debriefer was involved in the project study as an external reviewer of research processes and findings (Creswell &

Poth, 2018). My peer debriefer reviewed the analysis of participant survey responses, challenged my biases and assumptions as a researcher and focus group participant, and confirmed initial data analysis. I used a research log to note survey responses and focus group participant reactions and interactions, questions about the study, insight, and emerging themes and patterns. I also used a reflexive journal for connections made during the study and to challenge my biases and assumptions.

During data analysis, a discrepant case emerged within Theme 1. I included the negative case in my data analysis section to increase the accuracy and credibility of my qualitative project study findings (Rose & Johnson, 2020). Although most of the participants had collaborative inquiry knowledge based on extensive school and central office DWIP training and professional learning community experiences, one study participant had limited collaborative inquiry knowledge because of self-described insufficient DWIP training and unfavorable in-school PLC experiences. This discrepant case helped answer the research questions.

## Summary

The problem investigated in this qualitative study was the marginal participation of elementary science teachers in school-based instructional team meetings to analyze student data. Science office personnel determined that elementary science teachers did not feel adequately trained on DWIP to analyze student data in school-based collaborative sessions. Therefore, the purpose of the study was to explore elementary science teachers' perceptions about using collaborative inquiry to analyze student data in professional learning communities. I emailed nine teachers at the study school site that fit

the project study criteria to request their participation. Five teachers completed the project study survey and four of the five teachers participated in the focus group. Data from the survey and focus group were collected and analyzed. Seven themes emerged from this study. The themes were: (a) teachers have specific knowledge of DWIP collaborative inquiry and collaborative planning, (b) teachers recognize collaborative skills and related knowledge impact their practice, (c) teachers recognize the value of various student assessments for flexible decision-making, (d) teachers acknowledge that colleagues sometimes -participate in collaborative sessions with adverse behaviors, (e) teachers identify adverse principal behaviors related to collaborative inquiry, (f) teachers identify supportive principal behaviors related to collaborative inquiry, and (g) teachers acknowledge impact of central office personnel on collaborative inquiry practices.

The conceptual framework for this study was grounded in adult learning theory, social constructivist theory, and collaborative inquiry practices. Knowles's theory of andragogy is based on six principles concerning adult learners: (a) a need to know the reason for the learning activity, (b) an ability to be self-directed, (c) a variety of work and personal experiences, (d) a readiness to gain relevant knowledge, (e) a sense of motivation to learn meaningful information, and (f) an internal motivation. Hargreaves & O'Connor (2018) suggested that attention to teachers' learning style, knowledge, diverse skill set, education, experiences, and perspective is essential for effective collaboration amongst teachers. Social constructivist learning is described as learners actively supporting one another to form individual meaning through collaboration (Diep et al., 2019). Collaborative inquiry is a cyclical framework of professional learning support for

educators to enhance classroom practice through the investigation of students' responses to instruction (Dogan & Adams, 2018). The connection of the two theories and collaborative inquiry formed this project study's conceptual framework suggesting that as adult learners, teachers bring prior experiences, knowledge, and expertise into professional collaborative learning environments to create new understandings through social interactions.

The seven themes identified from the data analysis aligned with the three-part conceptual framework. The first three themes that emerged were directly related to participants' specific knowledge and skills of collaborative planning, collaborative inquiry, and the impact of the knowledge and skills on PLC participation and classroom practice. Participants were familiar with the collaborative meeting structure of school staff and were actively involved in collaborative planning sessions with grade level and subject matter team members in the study school site. Participants gained knowledge of collaborative planning processes through experiential learning during the scheduled weekly sessions. Additionally, the participants also referred to faculty meetings devoted to learning collaborative inquiry protocols and procedures held in the study school site during school hours and after student dismissal. A few of the participants discussed additional collaborative inquiry training received in self-selected online courses and through the school system-sponsored face-to-face collaborative inquiry training sessions. Most participants reflected on positive professional development experiences through sharing and learning from fellow educators and one participant expressed displeasure with collaborative inquiry training from a previous school administrator.

The first research question focused on the elementary science teachers' perceptions about using collaborative inquiry to analyze student data in professional learning communities. The first three themes that emerged from the data were mostly positive as participants referred to the impact of their collaborative skills and knowledge on PLC participation and teaching practice. All the participants expressed appreciation for collaboratively working with colleagues as shared learning experiences. Most of the participants underscored the importance of using protocols for effective communication amongst colleagues while examining student work in DWIP sessions. Additionally, most of the participants referred to the benefit of participating in collaborative inquiry sessions to determine resources and professional development needs for instructional improvement. Participants agreed that although the collaborative sessions were focused on literacy in reading and mathematics, they adapted literacy strategies into science instruction. Participants concurred that teacher autonomy and creativity was needed in collaborative sessions to improve instruction. Most of the participants referred to their active participation in collaborative sessions, specifically, collaborative inquiry, that provided opportunities to discuss differentiated instructional strategies that they implemented in their classrooms. Additionally, participants described how examining various student assessments in collaborative sessions were valuable for individual decisions related to instructional improvement.

The findings from Themes 1, 2, and 3 aligned with those of Admiraal et al. (2020) and Goddard and Kim (2018). Admiraal et al. (2020) found that teachers involved in sharing knowledge during work-based professional learning activities improves

collaborative experiences and contributes to teacher learning and classroom instruction. Goddard and Kim (2018) concluded that teacher collaboration around instructional practices could improve teacher morale, strengthen teacher efficacy, and influence teachers to implement differentiated instruction after reflecting on individual pedagogical approaches.

The second research question was concerned with the barriers to using specified student data analysis methods. Theme 4 and Theme 5 emerged from the study's findings to answer this question. Both themes were focused on unproductive school staff behaviors regarding collaborative inquiry sessions. Theme 4 was focused on teaching staff behaviors while Theme 5 referenced former school administrator behaviors. All participants expressed displeasure of some collaborative team members' participation in collaborative inquiry sessions, as well as former school administrators' inconsistent or ineffective support of the collaborative inquiry process. Although all participants expressed an appreciation for collaboratively working with team members and a willingness to learn and share knowledge, some of the participants cited peer resistance to the collaborative inquiry process, groupthink and less than collegial interactions amongst teachers as primary barriers to more productive work sessions. Participants indicated collaborative inquiry team members felt mandated to participate with administrative checklists to document progress. All participants concurred that there were less barriers associated with collaborative planning in contrast to collaborative inquiry because of the presence of teacher accountability to one another.

All participants expressed dissatisfaction with the former school administrator's level of involvement with the collaborative inquiry process. Participants cited specific examples of questionable leadership such as, assigning teacher training facilitators without procedural guidance, giving incomplete or inaccurate information from school system collaborative inquiry trainings to staff, and assigning teachers to construct data walls without related data discussions. One participant emphasized the lack of leadership by a former school administrator for specific grade level collaborative inquiry sessions contributed to the lack of teacher motivation to participate. All participants agreed that the principal's active and knowledgeable involvement in staff training and participation in collaborative inquiry processes would have been helpful to produce more successful collaborative inquiry sessions.

Literature supports the findings of Theme 4 and Theme 5 of this qualitative project study. Ford and Youngs (2018) found that teachers demonstrate work environment-related norms of isolation and privacy when new initiatives regarding instructional practices are presented. Also, the authors indicated the collective work amongst teachers should involve school leadership to promote trust and collegiality for professional interdependence. Hargreaves (2019) acknowledged that teachers need human support, clear organizational structure, enthusiasm, and an openness to trust to develop collaborative professional relationships that positively contribute to a school's collaborative culture. Additionally, Hargreaves (2019) found that PLCs should be established with the goal of creating solidarity among teachers and between them and school administrators to prevent contrived collegiality.

The final research question was focused on the human and organizational supports for using specified data analysis methods. Theme 6 and Theme 7 are the final themes that emerged from this study. Theme 6 was focused on the school administrator's supportive behaviors related to collaborative inquiry, and Theme 7 concentrated on collaborative inquiry support provided by personnel of MSP, a central office teacher professional development grant initiative. Although all participants concurred the former school administrator displayed unfavorable behaviors related to collaborative inquiry, participants acknowledged there were supportive actions taken by the former and current school administrators. For example, all participants concurred the principal provided the structure for collaborative inquiry to take place in the school building. Organizational structure included arranging the school day schedule for collaborative sessions and providing substitute teachers for instruction to students during collaborative sessions. Specifically, the participants credited the former principal with selecting the teachers responsible for facilitating collaborative inquiry training for school staff. Most participants agreed the current principal demonstrated support for additional collaborative inquiry training through school budget funding.

All participants expressed appreciation for the support received from the MSP grant personnel for reinforcement of collaborative inquiry processes. One participant credited the MSP evening teacher workshops as an introductory experience in an authentic PLC in comparison to the school collaborative sessions. Other participants also identified the MSP evening sessions as opportunities to practice and reinforce collaborative inquiry processes by examining student work. Additionally, all participants

concurred the affiliation with the MSP personnel during evening sessions and in-school visits strengthened the use of collaborative inquiry protocols with school team members and enhanced teaching practices.

The findings from Theme 6 and Theme 7 were similar to those of Cobb et al. (2020), T. Kim and Lee (2019), and van Schaik et al. (2020). T. Kim and Lee (2019) found that the principal positively influences teacher participation in professional development when the principal's role switches to that of the coordinator and facilitator of professional development within the school environment. According to van Schaik et al. (2020) concluded that principals could promote teacher collaborative learning as facilitators of learning through delegating leadership and responsibility to teacher leaders. Cobb et al. (2020), suggested that school district leaders can impact teacher collaborative practices directly and indirectly as considerations are made for consistent scheduling of teacher collaboration and rigorous professional development that includes high-quality content-focused coaching.

## Project Deliverable

This qualitative project study explored elementary science teachers' perceptions of collaboration around student data analysis with their teacher team members and school administrators. Based on data collection and data analysis, I developed a 3-day training module, Becoming Wise about Data Wise through Collaborative Learning, that will be presented virtually for 8 hours each day to the study school faculty and administrators. The trainings are based on the ACE Habits of Mind - action, collaboration, and evidence, the core strategic ways of thinking about student data for the DWIP (Boudett et al.,

2020). The professional development training sessions will be presented on the Zoom platform through Google slides and the Padlet collaborative platform. Participants will gain electronic access to the daily agenda before each session to review. My goals for this project are to promote shared collaborative inquiry processes amongst school faculty and administrators through activities and discussions regarding student work, reinforce DWIP protocols, and provide strategies for collaborative learning.

# Section 3: The Project

Section 3 provides a description the project for this qualitative study, which was a series of three professional development trainings that focused on enhancing teacher and school administrator collaboration regarding student work. The professional development training series will be presented virtually in three 8-hour sessions as the study school district continues to follow reduced in-person professional learning following the COVID-19 pandemic. The study school district determined that virtual professional learning was just as effective as in-person (PGCPS, 2021). Each participant should have a personal copy of the Data Wise guidebook to use as the primary reference during the professional development sessions. However, the presentations will be customized for the immediate needs of the study school staff based on this study's findings. Zoom platform use will enable breakout room meetings for small group interaction, participant screen sharing for whole group reporting, and chat messaging to enhance presentations and promote participant engagement.

The title of the professional development training sessions was Becoming Wise about Data Wise through Collaborative Learning. Collegial interaction will be a result of data displays and discussion, small group interactions, and whole group Padlet activities. Varied student data and work samples will be incorporated to allow participants to share expertise and build background knowledge. These strategies and activities support this qualitative project study's conceptual framework of adult learning theory, sociocultural learning theory, and collaborative inquiry.

## Rationale

The conceptual framework for this study was grounded in adult learning, socioconstructivism, and collaborative inquiry. The framework was the lens through which I viewed teachers' perceptions of their collaborative inquiry experiences. According to Powell and Bodur (2019), adult learners have varied and specific learning needs. In-service teachers need learning experiences that are relevant, problem oriented, contextualized through life experiences, and participatory (Housel, 2019; Powell & Bodur, 2019). Additionally, adult learners need peer interactions to support knowledge construction (Diep et al., 2019). All levels of interdependence in peer interactions are of similar importance in promoting collective responsibility among teachers for collaboration (de Joeng et al., 2022). As teachers collaborate in a professional learning environment designed to review and analyze student data, knowledge is acquired to impact teaching and student learning (Amels et al., 2020). Teachers, as adult learners, can benefit from appropriate professional development to improve their practice.

Professional development is an arranged facilitation of learning activities for in-service teachers to (a) acquire new understandings, (b) seek new target behaviors, (c) obtain applicable competencies, and (d) make modifications to their practice (Sims et al., 2021; Yirci et al., 2021). In-service teachers' needs should be considered in planning professional development opportunities for optimal learning experiences (Darling-Hammond et al., 2018). As teachers actively participate in professional development, they along with their students and their school community are the beneficiaries of an enhanced academic environment (Yirci et al., 2021). Teacher professional development

appears to be a significant factor in advancing professional learning and student achievement.

Teacher professional development can be classified into three categories: programs, forms, and mechanisms (Sims & Fletcher-Wood, 2021). Professional development programmes are custom-designed activities and materials that originate from individuals, groups, or organizations (Sims et al., 2021). The second category of professional development for in-service teachers includes forms that are established as lesson studies, instructional coaching, and teacher learning communities (Sims et al., 2021). Additionally, Darling-Hammond et al. (2018) suggested that professional learning can be achieved through school-based collaborative engagement, mentoring, external workshops, conferences, and seminars.

The third category of professional development is the mechanisms or the techniques and activities that characterize the program or the form to promote change in teacher behavior and practice (Hobbiss et al., 2021; Sims et al., 2021). According to Sims et al. (2021), teacher professional development can be effective if at least one mechanism is present in the program or the form. Additionally, Sims et al. suggested that the originator of the professional development should be familiar with the mechanisms that would be most effective for the specific group of learners. Dogan and Adams (2018) suggested that the most effective form of professional development for in-service teachers is a PLC.

Effective professional development for in-service teachers is established if the teachers' schools are the learning environments with the context of their students,

practice, and school-wide goals in consideration (Bendtsen et al., 2021; Darling-Hammond et al., 2018). Effective and sustainable teacher professional development occurs through collaborative activities and collegial relationships (Bendtsen et al., 2021). Several factors should be considered in the establishment of effective professional development for in-service teachers as adult learners.

Although the study school was a pilot school for implementation of the school district's collaborative inquiry initiative, the DWIP, study participants expressed dissatisfaction with the inconsistent behaviors of faculty and school administrators during the DWIP in-school sessions. To address the concerns of the study participants regarding unfavorable and frequently ineffective collegial interactions during collaborative inquiry sessions, I created a 3-day professional development training module for the study school. The project outcome is for school team members and administrators to demonstrate a shared commitment to action for student assessment, intentional collaboration around student data, and a continual focus on evidence for improved teaching and learning.

## Review of the Literature

For this literature review, I used Google Scholar, ERIC, and JSTOR databases. In my search, I focused on peer-reviewed journals related to classroom teacher professional development and school culture. I used varied search terms and phrases for literature published within the last 5 years relative to my project on the genre of professional development. The following search terms were used for this review of literature: *professional development*, *teacher collaboration*, *teacher capacity*, *contrived collegiality*,

*professional trust and respect*, *collective teacher efficacy*, *school leadership*, *teachers as adult learners*, *online professional development*, and *principal professional development*. I conducted repeat searches in each of the databases.

In the first section of this literature review, I discuss the importance of professional development for teachers, the distinction between a traditional approach and a nontraditional approach to professional development, the seven elements of effective professional development, and the significance of job-embedded professional development. Next, I discuss the connections of the conceptual framework and professional development, including research related to collegial influence and interaction. In the final section, I discuss research-based best practices for online professional development to meet the needs of adult learners.

**Professional Development**

Professional development is considered an integral component of a teacher's professional life (Sancar et al., 2021). As suggested by Yirci et al. (2021), teacher professional development plays a role in career opportunities and individual retention in the teaching profession. Research studies have shown that teacher professional development has a significant impact on student achievement through improved teaching (Gore & Rosser, 2020; Hill et al., 2020). Improved teaching practices as a result of professional development also have a positive influence on school effectiveness (Lipscombe et al., 2019). Support for continual teacher professional development is essential to help teachers provide high-quality instruction for their students (Gore & Rosser, 2020) while increasing the probability of teachers becoming lifelong learners

(Yirci et al., 2021), thereby advancing the intellectual capital in the school (Lipscombe et al., 2019). Professional development is an essential indicator of teacher quality and teacher capacity as an adult learner.

According to Sancar et al. (2021), teacher professional development is defined by both traditional and new approaches to teacher learning. Frequently used traditional approaches to professional development for teachers are centered on teacher learning to change classroom practices and positively affect student achievement (Fischer et al., 2018). In contrast to traditional approaches to professional development, nontraditional approaches to professional development are focused on improving teacher learning and classroom practices through attention to participants' individual characteristics, needs, and professional work life in a collaborative, self-directed learning environment (Sancar et al., 2021). Nontraditional approaches to professional development are also known as job-embedded approaches to promote PLCs among teachers (Cavazos et al., 2018). The professional development training for my project study included sessions that aligned with the job-embedded approach to professional learning for thoughtful participant engagement.

According to Darling-Hammond et al. (2018), the term "effective" best describes thoughtful professional development. Effective professional development is structured professional learning that catalyzes improvement in teacher practices and student learning outcomes (Makovec, 2018). Similarly, Bates and Morgan (2018) suggested that effective professional development should increase teacher knowledge and practice to positively affect student learning. Research studies indicated common factors that describe effective

professional development. There are seven elements of effective professional development, also known as professional learning: (a) focus on content, (b) active learning, (c) support for collaboration, (d) models of effective practice, (e) coaching and expert support, (f) feedback and reflection, and (g) sustained duration (Darling-Hammond et al., 2018). The focus on content element should be designed to promote participants' deeper understanding of the content (Bates & Morgan, 2018; Gore & Rosser, 2020). Each of the seven elements were present in the current professional development project.

The content for the professional development project was DWIP protocols to support collaborative inquiry in the school for teachers and administrative personnel. The active learning element involved participants in mirroring the learning styles that they want to facilitate for their students (see Darling-Hammond et al., 2018). My professional development project included active learning opportunities for participants to work in teams, ask questions, and collaborate on decisions regarding student learning. Support for collaboration is an essential element of professional learning to assist teachers in developing collective knowledge among colleagues (Bates & Morgan, 2018). School administrators will be encouraged to participate on teacher-led teams during the professional development sessions. Models of effective practice, as described by S. Kim et al. (2019), are relevant materials and techniques that teachers can envision using in the context of their classrooms to improve instruction and affect student learning. During the professional development sessions, participants will be expected to engage in activities related to questioning, protocols, and strategies for collaborative behaviors they can practice in collaborative inquiry sessions and in individual classrooms with their students.

Ma et al. (2018) asserted that coaching and expert support are grounded in mutually supportive relationships among peers to assist in personalized learning. Time during the small group sessions will be allotted for invited central office personnel trained in DWIP to support participants in collaborative inquiry processes. Feedback and reflection will give participants opportunities to reflect on and receive input on their classroom practices (see Darling-Hammond et al., 2018; S. Kim et al., 2019). Participants will be encouraged to ask questions during the professional development sessions, actively reflect throughout and at the end of each session, and request one-to-one follow-up for feedback on collaborative inquiry processes. The final element of effective professional development, sustained duration, addresses the content of the professional development over time including follow-up and continued support to teachers (Bates & Morgan, 2018). At the end of the professional development module, DWIP-knowledgeable central office personnel will be asked to attend one scheduled collaborative inquiry session, virtual or in person at the school building, to assess utilization of collaborative team protocols and development of team behaviors. Each of the elements for effective professional development reflects a thoughtful, nontraditional approach to professional learning.

Nontraditional, job-embedded professional development exists in various forms as teacher learning structures (Powell & Bodur, 2019). Mentoring, coaching, and classroom observations are on-site, one-to-one approaches to professional development that focus on the improvement of individual pedagogy, development of teacher leadership, and advancement of student learning (Lipscombe et al., 2019). Coaching teachers regarding collaborative inquiry protocols is included in my professional

development project. According to Little (2020), PLCs are organized school site communities of teachers in which instructional strategies are discussed and evaluated after classroom application. During my project, participants will have opportunities to practice collaborative behaviors that support discussions about student data and instructional strategies. Gumus and Bellibas (2021) asserted that job-embedded practices are the most viable options for teacher and principal work productivity. Therefore, I chose to build on the study school's established PLCs as a job-embedded approach for my professional development project.

**Connections Between Conceptual Framework and Professional Development**

The conceptual framework, grounded in adult learning theory, sociocultural theory, and collaborative inquiry, was directly related to teacher professional development. Teachers, as adult learners, reported that support from facilitators, an intentional focus on students and teaching, engaged learning activities, peer collaboration, and open reflection conversations contributed to the success of their PLCs (Dogan & Adams, 2018). Additionally, Noonan (2019) found that teachers, as adult learners, appreciate professional learning sessions that consider their individual backgrounds and existing knowledge. Facilitators of professional development should understand that teachers approach professional learning in one or more attitudinal directions: (a) toward the facilitator, (b) toward the content, (c) toward personal efficacy for learning, and (d) toward the learning goal or expected performance (Ke et al., 2019; Ng & Baharom, 2018; Zhang et al., 2019). Adult learners' attitudinal foci have an influence on intentions to participate in professional learning opportunities. Although all

current study participants concurred that working with peers during collaborative inquiry sessions was meaningful and relevant, there were expressions of dissatisfaction related to team members and former school administrators' behaviors.

Sociocultural theory addresses the influence of social interactions and cultural beliefs and attitudes on individual learning (Cherry, 2022). Most of the current participants expressed collegial interaction challenges with team members and former school administrators regarding insufficient participation in the collaborative inquiry processes. By participating in my professional development sessions, PLC members and current school administrators may develop a shared commitment to learn with and from one another through intentional collaboration around student data.

**School Collaborative Culture**

Since early 2000, the frequency of professional collaboration has been one of the greatest challenges for K-12 school systems (Hargreaves & O'Connor, 2018). For example, the cultural environment and leadership of a school have a significant impact on the outcome of teachers' professional development in contrast to the important structural matters of the school (Liu & Hallinger, 2018). The participants in my qualitative study credited the former school administrators with providing structural matters of time and resources for collaborative inquiry to occur in the school's professional learning communities. Liu and Hallinger (2022) posited that as principals create and convey the school's vision of learning, structure teachers' collaborative work sessions, and provide essential instructional support, teachers become engaged in PLCs. However, study participants also expressed a desire for improved and engaging collaborative behaviors

by colleagues and former school administrators in collaborative inquiry sessions. Teachers expect school leaders, specifically principals, to give social cues for teachers to decide upon acceptable behaviors in their schools (Liu & Hallinger, 2022). According to Hauge (2019), collaborative behaviors between teachers and school leaders are essential factors in establishing collective professional learning. Principals, as instructional leaders, should be demonstrative in their value of the school's PLCs beyond seeking resources by verbalizing behavioral expectations of adult personnel (Cansoy, 2019; Qian & Walker, 2021). Additionally, Liu and Hallinger (2022) suggested that principals should devote time and effort to create a motivating environment that has clear guidelines on expectations accompanied with support and appropriate rewards for professional learning. Study participants voiced concerns that the school administrators were expressive about the outcomes of collaborative inquiry sessions without reinforcing appropriate collegial behaviors to achieve the outcomes.

PLCs that function with mandated policies and initiatives in place and less than genuine collegial interactions tend to operate with contrived collegiality (Liu & Hallinger, 2022). Hargreaves (2019) defined contrived collegiality as administrative-influenced teacher interactions for the purpose of implementing school district or school-adopted curriculum strategies. Study participants expressed concerns that collaborative inquiry was presented by the former principal as a school district mandate and additional associated tasks given by former school administrators were unrelated to the collaborative inquiry process.

To combat contrived collegiality and promote a professional collaborative culture, Hargreaves and O'Connor (2018) suggested that school leaders consider the solidarity and the solidity of the PLC. The solidarity of the PLC refers to the behaviors of the PLC members as a unit of oneness expressing support for one another in common experiences in contrast to solidity which is the substance of the PLC members' thoughts and processes related to the collaborative work. Therefore, study participants concurred the frequent collaborative planning sessions resulted in more productive work and unity amongst colleagues in comparison to the quarterly collaborative inquiry sessions where team members were less accountable to one another for the required tasks. Teacher accountability and unity is advanced and contrived collegiality is reduced when the principal transitions from a supportive role of the PLC to an influential role advocating the purpose of the PLC (Turner et al., 2018). The professional development project provides participants with DWIP protocols to promote authentic teamwork and efficiency in task completion.

Contrived collegiality is characterized by the lack of three elements: trust, reciprocal respect, and understanding amongst PLC members (Ke et al., 2019). According to Hargreaves and O'Connor (2018), surveyed teachers identified PLCs as the most reviled form of collegial professional development although school administrators prefer the PLC approach as a method to achieve school improvement. Teachers are motivated to engage in a PLC as they trust the principal to protect their individual needs and interests (Qian & Walker, 2021). To combat contrived collegiality and promote a collaborative school culture, trust-building and work commitment between principals and

teachers can develop in an environment that is characterized by transparent, open, and harmonious interactions (Brodie, 2019; Liu & Hallinger, 2022). My project provides opportunities for school administrators and teachers at the school study site to work together in small, rotating groups to discuss how to collectively work in safe spaces to establish trust.

Trust between PLC participants is essential to collaboratively learn and effectively work toward group goals (Hauge, 2019). Brodie (2019) suggested trust is an important factor in collaborative teacher environments to enable contesting team members' discussion points without experiencing defensive behaviors and unhealthy conflict. Kars and Inandi (2018) described trust amongst colleagues wherein the idea exists that school personnel will exercise integrity so that colleagues can take risks and be vulnerable to one another in challenging and difficult situations. During the training sessions, teachers and principals are afforded the opportunity to exhibit trust through role-play in collaborative inquiry scenarios. The display of trust amongst colleagues promotes the development of ideas and sharing of teaching practices instead of judgment (Brodie, 2019). Ford and Ware (2018) emphasized the cultural factor of trust should exist between teachers and between teachers and principals. In addition to trust, participants in the project are encouraged to demonstrate mutual respect for colleagues to contribute to the school's collaborative culture.

Kars and Inandi (2018) purported trust and respect are regarded as cultural characteristics that contribute to the success of professional learning communities. Wan (2020) identified trust and respect as relationship attributes of a PLC with respect being

the more immediate of the two factors to establish between colleagues. As team members consistently work together on shared school vision tasks, reciprocal respect for individual opinions is established (Serviss, 2021). Professional respect amongst project participants is promoted through discussions and team building tasks for collaborative inquiry.

Along with cultivating trust and respect between PLC members, an understanding of one another's role in the structure, function, and sustainability of the PLC through the collaborative inquiry process will be encouraged in my professional development project. Ho and Chua (2019) asserted that principals should understand the importance of their role to initiate team-building relations amongst members, teachers' belief in their own abilities and involving teachers in collaborative work around student data. Patterson et al. (2020) conducted a qualitative study of a low-performing urban middle school to determine school personnel roles in establishing a collaborative culture for teacher engagement and student achievement. The principal demonstrated conceptual knowledge of and participated in the collaborative processes during the implementation phase, which contributed to the sustainability of the school's cultural change. Additionally, instructional coaches and teachers collaborated on efforts to advance cultural change and embraced collective responsibility for student achievement based on positive student outcomes in colleagues' classrooms. The acknowledgement of teachers being essential personnel to help make decisions regarding the school's cultural change is key to engaging teachers in their learning for ownership and student learning outcomes (Patterson et al., 2020). The principal has the responsibility to lead PLC members to (a) understand the influence of instruction on student achievement, (b) set attainable goals,

(c) collect and collaboratively analyze student work, and (d) use previously established protocols to inform instruction (Ho & Chua, 2019). As PLC members utilize DWIP protocols through research-based practices for online professional development, mutual understandings between participants will be encouraged.

**Best Practices for Online Professional Development**

Knowles (1980), widely recognized as the originator of andragogy, proposed four specific needs of adults for their learning experiences: (a) active participation in planning and assessment; (b) connection of life experiences for context; (c) relevance to personal and professional lives, and (d) multiple occasions to engage in problem solving activities. Merriam (2018) espoused andragogy as a humanism theory model that is significant because of the emphasis on adult learning principles. Conner et al. (2018) posited each professional development session should involve approaches that align with adult learning needs. Consequently, I designed my project to accommodate for adult learning needs to enhance the online professional learning experience devoted to collaborative inquiry.

Brieger et al. (2020) and Diep et al. (2019) discussed the impact of several learning theories that are consistent with meeting the needs of adults for online learning. For my professional development project, two of those theories, andragogy, and constructivism, were selected because of the close alignment with this study's conceptual framework that includes andragogy and socioconstructivism. Andragogy was considered due to the emphasis on an individual's motivation and the empowerment of adult learners, while constructivism focuses on individuals making sense of learning with

external support and intervention (Brieger et al., 2020; Diep et al., 2019). The professional development project was developed with strategies that (a) consider adult learners' motivation for collaboration, (b) promote participants empowerment in collaborative learning, and (c) support new learning in a virtual, social learning environment.

Several adult learning strategies are included in the professional development project to enhance online learning. Online professional learning should provide unlimited opportunities for participants to review sessions (Echols et al., 2018). Consequently, the project will be hosted and recorded on the Zoom platform as all study school district personnel have a Zoom account for meeting, teaching, and learning. Powell and Bodur (2019) conducted a qualitative study of K-12 teachers' perceptions of their job-embedded, online training professional development. Teachers in the study concurred that reflection and feedback were the most poignant elements for successful online training. Therefore, I included opportunities for participant reflection during and at the end of each session along with immediate feedback from the session facilitator(s).

Ongoing feedback is considered an effective professional learning strategy to promote efficacy (Diep et al., 2019) that can be achieved through one-on-one coaching (Kraft et al., 2018). As a result, I suggested in my project that a follow up, face-to-face coaching session with individual participants should be provided as needed or requested. In alignment with andragogy and constructivism characteristics, three types of presence should exist in professional learning: (a) cognitive presence with active participants; (b) teaching presence that includes the facilitation of meaningful activities; and (c) social

presence that embodies mutual respect, support and trust for participants and facilitators (Diep et al., 2019). Accordingly, I have designed the professional development project with purposeful activities that will encourage active participation and application demonstrated through positive behaviors toward participants and facilitators. Additionally, Echols et al. (2018) found that study participants who were involved in collaborative activities tend to share skills and knowledge more frequently than those who initially exhibited resistant behaviors toward collaboration. Consequently, I have included several opportunities for collaboration around student data in the professional development project.

**Conclusion**

Effective professional development can be achieved in professional learning communities where teachers collaborate to affect student learning outcomes (Henderson, 2018). Since the COVID-19 pandemic, the study school district has limited face-to-face professional development trainings and has determined that effective professional development can be achieved through virtual technologies. The 3-day virtual professional development is designed to increase teacher and school administrators' engagement in the DWIP which is grounded in collaboration around student data. Professional development that is connected to a teacher's practice and is sustained over time is ideal to promote a change in teaching practice (Darling-Hammond et al., 2018). Based on the current study's findings, the professional development sessions focus on collaborative inquiry around student data and the development of trust in and respect for colleagues in using the DWIP in the study school's professional learning communities.

# Project Description

## Needed Resources and Existing Support

The initial support for the professional development virtual training is the study school principal. The principal will need to approve the 3-day training and to schedule each of the 8-hour training sessions on the school's calendar. After the principal gives their approval, the principal or principal's designee will determine the professional development facilitator for the training. The principal will decide if additional school district personnel, such as a technical support representative will need to attend and support the 3-days of training. Advertisement of the training will be done at the school level so that all staff and faculty are made aware of the professional development training. All participants will need to use their school district issued MacBook or Dell laptops to access the Zoom and Padlet web-based platforms for the virtual training sessions and the Google management system for email documents and training evaluations. All school district personnel have a Zoom account because of the COVID-19 crisis and Google account for instruction, communication, and training purposes. The professional development coordinator will provide the session agendas and Zoom link for training to the school principal or designee for email distribution to all participants. Training participants will need their school issued Data Wise guidebook to reference as needed in the training sessions. The principal or designee will decide on the student performance assessments that will be examined, analyzed, and discussed by participants during the 3-day virtual training.

**Potential Barriers and Solutions**

There are two potential barriers to implementation of the 3-day virtual professional development training. One barrier could be scheduling issues with currently scheduled district PD. Each academic year, the district requires building principals to schedule mandated PD sessions. The annual, August mandatory training days for all school district staff and faculty are organized and facilitated through school district personnel. Therefore, one barrier could be identifying the best possible time to introduce and implement this PD. A possible solution to a scheduling dilemma is to schedule three days of training during the summer before the district-wide August training days begin.

The second barrier to implementation of the 3-day virtual professional development training could be finances. Each school in the study school district has allocated funds for professional development. If the pd training sessions are held during teachers' non-working hours, participating teachers' stipends would be paid from the school's professional development funds. If the school funds are insufficient to pay teacher stipends, one possible solution would be to hold the professional development sessions during the district-wide training days. A second solution to pay teacher stipends could be for the school principal to request additional funds from the study school district's Title II office.

**Implementation and Timeline**

Ideal implementation of my 3-day virtual professional development training would be during teacher workdays at the start of the fall semester. Day 1 of the training will focus on the school profile which includes the school improvement process and

current school initiatives. Day 2 of the training will include collaborative data review of single data sources. Day 3, the final day of training, will focus on collaborative data review of multiple data sources.

Each day of the professional development training will begin at 8:00 a.m. and end at 4:00 p.m. The morning training session will last 4 hours with participants working in the whole group and in small groups on different topics. Two 20-minute breaks will be included in the morning session to give participants an opportunity to reflect and ask any training related questions that were not answered during the morning session. After the second break, participants will work in a small group until lunch at noon. After the 45-minute lunch, a 10-minute recap of the morning session will occur to review key concepts and understandings. After the recap, the afternoon session will last 2 hours and 55 minutes with different topics from the morning session. One 10-minute break will be given in the afternoon. Additionally, the afternoon session will include a recap of the day and a formative evaluation for participants to complete. The afternoon session of the final day will also include a summative evaluation for participants to complete.

**Roles and Responsibilities**

***Professional Development Training Coordinator***

The school training coordinator of professional development will secure the training sessions approval from the school principal, confer with the principal on selection of a study school district DWIP training facilitator, and provide the training sessions' Zoom link and 3-day agenda to share with the facilitator and participants. Additionally, the training coordinator will share the facilitator's guide with the training

facilitator, check participant attendance during the module, ensure participants and facilitator adhere to the training agenda, and monitor the chat feature as needed.

***Study School Principal***

The principal will be responsible for approving the professional development training request and scheduling the 3-day virtual training dates. The principal or designee will select an experienced DWIP training facilitator for the module sessions. It is suggested the facilitator has three to five years of DWIP experience to create an effective professional development environment. The principal will request additional personnel trained in DWIP to attend the virtual sessions for small group support and follow up for collaborative inquiry teams support after the module is completed. If teacher stipends are needed for the module sessions, the principal will make the request from the study school district's Title II office. Additionally, the principal will select or approve from the principal's designee, the student data that will be reviewed and analyzed during the training sessions. Finally, the principal will participate in the virtual training sessions.

***DWIP Training Facilitator***

The assigned training facilitator will review, prepare, and facilitate the use of the training slides during the sessions and invite DWIP-skilled central office personnel to support small group sessions, if desired. Additionally, the training facilitator will lead the whole group segments and facilitate the sharing, recap, and closing segments. Finally, the training facilitator will encourage interaction between participants during whole and small group time periods, answer participants' questions relative to the professional learning sessions, and administer and review the formative and summative evaluations.

### *Training Participants*

Training participants will be responsible for signing into the school employee attendance system and actively participating in the training sessions through questioning, sharing, completing activities, and collaborating in small group segments. During the training sessions, participants will be expected to alert the co-facilitators if any technical assistance is needed. Participants will be required to complete the daily evaluation survey and the summative evaluation on the final day of training.

### *Technology Help Representative*

In the event of technical difficulties during the virtual training session, the technology help representative assigned to the school, or the technology help desk will be contacted by the principal designee to solve technical problems with Zoom, Google and other web-based applications used during the training. The technology help representative will also be expected to privately assist participants with individual technical concerns during training via phone or chat.

## Project Evaluation Plan

### Formative and Summative Evaluation

Evaluation of teacher professional development is essential to gain an understanding of whether training participants perceived the training as relevant, authentic, interactive, collaborative, useful, reflective, and contextual for classroom transfer (Powell & Bodur, 2019). The 3-day virtual professional development training will be evaluated through formative and summative means. Formative evaluation is qualitative feedback on training content and performance that occurs during the learning

(Borg, 2018). The participants of the professional development training will complete a formative evaluation at the end of each day's training during the closing segment to provide immediate feedback and recommendations for subsequent training sessions. The formative evaluation has an open-ended question design to provide participants with an opportunity to reflect on daily sessions. Additionally, participants are asked to make suggestions for any changes for the subsequent sessions and request professional development follow-up sessions. The formative evaluation is in the "Facilitator's Guide for Becoming Wise About Data Wise through Collaborative Learning*"* in Appendix A. Summative evaluation is directed toward learning and skill development at the conclusion of training (Borg, 2018). The summative evaluation will be given to determine if the training positively impacted participants' knowledge and skills related to the project goals. The summative evaluation consists of seven multiple choice questions for participants to select their level of agreement for learning in the professional development module. The summative evaluation is in the "Facilitator's Guide for Becoming Wise About Data Wise through Collaborative Learning" in Appendix A. The summative evaluation will be administered on the final day of training following the formative evaluation.

**Overall Project Goals**

The 3-day professional development project is goal-based. The overall goals of my professional development project are to promote shared collaborative inquiry processes, reinforce DWIP protocols, and provide strategies for collaborative learning amongst faculty and school administrators. The formative evaluation will be administered

daily to determine highlights and challenges of the virtual professional development training sessions. The results of the formative evaluation will help the facilitator understand the participants' daily perspectives of the design and implementation of the training sessions to make any needed modifications to the next session. The summative evaluation, given on the final day of training, will provide participants with an opportunity to reflect upon and share the impact of the training for furthering collaborative inquiry processes and protocols, as well as collaborative learning with colleagues.

**Overall Evaluation Goals**

The summative evaluation instrument for the 3-day virtual professional development training is a questionnaire for participants to complete on the final day of the training. The participants' responses will determine the impact of the training regarding collaborative learning and collaborative inquiry protocols and processes. It is common practice to share the results of a program evaluation with stakeholders (Guyadeen & Seasons, 2018). Therefore, it is an expectation that in addition to me, the training facilitator and Principal will share the results of the training evaluation with district stakeholders.

The stakeholders for this professional development training evaluation are the training participants, school district teacher mentors, the elementary science office personnel, and the research and evaluation office. The training facilitator will provide the study school principal with the summative evaluation results to share with the faculty and staff. Additionally, the Principal and training facilitator will share the summative

evaluation results with appropriate central office personnel as deemed appropriate. Finally, the training facilitator will share the summative evaluation results with me for personal knowledge as the project study developer. I will also share a summary of the professional development module including the summative results with the school district research and evaluation office.

## Project Implications

### Social Change Implications

The professional development project, "Becoming Wise about Data Wise through Collaborative Learning", may have positive social change implications. The project may impact the professional development training participants by providing them with cooperative behavior strategies to co-construct knowledge and apply DWIP protocols during collaborative inquiry sessions. After participating in the professional development module, school administrators may participate, as much as possible, in collaborative inquiry processes in the school's professional learning communities. Finally, participation in the project by teachers and school administrators may enhance the school's collaborative culture to promote a continual focus on student evidence for teaching and learning.

### Importance to Local Stakeholders

The study school district has included collaborative inquiry by schools in the Master Plan to support the systemic effort of data-based decision-making (PGCPS, 2019). By participating in the professional development training sessions, the study school's teachers and administrators could increase skills needed to analyze student data

in professional learning communities. A direct impact of teachers' advanced student data analysis skills could occur in the classroom as teachers utilize the data to inform their instructional decisions and positively affect student achievement. Additionally, school staff and faculty that participate in the professional development training could sustain positive working relationships while learning together in collaborative structures. The significance of the school's personnel working and learning together could result in collective efficacy for student achievement and school improvement.

The purpose of the qualitative project study was to explore elementary science teachers' perceptions about using collaborative inquiry to analyze student data in professional learning communities. Study participants identified effective and consistent collaborative behaviors from teaching colleagues and school administrators as a need in my study. Therefore, I designed a 3-day professional development module to address the following local problem: Elementary science teachers marginally participate in school-based instructional team meetings to analyze student data. Providing a professional development training for teaching staff and school administrators on DWIP may result in authentic teamwork with intentional, cooperative behaviors to collaborate on student data. The professional development module could have implications beyond the study school site as a framework for local school district staff development on collaborative inquiry and sustaining school collaborative culture through relationship building strategies.

## Conclusion

In Section 3 I presented a 3-day professional development module as the project for this qualitative project study. The project study participants identified the need for consistent and cooperative behaviors of teaching colleagues and school administrators during collaborative inquiry sessions. The study's findings and the conceptual framework of adult learning, socioconstructivism, and collaborative inquiry supported the rationale for the professional development project. Professional development is significant in in-service teachers' lives as a contributing factor to the advancement of professional learning and student achievement and increasing teacher capacity as adult learners. Implementation of job-embedded professional development is a non-traditional approach to professional learning for school personnel. Job-embedded professional development enhances teacher and principal work productivity. The most effective form of professional development is a professional learning community. As members of a professional learning community collaborate, co-construction of knowledge, improvement in teacher practice, and increased student achievement is realized. Additionally, trust, respect, and understanding of responsibilities between members of professional learning communities promotes productive collegial interactions and a positive, collaborative school culture. As school administrators advocate the purpose, establish, support, and participate in collaborative professional learning structures, contrived collegiality is reduced to produce open and harmonious interactions. Teachers become more invested in professional learning communities when school administrators are engaged in the professional learning processes.

The goals of the 3-day virtual professional development module are to promote shared collaborative inquiry processes, reinforce DWIP protocols, and provide strategies for collaborative learning amongst faculty and school administrators. The design of the professional development module aligns with adult learning needs specifically, content relevancy, problem-solving, reflection, and feedback. Participants will also have opportunities to suggest module revisions and evaluate the module through formative and summative evaluations. During the online training, teaching staff and school administrators will engage in various activities to promote application of collaborative inquiry processes, co-construct knowledge and support collegiality in their professional learning communities. I concluded Section 3 with a discussion about how the project could benefit local stakeholders through increased skills to analyze student data for academic achievement, sustainable working relationships, and collective efficacy as a result of learning together. In Section 4, I will describe project strengths, limitations, and recommendations for alternative approaches. Next, I will discuss scholarship, project development, and leadership and change followed by my reflective analysis as a scholar, practitioner, and project developer. Additionally, I will reflect on the importance of the project study, implications, applications, and directions for future research. I will end Section 4 with a conclusion of the qualitative project study.

# Section 4: Reflections and Conclusions

The problem addressed in the current qualitative project study was the marginal participation of elementary science teachers in school-based collaborative team meetings to analyze student data. The purpose of this study was to explore elementary science teachers' perceptions about using collaborative inquiry to analyze student data in PLCs. The findings of this study indicated that study participants were dissatisfied with the behaviors displayed by their team members and the former school administrator regarding collaborative inquiry sessions. I designed a 3-day professional development module to address the local problem. The professional development module was created for the study school administration and faculty to collaborate around student data while promoting collegial relationships.

Section 4 provides reflections and conclusions related to the project, the work, and my development as a scholar, practitioner, and project developer. Next, I include recommendations for alternative approaches, definitions, and solutions to the problem of the study. I end this section with implications, applications, and directions for future research related to the problem of the study.

## Project Strengths and Limitations

### Project Strengths

I designed a 3-day professional development module focused on collaborative inquiry processes, protocols, and team-building strategies for elementary school teaching staff and administrators. The problem addressed in my qualitative study was the marginal participation of elementary science teachers in school-based instructional team meetings

to analyze student data. The study's findings indicated elementary science teachers experienced adverse behaviors displayed by team members and school administrators in relation to collaborative inquiry. School staff collaboration requires open-minded individuals, appropriate professional development, and school administrative support (Henderson, 2018). The professional development training module will provide participants with opportunities to participate in whole-group segments, small-group discussions, and individual reflection periods to encourage collaboration and team building.

There were two strengths of this professional development project. The first strength of the project was that the training structure will incorporate research-based strategies to engage participants in discussions and activities. Through the implementation of this 3-day professional development training, teaching faculty and school administrators will be able to collaborate around student data while sharing their knowledge and skills of collaborative inquiry. Effective professional development acknowledges participants' varied experiences to enhance collaboration (Hargreaves & O'Connor, 2018). Participants in my professional development project may gain an understanding of individual perspectives relative to student data analysis in PLCs. The second strength of this project was that the content of the professional development training was directly related to teaching staff responsibilities. Teachers are required to analyze student data in PLCs to identify students' academic needs and design appropriate instruction based on the identified needs.

### Project Limitations

There were two limitations of the professional development project. One limitation was the time offering for the professional development module. Although the training module could be offered during school-based professional development days, the summer option might be feasible if there are staff training needs to address during the school year. It is imperative for school administrators to schedule professional learning during the school day because staff might not be willing or available beyond the school workday (Henderson, 2018). Additionally, it is likely that summer training would require teacher stipends and the coordination of 3 full days during the summer vacation. Another limitation was the availability of a DWIP training facilitator to commit to the professional development module for 3 days. Although it would be advantageous to have an individual with DWIP knowledge and skills to serve in the capacity of training facilitator, there may be other work responsibilities that could limit their participation.

## Recommendations for Alternative Approaches

### Alternative Approach

I employed a qualitative approach in the project study to address the local problem. I limited the sample population to one elementary school that was selected by the study school district to pilot the DWIP. I further specified study participants to be elementary science teachers with a minimum of 1 year of teaching in the study school. Alternatively, I could have collected survey data from elementary science teachers within the entire school district. The alternative approach would have broadened the scope of the

study to investigate a larger sample population of elementary science teachers regarding their perceptions of using student data analysis in their PLCs.

### Alternative Solution

I designed a 3-day professional development module for elementary teachers and school administrators. However, I could have developed a policy recommendation as an alternative solution to the local problem. A policy recommendation could have been used to address the problem of elementary science teachers' marginal participation in collaborative inquiry sessions. The policy would have addressed the level of direct support elementary science teachers need from school administrators regarding collaborative inquiry.

## Scholarship, Project Development and Evaluation, and Leadership and Change

### Scholarship

My doctoral journey began with the personal desire to add to the body of educational research. As a resource educator for the study school district, I read various books and articles to prepare for professional development staff trainings and wondered if I could contribute to the literature in education. My doctoral experience has challenged everything I thought I knew about the research process. Throughout the doctoral study experience, I became acquainted with the knowledge and skills needed to conduct scholarly research, and I made significant progress in research and writing despite several personal challenges. My research and writing skills improved as I used a myriad of scholarly sources, analyzed data to identify themes, concluded findings, and developed a professional development module to complete the project study.

**Project Development**

Before I decided on the project, I made connections between the four project study elements: (a) problem, (b) research questions, (c) conceptual framework, and (d) findings from the data analysis. I learned the elements' connections were essential to provide guidance on selection of the project's genre: professional development. I serve as a professional development designer and trainer primarily for teachers, which made it easy to develop my project. However, as a project developer, I learned that the study's findings and the review of literature for the project were helpful as I planned the 3-day professional development module on collaborative inquiry for teachers and school administrators.

**Leadership and Change**

Throughout my doctoral journey, I have read scholarly articles that helped strengthened my understanding of teacher capacity for professional learning, which I have applied in my work responsibilities for professional development. I have valued the doctoral-level requirement of peer-reviewed articles for inclusion in my project study, and I have shared the significance of peer-reviewed sources with two teachers pursuing master's degrees in education. After writing my prospectus, I enrolled in a Walden writing short course to improve my writing skills and encouraged a fellow doctoral candidate to enroll in the short course. During the doctoral study process, I became more confident in writing and contributed to writing a successful grant proposal for teacher program funding in the study school district. I also realized that I needed to overcome the challenge of working in isolation during the online doctoral process, so I periodically

consulted with a trusted colleague to discuss my progress and receive encouragement. Sharing a summary of the 3-day professional development module with the study school district's research and evaluation office could promote interest in reviewing module participants' summative evaluation results to consider implementation in pilot elementary schools to increase the use of collaborative inquiry processes and protocols.

**Reflective Analysis as a Scholar**

Throughout my doctoral journey, I reflected on my work as a scholar with satisfaction and frustration. Once I identified the problem for my project study, I became overwhelmed with the quantity of relevant articles needed to produce a quality proposal. I experienced times of frustration searching for articles that aligned with my study problem and defined my conceptual framework. I acknowledge that some of my frustration was due to the unexpected amount of time it took to organize the articles for the first literature review. However, I experienced satisfaction once I developed an arrangement of topics and subtopics in an electronic filing system. As a novice researcher, I learned to use skills beyond summarizing through critical analysis of what I read to identify key concepts that I could use in my research. I developed an effective and consistent system of notetaking as preparation for writing numerous drafts. I discovered that writing an outline for each topic and subtopic allowed me to synthesize ideas from multiple authors.

Another source of my frustration and satisfaction was completing the data analysis of my project study. I initially planned to analyze the qualitative data using subscription software, which presented a challenging learning curve. Although I decided to manually analyze the data, I was overwhelmed with the number of months I worked to

achieve completion. I acknowledge that I struggled with the transition from critical writing in the first section of the project study to descriptive and analytical writing in the second section of the project study. It became easier to complete the data analysis after I completed a Walden University residency session followed by a doctoral writing support course.

Finally, I experienced periods of temporary writing blocks. These periods were characterized by the personal need to submit a stellar draft. I realized that I subjected myself to perfectionism that resulted in delayed writing. The temporary writing blocks decreased as I committed to writing 30 minutes per day. I also experienced several personal challenges that created temporary obstacles in my doctoral journey, which have contributed to my development as a scholar through persistence to gain knowledge and skills and commit to be a change agent in the educational community.

**Reflective Analysis as a Practitioner**

My professional work experience has been enhanced as a result of the doctoral process. As a resource educator for the study school district's classroom teachers, my work is dependent on active reflection of my interactions with staff for the next steps in training. As I planned teacher training workshops during my doctoral journey, I redesigned four annual workshop sessions to provide more meaningful, relevant, and collaborative learning experiences in accordance with adult learning principles and the socioconstructivist theory. I also revised the annual teacher workshop sessions to include a supplemental resources list at the end of the slideshow that reflects additional evidence to support the workshop content. Additionally, I applied the knowledge gained from the

project development by sharing research-based practices for effective professional development in the office team meetings for team members to consider while planning their training sessions.

### Reflective Analysis as a Project Developer

As a project developer, I relied on two project study elements, the second review of literature and the findings, to design a 3-day professional development module on collaborative inquiry and team building. With the understanding of the significance of the two planning elements, I became confident that I would create an effective module. While planning the module, I realized that the training, implementation, and follow-up would be different from the professional development sessions I planned as part of my work responsibilities. The training had a content focus on collaborative inquiry processes and protocols for which I have increased my knowledge through scholarly research. Another contrasting factor of the professional development module was that the implementation would occur with a training facilitator assigned to support collaborative inquiry in the study school. The selection of a training facilitator with knowledge of teachers' professional background and experience will be advantageous for professional learning of the faculty and staff (see Merriam & Baumgartner, 2020). I learned that as a project developer, I decide the level of my participation in any training implementation and follow-up support based on participant feedback.

## Reflection on Importance of the Work

As I reflected on the overall importance of the project study, I envisioned that the research and the 3-day professional development module could be used to identify school

cultural factors and teacher needs for productive collaborative inquiry in PLCs. It is important for school administrators and teachers to understand that completing collaborative processes and following protocols requires cooperative behaviors from team members. During the project study, I learned the importance of teachers and school administrators understanding and acting on their roles to engage in collaborative inquiry work sessions for professional enrichment and student achievement.

The 3-day professional development module may be an effective professional learning experience for the teaching staff and school administrators. The professional development module was designed to provide participants with opportunities to collaborate with each other regarding student data, engage in discussions about the current school culture, and identify ways to effect and sustain a positive and collaborative culture centered on evidence for improved teaching and learning. The module may be a critical learning opportunity for participants to acknowledge shared responsibility for participation in collaborative inquiry, which impacts their students' academic outcomes.

## Implications, Applications, and Directions for Future Research

### Implications

This project has two potential implications for positive social change at the local level. The purpose of this qualitative project study was to explore elementary science teachers' perceptions about using collaborative inquiry to analyze student data in PLCs. One implication for positive social change could be determining the effect of elementary science teachers' perceptions regarding collaborative inquiry. An acknowledgment of the science teachers' collaborative experiences by colleagues could improve communication

in collaborative sessions. The second implication for positive social change could be identifying specific professional development needs of elementary science teachers regarding collaborative inquiry. As teachers' professional learning needs are met, more productive collaborative sessions could occur, thereby increasing collective efficacy for achieving positive student outcomes.

**Applications**

The potential implications for positive social change could be ensured through the 3-day professional development module. As noted in the study findings, elementary science teachers indicated that adverse behaviors were displayed by team members and former school administrators regarding collaborative inquiry. The module provides opportunities for participating teachers and school administrators to demonstrate cooperative behavior during activities and discussions around student data. As participants actively engage in the professional development sessions, authentic teamwork and meaningful learning could be established and continued after the module is completed. Additionally, the module experience could lead to school administrators interacting with teachers during collaborative inquiry sessions to sustain a consistent collaborative school culture. Finally, teachers could commit to actions involving student assessment to support a consistent focus on evidence for teaching and learning.

Theoretical implications could be applied as the study's findings and conceptual framework are in alignment. My 3-day professional development module could serve as a framework for local, systemic professional development consistent with a coherent structure for adult learning. The module can be described by the application of the

socioconstructivist theory, the context of training through collaborative learning, and the content of training on the DWIP.

### Directions for Future Research

I decided on a qualitative project study approach to investigate the local problem of marginal participation of elementary science teachers in school-based instructional team meetings to analyze student data. Directions for future research could include a quantitative approach for a project study to extend this work. A quantitative survey could be used to collect data from a larger sample population of elementary science teachers. A larger sample population would allow new science teachers to a school or school district to participate in the study. The surveyed population could be across a school district, a state, or a region dependent upon the researcher's intended scope of study.

## Conclusion

This project study addressed the perceptions of elementary science teachers regarding using collaborative inquiry to analyze student data in professional learning communities. The three research questions for this study focused on teachers' views of collaborative inquiry and the human and organizational barriers to and supports for collaborative inquiry in their professional practice. The survey and focus group questions were based on teachers' perceptions of their individual DWIP professional development and work experience.

The findings of this qualitative study aligned with the research questions and the conceptual framework that were developed on the theories of adult learning and socioconstructivism along with the practice of collaborative inquiry. The results from the

focus group interview showed most of the teachers acknowledged their students' data and DWIP knowledge and skills influenced their teaching practice, not their school PLC experience. A discrepant finding appeared when one teacher acknowledged that their DWIP training was inadequate for application in the PLC.

This study's findings also indicated teachers recognized former school administrators and school district grant office personnel for their support of collaborative inquiry processes. However, teachers concurred some team members and former school administrators were human barriers to collaborative inquiry practices in their PLCs. Teachers in the current study did not clearly indicate specific reasons for adverse behaviors of colleagues during DWIP school sessions. By contrast, previous research studies provide several contributing factors to unproductive PLCs to include contrived collegiality, lack of trust and respect for colleagues, misunderstanding of individual roles in the PLC, and judgment of team members (Brodie, 2019; Diehl, 2019; Hauge, 2019; Hargreaves & O'Connor, 2018; Wan, 2020). The current literature relative to this qualitative project study indicated that in order to establish productive PLCs, teachers and principals need to actively participate in collaborative inquiry sessions. To address the barriers to using collaborative inquiry in PLCs, I created a 3-day professional development module for teachers and principals to collaborate around student data. As a result of the professional development module, positive social change may be realized through consistent cooperative behaviors displayed by team members and active participation by school administrators in collaborative inquiry sessions. The synergy that could be created among school staff after the professional development module could

enhance the collaborative culture of the school to support a continual focus on student data for improved teaching and learning.

# References

Abrams, L. M., Varier, D., & Mehdi, T. (2021, June). The intersection of school context and teachers' data use practice: Implications for an integrated approach to capacity building. *Studies in Educational Evaluation*, *69*, 1–3. https://doi.org/10.1016/j.stueduc.2020.100868

Admiraal, W., Vermeulen, J., & Bulterman-Bos, J. (2020, October 13). Teaching with learning analytics: How to connect computer-based assessment data with classroom instruction? *Technology, Pedagogy, and Education*, *29*(5), 577–591. https://doi.org/10.1080/1475939X.2020.1825992

Ajani, O. A. (2019, December). Understanding teachers as adult learners in professional development activities for enhanced classroom practices. *AFFRIKA: Journal of Politics, Economics and Society*, *9*(2), 195–208. https://www.proquest.com/scholarly-journals/understanding-teachers-as-adult-learners/docview/2349159695/se-2

Akinbobola, A. O., & Bada, A. A. (2018, May 27). Relative effectiveness of case-based and collaborative learning strategies on students' achievement and retention in Nigeria senior secondary school physics. *European Journal of Education Studies*, *4*(7), 232–244. https://doi.org/10.5281/zenodo.1254095

Alnasser, Y. A. (2020, June 4). The perspectives of Colorado general and special education teachers on the barriers to co-teaching in the inclusive elementary school classroom. *Education 3-13*, *49*(6),716–729. https://doi.org/10.1080/03004279.2020.1776363

Alsarawi, A. (2019). A process, framework, and set of tools for facilitating co-planning among co-teachers. (EJ1218543). ERIC. https://files.eric.ed.gov/fulltext/EJ1218543.pdf

Alt, D. (2018, July). Science teachers' conceptions of teaching and learning, ICT efficacy, ICT professional development and ICT practices enacted in their classrooms. *Teaching and Teacher Education*, *73*(1), 141–150. https://doi.org/10.1016/j.tate.2018.03.020

Amels, J., Kruger, M. L., Suhre, C. J. M., & van Veen, K. (2020, April 1). The effects of distributed leadership and inquiry-based work on primary teachers capacity to change: Testing a model. *School Effectiveness and School Improvement*, *31*(3), 468–485. https://doi.org/10.1080/09243453.2020.1746363

Andrade, C. (2020, December 17). The inconvenient truth about convenience and purposive samples. *Indian Journal of Psychological Medicine*, *43*(1), 86–88. https://doi.org/10.1177/0253717620977000

Antinluoma, M., Ilomaki, L., Lahti-Nuuttila, P., & Toom, A. (2018). Schools as professional learning communities. *Journal of Education and Learning*, *7*(5), 76–91. https://doi.org/10.5539/jel.v7n5p76

Appova, A., & Arbaugh, F. (2018). Teachers' motivation to learn: Implications for supporting professional growth. *Professional Development in Education*, *44*(1), 5–21. https://doi.org/10.1080/19415257.2017.1280524

Azungah, T. (2018, November 15). Qualitative research: Deductive and inductive approaches to data analysis. *Qualitative Research Journal*, *18*(4), 383–400.

https://doi.org/10.1108/QRJ-D-18-00035

Babbie, E. (2021). *The practice of social research* (5th ed.). Cengage Learning.

Baker-Doyle, K. J. (2021). *Transformative teachers: Teacher leadership and learning in a connected world*. Harvard Education Press.

Barak, M., & Green, G. (2021, February 4). Applying a social constructivist approach to an online course on ethics of research. *Science and Engineering Ethics*, *27*(8), 1–24. https://doi.org/10.1007/s11948-021-00280-2

Bates, C. C., & Morgan, D. N. (2018, February 23). Seven elements of effective professional development. *The Reading Teacher*, *71*(5), 623–626. https://doi.org/10.1002/trtr.1674

Beck, J. S., Morgan, J. J., Brown, N., Whitesides, H., & Riddle, D. R. (2019, November 5). "Asking, learning, seeking out": An exploration of data literacy for teaching. *The Educational Forum*, *84*(2), 150–165. https://doi.org/10.1080/00131725.2020.1674438

Bendtsen, M., Forsman, L., & Bjorklund, M. (2021, November 28). Exploring empowering practices for teachers' sustainable continuing professional development. *Educational Research*, *64*(1), 60–76. https://doi.org/10.1080/00131881.2021.2000338

Bhat, B. A., & Bhat, G. J. (2019, June). Formative and summative evaluation techniques for improvement of learning process. *European Journal of Business Economics*, *7*(5), 776–785. researchgate.net/profile/Bilal-Bhat-6/publication/333633265_Formative_and_Summative_Evaluation_Techniques_fo

r_Improvement_of_Learning_Process/links/5e6b7e48a6fdccf321d9926e/Formative-and-Summative-Evaluation-Techniques-for-Improvement-of-Learning-Proces

Blake, J., & Gibson, A. (2020, January 21). Critical friends group protocols deepen conversations in collaborative action research projects. *Educational Action Research*, *29*(1), 133–148. https://doi.org/10.1080/09650792.2020.1717568

Blanco, G. L., & Rossman, G. B. (2021). As a qualitative study unfolds: Shifts in design and analysis. In C. Vanover, P. Mihas, & J. Saldana (Eds.), *Analyzing and interpreting qualitative research: After the interview* (pp. 7–23). SAGE.

Blanton, L. P., Pugach, M. C., & Boveda, M. (2018, May 30). Interrogating the intersections between general and special education in the history of teacher education reform. *Journal of Teacher Education*, *69*(4), 354–366. https://doi.org/10.1177/0022487118778539

Bolhuis, E., Voogt, J., & Schildkamp, K. (2019, March). The development of data use, data skills, and positive attitude towards data use in a data team intervention for teacher educators. *Studies in Educational Evaluation, 60,* 99–108. https://doi.org/10.1016/j.stueduc.2018.12.002

Borg, S. (2018, July 10). Evaluating the impact of professional development. *RELC Journal, 49*(2), 195–216. https://doi.org/10.1177/0033688218784371

Boudett, K. P., City, E. A., & Murnane, R. J. (2020). *Data Wise revised and expanded edition: A step-by-step guide to using assessment results to improve teaching and learning*. Harvard Education Press.

Braun, V., Clarke, V., Boulton, E., Davey, L., & McEvoy, C. (2020, August 16). The

online survey as a qualitative research tool. *International Journal of Social Research Methodology, 24*(6), 641–654. https://doi.org/10.1080/13645579.2020.1805550

Brezicha, K. F., Ikoma, S., Park, H., & LeTendre, G. K. (2019, January 28). The ownership perception gap: Exploring teacher job satisfaction to teachers' and principals' perception of decision-making opportunities. *International Journal of Leadership in Education, 23*(4), 428–456. https://doi.org/10.1080/13603124.2018.1562098

Brieger, E., Arghode, V., & McLean, G. (2020, January 20). Connecting theory and practice: Reviewing six learning theories to inform online instruction. *European Journal of Training and Development,44*(4/5), 321–339. https://doi.org/10.1108/EJTD-07-2019-0116

Brodie, K. (2019, November 19). Teacher agency in professional learning communities. *Professional Development in Education, 47*(4), 560–573. https://doi.org/10.1080/19415257.2019.1689523

Burns, M. K., Naughton, M. R., Preast, J. L., Wang, Z., Gordon, R. L., Robb, V., & Smith, M. L. (2018). Factors of professional learning community implementation and effect on student achievement. *Journal of Educational and Psychological Consultation, 28*(4), 394–412. https://doi.org/10.1080/10474412.2017.1385396

Burns, R. (2020). *Adult learner at work: the challenges of lifelong education in the new millennium* (2nd ed.). Taylor and Francis Group.

Cansoy, R. (2019). The relationship between school principals' leadership behaviors and

teachers' job satisfaction: A systematic review. *International Education Studies, 12*(1), 37–52. https://doi.org/10.5539/ies.v12n1p37

Cansoy, R., & Parlar, H. (2018, May 14). Examining the relationship between school principals' instructional leadership behaviors, teacher self-efficacy, and collective teacher efficacy. *International Journal of Educational Management*, *32*(4), 550–567. https://doi.org/10.1108/IJEM-04-2017-0089

Cansoy, R., Parlar, H., & Polatcan, M. (2020, January 8). Collective teacher efficacy as a mediator in the relationship between instructional leadership and teacher commitment. *International Journal of Leadership in Education, 25*(6), 900–918. https://doi.org/10.1080/13603124.2019.1708470

Carpenter, D. (2018, January 8). Intellectual and physical shared workspace: Professional learning communities and the collaborative culture. *International Journal of Educational Management*, *32*(1), 121–140. https://doi.org/10.1108/IJEM-05-2017-0104

Cavazos, L., Linan-Thompson, S., & Ortiz, A. (2018, February 20). Job-embedded professional development for teachers of English learners: Preventing literacy difficulties through effective core instruction. *Teacher Education and Special Education,41*(3), 203–214. https://doi.org/10.1177/0888406418758465

Cherry, K. (2022, October 14). *How social learning theory works*. Very well mind. https://www.verywellmind.com/social-learning-theory-2795074

Clark, S. K. & Lott, K. (2019, August). Teaching teachers: No time for science? Using an integrated approach to teach science inquiry. *Science and Children, 57*(1), 68–73.

https://www.jstor.org/stable/26901499

Close, K., Amrein-Beardsley, A., & Collins, C. (2018, June 5). *State-level assessments and teacher evaluation systems after the passage of the Every Student Succeeds Act: Some steps in the right direction.* Boulder: National Education Policy Center. http://nepc.colorado.edu/publication/state-assessment

Cobb, P., Jackson, K., Henrick, E., & Smith, T. M. (2020). *Systems for instructional improvement: Creating coherence from the classroom to the district office*. Harvard Education Press.

Cocquyt, C., Diep, A. N., Zhu, C., DeGreef, M., & Vanwing, T. (2018, June). Contribution of Social-Constructivist and Andragogical Principles in Blended Learning to Adult's Social Inclusion and Social Capital. *Andrological Studies,* 47–78. https://doi.org/10.5937/ANDSTUD1801047C

Conner, N. W., Dev, D., & Krause, K. (2018, June). Needs assessment for informing extension professional development trainings on teaching adult learners. *Faculty Publications, Department of Child, Youth, and Family Studies, 246*(3). https://digitalcommons.unl.edu/famconfacpub/246

Corry, M., & Stella, J. (2018, October 17). Teacher self-efficacy in online education: A review of the literature. *Research in Learning Technology*, *26*. https://doi.org/10.25304/rlt.v26.2047

Coskun, K. (2020, July 20). A new explanation for the conflict between constructivist and objectivist grounded theory. *International Journal of Qualitative Methods*, *19*. https://doi.org/10.1177/1609406920938280

Cosner, S., DeVoto, C., & Rah'man, A. A. (2018, March 21). Drawing in the school context as a learning resource in school development: Application-oriented projects in active learning designs. *Journal of Research on Leadership Education*, *13*(3), 238–255. https://doi.org/10.1177/1942775118763872

Crawford, L. M. (2019). Qualitative research designs. In G. J. Burkholder, K. A. Cox, L. M. Crawford, & J. H. Hitchcock (Eds.), *Research designs and methods: An applied guide for the scholar-practitioner* (pp. 81–98). SAGE.

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publishing.

Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). SAGE Publications.

Darling-Hammond, L., Hyler, M. E., Sheffield, R., & Gardner, M. (2018, June). *How California school districts can support best practices in effective teacher professional development.* Learning Policy Institute. https://learningpolicyinstitute.org/sites/default/files/product-files/CA_Effective_Teacher_Professional_Development_FACTSHEET.pdf

Datnow, A. (2020, February 6). The role of teachers in educational reform: A 20-year perspective. *Journal of Educational Change*, *21*(3), 431–441. https://doi.org/10.1007/s10833-020-09372-5

Datnow, A., & Park, v. (2018, April 30). Opening or closing doors for students? Equity and data use in schools. *Journal of Educational Change, 19,* 131–152. https://doi.org/10.1007/s10833-018-9323-6

Datnow, A., & Park, V. (2019). *Professional collaboration with purpose: Teacher learning towards equitable and excellent schools*. Routledge.

de Joeng, L., Meirink, J., & Admiraal, W. (2022, February 23). School-based collaboration as a learning context for teachers: A systematic review. *International Journal of Educational Research, 112*, 101927. https://doi.org/10.1016/j.ijer.2022.101927

De Simone., J. J. (2020, July 2). The roles of collaborative professional development, self-efficacy, and positive affect in encouraging educator data use to aid student learning. *Teacher Development*, *24*(4), 443–465. https://doi.org/10.1080/13664530.2020.1780302

Dewitt, P. M. (2019, July 1). High-powered teams: How collective efficacy develops. *Educational Leadership* (76), 31–35. https://www.ascd.org/el/articles/how-collective-teacher-efficacy-develops

Diehl, D. K. (2019, February 5). Teacher professional learning communities and institutional complexity: Negotiating tensions between institutional logics. *Sociological Spectrum*, *39*(1), 1–19. https://doi.org/10.1080/02732173.2018.1564099

Diep, A. N., Zhu, C., Cocquyt, C., de Greef, M., Vo, M. H., & Vanwing, T. (2019, July). Adult learners' needs in online and blended learning. (EJ1235812). ERIC. http://files.eric.ed.gov/fulltext/EJ1235812.pdf

Dogan, S., & Adams, A. (2018, August 6). Effect of professional learning communities on teachers and students: Reporting updated results and raising questions about

research design. *School Effectiveness and School Improvement, 29*(4), 634–659. https://doi.org/10.1080/09243453.2018.1500921

Dolin, J., Black, P., Harlen, W., & Tiberghein, A. (2018). Exploring relations between formative and summative assessment. In J. Dolin & R. Evans (Eds.), *Transforming assessment: Through an interplay between practice, research, and policy*, pp. 53–80. Springer.

Donohoo, J. (2018, March 2). Collective teacher efficacy research: Productive patterns of behavior and other positive consequences. *Journal of Educational Change*, *19*(3), 323–345. https://doi.org/10.1007/s10833-018-9319-2

Donohoo, J., Hattie, J., & Eells, R. (2018, March 1). The power of collective efficacy. *Educational Leadership,* 75(6), 41–44. https://www.ascd.org/el/articles/the-power-of-collective-efficacy

Durdella, N. (2019). *Qualitative dissertation methodology: A guide for research design and methods.* Sage Publications.

Echols, D. G., Neely, P. W., & Dusick, D. (2018, June). Understanding faculty training in competency-based curriculum development. *The Journal of Competency-Based Education, 3*(2). https://doi.org/10.1002/cbe2.1162

Elliott, V. (2018, November 24). Thinking about the coding process in qualitative data analysis. *The Qualitative Report; Fort Lauderdale, 23*(11), 2850–2861. https://doi.org/10.46743/2160-3715/2018.3560

Eshchar-Netz, L., & Vedder-Weiss, D. (2021, March). Teacher learning in communities of practice: The affordances of co-planning for novice and veteran teachers'

learning. *Journal of Research in Science Teaching, 58*(3), 366–391. https://doi.org/10.1002/tea.21663

Etmanski, C., Bishop, K., & Beth Page, M. (Eds.). (2018). *Adult learning through collaborative leadership: New directions for adult and continuing education.* Wiley Periodicals Inc.

Farley-Ripple, E. N., Jenning, A. S., & Buttram, J. (2019, October). Toward a framework for classifying teachers' use of assessment data. *AERA Open, 5*(4), 1–18. https://doi.org/10.1177/2332858419883571

Ferreira, C. M., & Serpa, S. (2018, May). Informed consent in social science research: Ethical challenges. *International Journal of Social Science Studies, 6*(5), 13–23. https://doi.org/10.11114/ijsss.v6i5.3106

Ferreira, D., & MacLean, G. (2018). Andragogy in the 21st century: Applying the assumptions of adult learning online. *Language Research Bulletin, 32*, 10–19. https://doi.org/10.34577/00004305

Fischer, C., Fishman, B., Dede, C., Eisenkraft, A., Frumin, K., Foster, B., Lawrenz, F., Levy, A. J., & McCoy, A. (2018, May). Investigating relationships between school context, teacher professional development, teaching practices, and student achievement in response to a nationwide science reform. *Teaching and Teacher Education, 72*, 107–121. https://doi.org/10.1016/j.tate.2018.02.011

Ford, T. G. & Ware, J. K. (2018). Teacher self-regulatory climate: Conceptualizing an indicator of leader support for teacher learning and development. *Leadership and Policy in Schools, 17*(1), 27–51. https://doi.org/10.1080/15700763.2016.1197283

Ford, T. G., & Youngs, P. A. (2018, May 1). Creating organizational structures to facilitate collegial interaction among teachers: Evidence from a high performing urban midwestern US district. *Educational Management Administration & Leadership*, *46*(3), 424–440. https://doi.org/10.1177/1741143216682501

Fowler, K., Windschitl, M., & Richards, J. (2019, April/May). Exit tickets. *The Science Teacher*, *86*(8), 18–26. https://www.nsta.org/science-teacher/science-teacher-aprilmay-2019/exit-tickets

Garcia-Martinez, I., Montenegro-Rueda, M., Molina-Fernandez, E., & Fernandez-Batanero, J. M. (2021, May 13). Mapping teacher collaboration for school success. *School Effectiveness and School Improvement*, *32*(4), 631–649. https://doi.org/10.1080/09243453.2021.1925700

Goddard, Y., & Kim, M. (2018, January 1). Examining connections between teacher perceptions of collaboration, differentiated instruction, and teacher efficacy. *Teachers College Record*, *120*(1), 1–24. https://doi.org/10.1177/016146811812000102

Gore, J., & Rosser, B. (2020, February 8). Beyond content-focused professional development: Powerful professional learning through genuine learning communities across grades and subjects. *Professional Development in Education*, *48*(2), 218–232. https://doi.org/10.1080/19415257.2020.1725904

Gumus, E., & Bellibas, M. S. (2021, March 22). The relationship between the types of professional development activities teachers participate in and their self-efficacy: a multi-country analysis. *European Journal of Teacher Education*, 1–28.

https://doi.org/10.1080/02619768.2021.1892639

Gunning, A. M., Marrero, M. E., Hillmann, P. C., & Brandon, L. T. (2020, May 18). How k-12 teachers of science experience a vertically articulated professional learning community. *Journal of Science Teacher Education*, *31*(6), 705–718. https://doi.org/10.1080/1046560X.2020.1758419

Guyadeen, D. & Seasons, M. (2018). Evaluation theory and practice: Comparing program evaluation and evaluation in planning. *Journal of Planning Education and Research*, *38*(1), 98–110. https://doi.org/10.1177/0739456X16675930

Hargreaves, A. (2019, July 11). Teacher collaboration: 30 years of research on its nature, forms, limitations, and effects. *Teachers and Teaching*, *25*(5), 603–621. https://doi.org/10.1080/13540602.2019.1639499

Hargreaves, A., & O'Connor, M. T. (2018). *Collaborative professionalism: When teaching together means learning for all.* Corwin Press.

Hauge, K. (2019, May 26). Teachers' collective professional development in school: A review study. *Cogent Education*, *6*(1). https://doi.org/10.1080/2331186X.2019.1619223

Henderson, D. (2018). Staff collaboration for student success: Implementation challenges of professional learning communities and response to intervention. (EJ1230351) ERIC. https://files.eric.ed.gov/fulltext/EJ1230351.pdf

Hill, H., Lynch, K., Gonzalez, K., & Pollard, C. (2020, January 27). Professional development that improves STEM outcomes. *Phi Delta Kappan, 101*(5), 50–56. https://doi.org/10.1177/0031721720903829

Ho, J., & Chua, P. M. H. (2019). Successful principalship: Beyond leadership practice and teacher agency. *International Studies in Educational Administration (Commonwealth Council for Educational Administration & Management (CCEAM))*, *47*(1), 20–37. https://repository.nie.edu.sg/bitstream/10497/21956/5/ISEA-47-1-20.pdf

Hobbiss, M., Sims, S., & Allen, R. (2021, February). Habits formation limits growth in teacher effectiveness: A review of converging evidence from neuroscience and social science. *Review of Education*, *9*(1), 3–23. https://doi.org/10.1002/rev3.3226

Holland, A. A. (2019, January). Effective principles of informal online learning design: A theory-building metasynthesis of qualitative research. *Computers & Education, 128*, 214–226. https://doi.org/10.1016/j.compedu.2018.09.026

Housel, D. A. (2019, May 26). When co-occurring factors impact adult learners: Suggestions for instruction, preservice training, and professional development. *Adult Learning*, *31*(1). https://doi.org/10.1177/1045159519849910

Hubers, M. D., Poortman, C. L., Schildkamp, K., & Pieters, J. M. (2019, January 1). Spreading the word: Boundary crossers building collective capacity for data use. *Teachers College Record*, *121*(1), 1–45. https://doi.org/10.1177/016146811912100102

Individuals with Disabilities Education Act of 2004. (2019, November 7). *IDEA-reauthorized statute highly qualified teachers.* Section 1462 https://sites.ed.gov/idea/statute-chapter-33/subchapter-iv/part-b/1462

Jiang, Y., & Chen, C. C. (2018). Integrating knowledge activities for team innovation:

Effects of transformational leadership. *Journal of Management*, *44*(5), 1819–1847. https://doi.org/10.1177/0149206316628641

Jimerson, J. B., Garry, V., Poortman, C. L., & Schildkamp, K. (2021, June). Implementation of a collaborative data use model in a United States context. *Studies in Educational Evaluation*, *69*. https://doi.org/10.1016/j.stueduc.2020.100866

Johnson, S. M., Reinhorn, S., & Simon, N. (2018, May 1). Ending isolation: The payoff of teacher teams in successful high-poverty urban schools. *Teachers College Record*, *120*(5), 1–46. https://doi.org/10.1177/016146811812000502

Jones, S. M., McGarrah, M. W., & Kahn, J. (2019, July 30). Social and emotional learning: A principled science of human development in context. *Educational Psychologist*, *54*(3), 129–143. https://doi.org/10.1080/00461520.2019.1625776

Kars, M., & Inandi, Y. (2018). Relationship between school principals' leadership behaviors and teachers' organizational trust. *Eurasian Journal of Educational Research*, *74*, 145–164. https://doi.org/10.14689/ejer.2018.74.8

Kauerz, K., & Coffman, J. (2019, November). *Framework for planning, implementing, and evaluating p-3 approaches* (2nd ed.). National P-3 Center, University of Colorado. https://nationalp-3center.org/resources/framework-for-planning-implementing-and-evaluating-p-3-approaches/

Ke, Z., Yin, H., & Huang, S. (2019, September 5). Teacher participation in school-based professional development in China: Does it matter for teacher efficacy and teaching strategies? *Teachers and Teaching*, *25*(7), 821–836.

https://doi.org/10.1080/13540602.2019.1662777

Keay, J. K., Carse, N., & Jess, M. (2018, March 20). Understanding teachers as complex professional learners. *Professional Development in Education, 45*(1), 125–137. https://doi.org/10.1080/19415257.2018.1449004

Khalid, N. H. M., Latif, A. A., & Yusof, I. J. (2021, November 18). Research focusing on assessment literacy: A systematic literature review. *Studies of Applied Economics*, *39*(10), 1–25. https://doi.org/10.25115/eea.v39i10.5816

Kim, S., Raza, M., & Seidman, E. (2019, February 28). Improving 21st-century teaching skills: The key to effective 21-st century learners. *Research in Comparative and International Education, 14*(1), 99–117. https://doi.org/10.1177/1745499919829214

Kim, T., & Lee, Y. (2019, September 18). Principal instructional leadership for teacher participation in professional development: Evidence from Japan, Singapore, and South Korea. *Asia Pacific Education Review*, *21*(2), 261–278. https://doi.org/10.1007/s12564-019-09616-x

Kippers, W. B., Poortman, C. L., Schildkamp, K., & Visscher, A. J. (2018, March). Data literacy:What do educators learn and struggle with during a data use intervention? *Studies in Educational Evaluation*, *56*, 21–31. https://doi.org/10.1016/j.stueduc.2017.11.001

Knowles, M. S. (1980). *The modern practice of adult education: From pedagogy to andragogy* (2nd ed.). Association Press.

Knowles, M. S., Holton III, E. F., Swanson, R. A., & Robinson, P. A. (Eds.). (2020). *The adult learner: The definitive classic in adult education and human resource development* (9th ed.). Routledge.

Kolleck, N. (2019, October 24). Motivational aspects of teacher collaboration. *Frontiers in Education, 24.* https://doi.org/10.3389/feduc.2019.00122

Kraft, M. A., Blazar, D., & Hogan, D. (2018, February 22). The effect of teacher coaching on instruction and achievement: A meta-analysis of the causal evidence. *Review of Educational Research*, *88*(4), 547–588. https://doi.org/10.3102/0034654318759268

Krammer, M., Rossmann, P., Gastager, A., & Gasteiger-Klicpera, B. (2018, April 18). Ways of composing teaching teams and their impact on teachers' perceptions about collaboration. *European Journal of Teacher Education*, *41*(4), 463–478. https://doi.org/10.1080/02619768.2018.1462331

Learning Forward. (2022). *Standards of professional learning.*https://standards.learningforward.org/?_ga=2.121622656.969070551.1666365468-1804603000.1665979010

Lester, J. N., Cho, Y., & Lochmiller, C. R. (2020, February 9). Learning to do qualitative data analysis: A starting point. *Human Resource Development Review*, *19*(1), 94–106. https://doi.org/10.1177/1534484320903890

Lewis, S., & Holloway, J. (2018, March 16). Datafying the teaching profession: remaking the professional teacher in the image of data. *Cambridge Journal of Education.* https://doi.org/10.1080/0305764X.2018.1441373

Liebowitz, D. D., & Porter, L. (2019, July 30). The effect of principal behaviors on student, teacher, and school outcomes: A systematic review and meta-analysis of the empirical literature. *Review of Educational Research*, *89*(5), 785–827. https://doi.org/10.3102/0034654319866133

Limes-Taylor Henderson, K., & Esposito, J. (2019). Using others in the nicest way possible: On colonial and academic practice(s), and an ethic of humility. *Qualitative Inquiry: QI*, *25*(9–10), 876–889. https://doi.org/10.1177/1077800417743528

Linneberg M. S. & Korsgaard, S. (2019, May 8). Coding qualitative data: A synthesis guiding the novice. *Qualitative Research Journal, 19*(3), 259–270. https://doi.org/10.1108/QRJ-12-2018-0012

Lipscombe, K., Buckley-Walker, K., & McNamara, P. (2019, May 6). Understanding collaborative teacher teams as open systems for professional development. *Professional Development in Education*, *46*(3), 373–390. https://doi.org/10.1080/19415257.2019.1613256

Little, M. E. (2020, Winter). Collaboration and connections among middle school teachers of mathematics: Enhancing efficacy through professional learning communities. (EJ1243775). ERIC. https://files.eric.ed.gov/fulltext/EJ1243775.pdf

Liu, S., & Hallinger, P. (2018, April 12). Principal instructional leadership, teacher self-efficacy, and teacher professional learning in China: Testing a mediated-effects model. *Educational Administration Quarterly*, *54*(4), 501–528. https://doi.org/10.1177/0013161X18769048

Liu, S., & Hallinger, P. (2022, March 29). The effects of instructional leadership, teacher responsibility, and procedural justice climate on professional learning communities: A cross-level moderated mediation examination. *Educational Management Administration & Leadership*. https://doi.org/10.1177/17411432221089185

Love, N., & Crowell, M. (2018, October). Strong teams, strong results: Formative assessment helps teacher teams strengthen equity. *The Learning Professional*, *39*(5), https://learningforward.org/wp-content/uploads/2018/10/strong-teams-strong-results.pdf

Ma, N., Xin, S., & Du, J. Y. (2018, April). A peer coaching-based professional development approach to improving the learning participation and learning design skills of in-service teachers. *Journal of Educational Technology & Society, 21*(2), 291–304. http://www.jstor.org/stable/26388408

Makovec, D. (2018). The teacher's role and professional development. *International Journal of Cognitive Research in Science, Engineering, and Education*, *6*(2), 33–46. https://doi.org/10.5937/ijcrsee1802033M

Mandinach, E. B., & Schildkamp, K. (2021, June). The complexity of data-based decision-making: An introduction to the special issue. *Studies in Educational Evaluation, 69.* https://doi.org/10.1016/j.stueduc.2020.100906

Marshall, K. (2018, February 26). In praise of assessment (done right). *Phi Delta Kappan*, *99*(6), 54–59. https://doi.org/10.1177/0031721718762424

Merriam, S.B. (2018). Adult learning theory: Evolution and future directions. In K.Illeris (Ed.), *Contemporary theories of learning: Learning theorists…in their own words* (2nd ed., pp. 83–96). Routledge.

Merriam, S. B. & Baumgartner, L. M. (2020). *Learning in adulthood: A comprehensive guide.* John Wiley & Sons.

Miles, M. B., Huberman, A. M., & Saldana, J. (2018). *Qualitative data analysis: A methods sourcebook.* (4th ed., pp. 296–325). SAGE.

Mora-Ruano, J. G., Heine, J. H., & Gebhardt, M. (2019, August 13). Does teacher collaboration improve student achievement? Analysis of the German PISA 2012 sample. *Frontiers in Education.* https://doi.org/10.3389/feduc.2019.00085

Moser, A., & Korstjens, I. (2018). Series: Practical guidance to qualitative research. Part 3: Sampling data collection and analysis. *European Journal of General Practice*, *24*(1), 9–18.https://doi.org/10.1080/13814788.2017.1375091

Moulakdi, A., & Bouchamma, Y. (2020, May 24). Elementary schools working as professional learning communities: Effects on student learning. (EJ1254654). ERIC. https://files.eric.ed.gov/fulltext/EJ1254654.pdf

Muckenthaler, M., Tillmann, T., Weib, S., & Kiel, E. (2020, April 1). Teacher collaboration as a core objective of school development. *School Effectiveness and School Improvement, 31*(5), 1–19. https://doi.org/10.1080/09243453.2020.1747501

Mueller, T. G., & Vick, A. M. (2019). An investigation of facilitated individualized education program meeting practice: Promising procedures that foster family-

professional collaboration. *Teacher Education and Special Education*, *42*(1), 67–81. https://doi.org/10.1177/0888406417739677

Nastasi, B. K., Hitchcock, J. H., Gutierrez, R., & Oshrin, S. (2022). Promoting quality of mixed methods consultation research: A synergistic participatory framework. *Journal of Educational and Psychological Consultation*, *32*(1), 22–45, https://doi.org/10.1080/10474412.2021.1887743

National School Reform Faculty. (2018). What is critical friends group® work? www.nsrfharmony.org/whatiscfgwork/

Ng, H. Z., & Baharom, S. S. (2018, November 8). An analysis on adult learners' satisfaction in online education programmes. *International Journal of Interactive Mobile Technologies*, *12*(7), 70–85. https://doi.org/10.3991/ijim.v12i7.9665

Noonan, J. (2019). An affinity for learning: Teacher identity and powerful professional development. *Journal of Teacher Education*, *70*(5), 526–537. https://doi.org/10.1177/0022487118788838

Ntinda, K. (2019). Narrative research. In P. Liamputtong (Ed.), *Handbook of research methods in health social sciences.* Springer.

Osher, D., Moroney, D., & Williamson, S. (Eds.). (2018). *Creating safe, equitable, engaging schools: A comprehensive, evidence-based approach to supporting students.* Harvard Education Publishing Group.

Osmond-Johnson, P., & Fuhrmann, L. R. (2022, July 14). Supporting teacher candidates to become collaborative teaching professionals: Developing professional capital through a collaborative inquiry-based community of practice. *Journal of*

*Professional Capital and Community*, *7*(3), 243–255. https://doi.org/10.1108/JPCC-02-2022-0013

Ouyang, F., Chang, Y. H., Scharber, C., Jiao, P., & Huang, T. (2020, April). Examining the instructor-student collaborative partnership in an online learning community course. *Instructional Science*, *48,* 183–204. https://doi.org/10.1007/s11251-020-09507-4

Pak, K., & Desimone, L. M. (2019). Developing principals' data-driven decision-making capacity: Lessons from one urban district. *Phi Delta Kappan*, *100*(7), 37–42. https://doi.org/10.1177/0031721719841337

Park, V. (2018,April 17). Leading data conversation moves: Toward data-informed leadership for equity and learning. *Educational Administration Quarterly*, *54*(4), 617–647. https://doi.org/10.1177/0013161X18769050

Patterson, J. A., AlSabatin, H., Anderson, A., Klepacka, M., Lawrence, J., & Miner, B. (2020). A distributed leadership perspective on implementing instructional reform: A case study of an urban middle school. *Journal of School Leadership, 31*(3), 163–267. https://doi.org/10.1177/1052684620904942

Piaget, J., Tomlinson, J., & Tomlinson, A. (1929). *The child's conception of the world.* Harcourt, Brace & Company.

Pino-Yancovic, M., & Ahumada, L. (2020, January 31). Collaborative inquiry networks: The challenge to promote network leadership capacities in Chile. *School Leadership and Management, 40*(2/3), 221–241. https://doi.org/10.1080/13632434.2020.1716325

Pino-Yancovic, M., Ahumada, L., DeFerrari, J., Correa, F., & Valenzuela, J. P. (2022). Collaborating inside and outside the school: Together overcoming COVID-19 challenges in Chile. (EJ1355648). ERIC. https://files.eric.ed.gov/fulltext/EJ1355648.pdf

Podolsky, A., Kini, T., & Darling-Hammond, L. (2019). Does teaching experience increase teacher effectiveness? A review of U. S. research. *Journal of Professional Capital and Community*, *4*(4), 286–308. https://doi.org/10.1108/JPCC-12-2018-0032

Powell, C. G., & Bodur, Y. (2019, January). Teachers' perceptions of an online professional development experience: Implications for a design and implementation framework. *Teaching and Teacher Education, 77*, 19–30. https://doi.org/10.1016/j.tate.2018.09.004

Prenger, R., & Schildkamp, K. (2018, January 19). Data-based decision making for teacher and student learning: A psychological perspective on the role of the teacher. *Educational Psychology Review*, *38*(6), 734–752. https://doi.org/10.1080/01443410.2018.1426834

Priestley, M., & Drew, V. (2019). Professional enquiry: An ecological approach to developing teacher agency. In Godfrey, D. & Brown, C. (Eds.)., *An ecosystem for research-engaged schools: Reforming education through research* (pp.154–170). Routledge.

Qian, H., & Walker, A. (2021, March 21). Building emotional principal-teacher relationships in Chinese schools: reflecting on Paternalistic Leadership. *The Asia-*

*Pacific Education Researcher, 30*, 327–338. https://doi.org/10.1007/s40299-021-00563-z

Quinn, J., McEachen, J., Fullan, M., Gardner, M., & Drummy, M. (2019). *Dive into deep learning: Tools for engagement.* Corwin.

Rausch, A., Bold, E., & Strain, P. (2021). The more the merrier: Using collaborative transdisciplinary services to maximize inclusion and child outcomes. *Young Exceptional Children*, *24*(2), 59–69. https://doi.org/10.1177/1096250620922206

Ravitch, S. M., & Carl, N. M. (2019). *Qualitative research: Bridging the conceptual, theoretical, and methodological* (2nd ed.). SAGE.

Reaves, J. (2018). A Study of Groupthink in Project Teams. *Walden Dissertations and Doctoral Studies.* 5033. https://scholarworks.waldenu.edu/dissertations/5033

Rose, J., & Johnson, C. W. (2020, February 10). Contextualizing reliability and validity in qualitative research: Toward more rigorous and trustworthy qualitative social science in leisure research. *Journal of Leisure Research*, *51*(4), 432–451. https://doi.org/10.1080/00222216.2020.1722042

Saldana, J., & Omasta, M. (2018). *Qualitative research: Analyzing life*. SAGE

Sancar, R., Atal, D., & Deryakulu, D. (2021, May). A new framework for teachers' professional development. *Teaching and Teacher Education*, *101*(2021), 2–12. https://doi.org/10.1016/j.tate.2021.103305

Schaap, H., & deBruijn, E. (2018, April). Elements affecting the development of professional learning communities in schools. *Learning Environments Research*, *21*(1), 109–134. https://doi.org/10.1007/s10984-017-9244-y

Schaik, P., Volman, M., & Admiraal, W. (2020, April). Fostering collaborative teacher learning: A typology of school leadership. *European Journal of Education*, *55*, 217–232. https://doi.org/10.1111/ejed.12391

Schildkamp, K. (2019, June 12). Data-based decision-making for school improvement: Research insights and gaps. *Educational Research, 61*(3), 257–273. https://doi.org/10.1080/00131881.2019.1625716

Schildkamp, K., Handelzalts, A., Poortman, C. L., Leusink, H., Meerdink, M., Smit, M., Ebbeler, J., & Hubers, M. D. (2018). Introducing the data team procedure in the school. In *The data team procedure: A systematic approach to school improvement* (71–77). Springer.

Schildkamp, K., Poortman, C. L., Ebbeler, J., & Pieters, J. M. (2019, July2). How school leaders can build effective data teams: Five building blocks for a new wave of data-informed decision making. *Journal of Educational Change*, *2*0(3), 283–325. https://doi.org/10.1007/s10833-019-09345-3

Schoch, K. (2020). Case study research. In G. T. Burkholder, K. A. Cox, L. M. Crawford, & J. H. Hitchcock (Eds.), *Research designs and methods: An applied guide for the scholar-practitioner* (pp. 245–258). SAGE.

Schwabsky, N., Erdogan, U., & Tschannen-Moran, M. (2020, March 23). Predicting school innovation: The role of collective efficacy and academic press mediated by faculty trust. *Journal of Educational Administration and History, 58*(2), 246–262. https://doi.org/10.1108/JEA-02-2019-0029

Segal, A., Lefstein, A., & Vedder-Weiss, D. (2018, February 28). Appropriating

protocols for the regulation of teacher professional conversations. *Teaching and Teacher Education: An International Journal of Research and Studies*, *70*(1), 215–226. https://doi.org/10.1016/j.tate.2017.11.018

Senn, G., McMurtrie, D., & Coleman, B. (2019). Collaboration in the middle: Teachers in interdisciplinary planning. *Current Issues in Middle Level Education*, *24*(1). https://digitalcommons.georgiasouthern.edu/cimle/vol24/iss1/6

Serviss, J. (2021, May 13). *Four benefits of an active professional learning community.* ISTE. https://www.iste.org/explore/professional-development/4-benefits-active-professional-learning-community

Sim, J., Saunders, B., Waterfield, J., & Kingstone, T. (2018, March 27). Can sample size in qualitative research be determined a priori? *International Journal of Social Research Methodology*, *21*(5), 619–634. https://doi.org/10.1080/13645579.2018.1454643

Sims, S., & Fletcher-Wood, H. (2021). Identifying the characteristics of effective teacher professional development: A critical review. *School Effectiveness and School Improvement*, *32*(1), 47–63. https://doi.org/10.1080/09243453.2020.1772841

Sims, S., Fletcher-Wood, H., O-Mara-Eves, A., Cottingham, S., Stansfield, C., Van Herwegen, J., & Anders, J. (2021, October). *What are the characteristics of effective teacher professional development? A systematic review and meta-analysis.* Education Endowment Foundation. https://educationendowmentfoundation.org.uk/education-evidence/evidence-reviews/teacher-professional-development-characteristics

Smale-Jacobse, A. E., Meijer, A. E., Helms-Lorenz, M., & Maulana, R. (2019, November 22). Differentiated instruction in secondary education: A systematic review of research evidence. *Frontiers in Psychology*, *10*. https://doi.org/10.3389/fpsyg.2019.02366

Smith, W. C., & Holloway, J. (2020, November 5). School testing culture and teaching satisfaction. *Educational Assessment, Evaluation, and Accountability*, *32*, 461–479. https://doi.org/10.1007/s11092-020-09342-8

Solvason, C., & Winwood, J. (2022, Spring/Summer). Exploring drivers and barriers: Working in multiprofessional teams to support children and families. *School Community Journal*, *32*(1),105–126.www.schoolcommunitynetwork.org/scj.aspx

Spaulding, D. T., & Smith, G. M. (2018). *What does your school data team sound like? A framework to improve the conversation around the data.* SAGE Publications.

Spillane, J. P., & Shirrell, M. (2018, Spring). The schoolhouse network: How school buildings affect teacher collaboration. *Education* Next, *18*(2), 68-73. https://www.educationnext.org/schoolhouse-network-how-school-buildings-affect-teacher-collaboration

Stake, R. (1995). *The art of case study research.* SAGE Publications.

Trabona, K., Taylor, M., Klein, E. J., Munakata, M., & Rahman, Z. (2019). Collaborative professional learning: Cultivating science teacher leaders through vertical communities of practice. *Professional Development in Education*, *45*(3), 472–487. https://doi.org/10.1080/19415257.2019.1591482

Turner, J. C., Christensen, A., Kackar-Cam, H. Z., Fulmer, S. M., & Trucano, M. (2018).

The development of professional learning communities and their teacher leaders: An activity systems analysis. *Journal of the Learning Sciences, 27*(1), 49–88. https://doi.org/10.1080/10508406.2017.1381962

Van Geel, M., Keuning, T., Visscher, A., & Fox, J. P. (2019). Changes in educational leadership during a data-based decision-making intervention. *Leadership and Policy in Schools, 18*(4), 628–647. https://doi.org/10.1080/15700763.2018.1475574

Vygotsky, L. S., & Cole, M. (1978). *Mind in society: The development of higher psychological processes.* Harvard University Press.

Wachen, J., Harrison, C., & Cohen-Vogel, L. (2018). Data use as instructional reform: Exploring educators' reports of classroom practice. *Leadership and Policy in Schools, 17*(2), https://doi.org/10.1080/15700763.2016.1278244

Walden University. (2019). EdD Capstone Guidebook 2019. https://academicguides.waldenu.edu/research-center/program-documents/edd

Wan, S. W. (2020). Unpacking the relationship between teachers' perceptions of professional learning communities and differentiated instruction practice. *ECNU Review of Education, 3*(4), 694–714. https://doi.org/10.1177/2096531120969988

Wardrip, P. S., & Herman, P. (2018). We're keeping on top of the students: Making sense of test data with more informal data in a grade-level instructional team. *Teacher Development, 22*(1), 31–50. https://doi.org/10.1080/13664530.2017.1308428

Weddle, H. (2020). Teachers' opportunities to learn through collaboration over time: A case study of math teacher teams in schools under pressure to improve. *Teachers*

*College Record*, *122*(12), 1–40. https://doi.org/10.1177/016146812012201204

Weddle, H., Lockton, M., & Datnow, A. (2019). Teacher collaboration, differing expectations, and emotions in school improvement. *Educational Administratio Quarterly*, *4*(4), 325–343. https://doi.org/10.1108/JPCC-03-2019-0005

Weiss, S., Markowetz, H., & Kiel, E. (2018, June 15). How to teach students with moderate and severe intellectual disabilities in inclusive and special education settings: Teachers' perspectives on skills, knowledge, and attitudes. *European Educational Research Journal*, *17*(6), 837–856. https://doi.org/10.1177/1474904118780171

Williams, M., & Moser, T. (2019). The art of coding and thematic exploration in qualitative research. *International Management Review*, *15*(1), 45–55. https://www.proquest.com/docview/2210886420

Xing, W., Popov, V., Zhu, G., Horwitz, P., & McIntyre, C. (2019, September). The effects of transformative and non-transformative discourse on individual performance in collaborative-inquiry learning. *Computers in Human Behavior*, *98*, 267–276. https://doi.org/10.1016/j.chb.2019.04.022

Yancovic, M. P., Torres, A. G., Figueroa, L. A., & Chapman, C. (2019). *School improvement networks and collaborative inquiry: Fostering systemic change in challenging contexts.* Emerald Group Publishing.

Yin, R. K. (2018). Case study research and applications: Design and methods (6th ed.). SAGE

Yirci, R., Durna, S., & Kocabas, I. (2021). The current status of in-service trainings for

teachers and expectations: Do they match? (EJ1294034). ERIC. https://files.eric.ed.gov/fulltext/EJ1294034.pdf

Yousaf, S. U., Usman, B., & Islam, T. (2018, April). Effects of supervision practices of principals on work performance and growth of primary school teachers. (EJ1209757). ERIC. https://files.eric.ed.gov/fulltext/EJ1209757.pdf

Zhang, S., Lui, Q., & Cai, Z. (2019). Exploring primary school teachers technological pedagogical content knowledge (TPACK) in online collaborative discourse: An epistemic network analysis. *British Journal of Educational Technology*, *50*(6), 3437–3455. https://doi.org/10.1111/bjet.12751

Appendix A: The Project

# Becoming Wise About Data Wise Through Collaborative Learning

## A Facilitator's Guide

Created by Linda Armwood

## Table of Contents

## Introduction

This guide is provided to support facilitation of the professional development module, *Becoming Wise about Data Wise through Collaborative Learning.* The guide includes an introduction of the module to include professional development goals, the intended outcome, a full day agenda outline for each day, a complete description of each module session, presentation slideshow screenshots, and the formative and summative evaluations. The slideshow screenshots and evaluations are at the end of this guide.

The goals of the 3-day professional development module are to promote shared collaborative inquiry processes, reinforce DWIP protocols, and provide strategies for collaborative learning among faculty and school administrators. The intended outcome for the module is for school team members and administrators to demonstrate a shared commitment to action for student assessment, intentional collaboration around student data, and a continual focus on evidence for improved teaching and learning. The module is planned for implementation of 8 hours for each day on the Zoom platform in accordance with school district professional development implementation.

The module is intended for school administrators and teaching staff to collaborate as participants for each day. As you prepare to facilitate the professional development, please consider different knowledge levels of the school staff regarding the Data Wise Improvement Process. Additionally, please be aware that there is a probability of staff members participating as new teachers in the profession, new

members of the school, and returning staff members. Encourage all module attendees to actively participate in all activities, ask questions, and to use the Zoom chat feature when needed. Please allow any participants to continue working in small groups, if requested, during scheduled session breaks. Each participant should have the 3-day agenda provided by the principal's designee prior to the first day of the module sessions. Additionally, participants should be made aware by the principal's designee to have their electronic or hard copy of the current edition of the Data Wise book available during the professional development module for reference as needed.

As the professional development facilitator, there are preparation tasks for you to complete several days before implementation of the module. The tasks are described in the Facilitator's Preparation Task section. Please review the preparation tasks, daily agendas, and slideshow screenshots before providing the principal's designee with the 3-day agenda for participants to review.

# Preparation Tasks

Preparation Tasks for Day 1:

- Email the principal's designee the 3-day agenda to forward to module participants.
- Create a Google slideshow based on module slide screenshots for Day 1, pages 26-29.
- Create space on Padlet for the participants challenge activity (Day 1, Slide 4). *Remember to add the Padlet link to the Zoom chat for participants access.*
- Obtain the names for each teacher and school administrator for Zoom breakroom assignments by grade level. Decide the grade level breakroom assignment for school administrators.
- Review the ACE Habits of Mind in the DWIP book and develop scenarios appropriate for the discussion on student data facts and inferences.
- Create space on Padlet for participants to recap the morning session after the lunch break. *Remember to add the Padlet link to the Zoom chat for participants to access.*
- Create a Google formative evaluation and link, p. 36. The formative evaluation should be given each of the three days. *Remember to add the Google link in the Zoom chat for participants to complete at the end of the session.*

Preparation Tasks for Day 2:

- Check with the principal's designee that student data has been provided for the grade level groups' activities. *This task should be done a few days before the Day 2 session begins.*
- Create a Google slideshow based on module slide screenshots for Day 2, pages 30-32.
- Create space on Padlet for the participants' challenge emoticon activity (Day 2, Slide 1). *Remember to add the Padlet link to the Zoom chat for participants' access.*
- Refine notes to recap Day 1. Be prepared to share recap notes with participants on additional Padlet pages or slides to encourage recap participation.
- Assign participant names, excluding school administrators, to grade level groups for Zoom breakout rooms. School administrators will self-select rotation order through groups.
- Prepare open-ended questions for whole group discussions as shown on slide screenshots.
- Create space on Padlet for participants to recap the morning session after the lunch break. *Remember to add the Padlet link to the Zoom chat for participants to access.*
- Create a Google link for the formative evaluation. *Remember to add the Google link in the Zoom chat for participants to complete at the end of the session.*

Preparation Tasks for Day 3:

- Create a Google slideshow based on module slide screenshots, pages 33-35.
- Create space on Padlet for the participants' song activity (Day 3, Slide 2). *Remember to add the Padlet link to the Zoom chat for participants' access.*
- Refine notes to recap Day 2. Be prepared to share recap notes with participants on additional Padlet pages or slides to encourage recap participation.
- Create space on Padlet for participants to recap the morning session after the lunch break. *Remember to add the Padlet link to the Zoom chat for participants to access.*
- List grade level group names to include school administrators in different groups from previous days.
- Create a Google link for the formative evaluation. *Remember to add the Google link in the Zoom chat for participants to complete at the end of the final session.*
- Create a Google summative evaluation, pages 37-38. *Remember to add the Google link in the Zoom chat for participants to complete at the end of the final session.*

## Day 1

## Agenda Outline

**Day 1: Where are You? Where are We?**

**Time:** 8:00 a.m. – 4:00 p.m.

**Check in:** 8:00 a.m. – 8:15 a.m.

**Morning Work Session I:** 8:15 a.m. - 10:00 a.m.

- Welcome and Introductions (8:15 a.m. – 8:30 a.m.)
- Goals, Intended Outcome, and Agenda Review (8:30 a.m. – 8:40 a.m.)
- What's Your Data-tude? (8:40 a.m. – 8:50 a.m.)
- Facts vs Inferences (8:50 a.m. – 9:05 a.m.)
- The Ideal Improvement Process (9:05 a.m. – 9:20 a.m.)
- An Actual Improvement Process (9:20 a.m. – 9:45 a.m.)
- Break (9:45 a.m. – 10:00 a.m.)

**Morning Work Session II:** 10:00 a.m. -12:00 p.m.

- Collection, Analysis, and Implementation (10:00 a.m. – 10:10 a.m.)
- Do You See What I See? (10:10 a.m. – 10:45 a.m.)
- This is Normal (10:45 a.m. – 11:05 a.m.)
- ACE Habits of Mind (11:05 a.m. – 11:20 a.m.)
- Break (11:20 a.m. – 11:30 a.m.)
- What are You Working With? Part I (11:30 a.m. -12:00 p.m.)

**Lunch:** 12:00 p.m. – 12:45 p.m.

**Afternoon Work Session I:** 12:45 p.m. – 2:20 p.m.

- Morning Session Recap (12:45 p.m. – 12:55 p.m.
- What are You Working With? Part II (12:55 p.m. – 1:10 p.m.)
- What are We Doing? (1:10 p.m. – 2:10 p.m.)
- Break (2:10 p.m. – 2:20 p.m.)

**Afternoon Work Session II:** 2:20 p.m. – 4:00 p.m.

- Initiatives Inventory (2:20 p.m.- 2:50 p.m.)
- Where are We? (2:50 p.m. – 3:30 p.m.)
- Reflection (3:30 p.m. – 3:45 p.m.)
- Closeout (3:45 p.m. – 4:00 p.m.)

## Day 1 Module Session Description and Tasks

**Session Description**: The Day 1 session will focus on the participants knowledge, feelings, and practices of collaborative inquiry. The session includes individual, small group, and whole group activities on facts and inferences; the collection, analysis, and implementation of student data; and the DWIP ACE Habits of Mind. Additionally, the session includes a review of the student assessments and initiatives that are unique to the school.

***Opening Session (8:00 a.m. – 8:40 a.m.)***

Display Day 1, Slide 1. After attendees check in, welcome them, and introduce yourself. Ask attendees to access today's agenda. Display Day 1, Slide 2. Ask attendees to introduce themselves (name and position/grade level) and give an adjective that describes their motivation to learn to initiate a sense of community online. Encourage attendees to participate. Display and read Day 1, Slide 3 and inform participants that the goals encompass the entire module, and the intended outcome should be initially realized during the professional development as they collaborate.

***Morning Session 1 Introduction Tasks (8:40 a.m. – 9:05 a.m.)***

Display Day 1, Slide 4. Inform participants that there is a link to Padlet in the Zoom chat. Explain the task is for participants to anonymously share their knowledge and feelings about collaborative inquiry in the Padlet tool. Ask if there are any questions about the task. Be prepared to provide instructions for participants unfamiliar with using Padlet. After the suggested 5-minute period, display and discuss with participants the Padlet responses to note any patterns and outliers. Entertain participants' questions and comments. Return to Day 1, Slide 4 and introduce the 'Facts and Inferences' task. Encourage participants to share their thoughts on distinguishing between student data facts and student data inferences. Be prepared to give scenarios/examples or ask leading questions to encourage participation. Ask participants to explain the importance of distinguishing between facts and inferences when examining student data.

***First Small Group Session (9:05 a.m. – 9:45 a.m.)***

Lead into this session pointing out that accurate data analysis and interpretation is critical to the school improvement process. Do not Display Day 1, Slide 5 yet. Explain to participants that they will be randomly placed in small groups using the Zoom breakroom tool to complete a 2-part school improvement task. Inform participants the first part of the task is to describe an ideal school improvement process in 15 minutes. Instruct participants to select a group member to report when the whole group reconvenes.

Near the end of the 15 minutes, visit each group to explain the second part of the task- compare an actual school improvement process to their small group's ideal process within 15 minutes. The sample actual school improvement process is found in the 'Selected Protocols' section, page 222 of *Data Wise Revised and Expanded* (2020). Reconvene the whole group and display Day 1, Slide 5. Ask groups to share their descriptions and lead participants to note similarities and differences to promote discussion about their school's improvement process. Encourage participants to express perspectives on the school's improvement process and their individual roles and responsibilities in the process.

***Morning Session Break 1 (9:45 a.m. – 10:00 a.m.)***

Display Day 1, Slide 6 and inform participants of the 15-minute break. Check the grade level group names for the breakout rooms for the second morning session.

***Morning Session 2 Introduction Task (10:00 a.m. – 10:10 a.m.)***

Welcome participants back to the session and thank them for their participation in the first morning session. Add any appropriate comments. Display Day 1, Slide 7. Inform participants that they have 10 minutes to individually reflect on the kinds of student data they collect, how they independently analyze student data, and how the student data findings are implemented in their classrooms. This task allows participants to actively reflect and exercise self-accountability for student data. Sharing reflections is not required.

***Small Group and Whole Group Sessions (10:10 a.m. – 11:20 a.m.)***

Display Day 1, Slide 8. Announce that participants will work in pre assigned breakout rooms for 35 minutes. Read the slide and emphasize that they are expected to access the most current state performance data for their grade level students. Inform participants that they will identify facts and make inferences about the state performance data they are reviewing and explain how inferences affect analysis and classroom implementation. Instruct participants to select a group member to report when the whole group reconvenes.

Use the Zoom timing tool to reconvene the whole group and refer to Day 1, Slide 8 to explain the whole group task is to share within 20 minutes how setting norms affect student data inferences. (It is highly probable that participants will experience the importance of having protocols in place when individually and collectively reviewing student data). Encourage participants to share any significant findings for their grade level students.

Display Day 1, Slide 9. State the ACE Habits of Mind as shown on the slide. Ask for volunteers to share any personal evidence of these habits displayed in their school processes and/or routines. Be prepared to provide your sample scenarios for participants to identify ACE Habits of Mind. Encourage participation.

***Morning Session Break 2 (11:20 a.m.-11:30 a.m.)***

Display Day 1, Slide 10 and inform participants of the 10-minute break. Remove the school administrators from the previously assigned grade level groups.

***Small Group Session (11:30 a.m. – 12:00 p.m.)***

Display Day 1, Slide-11 and inform participants that they will be returned to their breakout room groups to discuss personal and professional characteristics needed to achieve the ACE Habits of Mind. Ask participants to select a different group representative to share their group's characteristics discussion highlights at the appropriate time after lunch. Inform participants that the school administrators and the facilitator(s) will visit as many groups as possible within the allotted time. Use the Zoom

timing tool to reconvene the group. Display Day 1, Slide 12 and inform participants of the 45-minute lunch break.

***Lunch Break (12:00 p.m. – 12:45 p.m.)***

***Afternoon Session 1 (12:45 p.m. – 2:10 p.m.)***

Welcome back the participants. Display Day 1, Slide 13. Direct participants to the Padlet link in the chat and ask participants to silently read the morning session recap. Ask volunteers to add to the Padlet notes as needed. Briefly discuss Padlet entries. Allow 10 minutes for this whole group activity.

Return to Day 1, Slide 13, and ask for each group representative to briefly share their group's characteristics discussion highlights. Note any similarities and engage participants in a discussion about the ACE Habits of Mind for the school. Allow 15 minutes for this whole group activity. Inform participants that they will be randomly placed in Zoom breakout rooms to discuss and list the assessments that are administered in the school. Include the school administrators in the random small group list and encourage them to rotate groups. Let participants know that the allotted time for this small group activity is 60 minutes and they are expected to present, in the second afternoon session, the assessments as a chart with assessment information that the groups decide is essential to know. Remind participants to encourage a colleague who has not presented for any group to report for their group.

***Afternoon Session Break (2:10 p.m. – 2:20 p.m.)***

Use the Zoom timing tool to reconvene the whole group. Display Day 1, Slide 14 and inform participants of the 10-minute break.

***Afternoon Session 2 (2:20 p.m. – 3:30 p.m.)***

Display Day 1, Slide 15. Announce to participants that they will be returned to their same small groups before the break to add state, school district, and school initiatives to their assessments chart within a 30-minute time period. Encourage groups to discuss the relationship of the assessments and initiatives to the school improvement process. Reconvene the groups and display Day 1, Slide 15. Inform participants that this is the

last activity before closing the first day session. Have each group representative to briefly share their group chart and explain any school improvement relationships. Allow a total of 30 minutes for this reporting activity. Note similarities and differences in matching initiatives and connections to the school improvement process.

***Reflection and Closeout (3:30 p.m. – 4:00 p.m.)***

Display Day 1, Slide 16. Invite participants to take 5 minutes to individually reflect on the concepts and activities from the full day session. Afterward, recap the concepts and activities from the day, ask participants if they have any questions related to today's professional learning sessions, and relate the session to the intended outcome of the module. Direct participants to the formative evaluation Google link in the chat to complete for Day 1 closing. Remind participants to tap the 'Submit' tab at the end of the evaluation when they have completed the evaluation. Review all evaluations to make decisions about future professional development.

## Day 2

## Agenda Outline

**Day 2: What Does the Data Say?**

**Time:** 8:00 a.m. – 4:00 p.m.

**Check in:** 8:00 a.m. – 8:15 a.m.

**Morning Work Session I:** 8:15 a.m. - 10:10 a.m.

- Welcome and Emoticons (8:15 a.m. – 8:30 a.m.)
- Review of Agenda and Day 1 (8:30 a.m. – 8:40 a.m.)
- ACE Habits of Mind (8:40 a.m. – 9:00 a.m.)
- See and Say, Part I (9:00 a.m. – 10:00 a.m.)
- Break (10:00 – 10:10 a.m.)

**Morning Work Session II:** 10:10 a.m. -12:00 p.m.

- See and Say, Part II (10:10 a.m. – 10:50 a.m.)
- Break (10:50 a.m. – 11:00 a.m.)
- What Questions Do You See? (11:00 a.m. – 12:00 p.m.)

**Lunch:** 12:00 p.m. – 12:45 p.m.

**Afternoon Work Session I:** 12:45 p.m. – 2:05 p.m.

- Morning Session Recap (12:45 p.m. – 12:55 p.m.
- What Data do We Need? (12:55 p.m. – 1:55 p.m.)
- Break (1:55 p.m. – 2:05 p.m.)

**Afternoon Work Session II:** 2:05 p.m. – 4:00 p.m.

- Examining Student Work, Part I (2:05 p.m. – 3:05 p.m.)
- Where are We? (3:05 p.m. – 3:35 p.m.)
- Reflection (3:35 p.m. – 3:45 p.m.)
- Closeout (3:45 p.m. – 4:00 p.m.)

## Day 2 Module Session Description and Tasks

**Session Description**: The Day 2 session will build on the Day 1 session. The session includes individual, small group, and whole group activities on perspectives of the DWIP ACE Habits of Mind and practices of student data analysis to include group meeting norms. Additionally, the session includes reviews and analysis of recent student data selected by school administration and current student work samples selected by teachers.

***Opening Session (8:00 a.m. – 8:40 a.m.)***

Display Day 2, Slide 1. After attendees check in, welcome them back, and thank them for returning for Day 2. Display Day 2, Slide 2. Inform attendees of the Padlet link in the Zoom chat. Explain that their 5-minute task is to draw or download an emoticon that represents their approach to analyzing student data. Encourage attendees to participate and volunteer to explain their emoticons. Display and read Day 2, Slide 2 to remind participants of the intended outcome of the 3-day sessions. Ask participants to silently review the agenda and ask if there are any questions. Inform participants that they will work in their grade level groups throughout the day and a different group representative should share when the whole group reconvenes. Announce that teachers will need to have access to one or two samples of student work for the afternoon session. Display Day 2, Slide 3 and ask for volunteers to share highlights from Day 1. Be prepared to review Day 1 concepts and observations.

***Morning Session 1(8:40 a.m. – 10:00 a.m.)***

Display Day 2, Slide 3. Inform participants that they will work in their grade level groups for 20 minutes. Inform school administrators that they will be assigned a temporary breakout room to establish a rotation schedule for themselves to visit groups throughout the day. Explain to the whole group that the grade level tasks are to share their perspectives on the ACE Habits of Mind explored on Day 1 and to discuss the impact those habits have on collaborative behavior.

Reconvene the groups and ask for a volunteer from each group to share their group's discussion summary. Note similar responses and ask participants for their comments.

***Morning Session 2 (9:00 a.m. – 10:00 a.m.)***

Display Day 2, Slide 3. Inform participants that they will be returned to their groups for a 60-minute student data collaborative session. Explain that they are expected to review and analyze student data provided by school administration after establishing norms for the small group. Inform participants to select a representative to share findings and any concerns about the data and the analysis process. Allow the Principal or designee to elaborate on where to access the assigned grade level data for this activity. Use the Zoom timing tool to reconvene the group.

***Morning Session Break 1 (10:00 a.m. – 10:10 a.m.)***

Display Day 2, Slide 4. Inform participants that sharing by groups will occur after the 10-minute break.

***Morning Session 3 (10:10 a.m. – 10:50 a.m.)***

Display Day 2, Slide 5. Remind participants that one group representative will share their findings and any concerns about the data and the analysis process. Note any similarities and encourage discussion about the analysis process. Be prepared with questions to promote discussion. Display Day 2, Slide 6. Inform participants of the second morning break for 10-minutes.

***Morning Session Break 2 (10:50 a.m.-11:00 a.m.)***

Prepare morning recap.

***Morning Session 4 (11:00 a.m. – 12:00 p.m.)***

Display Day 2, Slide 7. Inform participants that they will return to their grade level groups to identify inferences from the analyzed student data and discuss how those inferences can be supported. Tell participants that they have 60-minutes to work on the student data task.

Remind participants that one group member will report each groups' discussion summary after the lunch break. Reconvene the whole group. Display Day 2, Slide 8 and inform participants of the 45-minute lunch break.

***Lunch Break (12:00 p.m. – 12: 45 p.m.)***

***Afternoon Session 1 (12:45 p.m. – 1:55 p.m.)***

Welcome back participants. Display Day 2, Slide 9. Direct participants to the Padlet link in the Zoom chat. Ask participants to silently read the morning sessions recap. Invite participants to add to the recap notes. Allow 10 minutes for the recap segment. Refer to Day 2, Slide 9 and inform participants that they will continue working in their grade level groups for 30 minutes. Tell participants that they are expected to discuss the data needed to address the inferences made about the previous student data assigned to their groups. Reconvene the groups and ask for a volunteer or selected group representative to share their group's discussion summary. Note any similarities and differences in data sources shared by groups. Display Day 2, Slide 10 and inform participants of the 10-minute break. Remind teachers to have one or two samples of student work for the afternoon small group session.

***Afternoon Break (1:55 p.m. – 2:05 p.m.)***

***Afternoon Session 2 (2:05 p.m. – 3:35 p.m.)***

Display Day 2, Slide 11 and inform participants that they will continue to work in their small groups. Explain that each teaching member of the group is expected to share a sample of student work for the group to review and ask questions. Also, state that group members should suggest strategies to address student achievement related to the work sample. Announce that a group representative will not be needed for this 60-minute session.

Reconvene the groups and refer to Day 2, Slide 11. Thank participants for sharing their student work and collaborating on student achievement strategies. Explain to participants that the last session for the day will be a whole group discussion on how

norms were established and followed in the grade level groups. Ask for volunteers to begin the discussion. Be prepared with questions to promote discussion.

***Reflection and Closeout (3:35 p.m. – 4:00 p.m.)***

Display Day 2, Slide 12. Invite participants to take 5 minutes to individually reflect on the concepts and activities from the full day session. Afterward, recap the concepts and activities from the day. Ask participants if they have any questions related to today's professional learning session and relate the session to the intended outcome of the module. Direct participants to the formative evaluation link in the chat to complete for Day 2 closing. Remind participants to tap the 'Submit' tab at the end of the evaluation when they have completed the evaluation. Review all evaluations to make decisions about future professional development.

## Day 3

## Agenda Outline

**Day 3: Are We There Yet?**

**Time:** 8:00 a.m. – 4:00 p.m.

**Check in:** 8:00 a.m. – 8:15 a.m.

**Morning Work Session I:** 8:15 a.m. - 10:10 a.m.

- Welcome and Songs (8:15 a.m. – 8:30 a.m.)
- Review of Agenda and Day 2 (8:30 a.m. – 8:40 a.m.)
- ACE Habits of Mind (8:40 a.m. – 9:00 a.m.)
- Examining Student Work, Part II (9:00 a.m. – 10:00 a.m.)
- Break (10:00 – 10:10 a.m.)

**Morning Work Session II:** 10:10 a.m. -12:00 p.m.

- What Questions do You See? (10:10 a.m. – 10:50 a.m.)
- Break (10:50 a.m. – 11:00 a.m.)
- Examining Student Work, Part III (11:00 a.m. – 12:00 p.m.)

**Lunch:** 12:00 p.m. – 12:45 p.m.

**Afternoon Work Session I:** 12:45 p.m. – 2:05 p.m.

- Morning Session Recap (12:45 p.m. – 12:55 p.m.
- What Were They Thinking? (12:55 p.m. – 1:55 p.m.)
- Break (1:55 p.m. – 2:05 p.m.)

**Afternoon Work Session II:** 2:05 p.m. – 4:00 p.m.

- Is This a Plan or What? (2:05 p.m. – 3:05 p.m.)
- Where are We? (3:05 p.m. – 3:35 p.m.)
- Reflection (3:35 p.m. – 3:45 p.m.)
- Closeout (3:45 p.m. – 4:00 p.m.)

**Day 3 Module Session Description and Tasks**

***Opening Session (8:00 a.m. – 8:40 a.m.)***

Display Day 3, Slide 1. After attendees check in, welcome them back, and thank them for returning for Day 3. Display Day 3, Slide 2. Inform attendees of the Padlet link in the Zoom chat. Explain that their 5-minute task is to name a song that represents their approach to analyzing student data. Encourage attendees to participate and volunteer to explain their songs. Display and read Day 3, Slide 2 to remind participants of the intended outcome of the 3-day sessions. Ask participants to silently review their copy of the agenda and ask if there are any questions. Inform participants that they will work in whole and grade level groups throughout the day and a different group representative should share when the whole group reconvenes. Announce that everyone will have access to student data provided by school administration for today. Display Day 3, Slide 3 and ask for volunteers to share highlights from Day 2. Be prepared to review Day 2 concepts and observations.

***Morning Session 1 (8:40 a.m. – 10:00 a.m.)***

Refer to Day 3, Slide 3 and inform participants that they will work in their grade level group first to discuss their perspectives on the ACE Habits of Mind and the impact those habits have on group collaborative behaviors. Tell participants that they will work in their groups for 10-minutes and then return to the whole group to share their discussion summary. Reconvene the groups and ask for a volunteer to share. Encourage participation and note the perspectives in the group summaries.

Refer to Day 3, Slide 3 and inform participants that they will remain in the whole group for 20-minutes to review and analyze the student data selected and provided by the school administration. Explain that they are expected to note and discuss the similarities and differences of the data. Allow the principal or designee to elaborate on where to access the student data for review and analysis. After the 20-minute segment, announce that participants will work in their grade level groups for 40 minutes to develop questions related to the data.

***Morning Session Break 1 (10:00 a.m. – 10:10 a.m.)***

Display Day 3, Slide 4. Inform participants that there is a 10-minute break before the whole group sharing session.

***Morning Session 2 (10:10 a.m. – 12:00 p.m.)***

Display Day 3, Slide 5 and inform participants that they will share their discussion summaries about the student data Ask for a volunteer to begin the group discussion summaries. Encourage participation in the discussion and note similar questions and/or categories of questions. The duration of this activity is 40 minutes.

***Morning Session Break 2 (10:50 a.m. – 11:00 a.m.)***

Inform participants that there is a 10-minute break. Prepare the morning recap for the afternoon session.

***Morning Session 2 continued (11:00 a.m. – 12:00 p.m.)***

Display Day 3, Slide 5 and inform participants that they will work in their grade level group to access and examine the most recent student data from the school district or state assessments. Tell participants that they have 60 minutes to analyze and describe the data as the group decides and it is expected that inferences will also be shared in the afternoon session. Reconvene the groups and display Day 3, Slide 6. Tell participants the lunch break ends at 12:45 p.m.

***Lunch Break (12:00 p.m. – 12:45 p.m.)***

***Afternoon Session 1 (12:45 p.m. – 1:55 p.m.)***

Display Day 3, Slide 7 and welcome the participants. Inform participants of the Padlet link in the Zoom chat. Ask participants to silently read the morning sessions recap. Invite participants to add to the recap notes. Allow 10 minutes for the recap segment. Refer to Day 3, Slide 7 and tell participants that each group representative will share their group's discussion summary to include inferences. Encourage participation and note similarities and differences in inferences.

***Afternoon Break (1:55 p.m. – 2:05 p.m.***

Display Day 3, Slide 8 and inform participants of the 10-minute break.

***Afternoon Session 2 (2:05 p.m. – 3:35 p.m.)***

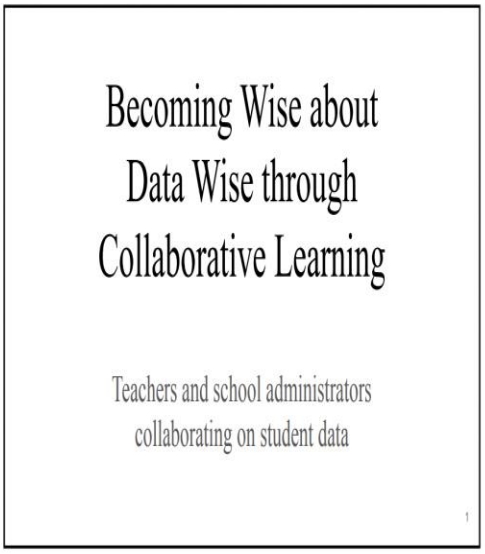
Display Day 3, Slide 9 and let participants know that they will be working in their grade level groups for 60-minutes to create a team action plan for collaborative inquiry. Inform participants that norms, roles, and processes must be included in the team action plan. Encourage participants to select or accept a volunteer group representative to share their action plan.

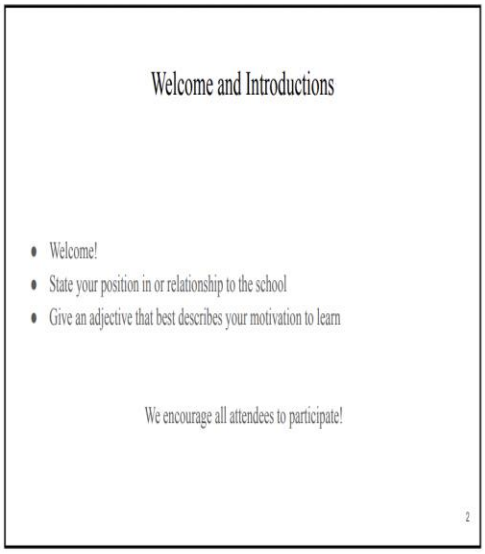
Display Day 3, Slide 9. Reconvene the whole group and ask for a volunteer to share their group's action plan. Encourage participation and note any comments on how participants plan to support one another in the implementation of the action plans for collaborative inquiry.

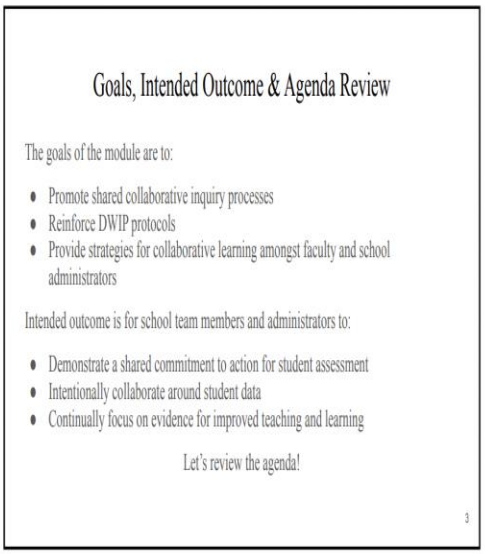
***Reflection and Closeout (3:35 p.m. – 4:00 p.m.)***

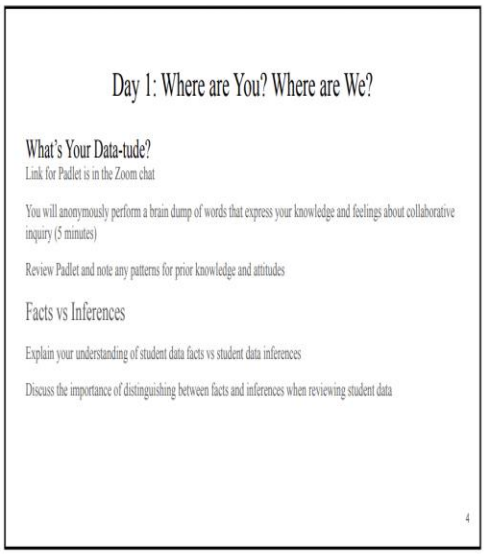
Display Day 3, Slide 10. Invite participants to take 15 minutes to individually reflect on the concepts and activities from the full day session. Afterward, recap the concepts and activities from the day, ask participants if they have any questions related to any of the professional learning sessions, and relate today's session to the intended outcome of the module. Direct participants to the separate formative evaluation and summative evaluation links in the chat to complete for Day 3 and module closing. Remind participants to tap the 'Submit' tab at the end of each evaluation when they have completed the evaluations. Review all evaluations to make decisions about future professional development and determine if goals/ outcomes were achieved.

**Day 1 Presentation Slides (1-4)**

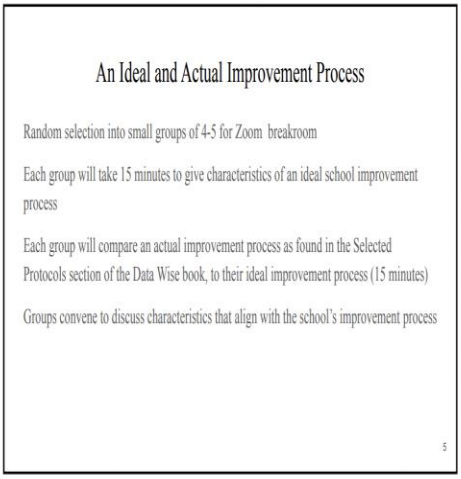


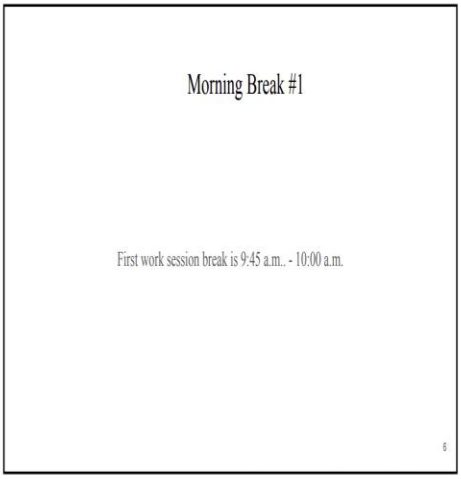



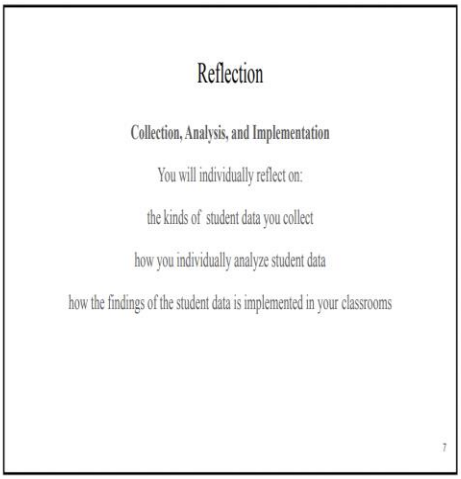



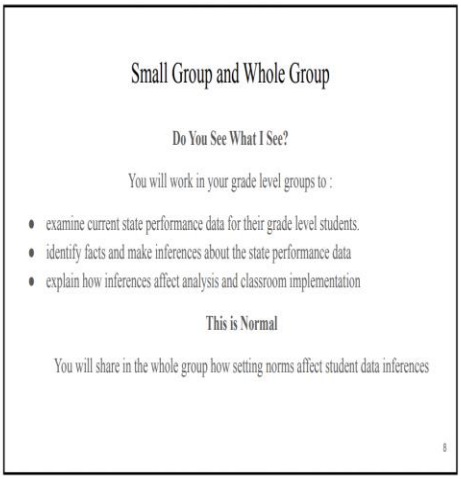



## Day 1 Presentation Slides (5-8)

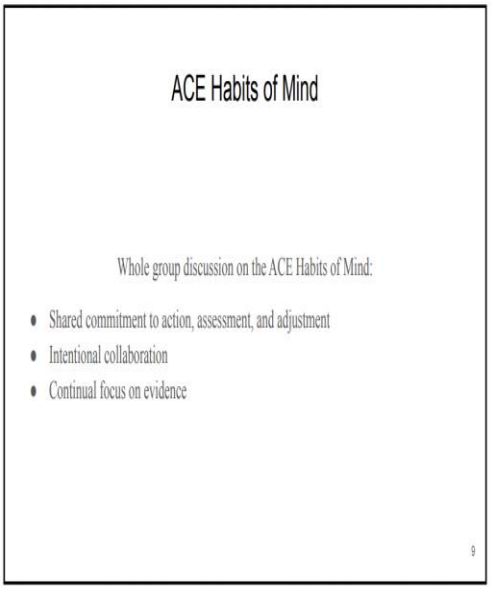


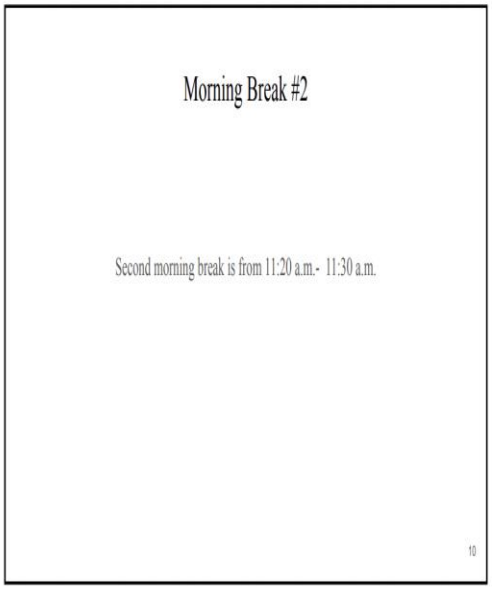



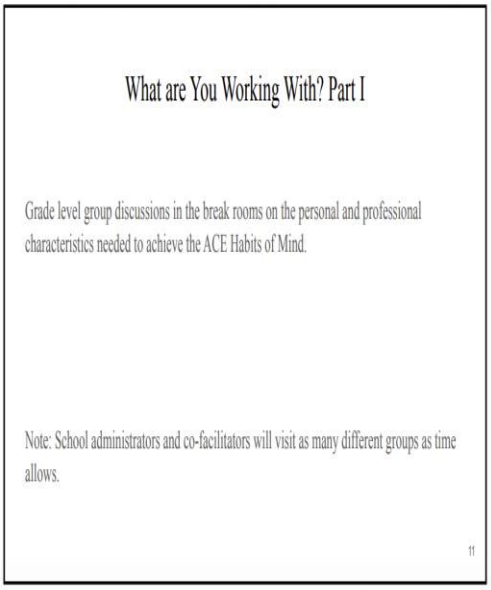



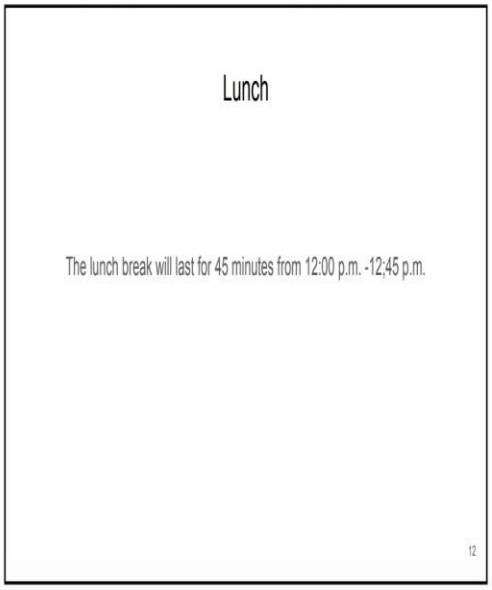



## Day 1 Presentation Slides (9-12)

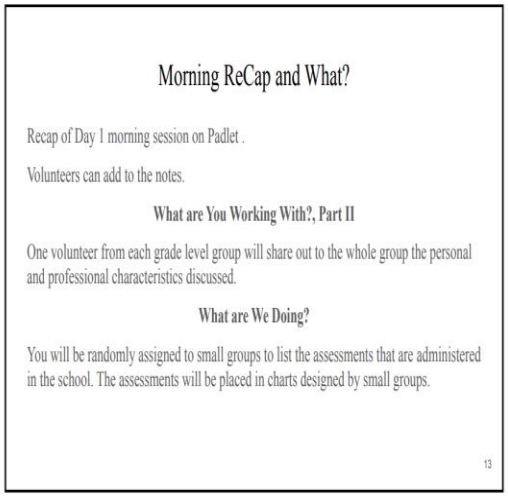


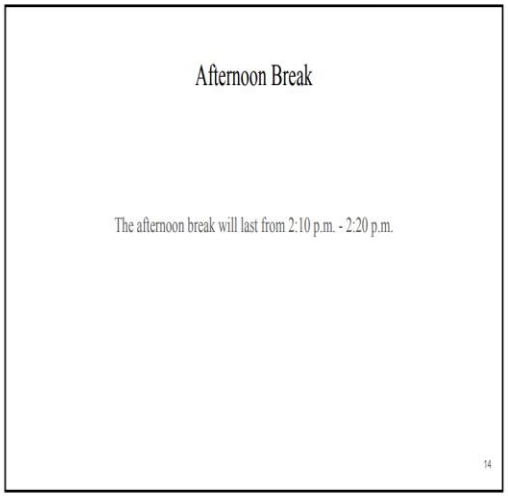



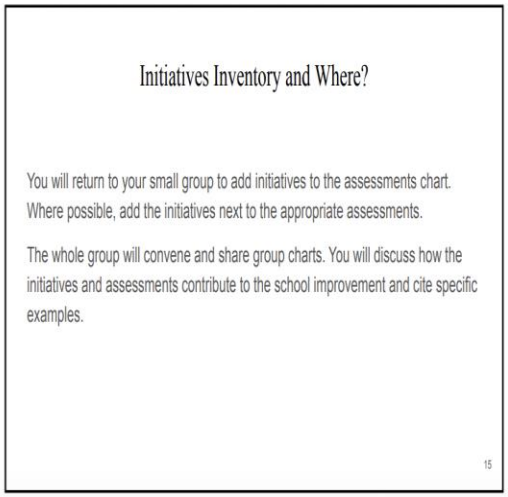



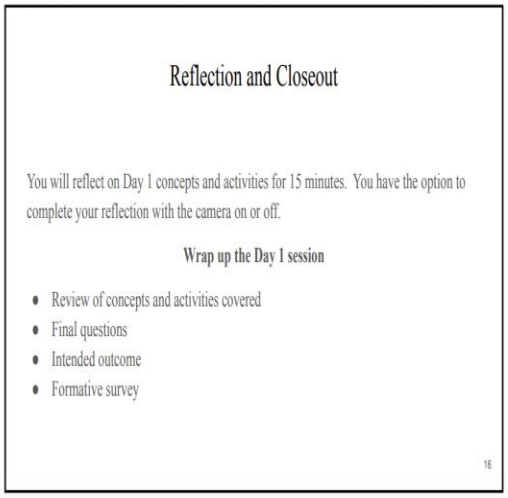



## Day 1 Presentation Slides (13-16)



## Day 2 Presentation Slides (1-4)

# Becoming Wise about Data Wise through Collaborative Learning

**Welcome Back!**

1

### Introductions and Intended Outcome

The link for Padlet is in the Zoom chat.

You will draw or download an emoticon from the web to represent your approach to analyzing student data. (5 minutes)

Volunteers will be asked to elaborate on emoticons.

Intended outcome is for school team members and administrators to:

- Demonstrate a shared commitment to action for student assessment
- Intentionally collaborate around student data
- Continually focus on evidence for improved teaching and learning

Let's review the agenda!

2

### Day 2- What does the Data Say?

Review of Day 1 (co-facilitators and volunteers share)

**ACE Habits of Mind**

You will work in your grade level group to discuss your perspectives on the ACE Habits of Mind and the impact those habits have on group collaborative behaviors. Groups will be asked to share a summary of perspectives/impact in the whole group.

**See and Say, Part I**

You will return to your grade level group to review and analyze the student data provided by your school administrators. You will establish group norms and note any particular concerns with the data and/or analysis process. Each group will select a representative to share in the whole group.

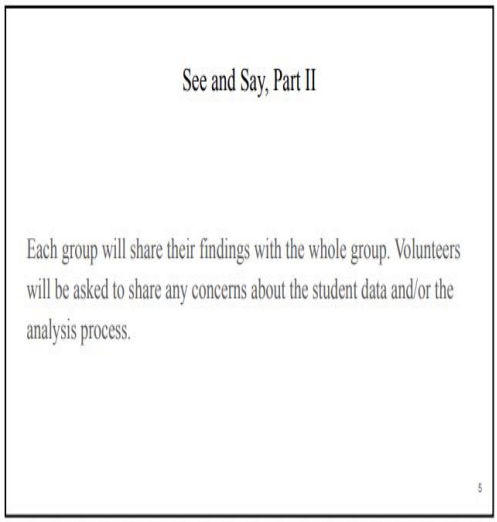
3

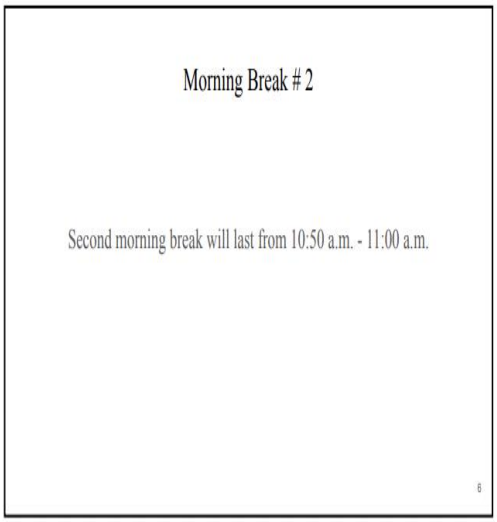
### Morning Break # 1

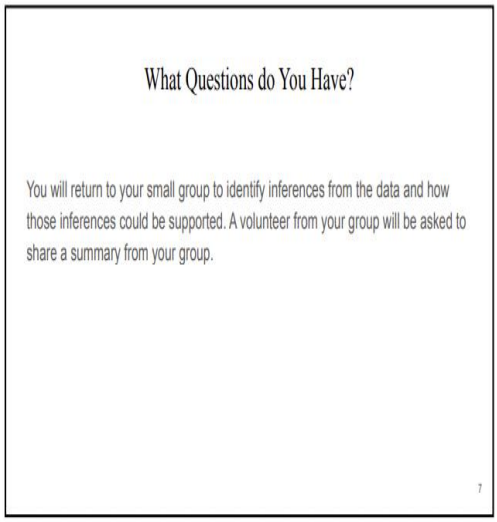
First work session break will last from 10:00 a.m. - 10:10 a.m.

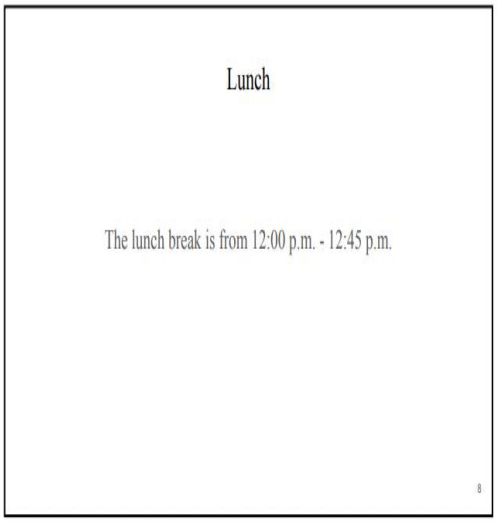
4

## Day 2 Presentation Slides (5-8)



## Day 2 Presentation Slides (9-12)

### Morning Recap and What?

Recap of Day 2 morning session on Padlet.

Volunteers can add to the notes.

**What Data do We Need?**

In your small group, you will discuss the data needed to address inferences about the previous student data. A volunteer will be asked to share in the whole group.

9

### Afternoon Break

The afternoon break will last from 1:55 p.m. - 2:05 p.m.

10

### Examining Student Work, Part I and Where?

**Examining Student Work, Part I**

Each small group member will share a sample of student work for the group to review and ask questions. Group members will suggest strategies to address student achievement related to the student work sample.

**Where are We?**

The whole group will reconvene to discuss how norms were established and followed in small groups.

11

### Reflection and Closeout

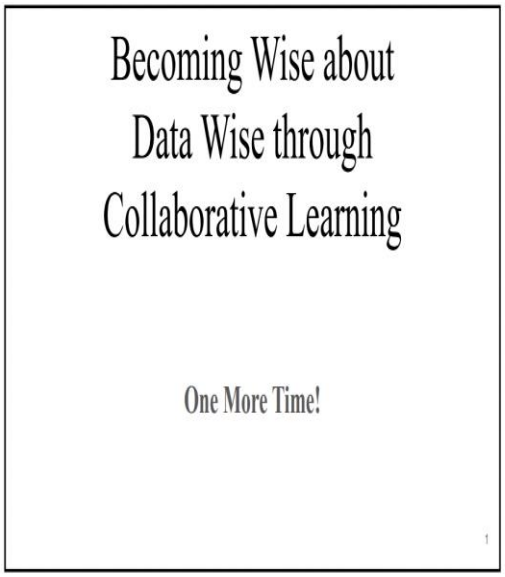
You will reflect on Day 2 concepts and activities for 15 minutes. You have the option to complete your reflection with the camera on or off.

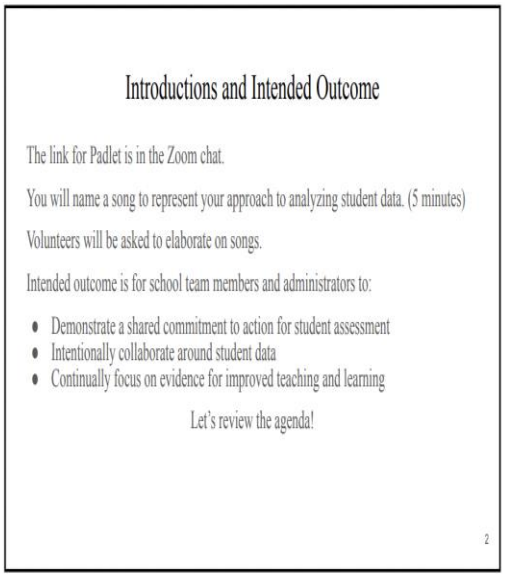
**Wrap up the Day 2 session**

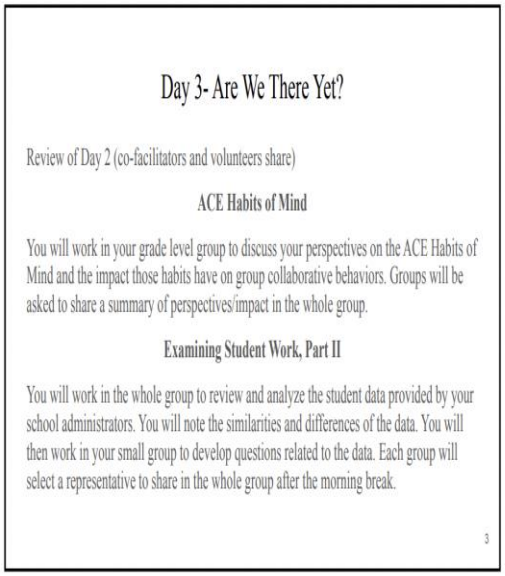
- Review of concepts and activities covered
- Final questions
- Intended outcome
- Formative survey

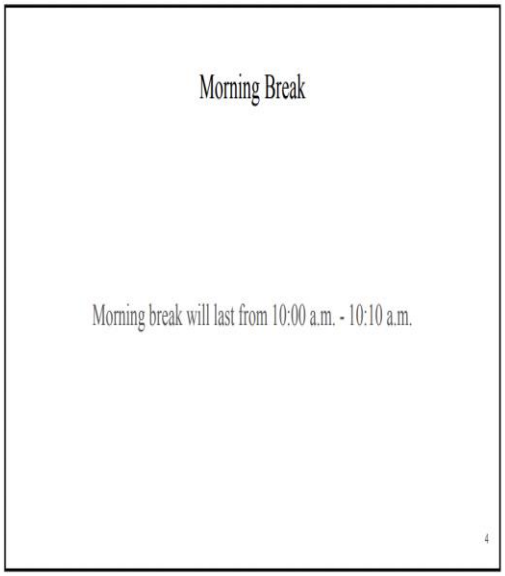
12

**Day 3 Presentation Slides (1-4)**



## Day 3 Presentation Slides (5-8)

### What? And Examining Student Work, Part III

**What Questions do You Have?**

The whole group will convene to share and discuss the questions generated in the small group before the morning break.

**Examining Student Work, Part III**

You will work in your small grade level group to examine most recent student data from the school district or state assessments. A volunteer from each group will share a group summary after the recap segment.

5

### Lunch

The lunch break is from 12:00 p.m. - 12:45 p.m.

6

### Morning Recap and What?

Recap of Day 3 morning session on Padlet.

Volunteers can add to the notes.

**What Were They Thinking?**

A volunteer from each small group will be asked to share inferences related to student thinking based on current student data examined.

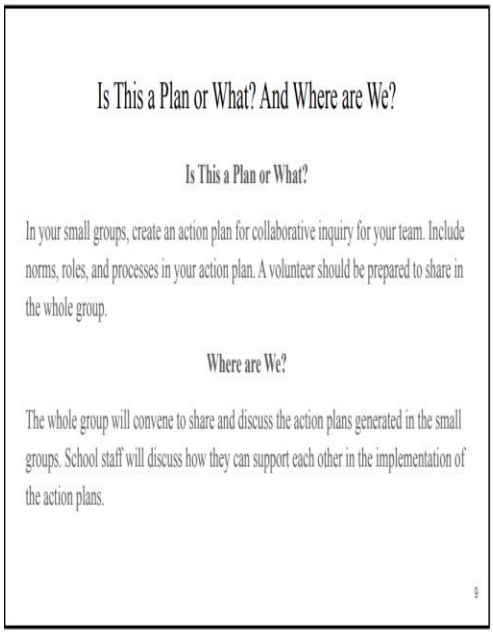
7

### Afternoon Break

The afternoon break will last from 1:55 p.m. - 2:05 p.m.

8

## Day 3 Presentation Slides (9 & 10)



Is This a Plan or What? And Where are We?

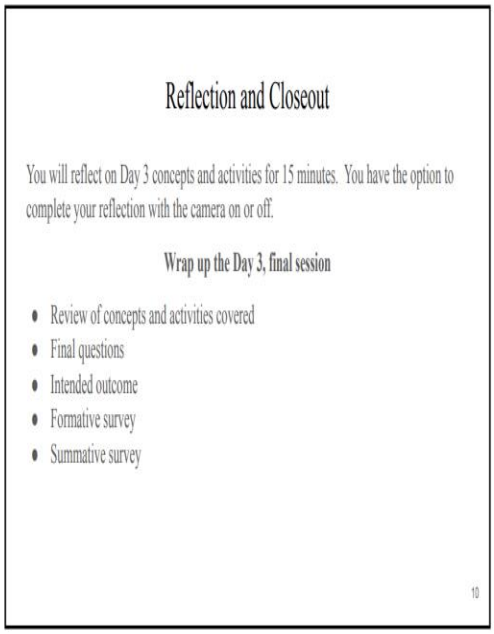
**Is This a Plan or What?**

In your small groups, create an action plan for collaborative inquiry for your team. Include norms, roles, and processes in your action plan. A volunteer should be prepared to share in the whole group.

**Where are We?**

The whole group will convene to share and discuss the action plans generated in the small groups. School staff will discuss how they can support each other in the implementation of the action plans.

9



Reflection and Closeout

You will reflect on Day 3 concepts and activities for 15 minutes. You have the option to complete your reflection with the camera on or off.

**Wrap up the Day 3, final session**

- Review of concepts and activities covered
- Final questions
- Intended outcome
- Formative survey
- Summative survey

10

**Formative Evaluation**

Thank you for participating in today's professional development session. Please complete this Google formative evaluation to reflect on your professional learning today. Remember to tap 'Submit' at the bottom of the form when you have completed the evaluation.

1. Briefly explain, in 3-5 sentences, the most impactful takeaway from today's session.
2. What is your greatest challenge with DWIP?
3. Briefly explain, in 3-5 sentences, what you learned today that will help you overcome that challenge?
4. Provide feedback on any changes you would like for the next session and/or request a follow-up professional development session.

**Summative Evaluation**

**Directions:** Please complete this summative evaluation by selecting the number of the option that best describes your status of this 3-day professional development module. Remember to tap 'Submit' when you have completed the evaluation.

1-Dissatisfied; 2 – Satisfied; 3 – Neutral; 4 – Agree; 5 – Disagree

1. I learned collaborative inquiry processes that I will implement in the team collaborative inquiry sessions.

   1-Dissatisfied; 2 – Satisfied; 3 – Neutral; 4 – Agree; 5 – Disagree
2. I learned collaborative inquiry protocols that I will implement in the team collaborative inquiry sessions.

   1-Dissatisfied; 2 – Satisfied; 3 – Neutral; 4 – Agree; 5 – Disagree
3. I learned that collaborative inquiry requires cooperation amongst participants.

   1-Dissatisfied; 2 – Satisfied; 3 – Neutral; 4 – Agree; 5 – Disagree
4. I learned that collaborative inquiry requires the development of trust amongst participants.

   1-Dissatisfied; 2 – Satisfied; 3 – Neutral; 4 – Agree; 5 – Disagree
5. I learned that collaborative inquiry requires the development of trust amongst participants.

   1-Dissatisfied; 2 – Satisfied; 3 – Neutral; 4 – Agree; 5 – Disagree
6. I was provided sufficient time to collaborate with colleagues.

   1-Dissatisfied; 2 – Satisfied; 3 – Neutral; 4 – Agree; 5 – Disagree
7. I learned to provide constructive feedback for student data analysis.

   1-Dissatisfied; 2 – Satisfied; 3 – Neutral; 4 – Agree; 5 – Disagree
8. I learned to receive constructive feedback for student data analysis.

   1-Dissatisfied; 2 – Satisfied; 3 – Neutral; 4 – Agree; 5 – Disagree