THE EFFECTS OF REFLECTIVE SCRIPTS

THE EFFECTS OF REFLECTIVE SCRIPTS ON ARGUMENT AND COLLABORATION IN TEACHER PLCS: A CASE STUDY

By

CHRISTOPHER ZEGAR

A dissertation submitted to the

Graduate School of Education

Rutgers, The State University of New Jersey

in partial fulfillment of the requirements for the degree of

Doctor of Education

Graduate Program in Design of Learning Environments

written under the direction of

_______________________________________________
Angela O’Donnell (Chair)

_______________________________________________
Ravit Duncan (Committee Member)

_______________________________________________
Brian Dashew (Committee Member)

New Brunswick, New Jersey

January 2022
THE EFFECTS OF REFLECTIVE SCRIPTS

Abstract
Teacher professional learning communities (PLCs) are a valuable tool that increase teacher collaboration to enhance student learning. These adult learning environments are dynamic in that they are places where adults are able to work within a community of practice (CoP) to address work-related challenges and lend support in semi-structured meetings. It is important, therefore, to create supports that increase effective collaboration between teachers as they engage each other around problems of practice to increase student learning.

The intent of this intervention study was to examine the impact of reflective prompts rooted in behaviors associated with effective collaboration as defined by a Thomson et al. (2007) study on teacher behavior in PLCs. The hypothesis of the researcher was that reflective prompts could significantly impact participant behaviors toward more effective collaboration, as well as increase dialogue moves associated with collaborative argumentation rooted in a 2001 Kuhn and Felton study. Qualitative coding and frequency analyses were conducted to examine the impact of reflective prompts on teacher behaviors both seen and perceived.

Analyses revealed that reflective prompts have no significant impact on how teachers used dialogue moves; however, there is evidence that participants did change behaviors in PLC meetings based on the prompts. Furthermore, in interviews, participants explained that the prompts did have a positive impact on focusing meetings. The findings of this study might be of particular interest to professionals creating supports for teacher PLCs.

Keywords: reflective scripts, self-regulated learning, professional learning communities, collaborative argumentation, community of practice
THE EFFECTS OF REFLECTIVE SCRIPTS

Table of Contents

Abstract ................................................................................................................................................... ii

Table of Contents ................................................................................................................................. iii

Acknowledgments ............................................................................................................................... viii

Chapter 1: Introduction to the Problem .............................................................................................. 1
  District Context .................................................................................................................................. 2
  Defining Key Terms .......................................................................................................................... 6
  Effective Professional Learning .......................................................................................................... 8
  Research Questions ............................................................................................................................ 15
  Hypothesis .......................................................................................................................................... 16

Chapter 2: Literature Review .............................................................................................................. 16
  Professional Learning .......................................................................................................................... 17
  Communities of Practice ...................................................................................................................... 18
  Relationships in Learning .................................................................................................................... 19
  PLCs as an Environment for Collaborative Adult Learning ............................................................. 20
  Eliciting Collaborative Behaviors Through Collaborative Scripts .................................................. 23
  Self-Reflection and Scripting .............................................................................................................. 26
  Argumentation & Collaborative Argumentation ................................................................................ 27

Chapter 3: Methodology ...................................................................................................................... 29
THE EFFECTS OF REFLECTIVE SCRIPTS

Theoretical Framework ................................................................. 29
Conjectures ............................................................................... 31
Research Design ....................................................................... 37
Study Plan .................................................................................. 40
Dependent Variables & Outcome Measures .............................. 48
Participant Consent Procedures .............................................. 51
Data Analysis ........................................................................... 51
Hypothesized Results ............................................................... 54
Conclusion ............................................................................... 54

Chapter 4: Findings .................................................................. 55

Results Research Question #1 .................................................. 59
Results Research Question #2 .................................................... 95

Chapter 5: Discussion ................................................................. 123

Summary of Findings ................................................................. 125
Research Question 1 ................................................................. 128
Research Question 2 ................................................................. 139
Conclusion ............................................................................... 149

Limitations .............................................................................. 150

Recommendations for Future Research .................................... 154

Final Conclusions Drawn ......................................................... 160
THE EFFECTS OF REFLECTIVE SCRIPTS

References ........................................................................................................................................... 162

Appendix A: Data Collection Summary Table .................................................................................. 179

Appendix B: Coding Scheme (Felton et al., 2015) .......................................................................... 181

Appendix C: Dialogue Move Code Book Adapted from Felton and Kuhn (2001) ......................... 185

Appendix D: Theoretical Framework & Conjecture Map ................................................................. 190

Appendix E: The Intervention Design ............................................................................................ 192

Appendix F: Interview Protocol ..................................................................................................... 193

Appendix G: Survey Questions ....................................................................................................... 195

Appendix H: Reflection Script Questions ........................................................................................ 201

Appendix I: Collaboration Coding Indicators .................................................................................. 204

Appendix J: Video Consent Form .................................................................................................... 208

Appendix K: Debriefing Statement .................................................................................................. 210

Appendix L: Adult Consent Form ..................................................................................................... 212

Appendix M: PLC Cycles .................................................................................................................. 215

Appendix N: District PLC Focus Planners 2019–20 ....................................................................... 224

Appendix R: Defined Facets of Trust .............................................................................................. 226
THE EFFECTS OF REFLECTIVE SCRIPTS

Table List

Table 1: Data Collection Summary Table ................................................................. 42
Table 2: ELA Collaborative Moves Sessions 1 and 3 ................................................. 66
Table 3: USII Collaborative Moves Sessions 1 and 3 ................................................. 62
Table 4: Grade 2 Collaborative Moves Sessions 1 and 3 ........................................... 62
Table 5: ELA Neutral Moves Sessions 1 and 3 ......................................................... 63
Table 6: USII Neutral Moves Sessions 1 and 3 ......................................................... 63
Table 7: Grade 2 Neutral Moves Sessions 1 and 3 .................................................... 64
Table 8: Description of Coded Dialogue .............................................................. 66
Table 9: ELA Neutral Dialogue Moves ................................................................. 68
Table 10: ELA Challenge Dialogue Moves ......................................................... 70
Table 11: ELA Collaborative Dialogue Moves ..................................................... 71
Table 12: USII Neutral Dialogue Moves .............................................................. 78
Table 13: USII Challenge Dialogue Moves ......................................................... 79
Table 14: USII Collaborative Dialogue Moves .................................................... 80
Table 15: Grade 2 Neutral Dialogue Moves ......................................................... 86
Table 16: Grade 2 Collaborative Dialogue Moves ............................................... 87
Table 17: Grade 2 Challenge Dialogue Moves .................................................... 88
THE EFFECTS OF REFLECTIVE SCRIPTS

Figure List

Figure 1: Theoretical Framework .................................................................................. 29
Figure 2: Conjecture Map .............................................................................................. 32
Figure 3: Study Plan ...................................................................................................... 41
Acknowledgments

I would like to spend some time acknowledging those who supported me during my time pursuing the program that resulted in the creation of this product. I would like to thank all of the participants in the study who took time out of their busy schedules to help enrich the research surrounding PLCs. I would like to thank my wife Rachel, my parents Joseph and Joan, and my father-in-law David. Without their support I never would have been able to make it through this process.

I would like to thank the faculty at the Graduate School Education at Rutgers, especially my dissertation chair, Angela O’Donnell, who constructed the most dynamic set of learning experiences I could ever have hoped for. And finally, I would like to thank my cohort, who created a network of support that has lasted well after many of us completed our dissertations.
The Effects of Reflective Scripts on Argument and Collaboration in Teacher PLCs,
A Case Study

Chapter 1: Introduction to the Problem

District Context

The following pages gives the context for the study and why the school district chosen for the study was a good candidate for work involving professional learning communities. Below a number of pressures facing the district will be laid out, showing that the Colts district will have to find a way to meet these pressures on a limited budget. The Colts Township School District is a middle-class K–12 public school district in northern New Jersey. The district is made up of a diverse township, which is composed of the six communities Colt, Drakes, Lumber, Happy Valley, Port Merriment, and Lardsdale at the K–8 level, and includes the town of Mt. Pasture for grades 9–12. The district is a G–H district (District Factor Groups (DFG) for School Districts, 2021a); however, this indicator does not fully demonstrate the difference in socioeconomic status between the different communities that make up the township since there are large disparities in wealth between the different communities.

These differences have created a situation where the school has to deal with conflicting values and needs. Conflict has erupted in the town as board of education (BOE) members have at times been in deep conflict over district priorities. Between approximately 2002 and 2012, the district went through a number of difficult years where the budget was voted down, resulting in the town cutting millions of dollars from the school budget (Voters Reject School Budget, 2006). Today, this has resulted in the district having to do more with less, as its 2019–2020 budget of $79,436,414 (Budget office, 2021) is significantly less than Ram District at $97,318,337 (District budget, n.d.) and Celebrity District at $97,053,315 (Budget, n.d.), two neighboring towns with
roughly the same population. It should be noted that currently these two districts have about a thousand more students than Colts; however, traditionally these districts have had roughly the same number of students. Today all three of these districts draw from a similar population and tax base. Furthermore, it should be noted that the town of Ram does have a higher median household income at $142,459 (Census profile: Ram Township School District, n.d.) than Colts at $113,957 (Census profile: Colts township school district, n.d.). However, Celebrity’s median household income is less than both towns at $88,073 (Census profile: Celebrity township school district, n.d.).

These numbers indicate that even though these towns are not identical, they are similar enough for comparison given their size, location, and socioeconomic status. This comparison shows that Colts has a significant deficit in school revenue compared to surrounding districts, which means that the district will have to do more with less and rely heavily on its own resources to increase student learning.

Compounding these issues was BOE infighting that resulted in years of turmoil on the BOE, which eventually led to the censuring of one of the BOE members (Condon, 2010). This incident revolved around the part the BOE member played in trying to silence students from voicing their opinions about state budget cuts (Condon, 2010). These events have left the district trying to do more with less in all areas including professional development. This trajectory does not seem like it will abate anytime soon, and since the implementation of the school funding reform, the district is expected to lose 14.42% of its state funding (Rosenthal, 2021).

Ethnically the district is homogenous, with an overwhelming percentage of the student population being white, roughly 79% (Census profile: Colts Township, n.d.); however, these demographics do seem to be changing. The number of Latino and Southeast Asia students have
increased in the last 5 years, with Latinos making up 10% of the population and Asians making up 5% (Census profile: Colts Township, n.d.). This trend toward diversification appears to be continuing into the foreseeable future. These demographic shifts have not created any significant pressures on the district at present. However, it does seem plausible that they will in the future if they continue. Demographic changes will force teachers to reexamine their practices to ensure that their approaches are both appropriate and culturally relevant to the changing needs of the district’s students.

These trends can already be seen in the school buildings. Colts High School’s demographic makeup is different than the town at large. In the 2017–18 school year the percentage of white students in the school was 72.6%. In the 2019–20 school year, that percentage dropped to 69.4% of the student body (Colts High School, n.d.).

District state academic indicators show the district to be slightly above average, though it is difficult to make any specific comparisons of the district to state average due to the disruption of state assessments from the COVID-19 pandemic. In the 2018–19 school year, district-wide SGP scores show that the district student average for growth was a score of 57.5, slightly above the state average of 50 in English language arts (ELA). Similar scores were present in math, where the district average score was 58 compared to 50 for the state (New Jersey Department of Education, 2021b). ELA has seen continuous improvement in scores over the last 3 years; however, math scores have not had any stable trend, going up some years and down in others (New Jersey Department of Education, 2021b). The district spends $17,006 per pupil (Budget office, n.d.).

The following paragraphs will focus on student academic performance in Colts High School and Colts Middle School, which are the two schools selected for the study. There are a
number of K–6 schools in the district; however, since only Colts Elementary has participants in the study, only that school will be analyzed in the following pages.

Colts High School has roughly 1,300 students enrolled for the 2019–20 school year. The students at the high school scored roughly average to the state on the PSAT, with an average PSAT score of 483 in ELA compared to the state’s 476, and a math score of 469 compared to the state’s 473. SAT scores are slightly better than the state average, with math scores of 557 and 562 in ELA compared to the state’s 536 in math and 536 in ELA (Colts High School, n.d.). The district has significantly fewer students taking advanced placement courses than the state average. The high school only has 27.5% of its students in AP/IB courses compared to 35.7% in the state (Colts High School, n.d.) This issue has been brought up at a number of meetings and most recently has been part of a discussion between the assistant superintendent, director of guidance, and director of innovative instruction in the district (C. Zegar, personal communications, July and August, 2019).

The high school sends roughly 85.9% of graduates on to either 2- or 4-year colleges after graduation (Colts High School, n.d.). The district also has a Chromebook 1 to 1 device initiative, and all students grades K–12 are given a Chromebook to use (District 1 to 1 initiative, n.d.).

Colts Middle School, the middle school in the district, has roughly 530 students split fairly evenly between grades 7 and 8 (Colts Middle School, n.d.). Students in the middle school mirror the district average’s on state standardized tests, with gradual increases in ELA scores and no determinable trendline for math (Colts Middle School, n.d.).

Colts Elementary School has roughly 320 students and contains one fourth of the district’s K–4 students. The school has seen an increase in their ELA proficiency rate, with a rate
of 40% in 2017–18 increasing to 46.8% in 2018–19. Math scores have seen a similar but more substantial positive trajectory with a 35% proficiency in 2017–18 increasing to 45.9% in 2018–19 (Colts Elementary School, n.d.).

What the previous pages show is that the Colts district is under stress from both academic and demographic demands. However, these demands must be satisfied on a shrinking budget. Any solution for the school district will have to involve professional develop and support to meet these challenges, without spending scarce resources on expensive professional development. Harnessing the power of the district’s professional learning communities could be an answer to the stressors facing the district.
Defining Key Terms

Professional Learning Communities

The organization Solution Tree, which focuses on PLCs, defines PLCs as “an ongoing process in which educators work collaboratively in recurring cycles of collective inquiry and action research to achieve better results for the students they serve. Professional learning communities operate under the assumption that the key to improved learning for students is continuous job-embedded learning for educators” (Why PLC at work, n.d.).

Professional Learning

Professional learning is the use of formal and informal learning opportunities that deepen and extend a professional’s competence, including knowledge, beliefs, motivation, and self-regulation. (Richter & Kunter, 2013 PLCs in schools should be organizational structures where teachers work together and reflect on their practice and student outcomes as well as examine the relationship between their practice and the performance of their students (Stoll, McMahon, & Wallace, 2006). PLCs focus on eliminating barriers to student success through collaboration that brings lasting change to classrooms (Rasberry & Mahajan, 2008).

Collaboration

Collaboration is the process by which a group of people actively and reciprocally engage in joint activities aimed at accomplishing a shared goal (Bedwell et al., 2012). In this study, features of effective collaboration found in a 2007 study by Thomson, Miller, and Perry were used to form scaffolds for effective collaboration. These features are Governance, Administration, Organizational Autonomy, Mutuality, and Norms. These features or themes help direct collaborative groups toward shared Norms and joint decision making (Thomson et al., 2007).
Collaborative Scripts

Collaborative scripts are scaffolds that specify and sequence learning activities and/or assigned roles to different learners and can consequently facilitate specific discourse activities such as the construction of arguments (Stegmann et al., 2012). Research suggests that computer-supported collaborative scripts (CSCS) can enhance and regulate teaching and learning activities through their ability to scaffold desired behaviors (Weinberger et al., 2009).

Collaborative Argumentation

Collaborative argumentation can be defined as a type of argumentative style that seeks to create a consensus by resolving different standpoints to find solutions to complex problems (Stegmann et al., 2012). Collaborative argumentation results in knowledge construction because individuals try to resolve their different standpoints to find a solution to a complex problem. When collaborating through argumentation, support is created for the integration of new knowledge into a person’s existing cognitive structures (Stegmann et al., 2012).

Reflection or Reflective Practices

Reflective practice is learning that is practice based, where the learner increases their proficiency through reflection (Merriam & Bierema, 2013). Reflection is connected to self-regulated learning and is seen as a phase of self-regulation, where a learner assesses the quality of the work after work has been performed. Reflection through this phase helps a learner internalize and reconstruct what they have learned (Lavoué et al., 2015). In this study, reflection as a means to learning is heavily influenced by Donald Schön’s Reflection-in-action and Reflection-on-action. Schön sees reflection as a way to correct overlearning that comes from repetitive experiences and allow learners to see these experiences from a different angle. Schön defines Reflection-in-action as when we think about something and react as it is happening,
which is commonly known as thinking on one’s feet. Reflecting-on-action is reflecting after an event has occurred where the learner is able to remove themselves from the situation while examining it (Schön, 1979).

**Professional Learning Communities in Colt School District**

In order to create a research plan for the Colt School District, it was important to collect information to assess the needs of the district. It is important that any intervention or research study is aligned with the district’s strategy for professional improvement and that any professional intervention supports organizational goals (Silberman & Biech, 2015). The following pages illustrate the steps taken to assess the current state of PLCs through district policies, administrator interviews, and PLC meeting evaluations. Since the district administration had not formulated overall goals for PLCs in the district, I relied heavily on information gathered from interviews to ascertain how administration felt about the current state of PLCs in the district and what PLC behaviors they hoped proper training would elicit.

**District Regulations.** PLCs exist in the district; however, there is no uniform time allotted for PLC time. When examining district policies, no direct mention of PLC time can be found, though there are sections devoted to professional learning in BOE policies. District Regulation 3240 focuses on professional development and states that professional learning should include collaborative teams of teachers, school leaders, and educational staff that work together to accomplish common goals and to do this through a cycle of constant professional improvement (BOE Policies, n.d.).

The district also references New Jersey’s NJAC 6A 9C-3.3 regulation that encourages professional learning involving learning communities that take on collective responsibility to achieve continuous improvement (BOE Policies, n.d.). Furthermore, no mention of PLC time
can be found in the district’s teacher contract; however, the contract does state that the district supports teacher professional development (REA Contract, 2021).

District regulations suggest that there is support for professional learning through professional learning communities; however, there are no policies directing how these communities should function. Administrators in the district create time for PLCs, but do not provide them with the support that they need to be successful. A lack of direction or purpose in district PLCs can be found through administrator planning meetings on PLCs.

Social Studies Department PLC Minutes. The social studies department PLC minutes were compiled by the researcher during the 2018–19 school year. This compilation was connected to meeting minutes from the 2017–18 school year and was taken from five PLC groups at the high school. The results showed that teachers were putting on paper that they looked at a number of different initiatives and resources throughout their PLC time; however, there was no indication from the minutes that any of these topics were discussed critically or that any action was taken. What the minutes seemed to suggest was that the PLC sessions were designed primarily as “knowledge sharing” sessions, or sessions that were fact-oriented, repetitive, and lacking progressive inquiry or sustained discourse (Ludvigsen et al, 2016). This type of behavior may not be problematic, but it does not seem to encourage the sharing, reflecting, and taking risks that are necessary for productive change (Vescio et al., 2008), or the critiquing of peers (Teague & Anfara, 2012) that research states is a necessary part of PLC culture. This audit resulted in the researcher, who was the supervisor of social studies in the district at the time, examining the PLC culture in the district in more depth.

PLC Planning Meetings with Administration. The following section contains information from interviews with administrative staff about the current state of professional
learning through PLCs in the district. The information was retrieved through PLC planning meetings with administrative staff, which took place between August and September of 2019. Each of the meetings lasted approximately 1 hour; all members of the administrative staff that are responsible for professional learning were involved in these collaborative meetings resulting in roughly 20 hours of discussion about professional learning. The meetings were conducted by the researcher, and the following information comes from my notes and professional learning plans developed from those meetings. A typed plan was developed by me and shared with the administrator in the meeting, the superintendent, and other interested administrators. These planning sheets were used in the creation of the following paragraphs.

Eight of the administrators at the planning meetings explicitly brought up a lack of understanding among their staff of what a PLC should be (C. Zegar, personal communication, July and August, 2019) and wanted to discuss ways to build a culture where PLCs could flourish in the district. It is important to note that these administrators represented every building and every grade level in the district. This makes sense since the superintendent stated to me that the last time the district went through PLC training was in 2009, roughly 10 years ago, and there had been a lot of staff turnover since that year. She stated that the training that occurred during that time was also focused almost exclusively on setting Norms for meetings and not on how to conduct critical professional dialogue in meetings (Radulic, personal communication, August 13, 2019).

Some of the specific concerns that arose through discussion with administrators were that their staff was “green” and did not know what they were supposed to do in the time that was allotted to them (J. Deeb, personal communication, July 9, 2019). That time constraint had created a situation where the staff was not able to meet as often as they would like and that
teachers were spending too much time just completing paperwork during the time allotted (N.
Ascevedo, personal communication, July 9, 2019; M. Cosgrove, personal communication, July 9,
2019). The principal of the middle school felt very strongly about the lack of effective PLCs in
his building and decided to dedicate at least one Tuesday meeting a month specifically to PLC
training throughout the year (P. Gallagher, personal communication, July 16, 2019).

Other concerns that came up in meetings with administrators were the lack of critical
conversation in PLCs (S. Mason, personal communication, August 13, 2019), the lack of
department identity to create curriculum or instruction based on collective values (E. Schmidt,
personal communication, July 11, 2019; E. Bachetta, personal communication, July 9, 2019; A.
Gallagher, personal communication, July 11, 2019), and a lack of accountability in the PLC
process. This was defined by multiple administrators as a lack of action, where PLCs became a
place of discussion but nothing was accomplished, and no one really held other members
accountable (D. Miller, personal communication, August 13, 2019; S. Mason, personal
communication, August 13, 2019; D. Glenn personal communication, July 10, 2019).

District goals and building professional development plans demonstrate district leader’s
focus on improving PLCs. The district goals focus on professional development and highlight the
use of professional learning communities in the district. This focus was recently elaborated upon
during a BOE meeting presentation on September 16, 2019 (BOE Minutes). Buildings have also
taken an initiative to form PLCs and make them part of their building goals. The high school and
the middle school have focused on the need for PLC improvement, which can be found in
Appendix Q

Furthermore, as stated earlier, administrators have taken part in planning meetings to
develop action plans for PLCs in their own buildings. The full building focus plans can be found
in Appendix Q. The middle school plan for the 2019–20 school year focused on “Promote collective efficacy through differentiated professional learning and teacher-leadership opportunities” (see Appendix Q). The high school professional development plan (PDP) also stressed the role of professional learning and was more explicit in using the term PLC. It stated “To engage in collective inquiry through best practices in both teaching and learning. In the PLC, collaboration represents the systematic process in which teachers work together interdependently in order to impact classroom practice in ways that will lead to better results for all students” (see Appendix Q).

With such a large focus on growing strong PLCs in the district, it seemed important to focus a study in the district on creating an effective PLC culture. Therefore, it is important to find strong research-based interventions that can encourage PLC growth without eliminating the intellectual freedom that helps define PLCs. The following section will propose some research-based interventions that have been shown to increase behaviors that contribute to effective PLCs.  

**Intervention Options to Elicit Effective PLC Behaviors**

It is important to design adult learning interventions that can help PLCs elicit productive types of collaboration. This study uses the framework developed by the researchers Thomson, Perry, and Miller in their 2007 study that surveyed 1,382 directors of organizations. Thomson et al. (2007) explored five features of the collaborative framework: Governance, Administration, Autonomy, Mutuality, and Norms. The researchers stated that these five features are in an interplay that demonstrates the complex nature of collaboration. Governance is defined as the understanding by collaborators that they must jointly make decisions; therefore, actions taken have a sense of shared responsibility and consensus. Administration is defined as the mechanisms that are established to achieve the purpose of collaborative; these are the central
coordinating, organizing, and disseminating of information authorities, which are present even in decentralized collaborative groups. Autonomy is defined as the interplay between individuals in the collaborative groups as they balance their personal wants versus the collaborative wants. Mutuality is the interdependence of the group, which can manifest as an appreciation and/or passion that transcends the rationale for collaborating in the first place. Finally, Norms are what creates a sense of reciprocity in the collaborative group that helps cement the reciprocal obligations between group members.

These features can help give structure or scaffolding to collaboration and maybe at the same time still allow for the freedom and ownership that is connected to andragogical adult learning theory (Merriam et al., 2007). In this study it was decided to use a reflective and self-regulation-based approach to elicit the desired behaviors in PLCs. Since PLCs are embedded in professional practice, interventions should be rooted in adult learning theory. The following paragraphs examine theories that can help guide the creation of an intervention that increases desired behaviors in PLCs, without over-scripting meetings that should encourage group autonomy and self-regulated learning.

Adult learners learn through accessing their wealth of experiential knowledge. Accessing experience for learning can help an adult build new understandings and incorporate new ways of thinking into existing schema. In order to maximize experiential learning, organizations should look to develop opportunities for adult learners to reflect on concrete experiences, participate in a community of practitioners, and be able to get in touch with their unconscious desires and fears (Fenwick, 2003).

One way to encourage critical dialogue and knowledge building in groups while mitigating some of the problems associated with conflict is collaborative argumentation.
Collaborative argumentation, or arguing in dialogue with the purpose of learning (Chinn & Clark, 2013), focuses on creating a consensus between arguers and has the potential to mitigate some of the negative behaviors associated with other types of arguments (Nussbaum et al., 2005; Nussbaum & Schraw, 2007; Hsu et al., 2015). Studies that focused on increasing collaborative argumentation showed increased counter arguments in academic settings (Nussbaum & Schraw, 2007; Nussbaum et al., 2007). Increasing scaffolds to elicit collaborative argumentative behaviors as seen in these studies could increase desired behaviors in PLC groups. However, many of the studies previously referenced worked with students who were given complicated arguments and told to find common ground. Topics in teacher PLCs are rooted in practice and, it seems, cannot be easily scripted without deviating from the semi-structured and organic nature of teacher professional collaboration. This does not mean that scaffolds for collaborative argumentation are not able to be used in an intervention, but the use of these scaffolds should not stifle the normal processes of PLC meetings.

Success in collaboration depends on strategies that foster dynamic, mutually interdependent interactions and self-regulatory skills that individuals contribute to the group (Chinn & Clark, 2013). Computer-supported collaborative scripts have been shown to help increase knowledge construction and argument quality (Noroozi et al., 2013; Karakostas & Demetriadis, 2011). They have also been shown to increase metacognitive processes (Valcke et al., 2009). Collaborative scripts provide individuals with specific information about appropriate actions that should take place in a particular situation (Kollar et al., 2006). However, it is unclear as to whether these results can be transferred to a semi-structured adult learning environment. Furthermore, it is also unclear as to whether these scripts can increase collaborative behaviors in a face-to-face meeting (either in person or through video conferencing), even
though there have been measures created to define and measure collaboration (Thomson et al., 2007; Quinn et al., 2016).

Productive communication, metacognition, and regulation are unlikely to occur without support that helps collaborators elicit effective behaviors (Gress et al., 2010; Chinn & Clark, 2013). Reflection activities have been shown to have an impact on behavior. Participants that engage in reflective activities have been shown through studies to use the reflective activities to reinforce the desired behaviors through internalization and elicit desired outcomes. Researchers have found that using computer-supported reflective scripts in computer-supported collaborative learning (CSCL) helped learners with self-regulation and planning (Wang et al., 2017). However, this study used adaptive scripts that changed with the learner and did not work directly with professionals in the field, but with students.

Research suggests that using collaborative scripts could increase self-regulation to increase desired collaborative behaviors in PLCs. However, a significant gap in research exists for using reflective collaborative scripts in adult semistructured collaborative sessions, such as teacher PLCs.

**Research Questions**

In what ways can the use of reflective collaborative scripts rooted in the collaborative indicators outlined in the 2007 study by Thomson et al.:

a. Have an impact on collaborative argumentation in PLC groups according to the coding mechanism developed by Felton and Kuhn (2001)?

b. Affect participant self-regulation to display behaviors outlined in the Thomson et al. (2007) study?
Hypothesis

When using reflective collaborative scripts, participants in PLCs will show an increase in effective collaborative behaviors, as defined by Thomson et al. (2007), as well as an increase in the collaborative argumentative dialogue moves as defined in the Felton and Kuhn (2001) study.

If these design interventions work, they could be implemented on a larger scale at the Colts district to meet the challenges facing the district using minimal resources by increasing the effectiveness of the district’s PLCs and in turn, hopefully increase student learning.

Chapter 2: Literature Review

Research for this paper was done by collecting studies in argumentation, collaborative argumentation, adult learning, and PLCs, as well as collaborative scripts. It was limited to peer-reviewed journals; however, not all of the referenced journals were studies. Nonstudies were used to analyze the data found and to set up useful definitions for key terms. I relied heavily on the JSTOR and ERIC databases for studies; however, a number of Rutgers University Library database searches were conducted to expand results not found in JSTOR and ERIC. The search resulted in over a hundred articles on the topic. However, that list was shortened to focus on articles that dealt specifically with the research plan.

PLCs were included in this review; however, since they represented the learning environment, the question of whether PLCs should be used for the study was not assessed. Articles on PLCs did help establish that PLCs contain many of the attributes of adult learning and are correlated to student learning.

Adult learning was not assessed as a theory, but was used to help focus the study and to help guide the examination of resources pertaining to self-directed learning, collaborative argumentation, and computer-supported collaborative scripts.
The following section frames the literature review through topics connected to the designed research plan, which include PLCs, andragogy and adult learning theory, collaborative argumentation, and collaborative scripts. The information found in these studies helped shape the overall design and focus of the research plan.

Finally, it should be added that the proposed design intervention would be conducted using design-based research (DBR). The purpose of DBR is to test theory and educational designs in real-world settings (Collins et al., 2004). Therefore, DBR is not as “clean” as traditional experiments in education. Unlike traditional educational research that tests a single variable in a controlled environment, it is set in real learning environments, which creates many variables (Collins et al., 2004). Almost all of the research examined in this review comes from traditional lab studies, which may have an impact on their results being transferable to semistructured professional learning environments.

The theoretical and philosophical framework for this literature review is connected to social constructivist theory as well as existential dialogue. Social constructivist theory, connected to educational theorists such as Vygotsky, Bakhtin, and, to a lesser extent, Piaget, is founded in the belief that knowledge is socially constructed (Asterhan & Schwarz, 2016; Chinn & Clark, 2013; Felton et al., 2009). Furthermore, building on this school of thought, according to social constructivist theory, interacting with others and sharing an individual’s understanding of reality with others constructs a collaborative learning group that benefits the cognitive development of an individual (Leonard, 2002).

**Professional Learning**

Professional learning is a segment of adult learning where formal and informal learning opportunities are used to deepen the knowledge, beliefs, motivation, and self-regulatory skills
that enhance a professional’s competence. These can be broken down into formal and informal learning opportunities, where formal learning opportunities are structured with a specific curriculum, and informal opportunities have no specified curriculum and are generally achieved through networks and collaborative activities (Richter & Kunter, 2010).

In education, administration plans opportunities for informal and formal learning to occur to increase teacher competency (Joyce & Calhoun, 2010). However, research has suggested that adults do not master ambitious approaches to teaching and learning by sitting and receiving information (McCann et al., 2012). Recently, formal professional development has been criticized for being shallow, fragmented, and unfocused (Helsing et al., 2008).

**Communities of Practice**

Communities of practice (CoP) theory will form the basis for understanding dynamics in professional communities. According to Wenger, a CoP forms when professionals learn from one another through reification and practice. A practice is a way that professionals develop a language, not always spoken, that allows them to transmit their shared histories and perspectives as they engage together in their work (Wenger, 1999). Reification, or what Wenger calls the “making into a thing,” are representations that are read by those through their practice. Reification allows important knowledge to be transferred through the community, traveling over space and time (Wenger, 1999). Practice and reification serve as interlocking actions of a CoP and can either drive the community toward effectiveness and inclusivity or alienation and ineffective practice. This means that CoPs are value neutral and can bring participants closer to effective adult learning, stagnate adult learning, or be harmful to the learners.

CoPs will develop regardless of whether a management or administrative team encourages one; therefore, it is important to think about what type of learning environments are
best suited for the target learners and devise the appropriate training and structures to elicit positive behaviors. According to research, teacher professional development should be connected to teacher practice, ongoing, and intensive (Darling-Hammond et al., 2009; Horn & Little, 2010). However, in order to develop learning that is both challenging and leads to results, it is important to take steps to ensure that buy-in, trust, and protocols are established (Gray, Kraus & Tarter, 2016). Otherwise challenging learning experiences can easily break down due to lack of trust. It is important to examine professional learning and build professional learning opportunities that connect to adult learning theories and build a positive CoP.

In this study, CoPs will be structured in the participants teacher PLCs. PLCs in the district were established in 2012, under then superintendent Mike Rossi (Swanson, personal communication, September 30, 2021). The participants in the specific PLC groups used in this study have been working in their respective PLC groups for at least 2 years.

**Relationships in Learning**

Ideal collaboration is both coordinated and interdependent, where learners strive to achieve a shared goal (Winne et al., 2013). Trusting relationships between collaborators should be nurtured since these relationships will help support the interplay between collaborators. Building trust for critical dialogue should be connected to how individuals view and interact with the “other” in dialogue. In the book *I and Thou*, Martin Buber creates a philosophical frame for a phenomenological approach to engaging others in discourse. For Buber, humans in dialogue approach the other from a position of either I-It or I-Thou. In the I-It relationship, the arguer diminishes the worth of their opponent and treats the opponent as a means to an end, as an object. The I-It relationship is one where all things become means, where they are categorized and utilized (Stevenson, 1963). This objectification cheapens interactions and leads to a shutting
off from knowledge because the arguers are in competition, and each sees the other as an object that needs to be moved. However, there is another way where the arguer meets their opponent as an equal. In this I-Thou relationship, the arguer understands and learns from their opponent by accepting the very real possibility of the “other’s” claims (Morgan & Guilherme, 2012). The I-Thou relationship is defined by its betweenness, presentness, and openness that builds a true mutual relationship (Stevenson, 1963). Nothing is objectified in the I-Thou relationship, and the focus is on peaceful goals and avoids aggression and deception. Therefore, the I–Thou relationship is built to increase understanding of the other rather than accomplish self-centered goals (Toledano, 2018).

In this relationship, each participant is ready to listen to the other without trying to dominate them, encouraging them to create and justify their own meaning. Buber calls this inclusion, which is separate from empathy, because at no time does one person try to give themselves up to the other’s reality, but instead tries to meet the other and accept them (Gordon, 2011). It is important to not only develop the proper relationship between learners, but also to have the structures in place to encourage collaborative learning.

It, however, is difficult to bring a concept like the I-Thou relationship into a set of specific attributes. It does, however, appear that this relationship can be used as a guide when creating meaningful collaborative environments, which are based on trust, mutuality, and the respect of other collaborators.

**PLCs as an Environment for Collaborative Adult Learning**

Effective professional learning in education needs to be ongoing, focused on student learning, and embedded in teacher practice (Garet et al, 2001; Darling-Hammond et al., 2009; Guskey, 2002), which includes ensuring that colleagues are able to meet regularly over time,
have shared values and vision, be reflective, lend support, and take an inquiry stance on problems that have an effect on them (Owen, 2014). Therefore, interventions made into an existing teacher CoP should have these attributes if the CoP is going to be successful at harnessing the community’s power to increase student learning and professional growth, two areas of focus in education.

PLCs were used as the collaborative environment for the design intervention study. Therefore, it is important to examine literature to establish if PLCs increase teacher collaboration, as well as if that collaboration leads to teachers challenging their previously held views and increasing their pedagogical content knowledge. Perry Graham suggests that PLCs are dynamic systems where participants must be willing to engage in real and not “ritualistic,” or going through the motions, conversation. These conversations must have a specific purpose which focuses on student learning and, because it is meaningful, results in contention between members (Graham, 2007).

Research has suggested that innovative teaching is likely to occur when teachers develop trusting relationships with their colleagues within their professional community (Stoll et al., 2006). Such a community can be realized through a PLC (Mu et al., 2018). Research has found that PLCs are an important way to support effective professional development (Matzat, 2013), as well as enhance a sense of school community and increase the professional growth of the faculty that take part in collaboration (Graham, 2007). However, judging by the studies collected in this review, there is some question as to how holistically one can make assumptions about PLCs.

In order for a PLC to be effective, it must have the overall objective of increasing teacher effectiveness and student learning (Dufour et al., 2006; Stoll et al., 2006; Vescio et al., 2008). In conjunction with a consistent focus on student learning, PLCs need reflective dialogue that leads
to extensive and continuous conversations among teachers about curriculum, instruction, and student development, which must go beyond surface-level exchanges of help (Vescio et al., 2008; Teague & Anfura, 2012; Bausmith et al., 2011).

In two literature reviews that examined over 50 studies on PLCs, the researchers found that though teacher collaboration did improve in PLCs, it was hard to tell how much pedagogical knowledge improved (Vangrieken et al., 2016; Vescio et al., 2008). This might have some connection to the fact that PLCs can become reinforcing mechanisms for the culture that exists in the district, since teachers in PLCs come from the same educational culture and might not feel the need to challenge assumptions they believe are facts (Sargent, 2015; Prenger et al., 2017).

The lack of conflict may not have been picked up in many studies of PLCs because of their heavy reliance on self-reporting surveys (Vescio et al., 2008). Furthermore, as the researchers Bausmith et al. (2011) discovered, PLC studies generally focus on school climate. In researching for this literature review, I ran into a similar problem; however, there were some studies that did look at increases in pedagogical content knowledge (Sargent, 2015; Mu et al., 2017; Richmond & Manokore, 2011). In these studies, PLCs were shown to increase pedagogical content knowledge. However, these findings should be looked at with caution since two of the studies were part of the Chinese Teacher Research System (TRS), which connects PLCs from different parts of China and encourages the collaboration of master teachers (Sargent, 2015; Mu et al., 2017). One 5-year study in the United States tried to examine changes in pedagogical content knowledge and found that for critical examination to occur, a culture of critical examination must be established (Richmond & Manokore, 2011).

Other studies that demonstrated an increase in teacher effectiveness through PLCs were located in the Netherlands (Matzat, 2013; Prenger et al., 2016). However, once again, it is hard to
make direct connections between what has worked in the Netherlands and assume it will work similarly in the United States where school districts are diverse in composition and vision.

One major obstacle for studying the effectiveness of PLCs, in anything other than school climate, is that there is no universally accepted definition for PLCs (Stoll et al., 2006; Vangrieken et al., 2017). This creates a significant problem with evaluating how PLCs function holistically. What these studies do suggest, however, is that even though PLCs do encourage collaboration, it is hard to tell what type of collaboration they actually encourage. Furthermore, because of the lack of standardization of PLCs, assumptions cannot be made that just because a school has PLCs, it has the appropriate mechanism to increase cognitive conflicts, which can lead to significant changes in teaching and increase learning outcomes for students.

In order to increase learning in PLCs, there needs to be a way to help guide learners from what has been defined as knowledge sharing, or the transmission of knowledge in a nonreflective or modified way, to knowledge construction and knowledge creation, which seeks to increase reflection, effort, and contention to create more meaningful learning experiences (Aalst, 2009). This transition may be difficult and, therefore, scaffolds may be needed to elicit positive collaborative behaviors in PLCs.

**Eliciting Collaborative Behaviors Through Collaborative Scripts**

Research suggests that teacher collaboration supports teacher professional learning (Doppenberg et al., 2012). Ideal collaboration consists of work that is coordinated by the group as well as where the group in collaboration creates a product that is interdependent. Therefore, genuine collaboration involves dynamic, mutually interdependent interaction intended to move the group toward a shared goal in a joint task (Gress et al., 2010). Collaboration can encourage cognitive conflict because of its focus on problem solving, thoughtful consideration of critical
feedback, and acceptance of alternative viewpoints in the development of a collective product (Dooner et al., 2008). However, without the right protocols, this can turn into affective conflict, where people take things personally and look to shut down criticism to protect their point of view (Dooner et al., 2008).

It is important to get an understanding of what constitutes collaborative behavior. However, in the studies assessed, collaboration did not have a standardized definition. The lack of a universal definition with universal indicators resulted in me trying to find a suitable study that broke down professional collaboration through specific indicators. Therefore, in the following research plan, collaboration was based off the indicators (see Appendix J) established by the researchers Thompson et al. (2007), which broke collaboration into the categories of Governance, Mutuality, Norms, Administration, and Organizational Autonomy.

One way to increase collaborative learning is through scripting, which has been shown to increase learner interactions (Jeong & Joung, 2007). Collaborative scripts are a set of guidelines that explain to learners how they should act (Karakostas & Demetriadis, 2011); specifically they can be understood as instructional plans that organize or focus collaborative learning activities (Wang, Kollar & Stegmann, 2017). This can be done by specifying and sequencing learning activities or assigning roles to different learners, which results in specific types of discourse (Stegmann et al., 2012). Scripting has been found to increase content knowledge (Karakostas & Demetriadis, 2011; Noroozi et al., 2013) and engagement (Wang et al., 2017) as well as metacognitive practices (Molenaar et al., 2014). However, it is important to find the right amount of scripting for a given learning situation (Wang et al., 2017). In this review, studies involving collaborative scripts were limited to those studies that used some sort of computer mediation (CMCS).
A number of studies examined in this review focused on scripting to attain content knowledge. In all cases, the subjects were university students and not professionals (Karakostas & Demetriadis, 2011; Noroozi et al., 2013; Rummel et al., 2009). In one study, the scripting that seemed to have the most impact was prompting (Karakostas & Demetriadis, 2011); however, in another study, scripting, though found to be helpful, did not create as impactful of gains as modeling (Rummel et al., 2009). This might be connected to the fact that the two studies that found scripting beneficial were connected to argument building (Karakostas & Demetriadis, 2011; Noroozi et al., 2013). This would connect to the findings of other studies on using scripts, specifically for argumentation (Jeong & Joung, 2007; Stegmann et al., 2012), with one study using scripts to increase domain-specific knowledge incorporating counterarguments as part of their scripted design (Noroozi et al., 2013).

Collaborative scripts were also found to increase higher order thinking and metacognitive processes in university students (Valcke et al., 2009) as well as metacognitive processes in elementary school students (Molenaar et al. 2014). In another study reflective prompts were sent to young students to evaluate their thinking, which found that when students engaged with metacognitive problematizing prompts (emphasizing certain parts of the learning assignment given), students showed improvement in their metacognitive processes (Molenaar et al., 2011). These students were young; however, both studies’ findings do connect to studies on scaffolding reflective practices (Chappell, 2007; Lei et al., 2013; Ifenthaler, 2012; Lehmann et al., 2014). Reflective practices might be able to support the work of collaborative scripts. Therefore, it is important to explore how scripting might connect to teacher reflection as a means to change practices.
Self-Reflection and Scripting

Reflection has been found to be an essential component of the learning process that can free educators from never critically questioning their understanding of their instruction and being stuck in unexamined judgements (Chappell, 2007). Reflection initiates cognitive processes that encourage self-regulation and metacognitive practices (Ifenthaler, 2012). Furthermore, question prompts have been shown to be an effective way to elicit reflective practices (Wu & Looi, 2012), and self-regulation (Molenaar et al., 2011; Lei et al., 2013; Wang et al., 2017).

The following studies looked at reflection as a way to increase metacognitive practices. In all but one of the studies (Verpoorten et al., 2012), reflection prompts did increase metacognitive processes and led to higher performance. One study did suggest that though reflective practices help, there was inconclusive evidence that by just having students self-reflect they will critically assess themselves (Davis, 2000). Furthermore, all but one (Chappell, 2007) of the studies focused on using computer-supported scaffolds or prompts.

Studies that compared generic prompts to domain-specific or content-specific reflective prompts all showed that domain-specific or content-specific prompts worked better (Ifenthaler, 2012; Kramarski & Kohen, 2017; Wu & Looi, 2012). However, the studies did show generic prompts to have a positive effect on metacognitive processes. More specifically, double loop questions, or questions that make learners examine not only the task at hand but also the reasoning behind the task, increased learning the most (Wu & Looi, 2012).

One study suggested that the use of reflective prompts could increase self-regulation and problem-solving processes (Ifenthaler, 2012). This study shows promise for the study that will be proposed in this dissertation since prompts that were domain specific and generic both influenced student growth. However, like many of the other studies, it focused on students and
not professionals. Furthermore, the study did not examine students in a complex social environment like a real classroom or a professional meeting.

Researchers in one study did find that having students reflect before the task to be helpful in learning; however, the researchers stated that this “preflection” did not help participants actually change their behavior (Lehmann et al., 2014). Building off this point, it is hard to say through these studies whether the use of reflective activities actually translates into changes in actions over a period of time. All of these studies except for one (Chapell, 2007) used students who were tested in controlled environments, which may not translate well into design-based research. Furthermore, the fact that all but one of the studies were conducted on students means that whether these practices will still be effective in semistructured adult learning environments, such as PLCs, is open to debate. Reflection prompts, however, do seem to show promise as possible intervention tools to help adult learners evaluate their practices. Nevertheless, reflection in this manner is an isolated activity and PLCs involve collaboration. To bridge the gap between isolated reflection and collaborative knowledge building, scaffolds must be put in place to increase critical interactions between those that are collaborating.

**Argumentation & Collaborative Argumentation**

Arguments force participants to support a position and consider and weigh both evidence and counterevidence in developing a stance, which can encourage meaning making and elicit deeper understandings (Jeong & Joung, 2007). Furthermore, a growing body of research has demonstrated the role of argumentation in fostering conceptual change (Jonassen & Kim, 2010).

However, arguing in isolation or to win a dispute increases confirmation bias because arguers tend to seek, interpret, and use evidence in a manner biased toward confirming their existing beliefs (Charness & Dave, 2017). Biased reasoning is difficult to unlearn, because it is
connected to biased searching through memory (Rajsic & Pratt, 2014). Studies have shown that even when given better options, dominant modes persisted (Rajsic & Pratt, 2014).

Argumentation, which seeks to create a consensus by resolving different standpoints to find solutions to complex problems, is known as collaborative argumentation (Stegmann et al., 2012). Collaborative argumentation encourages arguers to elaborate on their positions and increase an understanding of the content at the center of the argument (Chinn & Clark, 2013). In a study conducted by Nussbaum and Sinatra (2003), undergraduates increased their understanding of problems in their physics class by being prompted to argue for another answer when they were wrong. In another study, undergraduate students who were given collaborative argumentative scripts were shown to increase knowledge in comparison to the other conditions in the study (Noroozi et al., 2013).

Numerous studies demonstrated that researchers could use strategies to strengthen arguments and lower biases in arguments by increasing the use of opposing information (Charness & Dave, 2017; Felton et al., 2015a; Noroozi et al., 2013; Nussbaum et al., 2005; Nussbaum & Schraw, 2007; Rajsic & Pratt 2014; Villarroel et al., 2016). Specifically, studies focused on confirmation bias were able to show that collaborative argumentation could mitigate biases (Villarroel et al., 2016; Felton et al., 2015a; Charness & Dave, 2017). However, it is unclear whether these studies that showed confirmation bias can be eliminated through collaborative argumentation, or if these techniques just increase the use of counter arguments. In general, studies on collaborative argumentation demonstrate that it is possible to structure a learning environment that increases argumentation where participants understand contrary points of view and develop answers through compromise. The question, however, remains whether these types of scaffolds can change opinions in noncontrolled learning environments, or if
collaborative argumentation can be a successful intervention in adult professional learning environments, such as PLCs. If these strategies can translate into adult professional arguments, structures could be created to increase collaboration and ensure complex solutions to educational problems of practice.

Chapter 3: Methodology

Theoretical Framework

The study is grounded in theories that will inform the conjectures driving the intervention. The theories that drive the conjectures are CoPs, Martin Buber’s I-Thou relationship, and reflective practices. These theories will serve to give a philosophical organization to the research-based conjectures, helping to give more clarity as to why they were chosen. The conjectures will drive the selection of the embodiments, or the reified aspects of the conjectures to establish specific desired mediating processes that were measured.

Figure 1

Theoretical Framework
According to Wenger’s theory of CoPs (1998), professionals will create CoPs regardless of whether they are nurtured or not, since CoPs are not a policy or a process, but a manifestation of how professionals come together around a practice (Wenger, 1999). Therefore, it makes sense to try to embed practices and interventions that will help elicit effective behaviors to create a healthy CoP.

One way to anchor healthy attitudes in a CoP is to anchor it in a philosophical model that guides practitioners toward healthy relationships. This philosophical foundation can be found through the work of Martin Buber through his I-Thou relationship, which emphasizes respect and mutuality in dialogue. In the I-Thou relationship the other is not objectified, but met as a fellow human who has the prospect of contributing to the production of worthwhile solutions to a problem of practice (Morgan & Guilherme, 2012).

Finally, this relationship should be channeled through a process that is grounded in research to establish working collaborative relationships. This can be found in research connected to collaboration and adult learning. This study is grounded in the theory that humans are cooperative by nature and willing to form beneficial reciprocal relationships (Bowles & Gintis, 2011), which would mean that professionals are inclined to collaborate at work by reciprocally engaging in joint activities aimed at accomplishing a shared goal (Bedwell et al., 2012). This should be centered in adult learning theory where adults learn best when tasks are learner-centered, and where learners are self-directed, connect to their prior experiences, and allow for them to level control over their learning (Merriam & Bierema, 2013; Merriam et al., 2007).
Conjectures

The following study comes from the school of design-based research (DBR), which, though grounded in theory, looks to bring theory into the real world so it can be seen and tested (DiSessa & Cobb, 2004). DBR works from these theories through embodiments and mediating processes that bring forth the theory from the “world of ideas” to “the world of material” where it can be seen and tested. When this is done, a research team can be both informed by theory and inform theory, undergirding assumptions about the learning process.

Figure 2 is a conjecture map for the study; the pieces that make up a conjecture map are (a) the high-level conjectures that connect the theory to the design; (b) the embodiments, which are the tools, materials, and structures that bring the conjectures into the world; (c) mediating processes that demonstrate how the embodiments are used to elicit the theory-based behaviors; and (d) the desired outcome, which is constructed by the behaviors (Sandoval, 2014). The following paragraphs will describe how the high-level conjectures represented in the literature review informed the choice of specific embodiments, which were chosen with the hope of eliciting specific mediating processes leading to the desired outcome of increasing collaborative behaviors in a semistructured professional environment through the use of reflective scaffolds.
**Figure 2**

*Conjecture Map*

<table>
<thead>
<tr>
<th>High level conjectures: Conjectures are rooted in the theoretical framework and research studies referenced in the literature review.</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Increasing self-regulated behaviors through the use of reflective scripts based on effective collaboration will effect changes in behaviors resulting in more effective collaboration.</td>
</tr>
<tr>
<td>• The I-Thou relationship as discussed by Martin Buber can guide a framework for effective collaboration.</td>
</tr>
<tr>
<td>• Professionals when prompted to engage in collaborative argumentation will exhibit more consensus building behaviors and dialogue.</td>
</tr>
<tr>
<td>• Reflective scripts based on specific indicators of effective collaboration found in the study by Thomson et al. (2007) will guide participants toward behaviors associated with effective collaboration as a reflection of key principles of the I-Thou relationship and collaborative argumentation.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Embodiments</strong></th>
<th><strong>Mediating Processes</strong></th>
<th><strong>Outcomes</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>PLC Sessions</td>
<td>Contentious Situations Necessitating Collaborative Problem Solving</td>
<td>Participants will increase behaviors associated with effective collaboration as found in the Thomas et al. (2007) indicators, and the Felton and Kuhn coding scheme (2001).</td>
</tr>
<tr>
<td>Reflective Scripts</td>
<td>Reflective Journaling &amp; Reflection</td>
<td>Participants will indicate through interviews that their PLC elicited more of the behaviors associated with effective collaboration found in the Thomson et al. (2007) study. Which will be measured through participant interviews and reflections submitted.</td>
</tr>
<tr>
<td>Problems of Practice</td>
<td>Participants will reflect on their behaviors and the behaviors of the other members of their PLC against the indicators of effective collaboration found in the Thomson et al. (2007) study after each PLC session. Participants will be asked to reflect on the indicators and their responses before the next PLC session. Reflections will be analyzed for collaborative themes and compared to actions in examined PLC sessions.</td>
<td></td>
</tr>
</tbody>
</table>

It must be noted that though conjecture mapping can help with showing the logos behind a design, it cannot control the design. By their nature, design experiments have many variables that cannot be controlled (Dede, 2004; Collins et al., 2004). Therefore, it is very difficult to say for certain that a specific intervention (embodiment or mediating process) led to a specific outcome. There are a multitude of factors that can intervene in a real-world learning environment, which can make it difficult to say for sure what exactly is helping. This makes the Hawthorne Effect more of a problem in DBR, since it can be hard at times to tease out if a design helped children learn or a number of other factors helped them learn and you are crediting the design.
The design research study was not conducted in a lab setting and instead used professionals in their real assigned PLCs. The researcher is aware of this limitation and has taken steps to collect data from a number of sources, as well as to establish interrater reliability to mitigate this limitation of DBR.

**High-Level Conjectures**

Building off of the theories discussed above, the following conjectures were established to drive the DBR study. An assumption not included in the conjectures map above is one about the human desire to cooperate. The research plan and conjectures are based on the understanding that humans naturally want to care for the well-being of others and value fairness and decent behavior (Bowles & Gintis, 2011), which motivates them to want to cooperate with other group members.

The first conjecture is that it is possible to use reflective scripts rooted in effective collaboration to increase participant internalization of desired behavior and show outward manifestations of that behavior. This conjecture is rooted in the research referenced in the literature review that reflective question prompts initiate cognitive processes and metacognitive practices, and that these cognitive processes have been shown to encourage self-regulation (Ifenthaler, 2012; Molenaar et al., 2011; Lei et al., 2013; Wang et al., 2017) and reflective practices (Wu & Looi, 2012).

The second conjecture is rooted in the hypothesis that the reflective practices elicited by the prompts can be focused on specific behaviors outlined in the Thomson et al. 2007 study of Governance, Mutuality, Administration, and Autonomy. This assumption is based on the research on reflective practices and computer-supported collaborative scripts (CSCS), where CSCSs have been shown to increase learner interactions (Jeong & Joung, 2007) by explaining to...
learners how they should act (Karakostas & Demetriadis, 2011), which can focus collaborative learning activities (Stegmann, 2017). The Thomson et al. 2007 study was selected because of how its collaborative indicators connected to the viewing of other collaborators not as objects to be used but as full people contributing to a unified product. These indicators make a limited, but usable reification of the “I-Thou” relationship in professional collaboration.

The third conjecture is that these behaviors can be measured through coding schemes used to measure collaboration and learners in collaborative settings. The second measurement tool is based on the features of collaboration outlined in Thomson et al. (2007), which used survey data collected from 1,382 directors of organizations to determine the key features of collaboration outlined in their study. In this study, I hypothesize that these indicators can be used as a coding scheme to assess the impact of the reflection prompts to elicit the features of Mutuality, Governance, Administration, and Autonomy, as outlined in the study. The fifth concept of Norms outlined in the study was not included in the reflection prompts because Norms had been included in previous training for PLCs in the district. However, indicators found in Norms were examined through questions embedded in survey questions and interviews.

I also hypothesized that the impact of the reflective scripts could be measured by coding dialogue using coding designed to measure collaborative argumentation. This conjecture is rooted in the research that suggests that individuals who are prompted to find a consensus will be more likely to do so, and that the dialogue moves used by collaborators can be measured. The previous conjecture is based on the fact that collaborative argumentation encourages arguers to elaborate on their positions and increase an understanding of the content at the center of the argument (Chinn & Clark, 2013), which seeks to create a consensus by resolving different standpoints to find solutions to complex problems (Stegmann et al., 2012). This is connected to
the prompts in the reflection scripts connected to Mutuality and Administration. These reflection prompts are labeled as Reflection Question #2 and Reflection Question #3 and are listed below.

- **Reflection Question #2**: Highly effective groups have clearly defined roles for each member because it helps the group accomplish its goals more effectively. Conflicts, when they arise, are mediated quickly resulting in conclusions all group members can accept.

- **Reflection Question #3**: All group members in highly effective groups critically challenge one another to create solutions that allow each group to create a product of which they can all be proud.

The coding scheme being used is adapted from the coding scheme developed by Felton and Kuhn in a 2001 study. The study used a developed discourse-based model, which was used to examine the trends when developing arguments in discourse (Felton & Kuhn, 2001). The study focused on community college students in dyads and not on groups of three to four professionals in a professional setting. In the study, the researchers prompted individuals to persuade or to create a consensus. Those that worked to create a consensus built more on their partner’s discussions using the Advance code (Felton & Kuhn, 2001). What the study also found was that adults prompted to find consensus saw an increase in the use of Agree, Add, Advance, Substantiate, and Aside. Additionally, the study found that those same groups prompted to create consensus saw the codes for Disagree Counter-C, Interpret, Clarify-?, and Case-? decrease in use (Felton & Kuhn, 2001). The hypothesis was that by using this coding scale in the new context, I would see similar results in the coded dialogue.

**Embodiments**

The embodiments used in the research design are as follows: PLCs, reflective scripts, problems of practice, and reflective surveys. Professional learning in this study will occur in a
teacher CoP where professionals learn from one another by developing ways to engage with one another to navigate work (Wenger, 1999). In this study, PLCs serve as the tangible manifestation of Wenger’s community of practice. Teacher PLCs in the Colt District meet weekly for roughly 45 minutes. However, times do vary depending on the daily schedule. PLCs will serve as the stage, bringing teachers of the same content together, where teachers are able to work through problems of practice.

The problems of practice will not be scripted by the researcher; however, PLCs were navigating a number of district initiatives, such as online learning, benchmarking, and assessment expectations during the COVID-19 pandemic. These activities and stressors will serve as the problems of practice that teachers were reflecting on during the intervention stage of the study.

Reflective computer-supported collaborative scripts were created based on the work of Thomson et al. (2007), which consist of the features outlined in the study of effective collaboration. The features of Mutuality, Administration, Autonomy, and Governance were defined in the reflection questions and used as standards for participants to reflect on their own PLCs collaborative abilities and what steps each of them could take to better meet the reflection standards.

Mediating Processes

The stressors and district initiatives should create areas of conflict and problems of practice that will need to be coordinated by the group, where a consensus solution must be reached (Gress et al., 2010), which represents true collaboration. These sessions were taped using Google Meets. Google Meet was chosen because it was the medium that faculty in the district already used to hold their virtual meetings. Using a familiar video conferencing system
should limit any learning curve that may exist from having to be trained in new unfamiliar
software. Furthermore, in a study conducted by Archibald et al. (2019), the researchers found
that besides technical difficulties associated with navigating the video conferencing software
Zoom (different than the Google Meet), using video conferencing was a viable tool for collecting
qualitative data (Archibald et al., 2019).

Video footage was organized and broken down by speaker, session, and, to the best of my
ability, sections of dialogue between participants within a session and examined using the
different coding schemes to determine what effect the reflective scripts have had on participants.

The reflective scripts will elicit metacognitive practices which should encourage
participant reflection on effective aspects of collaboration. Reflection has been shown to initiate
cognitive processes that encourage self-regulation and metacognitive practices (Ifenthaler, 2012).
These behaviors were examined as they are internalized through participant interviews, surveys,
and reflection responses, and were examined in their outward expression by analyzing the
recorded PLC sessions. Data collected were analyzed using the coding schemes defined in the
research plan section.

Research Design

Learning Environment and Research Context

The learning environment for the study was the PLC meetings held by teachers in the
Colts School District. The design research intervention case study was quasiexperimental in
nature and tracked three PLC groups through different interventions for comparisons. The
studies, one to collect baseline data and the other to assess interventions, took place over two
rounds of seven meeting sessions (see Appendix F). The learning environment was chosen
because of its ease of access for me and the fact that the Colts School District has been using
teacher PLCs for close to 10 years. Each PLC session was scheduled to last approximately 45 minutes; however, each PLC session was taped in its entirety. Coding began when the PLC members started to discuss issues connected to PLC. In some cases, this meant that coding did not start until 10 minutes into the session. One group devoted almost an entire session to working through a coaching issue, which was not appropriate for a PLC session. This off-topic PLC session was coded because of its focus on a unified problem of practice. It should be noted that time for PLCs does fluctuate in the district significantly due to the COVID-19 pandemic. It is not clear how much meeting times will fluctuate; however, regardless of the time allotted, meetings were recorded. The learning environment was a typical semistructured professional collaborative learning environment that faculty in the district are used to; this is an environment where professionals in the same grade or content subject work to accomplish goals through collaboration and argument. Synchronous online learning for students was enacted in the district roughly 1 month prior to the start of data collection. This shift, in conjunction with the normal district deadlines and expectations, created numerous opportunities for teachers to work through complex problems together in their PLCs.

The following section details the procedures that were used in the intervention case study. The summary will detail how the different PLC groups were tracked, how data were collected, how interventions were administered, and how an environment was created to increase all possible benefits of the study to the participants and participating institutions while limiting all possible risks to the participants.

**Recruitment**

The recruitment of participants was strictly voluntary, and participants were able to back out of the study at any time, however, no participants indicated at any time during the study that
they wanted to leave. Before the study and after the third meeting, I visited all of the PLC groups to make sure that the participants felt comfortable and so participants could ask me any questions about the use of the data collected. Each PLC session was taped in its entirety, and all PLC sessions were uploaded to Dedoose; however, only three of the PLC sessions were coded for dialogue. All other PLC sessions were transcribed and watched to find common themes that could be compared to the other data collected during the study.

I am an administrator in the district where the study took place. To limit the uncomfortableness of participants, I ensured that I did not evaluate any of the participants in the study. I do not have any specific employees that I directly supervise in the district; however, I believe that in order to increase the comfort level of participants, I should remove myself from observing them in any evaluator capacity for the district. This will ensure that teachers will not feel pressured to give responses that I would want. One group had to be removed from the study because a member of the PLC suddenly came under my supervision. Even though the group stated that they did feel any extra pressure because of the shift in my administrative duties, I still felt that it was best to remove the group from the study. Therefore, no participant in the study was evaluated in any way by me during the year.

**Sample Size Justification**

The sample size (three PLC groups), allows for a full study to be conducted. The study does not require a control group or an intervention group since PLC groups were taped prior to the intervention for two sessions before being administered the intervention of the reflection collaborative scripts. The three intervention groups were chosen under discussion with my chair; it was determined that at least three PLC groups would be needed for the study. Since this is a case study, three groups were decided upon so that if a group had particular trouble, either through
group dynamics or confusion, I might have to intervene to help direct the PLC group. In conversations with my chair, it was decided that I might have to facilitate PLC groups and that having three groups would make it easier to ensure that at least one of the groups would not be facilitated by me in anyway. It should be noted that at no time during the study was any group in need of me going in to settle disputes or facilitate meetings.

**Study Plan**

The following research plan was developed to assess reflective computer-supported collaborative scripts in a teacher PLCs. Measuring computer-supported collaborative learning consists of observing, capturing, and summarizing complex individual and group behaviors. Researchers evaluate these behaviors and make reasonable inferences about learning processes. This is done by assessing the individual member about themselves and about the group, as well as by evaluating the group as a whole (Gress et al., 2010).

The design of the research plan was to create three separate case study PLC groups at different academic levels: (a) one group consisting of three second grade teachers; (b) one group consisting of four middle school English language arts teachers (ELA) teachers; and (c) one group consisting of three high school United States History II (USII) teachers. All teachers in the study were veteran teachers with at least 6 years of experience each. All teachers in the ELA and second grade PLC were female, and the three participants in the USII PLC were male.
Figure 3

*Study Plan*
Table 1

*Data Collection Summary Table*

<table>
<thead>
<tr>
<th>Data Collected</th>
<th>Collection Medium</th>
<th>Scoring / Coding of Measure</th>
<th>Time of Collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant data will be collected to determine how each participant feels about their group as it connects to indicators found in the Thomson et al. (2007) study.</td>
<td>Survey questions (see Appendix H).</td>
<td>Survey results will be collected to look for changes in survey responses. Since only 10 participants will be surveyed, each response will be tracked for changes.</td>
<td>Beginning of cycle, before the third PLC session, and at the end of the study.</td>
</tr>
<tr>
<td>Dialogue between participants will be assessed to determine if, after the intervention of reflective scripts are enacted, participants will change dialogue according to the adapted Felton and Kuhn (2001) coding scheme.</td>
<td>PLC sessions will be taped and transcribed. Examples found in the findings and discussion sections and codebook can be found in Appendix C.</td>
<td>Dialogue will be coding using a provisional coding method (Saldana, 2016) adapted version of the coding scheme developed by Felton and Kuhn (2001). Participants will be assessed to see if they use more dialogue moves associated with the Felton and Kuhn scheme as they receive the intervention.</td>
<td>Three PLC sessions located before the intervention, roughly 2 weeks into the intervention, and at the end of the intervention.</td>
</tr>
<tr>
<td>Collaborative behaviors will be examined in PLC sessions as they are defined by the indicators found in the Thomson et al. (2007) study.</td>
<td>PLC sessions will be taped and transcribed. Examples can be found in the findings section and discussion sections.</td>
<td>A Concept Coding method (Saldana, 2016) rooted in the indicators found in the Thomson et al. (2007) study, will be used by the researcher to find representations of behaviors associated with those indicators in the taped PLC sessions. These</td>
<td>All seven PLC sessions</td>
</tr>
<tr>
<td>Data Collected</td>
<td>Collection Medium</td>
<td>Scoring / Coding of Measure</td>
<td>Time of Collection</td>
</tr>
<tr>
<td>----------------</td>
<td>-------------------</td>
<td>-----------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Participant feelings about collaborative behaviors based on the indicators found in the Thomson et al. (2007) study will be analyzed for themes associated with effective collaboration and the usefulness of the intervention.</td>
<td>Participants will be interviewed. Interviews will be taped and transcribed. Examples can be found in the findings section and discussion sections.</td>
<td>A Concept Coding method (Saldana, 2016) rooted in the indicators found in the Thomson et al. (2007) study will be used by the researcher to find representations of behaviors associated with those indicators in the transcribed interviews (see Appendix J).</td>
<td>Interviews will be administered at the midpoint of the study and at the end of the study.</td>
</tr>
</tbody>
</table>

**Study Stages**

The study was conducted in weekly PLC meetings over 7 weeks. Participants were active in the study for roughly 60 minutes per week; however, some spent more time depending on how long they decided to stay in their PLC or how long they reflected on the weekly questions. The study was broken down into two phases and consisted of three PLC groups ranging from three to four members. The participants were recruited from their established PLC groups, and all members volunteered to be part of the study. It should be noted that the fact that the groups volunteered openly to be part of the study might have limited the types of behaviors elicited in the sessions, since groups who are in conflict may not want to participate. PLC groups are established by the district and, in normal years, contain three to four teachers of the same subject matter. These teachers normally meet weekly for 45 minutes. PLC groups are assigned by grade
level and content, which means that by design it is likely that almost all of the groups participating in the study have a history of working together in PLCs in the past. In this study, each of the groups had been together for at least 2 years.

After consent was given, teachers were asked to fill out a survey (see Appendix H); this survey was based on indicators found in the Thomson et al. (2007) study, and was used to assess how participants felt about their groups ability to collaborate in their PLC. Following the survey, the participants were videotaped discussing normal PLC business (district initiatives, student learning and assessment strategies, etc.) for two sessions. No intervention was given in the first two sessions. The taped sessions were coded using a provisional coding method based on the coding schemes found in the appendices (see Appendices B, C, and J). The coding scheme was adapted from the original study, since the original study was framed to assess arguments in both adults and children in a structured environment. In this study, the provisional coding system was applied to a semistructured PLC meeting format. The information gained from the coding gave me an understanding of the typical challenges and collaborative styles of teacher meetings. At the conclusion of the 2 weeks, the participants were again given the same survey they completed before starting the study. At the end of the study, the survey was given a third time to collect participant feelings about their PLC. Though the survey was given three times, only the first and the last survey were analyzed in the findings section because of participants leaving the study or not completing the second survey. The purpose of the survey was to determine the overall feelings the participants had about their own PLC in the indicators as outlined in Thomson et al. (2007) study, and compare survey results from before the intervention and after the intervention to determine if participant feelings changed after participating in the intervention study.

*Intervention Stage*
The second stage of the study took place after the implementation of the reflective scripts based on the aspects of effective collaboration as described by the Thomson et al. (2007) study. This stage was during a volatile time in the district, as it was trying to deliver quality virtual and in-person instruction during the COVID-19 pandemic. PLC meeting times fluctuated during these weeks as schedules were adapted for the in-person and virtual weeks of instruction.

Allotted time for PLCs also fluctuated, and some weeks the participants were given slightly less or more time depending on the schedule. No other intervention was administered during this time, for two reasons. First, in a teacher PLC, there are numerous variables influencing the social dynamics of the group. It is difficult to ascertain whether the treatment given to the group has any effect and if the desired intervention is competing with other planned interventions, such as researcher-manufactured scenarios. Creating manufactured scenarios might have also taken away from the authenticity of the challenges faced by the participants, since I would have given them the issues to discuss, and participants may not have felt emotionally invested in the staged scenarios the way that they would be for their own problems of practice. Secondly, and more importantly, the study took place during the winter of 2020–21, during which school districts were coping with the COVID-19 crisis. The crisis created numerous hurdles for teachers to overcome, which would force them to work collaboratively. It is understood, however, that by allowing participants to discuss the normal PLC topics of that time, I could not structure conflict.

Research states that PLCs that have demonstrated success are able to select their own objectives and are invested in their mission as a PLC (Stewart, 2014). I felt that with the pandemic’s constantly shifting pressures put on schools, artificially creating specific structures for PLC members to work through scripted problems could elicit more conflict-generating
scenarios that could prove to be a limiting factor for the study if the participants refuse to engage critically with one another.

The second stage of the study lasted approximately 5 weeks since the pandemic did result in the rescheduling of some of the PLC sessions. All PLC groups completed all seven sessions; however, they did not complete them all at the same pace. The pandemic did not force the study to push much longer than expected, since all groups finished within 2 weeks of the projected timeframe. One delay was due to a snowstorm that canceled school in the district, and the other was from the pandemic resulting in quarantining across the district and a quick shift to virtual learning, causing a shifting of the daily schedule. Participants were videotaped using Google Meets during this section of the study. The Google Meet sessions were uploaded into Dedoose for coding, and the taped session on Google Meet were deleted.

**Interventions**

The study used reflective prompts (see Appendix I) that were sent electronically to the participants in the study. The reflective prompts asked the participants to think about their PLC group as they compared to standards outlined in the reflective prompts. The reflective prompts were then sent back to the participants in the study before the next session. Participants were asked not only to reflect after each section but to participate in a type of “preflection” using their previous reflection results before the next session. The reflection questions also asked participants to elaborate on how they could work to improve their PLC as evaluated by the standard.

Reflection questions were rooted in the features of collaboration as outlined in a 2007 Thomson et al. study that focused on measuring collaboration in professional groups. These features were adapted to fit PLC groups. This was necessary for two reasons. First, the indicators
used in the original study were formatted as survey questions measured in a Likert-like scale, and second, these questions were created for companies. It was therefore important to rephrase the survey questions to fit a PLC setting without losing the intent of the questions, as well as eliminate questions that did not fit the context of a PLC. For example, in the original study, a question was “Your organization keeps an eye on partner organizations’ activities in the collaboration to make sure they are doing what they are supposed to be doing in the collaboration?” This was rephrased to, “all group members keep an eye on each other to make sure everyone fulfills their role in the collaborative process.”

The overarching features of collaboration listed in the Thomson et al. (2007) study were Mutuality, Governance, Autonomy, and Administration. Norms was also a category in their research, but was not included in the reflection question; assessment of Norms did occur through the interviews, transcribed sessions, and the surveys. The features were not just defined in the original study, but were broken down into indicators used as survey questions. As stated earlier, I used appropriate indicators for PLCs were used to shape the reflection questions. For example, listed below is one of the four reflection questions asked weekly:

Reflection Question #2: Highly effective groups have clearly defined roles for each member because it helps the group accomplish its goals more effectively. Conflicts, when they arise, are mediated quickly resulting in conclusions all group members can accept. In what ways have your actions helped your group accomplish the indicators in the above indicator? How might you change your behavior to more fully realize this indicator in future sessions?

This question is connected to the collaborative feature Administration and questions asked in the original Thomson et al. (2007) study. The survey questions found in the original
study were used to help construct the indicators for all of the reflection questions so that appropriate indicators could be used as standards for participants to reflect on and judge their own progress. Furthermore, besides reflecting on what happened in their group, the reflection questions ask the group members to think about what they have done or could do to accomplish the standard defined in the reflection question. The reflection questions were sent back to the participants a day before their next PLC meeting. The sending of the responses was intended to serve as a prompt for participants to think about the standards before the next meeting through an act of preflection.

All sessions were taped, and dialogue and behaviors were coded using an adapted version of the Mark Felton coding scheme on dialogue and collaborative argumentation (Felton & Kuhn, 2001) and another study conducted in 2007 measuring collaboration (Thomson et al., 2007).

**Dependent Variables & Outcome Measures**

The outcome measures of the study were the coded dialogue taped in the session and the coded behaviors in the taped sessions, as well as the survey and interview results collected during and after the study. These measures were used to determine the effectiveness of the intervention on second stage sessions versus the control sessions.

The survey used was adapted from a 2007 study by Thomson et al. and served to help establish a baseline before the study, as well as an assessment right before the intervention and at the conclusion of the study. The survey (see Appendix H) is meant to measure participant impressions and was formatted as a Likert scale. The survey specifically focuses on the indicators Governance, Norms, Administration, and Mutuality. Though Norms were not in the reflection questions, a number of the themes from Norms, such as trust and feeling respected, were in the reflection questions. Furthermore, Autonomy was not a specific section of the
survey, but was in the reflection questions. The rationale behind this decision was one of repetitiveness in survey questions since a number of the questions in the other sections asked questions about working together. In the interviews, there was a specific question that allowed the participants to discuss the effect of the reflective scripts on the participant’s ability to stay focused and the group’s ability to stay focused to accomplish goals.

A final interview (see Appendix G) was conducted at the completion of the study. The interview collected information about how the participants felt about their collaboration, their peers’ collaboration, and the intervention. The interview became a wealth of data, as participants were able to elaborate on where they thought their PLC group excelled as well as where it needed to grow. These interviews helped me better assess any connections between outward changes and inward motivation. It also allowed me to assess whether internal changes might be occurring when there were no observable changes in behavior.

The indicators in the Thomson et al. (2007) study were reformatted for this study as a thematic coding scheme (see Appendix J) and used to assess where aspects of standards outlined in the study become present in the recorded sessions. The coding scheme is broken down into the four features of collaboration, Mutuality, Autonomy, Administration, and Governance, outlined in the Thomson et al. (2007) study. The indicators used in the coding scheme were used to develop the reflection questions to make it easier to draw connections between when a participant modifies their outward behavior in a PLC session and how that outward change might be connected to internal changes reified in reflection responses.

The final assessment tool was an adaptation of the coding scheme developed by Mark Felton and Diana Kuhn in 2001 (see Appendix B) and measures the type of dialogue moves used in the sessions (Felton & Kuhn, 2001). Three of the PLC sessions were recorded for dialogue
moves, with one of the coded sessions occurring prior to the intervention. The coding scheme had been modified and shortened (see Appendix C) since the application in this study is very different than the studies where the scheme was originally used. In the studies conducted, the majority of the populations being assessed were students between the ages of 12 and 19 in structured learning environments. Furthermore, in the study, the researchers would prompt students to argue for persuasion or for consensus in a controlled setting. In this study, the coding looked at dialogue in groups of professionals in semistructured PLC meetings, where the researcher cannot control the agenda for the meetings. Therefore, though the actual coding scheme being used is not adapted; it is being applied to a new situation.

PLC sessions were recorded using Google Meet, a video conferencing software program that allows for the meeting to held virtually and synchronously. Meetings in Google Meet can be recorded and the camera will show the face of the person talking; group members who are not talking will appear in smaller boxes on the screen. However, in recorded sessions that are played back, the observer can only see the participants who are speaking and cannot see any of the participants who are off camera. Video conferencing software has been shown to be an effective tool to attain qualitative data (Archibald et al., 2019) and was used for not only the taped PLC sessions but also the taped interviews in the study.

All participants were given consent forms when they participate, as well as a debriefing form at the end of the study. These forms were downloaded as templates from the Rutgers website devoted to IRBs and adapted for the study. The forms being used are the adult consent form, the audio/video recording consent form, the interview protocol, and a debriefing form. Copies of filled out forms for IRB approval are found in the Appendix G, K, L, and M.
Participant Consent Procedures

The consent process occurred after a PLC had volunteered. The consent forms were given after a PLC has expressed interest and were administered in that group’s PLC. Participants were reminded that they can drop out at any time in the email that were sent with their reflective questions after each meeting. Because the pandemic made handheld forms impractical to deliver, participants were given digital consent forms to fill out, which were emailed to the participants as a survey (see Appendices K & M).

The subjects were debriefed on the study at two points. They were initially debriefed after the conclusion of the data collection where I explain the coding schemes. At this point of the debriefing, participants were able to ask questions about the study and the coding mechanism. I also debriefed participants at the end of the analysis of the data, so that the participants could gain insight into their PLCs from the study and how the interventions in the study influenced behavior (see Appendix L).

Data Analysis

Data from the study were analyzed and coded from the taped sessions. The software that was used for coding and analysis of the results was Dedoose. Spreadsheets were developed from the coded data and a basic descriptive statistical analysis was done on the results. The indicators and definitions from the 2007 Thomson et al. study were adapted to fit the context of adult teacher PLCs, and used in my study to help find themes in interview responses and the transcribed PLC sessions. Dialogue was coded using a provisional coding scheme derived from the Felton and Kuhn (2001) dialogue coding scheme. Validity represents the steps taken to establish the soundness of the research (Gall et al., 2014). The validity of the assessment tools, though not perfect, is increased by the fact that they were taken from other published studies. In
this study, though the original coding scheme was used, not all dialogue moves were analyzed; this is because a number of dialogue moves did not occur at all in any of the sessions. Some were used only once throughout all of the coding sessions and, therefore, were not included; however, some of the dialogue moves were included even if they were used very infrequently. Dialogue moves that happened very infrequently were sometimes analyzed because they formed the “buckets” of dialogue moves used to organize the types of moves in each of the coded sessions. Themed buckets of dialogue moves were not used in the Felton & Kuhn (2001) study; however, in the study and Felton studies afterward, the types of moves used in dialogue were organized into those that challenged and those that aimed to cooperate or build a consensus. In this study, I used these as guidance to formulate my own buckets of challenge moves, collaborative moves, and neutral moves. These buckets are explained further in the results section and were useful in comparing different types of conversational moves as they were found at different frequencies in the different sessions.

Surveys were distributed to participants at the beginning, middle, and end of the study. The Likert responses were assessed, and participant responses were compared throughout the study. The results of the surveys gave me the opportunity to examine the possible change in the perception of a participant’s impression of their PLCs ability to exemplify different aspects of effective collaboration as defined in the Thomson et al. (2007) study. The number of participants was small, given the fact the research was a case study of three PLC groups; however, the information gained from these surveys, when combined with reflection notes and interview responses, helps give a fuller impression of how participants felt about the influence of the reflective script intervention on how they thought about their own actions as well as how they thought about the actions of other PLC members.
According to the research conducted using the rubric, certain argumentative moves demonstrate higher levels of collaborative argumentation than others. For example, the use of Counter-C is shown to be a technique found more in collaborative argumentation than Counter-A. In the Felton & Kuhn (2001) study, adult participants were found to use fewer moves that were dismissive or confrontational than younger arguers. It was also found in this study that adults frequently used moves to interact that were not necessarily directed at actively seeking consensus or being combative. In this study, I organized these types of moves into a bucket named neutral. The decision to put these moves into a neutral bucket was informed by the Felton and Kuhn (2001) study, but were chosen based on my experience coding the dialogue moves. I will use two colleagues from my doctorate program to code a section for comparison to help ensure reliability of coding. Though I was using the established coding scheme (Felton & Kuhn, 2001), I was using a provisional coding scheme in case new argumentative dynamics arise.

In this intervention study, I will take the quantitative results and attempt to find correlations through statistical measures between the intervention and the types of dialogue moves used, with the hope of finding correlations between the interventions and statistically significant changes in participant dialogue moves. The results of the coded dialogue were added into the program Statistical Product and Service Solutions (SPSS) to look for significant correlation between the types of dialogue and the intervention given. I will also use qualitative and quantitative measures to examine how the interventions may correlate to changes in how participants perceived their groups collaboration and their collaborative behaviors. The three types of data points will help create triangulation of the data and increase reliability. The results of the coded dialogue were added into SPSS to look for significant correlation between the types of dialogue and the intervention given. I will also have fellow members of the Graduate School
of Education at Rutgers help me code the some of the results for interrater reliability; these
members are Kanika Chopra and Chelsea Jacoby.

**Hypothesized Results**

I hypothesize that after the conclusion of the study, participants after receiving a number
of rounds of the intervention reflection scripts will generate dialogue moves more conducive to
collaborative argumentation, as well as more collaborative behaviors found in the collaborative
scripts rooted in the Thomson et al. (2007) study.

It should also be noted that even though the study will harvest a rich amount of data
connected to discourse in PLCs, the sampling size was small; the results should be used to
inform further study and not seen as a design approach that if transferred will necessarily give
the same results. It is therefore important to interpret the findings study as important, but also as
one iteration, which will lead to better designs.

**Conclusion**

There is a gap in research dedicated to analyzing the type of behaviors that are elicited in
PLC environments as well as how to prompt teachers in PLCs to perform more constructive
behaviors. It is therefore necessary to (a) assess what types of behaviors naturally occur in PLCs
where members are in some stage of professional conflict and (b) test to see how to mitigate
negative behaviors and enhance constructive behaviors.

Results and data from this study can inform future iterations of the design and help me
construct an intervention that can improve critical collaborative behaviors in PLCs. The results
of the study can also help create scaffolds for other researchers and teachers to use who want to
increase PLC productivity. As stated earlier, if PLC effectiveness increases, studies suggest that
student achievement will as well.
Chapter 4: Findings

The purpose of the intervention study was to examine the impact of reflective scripts rooted in the Thomson et al. (2007) study on participant collaborative behaviors in their PLC meetings. The study examined the impact of the reflective scripts on participant dialogue using a version of a collaborative argumentation coding scheme developed by Felton and Kuhn (2001). The study also examined participant behavior in PLC meetings as well as participant assessment of the effects of the reflective scripts through interviews, reflection script responses, and surveys.

In order to better understand the impact of reflective scripts on participant behavior, I looked to answer the following questions.

In what ways can the use of reflective collaborative scripts rooted in the collaborative indicators outlined in the 2007 study by Thomson et al.:

a. Have an impact on collaborative argumentation in PLC groups according to the coding mechanism developed by Felton and Kuhn (2001)?

b. Affect participant self-regulation to display behaviors outlined in the Thomson et al. (2007) study?

It was my hypothesis that the introduction of reflective scripts rooted in effective collaboration would, over the span of the study, increase participant collaborative behaviors and dialogue patterns, as well as positively impact how participants felt about their own collaboration and the collaboration of their group members. The data collected were analyzed as it applied to the two research questions that framed the study. The results of the analysis of that data can be found in the following sections.
Impact of COVID-19

COVID-19 impacted the study in a number of ways that should be addressed. PLC time in the district became more difficult to standardize because teachers would be teaching in school one week, and then have to teach and have their PLC meetings virtually for the next couple of weeks. Some groups, like the Grade 2 PLC, were able to meet for upwards of 60 minutes, which was longer than the time they would normally have been allotted during in-person teaching. The USII PLC, on the other hand, met for less time; during in-person teaching they would have had 40–45 minutes to work together, during the pandemic they had only roughly 20–25 minutes to meet. The ELA PLC met roughly 30 minutes a week during this time, which was also less than the 45 minutes they would normally meet. Furthermore, the time allotted was inconsistent, where the school schedule would shift and change the amount of time allotted to meet. This caused a situation where frequency counts of dialogue moves did not make sense as a measure for evaluating the use of individual moves; instead it made more sense to use percentage of the overall dialogue connected to a dialogue move.

The pandemic also made securing groups more difficult, since I was shifted in my responsibilities to help the district through the pandemic. I was given direct supervision of more staff members and had my evaluation load increase, which required me to remove two possible groups from my study.

Data Analysis

The research approach of this study followed a convergent mixed methods approach since it involved merging information derived from both qualitative and quantitative data (Creswell & Creswell, 2017) in order to provide a fuller account of the behaviors expressed in the recorded sessions. The hope is that analyzing qualitative data such as interviews and dialogue
combined with quantitative data in the form dialogue move frequency charts would create a fuller understanding of how reflective scaffolding influences participant behaviors.

The coding method chosen for this study was a provisional coding method or a coding scheme that builds off codes and themes from previous fieldwork (Saldana, 2016). The recorded sessions were transcribed and evaluated using evaluation tools found in the following previous studies: one connected to a 2001 study conducted by Mark Felton on collaborative argumentation (Felton & Kuhn, 2001), and another study conducted in 2007 measuring collaboration (Thomson et al., 2007). Both coding schemes and indicators can be found in the appendices (see Appendices C and J).

In order to examine if there were shifts in the types of dialogue moves, provisional codes were made into buckets for different types of conversational. Provisional codes can be modified, revoked and expanded for the emergent findings in the data (Hedlund-de Witt, 2013). In this study the codes used in for organizing dialogue moves were grouped based on the emergent findings based on how different moves were used. These findings allowed me to create “buckets” of neutral moves, challenge moves, and collaborative moves. These buckets, though created by me, were informed by the description of different moves in the Felton and Kuhn (2001) study. The buckets were then compared against themselves (pre- and post-intervention) using one group t-test to determine if there was a significant change in the use of different dialogue buckets.

Since coding is a cyclical process, research has suggested that those using any qualitative coding scheme should keep analytic memos or journal entries that provide a researcher the opportunity to “brain dump” material that has come up in each coded session (Saldana, 2016). A content analysis approach was used during this portion of the study. A content analysis is when
text is analyzed for recurring themes and patterns. A pattern is when a descriptive finding is pulled from the transcripts, such as “all participants stated that they were able to contribute to PLC sessions.” A theme is more of a categorical term that connects to the pattern (Patton, 2014). In the case of this study, there were provisional themes of collaboration that were used connected to the 2007 Thomson et al. study on collaboration, and the transcriptions were examined to determine if, when, and where these themes arose. In this study, recorded sessions were coded in whole or in part during the week following the recorded session. This will allow for emerging themes that may not be in the predetermined provisional codes to be acknowledged during the sessions, as well as all for coding to remain manageable for the researcher and those who are participating in interrater reliability.

Participants were also interviewed at the end of the study (see Appendix G) to gain more insight into how the reflective scripts might have had an effect on professional practice and collaborative behaviors in PLCs. The interviews were transcribed and participant responses to interview questions were examined to see how participants felt about the effect of the reflective scripts on their practice. Interview responses were examined alongside of the reflections and the survey responses to gain a better insight into how participants felt about the reflective scripts and the effectiveness of their PLC sessions.

A pre-study survey, mid-point survey, and post-study survey were administered to all participants; however, not all participants completed all of the surveys. One participant left to go on maternity leave and was not able to complete the last survey; this resulted in her responses being omitted from the results. Another participant did not complete the mid-point or post-study survey; therefore, her responses were also removed from the results section. The survey results were analyzed to see if changes in participant responses occurred in the duration of the study.
Participants in the study were given a nonidentifiable acronym to use for their surveys (the same acronym that was used for coding); this way individual responses can be tracked and connected to intervention groups. However, there was no evidence connecting responses to any personal information about the participants. The acronyms were then turned into masked names for the purpose of flow when reading the study. A copy of the survey can be found in Appendix H.

Dialogue data collected from participant PLCs were coded in Dedoose and then transferred to a spreadsheet for further analysis. The data were then examined using basic descriptive statistics to determine frequency of specific dialogue moves. Data collected from sessions were also examined using a provisional coding scheme created by the researcher rooted in the indicators found in the Thomson et al. (2007) study (see Appendix J) and the coding scheme developed by Felton and Kuhn (2001) found in Appendix B.

The following analyzed data was pulled from coded PLC sessions. All data either in the form of percentage of dialogue codes, reflection responses, survey responses, interview question responses, or quotations from PLC sessions come from the transcriptions of those sections or completed participant forms, which are kept in secure files on my computer.

**Results Research Question #1**

**Did the provision of reflective prompts have an impact on collaborative argumentation in PLC groups according to the coding mechanism developed by Felton and Kuhn (2001)?**

Previous research should suggest that by providing prompts to the participants they would increase the use of dialogue moves that encouraged consensus, such as Agree, Add, Advance, and Substantiate (Felton & Kuhn, 2001). I hypothesized that the reflection on specific
types of effective collaborative behaviors would increase participant behaviors associated with effective collaboration through metacognitive practices associated with reflection, which could be measured through shifts in the type of dialogue moves as the study progressed.

Conversational moves were put into buckets based on their definitions to better organize and assess types of moves used. Drawing on some descriptions of conversational moves used in the Felton and Kuhn (2001) study, I placed conversational moves used in the sessions into three categories: neutral, challenge, and collaborate. Neutral dialogue moves were moves that did not challenge another group member, but also did not explicitly try to build consensus or collaborate with another group member. Neutral statements included dialogue moves such as Initiate, Case, Position, Clarify, Question, and Answer. These statements showed up the most in dialogue between group members. The second bucket of dialogue moves involved collaborative dialogue moves. These moves included Argument, Agree, Add, Acknowledge, Position? Clarify? and Advance. The final bucket consisted of challenging moves. These moves included moves such as Counter-A, Disagree, Dismiss, Refuse, and Reject. The conversational move Counter-C could be both collaborative or challenging; however, in this study, it was used almost exclusively to challenge another group member and therefore will be included in the challenge bucket. Other dialogue moves were used during the taped sessions; however, they occurred very infrequently, and I chose not to include them in the analysis. The full breakdown of dialogue moves used can be found in Appendix C.

In order to determine if the changes in the means were statistically significant, I examined them using a one-sample t-test. This would compare the mean of the first coded session prior to the intervention to the final coded session after the intervention. T-tests were administered for both the collaborative and neutral buckets to determine significant shifts in the
means. The challenge bucket was not analyzed in this manner because there were almost no occurrences of these conversational moves.

The p-value was evaluated to determine if the means of the buckets shifted statistically significantly. If the p-value is less than an alpha value of .05, the null hypothesis is rejected. The null hypothesis states that there is no significant difference between the measured phenomenon and. As such, the smaller the p-value, the more likely it is that the results can be attributed to the intervention (Gall et al., 2015).

The following tables show the changes in the means of the collaborative buckets in each of the PLCs between coded session 1 and coded session 3. It must be stated, however, that sample size is very small, and though statistical interpretation of possible changes is important, it is also important to dig deeper into the data collected to gain insight into what occurred in the collaborative sessions.

**Table 2**

*ELA Collaborative Moves Sessions 1 and 3*

<table>
<thead>
<tr>
<th></th>
<th>t</th>
<th>df</th>
<th>Significance</th>
<th>Mean Difference</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>One-Sided p</td>
<td>Two-Sided p</td>
<td>Lower</td>
</tr>
<tr>
<td>S3</td>
<td>-2.83</td>
<td>6</td>
<td>.015</td>
<td>.030</td>
<td>-5.5116344</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-4.026513</td>
</tr>
</tbody>
</table>

The first coded session mean of the ELA PLC was compared to the third coded session mean. In this comparison, the p-value suggested a statistically significant difference between the two means, where the mean went down significantly.
When comparing collaborative moves of the USII PLC in the first coded session to the third coded session, the p-value of the means showed that there was no statistical significant change.

When comparing the first coded session to the third coded session of the Grade 2 PLC using the one-sample t-test, the p-value suggested once again that the means were not statistically different.

The following figures show the changes in the means of the neutral buckets in each of the PLCs between coded session 1 and coded session 3.
Table 5

*ELA Neutral Moves Sessions 1 and 3*

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>One-Sample Test</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Test Value = 6.533333333</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>t</td>
<td>df</td>
<td>Significance</td>
<td>Mean Difference</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>One-Sided p</td>
<td>Two-Sided p</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.195</td>
<td>5</td>
<td>.040</td>
<td>.080</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.666666667</td>
<td>-.6280774</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7.9614107</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

When examining the neutral moves, a one-sample t-test was administered. The t-test showed that there was no statistical change between the two means.

Table 6

*USII Neutral Moves Sessions 1 and 3*

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>One-Sample Test</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Test Value = 8.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>t</td>
<td>df</td>
<td>Significance</td>
<td>Mean Difference</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>One-Sided p</td>
<td>Two-Sided p</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-1.796</td>
<td>5</td>
<td>.066</td>
<td>.133</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-3.050000000</td>
<td>-7.416333333</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.316333333</td>
</tr>
</tbody>
</table>

Similarly, when comparing the means between the first and third coded sessions, the one-sample t-test showed that there was no statistically significant movement between the means.
Finally, when examining neutral moves in the Grade 2 PLC, the one-sample t-test showed that the means between the first and third coded sessions were not statistically significant.

When examining dialogue moves in PLC sessions, it appears that the reflective scripts did not change the frequency of different moves. Fluctuations did, however, occur but did not have any trajectory that seemed to be rooted in the reflective scripts. It is difficult to say what created the fluctuation in each of the sessions since different sessions dealt with different topics with different external pressures resulting from the COVID-19 pandemic. However, there was no significant evidence that after receiving the intervention, specific dialogue moves increased.

There were a number of dialogue moves that appeared very infrequently or not at all in the sessions; these dialogue moves were not put into buckets or analyzed because of their infrequent nature. There were some moves included in the challenge bucket that were extremely infrequent; the rationale for including these moves was to better articulate how infrequently challenge moves were used in PLC sessions.

Each PLC group was coded three times. Coded session 1 in each group occurred before intervention and was given in December 2020. Coded sessions 2 and 3 occurred between January 7th and February 3rd of 2021. Winter storms and the COVID-19 pandemic forced some of the
session to be postponed; however, in each of the groups, three sessions were coded, one before
the intervention was given and two after. The Felton and Kuhn (2001) coding scheme breaks
apart types of dialogue moves and explains which types of moves are connected to consensus
building and collaborative argumentation.

As stated earlier, definitions for the codes were taken directly from the Felton and Kuhn
(2001) study; however, since this study dealt with different questions and a different target
group, these provisional codes were either kept or dropped in the final analysis due to their use in
this study. The most frequently found moves in the findings which were analyzed are found in
Table 2; however, a list of these codes with examples of participant responses can be found in
Appendix C. The decision to drop codes and focus on certain relevant dialogue moves was made
in consultation with my dissertation n chair and those who looked at my data for validity.
Table 8

*Description of Coded Dialogue*

<table>
<thead>
<tr>
<th>Code</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question</td>
<td>A simple informational question that does not refer back to the partner’s proceeding utterance.</td>
</tr>
<tr>
<td>Initiate</td>
<td>Statement that a line of reasoning that does not contain an argument and may conclude with a case question. Added for this study, “Starting a new line of discussion.”</td>
</tr>
<tr>
<td>Acknowledge</td>
<td>Validation of the partner’s preceding utterance by communicating interest, understanding, appreciation, or attentiveness.</td>
</tr>
<tr>
<td>Answer</td>
<td>Response to a Question.</td>
</tr>
<tr>
<td>Agree</td>
<td>Statement of agreement with the partner's preceding utterance.</td>
</tr>
<tr>
<td>Position</td>
<td>Statement of a position on a topic of discussion.</td>
</tr>
<tr>
<td>Position?</td>
<td>Request for the partner to provide their global position.</td>
</tr>
<tr>
<td>Aside</td>
<td>Off-topic or tangential comment.</td>
</tr>
<tr>
<td>Add</td>
<td>Elaboration of the partner's preceding utterance.</td>
</tr>
<tr>
<td>Clarify</td>
<td>Clarification of speaker's own argument in response to the partner's preceding utterance.</td>
</tr>
<tr>
<td>Case</td>
<td>Anecdote presented to illustrate an argument.</td>
</tr>
<tr>
<td>Counter-A</td>
<td>Critique of the partner’s argument that advances an unrelated claim, rather than addressing the partner’s claim.</td>
</tr>
<tr>
<td>Counter-C</td>
<td>Critique of the partner’s argument that challenges or undermines the strength of the partner’s claim.</td>
</tr>
<tr>
<td>Disagree</td>
<td>Simple disagreement without further argument or elaboration.</td>
</tr>
<tr>
<td>Dismiss</td>
<td>Simple and isolated statement that the partners preceding reason is unimportant or irrelevant.</td>
</tr>
</tbody>
</table>
### Code and Definition

<table>
<thead>
<tr>
<th>Code</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refuse</td>
<td>Explicit refusal to respond to the partner's preceding Question.</td>
</tr>
<tr>
<td>Reject</td>
<td>Explicit disagreement with an Accommodate, Interpret, or Recap.</td>
</tr>
<tr>
<td>Argument</td>
<td>New claim advanced in support of speaker’s position.</td>
</tr>
<tr>
<td>Advance</td>
<td>New claim advanced by speaker to strengthen or extend the partner’s claim-set.</td>
</tr>
<tr>
<td>Clarify?</td>
<td>Request for the partner to clarify their preceding utterance without an interpretation.</td>
</tr>
<tr>
<td>Position-?</td>
<td>Request for the partner to provide their global position.</td>
</tr>
</tbody>
</table>

The final ELA PLC coded session occurred prior to the other two PLCs in the study. The decision to code a session roughly one full reflection cycle earlier than the other two groups came from the fact that one of the members of the PLC left on maternity leave and was replaced by another faculty member. When the new PLC member became part of the group, the dynamic of the group changed and most of the meetings were devoted to learning about the new member and answering her questions.

The conversations of the PLC sessions centered around the topics of benchmarks, student attendance, technology problems, and the COVID-19 pandemic. There were no formal agendas in any of the meetings, and topics of conversation would shift based on the desires of the PLC members.

The neutral bucket of conversational moves was used the most often in PLC sessions. These moves accounted for 39.2% of the moves used in December 7th PLC, 56.5% of the moves used in the January 7th PLC, and 61.2% of the moves in the January 14th analyzed session. The
dialogue move Position was the most prevalent, ranging from 8.1% of the overall conversational moves to a high of 14.6% of the conversational moves. Asking and answering procedural or technical questions came next, with asking questions ranging from 8.9% of the overall dialogue moves to 12.2%. Answering questions posed ranged from 8.9% of a session to 13.6% of the session (Zegar dissertation notes).

**Table 9**

*ELA Neutral Dialogue Moves*

<table>
<thead>
<tr>
<th>Neutral moves</th>
<th>% Coded session 1</th>
<th>% Coded session 2</th>
<th>% Coded session 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initiate</td>
<td>2.2</td>
<td>10.1</td>
<td>11.1</td>
</tr>
<tr>
<td>Position</td>
<td>8.1</td>
<td>14.6</td>
<td>13.5</td>
</tr>
<tr>
<td>Case</td>
<td>3</td>
<td>4.5</td>
<td>10</td>
</tr>
<tr>
<td>Clarify</td>
<td>8.1</td>
<td>2.3</td>
<td>2.2</td>
</tr>
<tr>
<td>Question</td>
<td>8.9</td>
<td>11.4</td>
<td>12.2</td>
</tr>
<tr>
<td>Answer</td>
<td>8.9</td>
<td>13.6</td>
<td>12.2</td>
</tr>
</tbody>
</table>

Like in the Felton & Kuhn study (2001), dialogue moves that challenged other members’ questions made up significantly fewer of the overall moves in PLC sessions. Unlike the Felton and Kuhn study, there was not a significant change in Counter-C after the treatment was given. As stated earlier, challenging statements made up significantly less of a percentage than other dialogue moves, making up 4.3% of all dialogue moves in the December 7th PLC session, 1.1% of the overall PLC session on January 7th, and 0% of dialogue moves in the January 14th
session. Counter-A made up the highest percentage of the challenge moves used, but only made up 1.5% of the moves used in the coded session before the intervention was applied. Counter-C showed up in two sessions, making up 0.7% of dialogue moves in the coded session before then intervention was given, and 1.1% of the moves in the second coded session after the start of the intervention. The other dialogue moves from this bucket rarely appeared, and none of the other moves in this bucket appeared after the first session before the intervention (Zegar dissertation notes).
Table 10

*ELA Challenge Dialogue Moves*

<table>
<thead>
<tr>
<th>Challenge moves</th>
<th>% Coded session 1</th>
<th>% Coded session 2</th>
<th>% Coded session 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counter-A</td>
<td>1.5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Counter-C</td>
<td>0.7</td>
<td>1.1</td>
<td>0</td>
</tr>
<tr>
<td>Disagree</td>
<td>0.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Dismiss</td>
<td>0.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Refuse</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Reject</td>
<td>0.7</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

The collaborative bucket of dialogue moves made up a higher percentage of the dialogue moves than challenge, but less than the neutral statements. Collaborative statements in this bucket made up 35.6% of the moves in the December 7th PLC, 38.7% of the moves in the January 7th PLC, and 28.8% of the moves in the January 14th PLC (Zegar dissertation notes).

Agreeing and Adding to a fellow PLC member was used the most, with members Adding to a partner’s statements 15.9% in the second coded session; at its lowest use, it made up 3% of the coded moves in the first coded session. Agreeing with a fellow PLC member was also used often, where 10.4% of dialogue moves were devoted to Agree in the first coded session, 3.4% in the second session, and 10% of the moves in the third coded session. Advancing a partner’s argument, and asking Clarifying or Position? questions happened less often than other dialogue moves in the collaborate bucket, with Position? showing up in the first coded session only 2.2% of the time, and in the second coded session 5.7%. Advance also only showed up in conversation in the first coded session, and only 3% of the time. Asking for a group member to Clarify a
previous statement occurred more often, representing 6.7% of coded dialogue in the first coded session at its height, and 2.2% of the coded dialogue at its lowest in the third coded session (Zegar dissertation notes).

Members posing Arguments to other members also came less frequently, making up 1.5% of coded dialogue in coded session 1, 5.7% of the coded dialogue in coded session 2, and 3.3% of the moves in coded session 3.

Table 11

*ELA Collaborative Dialogue Moves*

<table>
<thead>
<tr>
<th>Collaborative moves</th>
<th>% Coded session 1</th>
<th>% Coded session 2</th>
<th>% Coded session 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argument</td>
<td>1.5</td>
<td>5.7</td>
<td>3.3</td>
</tr>
<tr>
<td>Add</td>
<td>3</td>
<td>15.9</td>
<td>7.8</td>
</tr>
<tr>
<td>Advance</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Acknowledge</td>
<td>8.8</td>
<td>5.7</td>
<td>5.5</td>
</tr>
<tr>
<td>Agree</td>
<td>10.4</td>
<td>3.4</td>
<td>10</td>
</tr>
<tr>
<td>Clarify?</td>
<td>6.7</td>
<td>2.3</td>
<td>2.2</td>
</tr>
<tr>
<td>Position?</td>
<td>2.2</td>
<td>5.7</td>
<td>0</td>
</tr>
</tbody>
</table>

It is hard to tell if the intervention had a significant impact on the dialogue moves in the different coded sessions. When looking at the most used moves in each of the buckets, it seems that the intervention encouraged the amount of neutral statements to go up, while making the dialogue moves in the challenge and collaborate buckets to go down. I would caution against drawing too many conclusions from that and encourage further research on the subject. This is because there were numerous dialogue codes that either did not neatly fit into one of the buckets
or were used so infrequently that they were not included in the results. In one session, these coded moves made up roughly 20% of all the dialogue moves that occurred (Zegar dissertation notes).

It does seem, however, that the interventions did not increase the use of challenging or combative dialogue with the vast majority of dialogue moves being either neutral or collaborative in nature. It might be a good idea to explore what might be causing the fluctuations of the dialogue moves outside of the intervention. It is possible the jumps in specific dialogue moves are connected to the context of the meeting.

It is also possible that conversational moves were more tied to topics being discussed in the different coded sessions than reflection prompts. Coded session dialogue moves will be analyzed in context to pull specific lines of dialogue that connected to the different codes. Furthermore, these coded sessions will examine how dialogue connected to the different themes of collaboration found in the Thomson et al. (2007) study. Though topics in each session will be examined, particular attention will be paid to large jumps in the percentage of use of a dialogue move between sessions.

The first PLC session was devoted to the first common benchmark assessment the group was giving and the work “Wendy Haverford” had done with her class who was ahead of the other classes. In the session, Wendy gave a presentation of the resources she had already used to prep for the benchmark (ELA Session 1 Notes). In this session, prior to the intervention, Question, Answer, Clarify, Clarify?, Acknowledge, Agree, and Position were used the most often. Clarify? made up 6.7% of the conversational moves in this session, which seems to be connected to group members, particularly “Donna Meagle,” who used Clarify? for 14% of her conversational moves. Roughly half of Donna’s Clarifying questions were posed to Wendy, but
the other half were posed to “Shawna Tweep,” who was not presenting. Wendy was also the only other person to use Clarify? in her dialogue moves. Donna’s other Clarify? moves were in an exchange with Shawna about the supervisor and her expectations for benchmarking.

Position made up 8.1% of the coded dialogue moves in the session; seven of the Position moves were clumped together in a 4-minute span between minute 26 and minute 30 of the session. The topic of conversation when the frequency increased was the Student Growth Objective (SGO), and how the SGO could be administered in a virtual environment. Shawna stated the following, “I have to have my kids retake the survey tomorrow, so once they retake that then I'll feel better because it's a mess right now.” Wendy gave a position on the topic of the SGO later in the conversation, “So I'm thinking we're just going to base all of the SGO off of how many books they read, you know, because that's like three to four, like five is the most so, you know, those are the high level.” Donna stated the following in response to Wendy, “I think we should tell him to, I think we should tell them we want to group our kids by that first question. How many independent reading books? Yeah, and then really the other two that we're looking at should if they told the truth should match the number of books they read.” All Position moves were participants giving what they think should be how the group reports the baseline data for the SGO. The Position moves were followed by a number of different moves such as Substantiate and Acknowledge. The Position moves were not followed by long arguments.

Coded session 2 focused primarily on Student Growth Objectives (SGOs); there was some confusion about whether SGOs would have to be given. Wendy was still ahead of the other PLC members in pacing and was explaining what she had done so far to collect SGO writing samples. Other topics that were discussed included the frustration they all felt about virtual instruction and navigating Google Meet; roughly the last 5 minutes of the PLC session were
devoted to the spreading of COVID-19 and the possibility of a vaccine coming soon, as well as reservations about the vaccine.

This session saw a number of shifts in the use of dialogue moves. Add increased during this session from 3% of all dialogue moves in session 1 to 15.9% of dialogue moves in session 2. Initiate went up from 2.2% of the moves in session 1 to 10.1% of the moves in session 2. Position also went up significantly between session 1 and 2, making up 8.1% of the moves in session 1 and 14.6% of the moves in session 2. Other moves decreased in use significantly as a percentage of moves in the session. Clarify made up 8.1% of the moves in the first session and just 2.3% of the second session. It is possible that the context of the conversation created these jumps in dialogue moves.

Ten uses of Add came during periods of verbalized frustration, where PLC members, instead of acknowledging their coworkers’ problems, contributed their own stories and complaints, which added to the conversation. This portion of the session was initiated by Shawna when she stated, “So, breakout rooms were good today, like in the classroom we would be putting them in groups.” Donna added to this statement by saying she would definitely be putting the students in groups. This turned the conversation and opened up the opportunity for Wendy to add that the only thing that frustrated her is when her cooperating teacher joins the Google Meet before her. Shawna added to this that she had the same problem. Wendy then added by stating that the first person to enter the Google Meet controls the meeting. The PLC members built on each other’s statement toward a point of frustration. The use of Add built to the use of Question and Answer. Shawna stated, “I wonder if you refreshed the link with her it would change who controls (the Google Meet).” Wendy responded, “I tried, I tried. I even shut down the computer and rebooted it.”
Initiate was used five times over a 5-minute period in this session between minute 8 and 15, which was dedicated to classroom books, SGOs, and technology issues. There were no agendas in the ELA PLC, and PLC members were able to bring up new topics at any time. The first initiate was about whether a member was going to be in the meeting. This started a short discussion about where she was; since she gave extra help and was pulled out for meetings, the members decided that she was most likely there. The second Initiate came from Donna, who stated, “Yeah so Wendy, you have your SGO done right? You met with Eric for the writing.” This initiation of a new line of conversation resulted in Wendy discussing what she did for the SGO and how she graded it. The third Initiate came from Wendy, who wanted to discuss the books in the book room. “Alright guys, the Fault In Our Stars, so I went to the book room. There’s like no copies left. Like it is really bad, because we have been using this book for the last three or four years, and none of them have been replenished.” This resulted in a conversation about how to access digital books, and what they should be doing about collecting the books when students are done. The fourth Initiate was centered on Donna coming back to Wendy’s students’ performance on the essays. “Wendy how did your kids do with the essays?” Wendy responded that her students did well, but that she did not finish grading them yet. The fifth Initiate came when the PLC group transitioned into the conversation about the Google Meet; that increased the frequency of the use of Add.

Fluctuations in the final coded PLC session might also have been connected to the specific context of the conversation and not the reflection sheets. There was not nearly as much fluctuation between coded session 2 and coded session 3. Session 3 started with a discussion about the internal benchmarking of students, but the majority of the time was devoted to two topics, one focused on the need for care and support for students and not academics during
virtual instruction and the other focused on the stress that the teachers felt during the COVID-19 pandemic. The use of Case fluctuated the most between the second and third coded sessions moving from 4.5% of coded dialogue to 10% of the coded dialogue. Agree also was used more often in conversation, moving from 3.4% of conversational moves to 10%. The use of Add dropped in this session from 15.9% of conversational moves to 7.8% of moves. When examining where Case was used in this session, there was not a concentration of its use like other dialogue moves that changed in their frequency of use. Instead, Case seemed to have been used to articulate points on a variety of topics in the session, where the teachers used it to share stories about how they felt about benchmarking, student health, and the pandemic. The increase of Agree also did not occur connected to one specific topic, but seemed to increase as PLC members gave their opinions about how benchmarks should be canceled and how to better serve students during the pandemic.

Case was used throughout the session, with its most frequent grouping of use toward the end of the session. Between minute 22 and 26, Case was used four times. The first one connected to a discussion about students writing their personal narratives and improvement. Shawna stated,

Okay, so I have one girl in my block one that already turned her draft in and I was looking over this morning … I’ve got to say the difference, the fact that we went over it and everything … it was lit it was Isabella Martell. Donna you remember, she was like new.

The next case occurred during the same discussion about the narratives. Shawna once again used Case, this time to back up a statement from Donna. Shawna stated, “I just, like one girl was saying how she took a situation where she went to an ice-skating tournament or something … and her story is about how the one mom forgot all the outfits for the skaters and
they were in Connecticut.” Shawna went on about how the student was discussing how to use author’s license to make the setting more interesting. Though Case occurs again shortly after Shawna’s use, it was used on a different topic of discussion. “Joan Calamezzo” discussed how she needed to consult with her kids, gave descriptions of her kids, and stated that she used Google Meet breakout rooms more to have consultation sessions. The conversation shifted after everyone agreed about the need to use breakout rooms, and then devolved into discussions about COVID-19. Shawna initiated this by explaining that her mother was in line for her COVID-19 vaccination, and at that point the rest of the session focused on the pandemic and the vaccine.

Dialogue in the USII PLC was coded in the same fashion as the ELA PLC, and dialogue codes were grouped into those that challenged other PLC members, those that attempted to collaborate with them, and those that were neutral. The USII PLC kept all of its members during the timeframe of the study; however, its PLC time fluctuated more than other PLCs, since the high school schedule in the Colts district was subject to the most change due to the pandemic. Similarly, in the USII PLC, it should also be noted that this PLC had a number of coaches, and conversation would drift to coaching and athletics.

Like the ELA PLC, the USII PLC had the majority of its dialogue moves labeled as neutral. Neutral moves made up 52.8% of all dialogue moves in the first coded session, 60.8% of all dialogue moves in the second coded session, and 34.5% of all dialogue moves in the final coded session. Like the ELA PLC, challenge-oriented dialogue moves were used the least, with Counter-A being the only challenge move used. Furthermore, Counter-A was only used 2.8% of the time in coded session 1 and was not found in any other coded sessions. Collaborative dialogue moves made up more of the overall moves than challenge and increased as a percentage of all dialogue moves during the intervention stage of the study. Collaborative moves made up
27.1% of the coded dialogue moves in coded session 1, 30.1% of the coded dialogue moves in coded session 2, and 53.2% of the dialogue moves in coded session 3.

Position occurred the most out of all the neutral dialogue moves, which ranged from 10.8% of dialogue moves in the first coded session to 25% of all dialogue moves in the second coded session. Other heavily used dialogue moves consisted of Question, which at its height made up 9.5% of the dialogue moves in coded session 1 and 6.3% at its lowest use in coded session 3, and Answer, which made up 12.2% of all coded dialogue in coded session 1 at its height and 6.3% at its lowest point in coded session 3.

Table 12

USII Neutral Dialogue Moves

<table>
<thead>
<tr>
<th>Neutral moves</th>
<th>% Coded session 1</th>
<th>% Coded session 2</th>
<th>% Coded session 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initiate</td>
<td>4.1</td>
<td>10.7</td>
<td>6.3</td>
</tr>
<tr>
<td>Position</td>
<td>10.8</td>
<td>25</td>
<td>12.5</td>
</tr>
<tr>
<td>Case</td>
<td>13.5</td>
<td>5.4</td>
<td>3.1</td>
</tr>
<tr>
<td>Clarify</td>
<td>2.7</td>
<td>5.4</td>
<td>3.1</td>
</tr>
<tr>
<td>Question</td>
<td>9.5</td>
<td>7.2</td>
<td>6.3</td>
</tr>
<tr>
<td>Answer</td>
<td>12.2</td>
<td>7.1</td>
<td>6.3</td>
</tr>
</tbody>
</table>

There were few attempts to challenge partners using any of the challenge dialogue moves. Counter-A was only used twice during all of the sessions and before the intervention was given. Counter-C was not found in any of the sessions in this PLC group. There was no evidence of other challenge dialogue moves used in the other sessions. Though more drastic than in the Felton and Kuhn study (2001), which found adults using more consensus building moves than
younger arguers. That study found much more use of Counter-C than was discovered in this study.

Table 13

**USII Challenge Dialogue Moves**

<table>
<thead>
<tr>
<th>Challenge moves</th>
<th>% Coded session 1</th>
<th>% Coded session 2</th>
<th>% Coded session 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counter-A</td>
<td>2.8</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Counter-C</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Disagree</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Dismiss</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Refuse</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Reject</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Collaborative conversation moves increased throughout the study, making up 53.2% of all moves by coded session 3. However, there might be a more fitting reason for this change than the reflective scripts, which will be discussed later. The most used collaborative dialogue move was Add, making up 12.5% of all conversation moves in coded session 3 at its height, and 8.1% of coded dialogue at its lowest in coded session 1. Acknowledge had the second highest frequency of use throughout the three coded sessions, making up 10.7% of all dialogue moves in coded session 2 at its highest frequency, and 8.1% of all coded dialogue at its lowest frequency of use as a percentage of coded dialogue in coded session 1.
Table 14

**USII Collaborative Dialogue Moves**

<table>
<thead>
<tr>
<th>Collaborative moves</th>
<th>% Coded session 1</th>
<th>% Coded session 2</th>
<th>% Coded session 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argument</td>
<td>1.4</td>
<td>0</td>
<td>9.4</td>
</tr>
<tr>
<td>Add</td>
<td>8.1</td>
<td>10.7</td>
<td>12.5</td>
</tr>
<tr>
<td>Advance</td>
<td>1.4</td>
<td>0</td>
<td>3.1</td>
</tr>
<tr>
<td>Acknowledge</td>
<td>8.1</td>
<td>10.7</td>
<td>9.4</td>
</tr>
<tr>
<td>Agree</td>
<td>8.1</td>
<td>1.8</td>
<td>9.4</td>
</tr>
<tr>
<td>Clarify?</td>
<td>0</td>
<td>1.8</td>
<td>0</td>
</tr>
<tr>
<td>Position?</td>
<td>0</td>
<td>5.1</td>
<td>9.4</td>
</tr>
</tbody>
</table>

It is important to look further into how these moves were used in context; however, what can be stated is that the USII PLC group did not use confrontational moves often and more frequently opted to use moves that were procedural or consensus building.

When examining jumps in types of dialogue, it might be important to contextualize the shifts to see what besides the reflection script intervention might be causing the changes in the use of certain dialogue moves.

In the first coded USII PLC session, the group spent almost all of the time allotted on coaching. Very little was discussed besides how the pandemic would have an effect on the different seasons. In this session, the PLC members used Case, which made 13.5% of the dialogue moves; however, these case moves were focused on explaining how their teams were going to cope with the pandemic. The codes Add, Acknowledge, and Agree were all connected
to giving support to the other PLC members as they were discussing the issues they might face trying to get their season organized.

Case examples did not apply to PLC business, since like the ELA PLC, the USII PLC did not have agendas or goals laid out at the beginning of the meeting. An example of a Case use in this session came from “Chris Traeger” discussing how COVID-19 has had an impact on how season overlap and are making student athletes have to unfairly choose a specific sport. “I’m going to be making a lot of cuts. Like a kid emailed me yesterday (and said) I want to do winter track. I said I don’t want her to have to decide. What if I’m going to cut her, you know, after three days.” All uses of Case came when discussing coaching, since no time was devoted to building arguments about teaching. There was some time spent on listing where people were in the curriculum, which “Ron Swanson” initiated. “How you doing with USII? Where are you?” The group members list where they are and the members give examples of what they like to teach. Ron states, “I could teach 4 months of Jackson, I love it.” Chris agrees with the statement by Ron, “Yeah, yeah.”

The January 14th session, which was not coded for dialogue moves, saw a shift in the focus of the PLC; however, this shift came well into the session. This session started the same way that the first coded session began by discussing sports; like the first coded session, the group members asked a question about pacing. Once again Ron starts this dialogue by asking, “Where are you guys at now?” It was not until 14 minutes into the session, but the session seemed to shift immediately once a goal was introduced.

Ron created the shift in the group when he suggested that the PLC should pursue a Japanese lesson study on the topic of the D-Day invasion. A Japanese lesson study is a type of collaborative lesson development and evaluation where a group of teachers develop a lesson,
called a “research lesson,” together. One teacher is chosen to teach the research lesson while the other group members are in the class taking notes on the lesson to see if the group’s conjectures about student learning and lesson design work as expected (Yoshida, 2012). The next PLC session was coded, and there were shifts in the types of moves that were made by participants. In this coded session, Initiate moves changed in frequency from being 4.1% of the dialogue moves in coded session 1 to 10.7% of the moves in coded session 2. Position went from 10.8% of the dialogue moves in coded session 1 to 25% of the dialogue moves in coded session 2.

Initiate was first used when “Ben Wyatt” decided to start a discussion about the lesson study by stating, “Do you want to do this? So pretty much what I was saying is like I don't do a whole lot.” This began the work on the lesson study. Prior to this statement, the group discussed Ron’s family and whether group members were completing the reflection sheets. Initiate occurred to switch the focus, but always stayed within the planning of the lesson study. Ron initiated another topic for focus in the lesson study, “So what do you think is the most important thing they need to know about D-Day?” This Initiate was phrased as a Question, but opened up a whole discussion. Ben responded with, “I think location, maybe they can start with a map, like this is Normandy.” Ron shifted the conversation again, “we have a weird generation…they have all been obsessed with Call of Duty for a very long time, so they are very aware of different weapons. So, they are big into that stuff so that might be something we should do and work into these lessons.” The point made by Ron started a conversation about the use of the technology in WWII and specifically D-Day. Chris tried to shift the discussion away from technology and weapons by sharing what he does, trying to use Initiate to shape the lesson study planning. “I was trying to draw like a certain picture today. Yeah kids going to the selective service going to the doctor and these kids look young. Yes. I like they don't have hair on their chest. They can
barely shave like these kids at D-day were like kids.” This shifted the discussion in the group to talking about testimonials of soldiers and pictures. All of these changes in topics happened roughly between minute 12 and minute 17 of the second coded session.

Between minute 12 and minute 20, Position was also used frequently. The Position moves connected to the Initiative moves in this session as participants gave their Positions on topics as the group planned the lesson study. For example, when Ben initiated the discussion about maps, Ron stated, “I was literally just talking about it. The blue on the map, I was like, what's this narrow strip of blue the ocean like no idea by the English Channel never heard of it. So that would be good.” Later Ben gave a position on resources to use, “I still like the idea of using Patton’s speech … you could, I don’t show the whole movie, but you could show the first fifteen minutes of Saving Private Ryan.” Chris gave his position on a topic of conversation he initiated with his statement about using pictures of young service men. The conversation moved to stories about a professor Ron had who gave a great tour, and Ben discussed his own father’s deployment. Chris went back to the topic and gave a Position, “It’s funny, in class I don’t focus on, I don’t really get into the, my angle is really the politics.” Ron responded by giving his Position, “I used to be that way, but now I at least take a moment to cover the tech.” This resulted in Ben stating that he liked to focus on strategy and how that is important. Ron then returned to his statement that geography must be included. The group members were not really building or substantiating arguments; they were laying out Positions about what they think are important aspects about D-Day that should be covered.

The final session saw increase in collaborative dialogue, which made up 53.2% of dialogue moves in the session. However, it is important to put this shift into the context of the PLC session. In this session, the PLC members were working together to determine what
resources and questions should be used in the document-based assessment that was the focus of their Japanese lesson study (USII Session 3 Notes). In this session, the group members had to make decisions that they all had to agree to, and that shift may have contributed to the shift in the type of dialogue. In session 3, Argument made up 9.4% of the dialogue moves, a shift from 0% of the moves in session #2. Agree also increased, moving from 1.8% of the dialogue moves in the second coded session to 9.4% of dialogue moves in coded session 3 (USII Codebook).

The first 10 minutes of the meeting was devoted to coaching. Two members of the PLC group had been discussing the pressures bought on by COVID-19. The conversation was specifically about how to move kids around with the different protocols; the following is a small portion of that conversation for context. Ron stated, “We are going to be in the blacktop for a while, I think.” Chris responded with, “Well what a mess…” Chris brought up that the team could go into the hallways of the school all together. Ron responded, “We are not allowed to… and we can’t go into the weight room.” The next 10 minutes was devoted to a large snowstorm that took place and how the different group members had to shovel the snow. At minute 18:05, Chris initiated the discussion about the lesson study by stating, “okay, let’s do this.”

This session saw an increase in the use of Argument if only slightly, as the focus of the session moved to the construction of the lesson study and not just planning what could be in the collaborative lesson. The group discussed if a portion of a movie should be shown and Ron made an attempt at an Argument about why he would show the clip even though was is not interesting to most of the class. “I am too and then I ask myself, do they really care, am I still doing it? Yeah, because I know there’ll be one kid in the room that will say. Wow. That was awesome.” Ron’s Argument here was in response to Chris’s statement about whether they should put a
movie clip in because students won’t find it interesting. Ron made another Argument later in the session about the need to hold student responsible for reading maps.

I love the letter, that's a great idea (a reference to a letter from the Russian foreign minister) and I think once you start doing that, you know, maybe showing a map. My thing is, when I've always found with the inclusion kids they get so messed up with the eastern and western front because they think of the United States. Yes, their eastern western is like all mixed up. So, when they look at a map and they see like England Atlantic Ocean they are thinking like, New Jersey, Atlantic Ocean, that's east.

It should be noted that it was Ron who made all of the arguments in this session, and the other group members did not attempt to build a rationale for what they want included, but do Add to statements by others and give Positions.

The Grade 2 PLC was the group that had the longest sessions, with some lasting over 1 hour compared to the roughly 35 minutes that the other groups met, as well as the most amount of dialogue moves. The Grade 2 PLC also spent the most amount of time on task in their PLCs and made references to knowing what they would discuss before the meetings officially started. It should also be noted that PLCs at the elementary schools function differently that at the secondary level, since the teachers at the elementary level teach roughly the same lessons during a week; at the high school level, lessons between teachers who teach the same class could be vastly different. Furthermore, at the high school level, content imbedded in the curriculum of a class might be taught at completely different times of the year depending on the pace of a specific teacher’s class.

Like the previous two PLC groups, the Grade 2 PLC’s dialogue moves were organized into three separate theme buckets. Furthermore, like the other coded PLCs, the coding for Grade
2 was pulled from three coded sessions, with the first coded session occurring before the intervention was given in December 2020, and the other two coded sessions occurring in January and February 2021 after the inclusion of the reflective script intervention. Challenge moves occurred the least frequently, making up 3.4% of the first coded session, 2.1% of the second coded session, and 1.8% of the third coded session. Neutral moves made up the largest percentage of moves in each session, accounting for 48.7% of the first coded session, 46.3% of the second coded session, and 42.5% of the third coded session. Collaborative moves made up significantly more of the percentage of moves in each session as compared to the challenge grouping of moves, but less than the neutral moves. Collaborative moves made up 37.3% of all coded moves in coded session 1, 42.2% of moves in coded session 2, and 45.8% of dialogue moves in coded session 3.

Table 15

*Grade 2 Neutral Dialogue Moves*

<table>
<thead>
<tr>
<th>Neutral moves</th>
<th>% Coded session 1</th>
<th>% Coded session 2</th>
<th>% Coded session 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initiate</td>
<td>7.9</td>
<td>4.8</td>
<td>15.5</td>
</tr>
<tr>
<td>Position</td>
<td>20.2</td>
<td>13.7</td>
<td>15.5</td>
</tr>
<tr>
<td>Case</td>
<td>4.7</td>
<td>2.1</td>
<td>0.9</td>
</tr>
<tr>
<td>Clarify</td>
<td>2.6</td>
<td>3.4</td>
<td>4.3</td>
</tr>
<tr>
<td>Question</td>
<td>7.2</td>
<td>12.7</td>
<td>2.6</td>
</tr>
<tr>
<td>Answer</td>
<td>6.1</td>
<td>9.6</td>
<td>3.7</td>
</tr>
</tbody>
</table>

As stated earlier, neutral moves made up the highest percentage of moves used throughout the three coded sessions. Position was the most frequently used dialogue move,
making up 20.2% of the overall dialogue moves in coded session 1 at its height, and 13.7% of the dialogue moves in coded session 2. Initiate was also used often, making up 15.5% of all dialogue moves used in coded session 3 at its height, and 4.8% of all moves at its lowest in coded session 2. Question and Answer were used often as well, with Question making up 12.7% of all moves in coded session 2 and Answer making up 9.6% of all dialogue during the same session. The percentage of use of Question and Answer do not match, because, like in other PLCs, not all questions were answered, and in other situations a question might elicit answers from more than one participant.

Table 16

**Grade 2 Collaborative Dialogue Moves**

<table>
<thead>
<tr>
<th>Collaborative moves</th>
<th>% Coded session 1</th>
<th>% Coded session 2</th>
<th>% Coded session 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argument</td>
<td>2.9</td>
<td>4.1</td>
<td>5.2</td>
</tr>
<tr>
<td>Add</td>
<td>5.4</td>
<td>13</td>
<td>17.3</td>
</tr>
<tr>
<td>Advance</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Acknowledge</td>
<td>5.1</td>
<td>6.9</td>
<td>14.7</td>
</tr>
<tr>
<td>Agree</td>
<td>15.2</td>
<td>9.6</td>
<td>3.4</td>
</tr>
<tr>
<td>Clarify?</td>
<td>2.9</td>
<td>2.7</td>
<td>4.3</td>
</tr>
<tr>
<td>Position?</td>
<td>5.8</td>
<td>6.9</td>
<td>0.9</td>
</tr>
</tbody>
</table>

Cooperative moves were used less than neutral moves but more than challenge moves. Agree and Acknowledge made up the largest percentage of cooperative moves, where Agree was used 15.2% of the time in coded session 1 at its height, and 3.4% of all dialogue moves in coded session 3 when it was used the least. Acknowledge made up its highest percentage of the
dialogue moves in session 3, making up 14.7% of all moves, and occurred the least in session 1, where it was 5.1% of all moves.

It appears that the number of collaborative moves used as a percentage of the overall PLC session increased as the intervention was given. However, it is important once again to examine the context of each meeting to see if other factors may have contributed to the increase in collaborative moves.

**Table 17**

*Grade 2 Challenge Dialogue Moves*

<table>
<thead>
<tr>
<th>Challenge moves</th>
<th>% Coded session 1</th>
<th>% Coded session 2</th>
<th>% Coded session 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counter-A</td>
<td>0</td>
<td>0</td>
<td>0.9</td>
</tr>
<tr>
<td>Counter-C</td>
<td>3</td>
<td>2.1</td>
<td>0.9</td>
</tr>
<tr>
<td>Disagree</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Dismiss</td>
<td>0.4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Refuse</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Reject</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Like the other PLC groups, the Grade 2 PLC did not use challenge moves often in any of the sessions. The most used challenge move was Counter-C which made up 3% of all conversational moves in coded session 1 at its height; however, it was only used once in coded session 3. Other challenge moves such as Counter-A and Disagree were each used only once in all three sessions; all other challenge conversational moves were not used at all during any of the sessions.
In order to gain a better understanding of what besides the reflection scripts could have influenced the shift in different dialogue moves, it is important to examine the topics of conversations in the different meetings to see if context influenced the different dialogue moves.

In the first coded session, Agree (15.2%) and Position (20.2%) made up the greatest percentage of dialogue moves. When examining the individual session, the topic of conversation was to decide what would be reported and what would not be reported in the first trimester grades. The report cards at the K–5 level are mastery report cards based on standards, so the PLC group was going over the different standards to decide whether the teachers had covered certain aspects of the curriculum by the time of reporting. The impact of COVID-19 also had an impact on reporting, since the teachers were at different places in the curriculum than they would have been in a typical year (Grade 2 PLC, Session 1 Notes).

Unlike the other PLC groups, within the first minute of discussion “Leslie Knope” brought up the theme for the PLC session, “Is a plan still to go over report cards?” Furthermore, when “April Ludgate” came a couple minutes late, she started by stating, “I know, I broke the first cardinal rule of PLC, perfect attendance.” The session focused completely on how to report student performance on the first report card. Position was used when making a statement about the report card and was generally followed up by a person agreeing with the statement. For example, April started by giving a position, “And did you notice the report cards format in Genesis changed a little bit looking and I actually like it better.” “Ann Perkins” responded, “Yeah. Yeah.” Many position statements focused specifically on whether they were ready to report certain skills, with the group collaborating on how to represent what was and what was not taught so far that year. Ann stated the following about narrative writing, “No, I feel like I would've done that more like in small groups, but I don't do small groups as often as I normally
would be.” Leslie gave a position statement, “We don't really have a compare and contrast unit like we used to.” This was a Position since it was not directed for anyone to respond to and was phrased as a statement.

Initiate made up 7.9% of the dialogue moves in this session; however, unlike the other groups, the Initiate stayed on the overarching theme of the report cards. Ann used Initiate, but by reading the report card indicators to move to the next topic of discussion. An example of this happens in the 10th minute of the session when she stated, “compares and contrasts two different parts of a story.” This led to different Position moves and elaboration on this report card indicator. April responded to the Initiate by giving a Position, “That says, trimester one and two not yet introduced.” Leslie followed this with a Case about her own teaching and how it appeared before the third trimester. This move was considered a Case, because it made direct reference to a personal story to articulate an argument but was used in context somewhat as a Position. Leslie ended the Case by stating, “we don’t really have a compare and contrast unit.” April agreed with this statement by stating, “yeah.” Ann seemed to have taken on the role of reading the indicators and used Initiate again by stating, “the next one is reading informational text.” Leslie responded to this with a Position, “I would say they get NAs for identifies main topic for descriptor one.” There was a break from the pattern of Ann using Initiate to move through the report card when Leslie stated the following, “what do we think about the descriptor, descriptor four identifies the main purpose of the text?” This initiate was out of the usual pattern of who initiated the move to another topic of discussion, but was still connected to the same theme, where Initiate was used to introduce another descriptor on the report card.

In the second session, Position once again made up a high percentage of the dialogue moves (13.7%). Usage of other dialogue moves increased as well; Question increased in its use
from 7.2% of dialogue moves to 12.7%, and Add increased from 5.4% in coded session 1 to 13% of the dialogue moves in coded session 2. This session was devoted to planning a common multiday lesson together. This lesson was called “Living Zoo” and had been done in previous year; however, it had never been done in a virtual setting (Session 2 Notes).

This session, unlike the first coded session, was more free flowing, though Ann did start by giving a topic of focus it deviated from at the beginning. The group did come back to science after the short deviation to discuss the “Living Zoo” project. The session started with an Initiate from Ann about science; this was responded to by April with an Add, which could be a Co-opt where she built on Ann’s statement with the addition of this Move, “I am having a difficult time with writing … because I feel like I need to meet with students individually in breakout rooms, but when I do that (mumble) it takes forever to get to them.” Ann supported April’s frustration by stating, “yeah, yeah, that is true,” and shaking her head in agreement. The conversation moved to writing and Leslie used Add to build on the statement of frustration by April, “I felt the same way today, when Danny signed into my class, it was during morning meeting, like ‘you don’t to hear me read a story.’ I was like who needs help and sent them into a breakout room with him.” This discussion shifted as the group worked to build opportunities to better navigate instructional expectations in the virtual setting. For example, Ann gave a strategy, “so in the morning when we have reading. I like tried the schedule like in the beginning (referring to the schedule laid out for them by administration). I really tried to stick to it see how it says reading mini lesson 15 minutes… And in September, you know, it was 5 minutes and then I started 10 minutes. You know how that goes. You add 5 minutes every time but yeah, I just kind of make sure that by 10:00 my reading lesson is done and then they can do that 30 minutes of reading independently and that gives you 30 minutes to make a thing get ready for the day meet with kids
who are struggling.” The conversation culminated with the group scheduling a time to really go
over and plan how they will attack the lessons and not just read each other’s lesson plans.

The session moved to the “Living Zoo” project. Ann started by using Initiate, but phrased
it as a Question, “so do you want to talk about the animal project?” The other members treated it
as a Question, so it was labeled as a Question move. April shortly after used Initiate to bring up
benchmarking. Ann tried again to use Initiate to come back to the project; at roughly minute
12:20, Ann brought up a Google Slide presentation and drew attention to it, “I don’t think I even
did anything to this, oh maybe I did, table of contents, chapter one, but we can switch it.” The
presentation was the organizer for the student project. Once Ann got the group to think about the
project, there started to be a cluster of Position used again, as well as a cluster of the use of Add.
However, though Add was clustered in certain places, it did not increase in its clustering when
the topic of the “Living Zoo” was introduced. Add was found more at the beginning of the
session, and at the beginning the use of Add was a way of also showing Acknowledgement of
frustration by adding similar frustrations about student writing.

The use of Initiate for the rest of the session stayed on the overall theme of the “Living
Zoo” project until the very end. Group members started to give Position moves as they
contributed to the construction of the project. For example, Leslie gave a Position move on
resources, “I don't know if that was just a year or more, like National Geographic, but the
problem is almost, like the thing I found yesterday and Raz kids about polar bears was either
level E or level Q., so sometimes it's, I mean at least it can read it to them.” April gave a
Position move about narrowing down the list of choices for students, “Unless we did offer that,
and each of us will pick six different animals and then share them.” The discussion on the project
lasted the rest of the session, and the pattern stayed the same, where there was a topic of discussion and clustering of Position around it.

The third coded sessions saw a number of fluctuations in the uses of different dialogue moves. Add increased from 13% of the dialogue moves in the second coded session to 17.3% in the third; however, I am not sure how much of a shift this really is because the second coded session was over 52 minutes, and the third session was closer to 35 minutes (Coded session notes). I decided to leave it in because it was an increase; however, it was not as drastic of an increase as the dialogue moves listed below. The fluctuation was due to changing schedules based on COVID-19 protocols in the district. The use of Acknowledge also increased, rising from 6.9% of dialogue in the second coded session to 14.7% of dialogue in the third coded session. Initiate also rose, moving from 4.8% of the dialogue moves in session 2 to 15.5% of the dialogue moves in the third coded session. The use of Question dropped a lot between the two sessions; the dialogue move fell from 12.7% of the total moves in coded session 2 to only 2.7% of the moves used in session 3.

The Grade 2 PLC devoted the third coded session to a number of topics ranging from lessons to be delivered to frustration about the pandemic. This session did not have a singular focus like the other two coded sessions, and the change in dialogue moves may reflect that shift. Acknowledge increased in the third session and a lot more support was given in this session between group members. Leslie started by voicing frustration, “I've been letting the kids chat during lunch because they don't get to see each other and it's like especially the ones who don't have siblings. I want them to be able to have time to like have conversations with kids their age. Well, it's so loud and like then I can't stay here and get stuff done and like I need to leave the room, but then I want to make sure they're appropriate so (Leslie stops talking).” Ann used
Acknowledge here to show support and to identify with Leslie’s frustration, “Oh, I know. Yeah, I feel like there's always one that like controls, monopolizes, the conversation, right?” The conversation went back to discussing *Duck! Rabbit!*, a resource used in the curriculum; however, frustration comes back in. Leslie said, “I feel like I am getting so confused now that we are on different schedules.” April used Acknowledge by expressing, “I know.” Ann laughed and this made Leslie laugh and shake her head. Leslie voiced further frustration, “I literally do Fundations at the end of the day and they are so checked out.” April chimed in and laughed, “Yeah, are we done at one or are we done at two?” Leslie responded, “Yeah, like kids I’m done now.” Both Ann and April used Acknowledge to show support for Leslie’s frustration by laughing and making a joke about the confusion students face when not knowing when the day ends. Ann used Acknowledge by lending support and saying “wow.” At roughly minute 6:20, Ann voiced frustration and Acknowledge was used to give support by other group members. At roughly minute 10, April also voiced frustration about time, and Ann used an Acknowledge move to give support. “Now we have kindness [00:20:37] we quit now.”

Not all Acknowledge connected to frustrations, at minute 5:50 of the session, Ann stated, “Dd you see the Magic E song I put in yesterday?” Leslie used Acknowledgement to give support to Ann by saying, “I loved it!” April also gave support, “That was cute.” The group laughed during the Acknowledgement moves.

The use of Initiate increased during this session and clustered during a 10-minute span between minutes 17 and 27; Initiate was used 10 times during this span. April stated, “Oh, I was like, okay, we got one regrouping problem done. That was it. Oh, do you know what I need to figure out? How do we see? What is that thing to see their screen?”
April used Initiate again to start a discussion about Black History Month, “Alright, so, what are we doing, you guys found stuff? You know Lisa's going to ask us. What are we doing for black history?” A group member suggested the book *Not Quite Snow White*. April then brought up another topic for discussion, this time about the changes associate with Read Across America, “Weeks, we had kindness and challenge week.” April used Initiate again at minute 22:30 when she stated, “I didn’t get through today’s reading, I only got to the activity, and I didn’t get any further?” This started a conversation about time devoted to reading and how much they each try to accomplish in a lesson. Around minute 23, Leslie started to use Initiate and drove the shifting between topics. Leslie started Initiating a conversation shift from reading to writing by asking April if she had access to the writing supports that she had put together. At minute 25, Leslie stated, “I don’t know if you saw this with the math, but if you look at my Google Classroom to my Google Assignment.” April responded to this, that she did see it but that she did not know what to make of it. This started a conversation about the math assignment that Leslie posted. The session continued on this path, and there was no set theme for the rest of the time that they met.

PLC sessions were examined across PLC groups to see how context or the intervention had an impact on dialogue. The results of this synopses as well as an overall sense of what the reported data suggest can be found in the next chapter.

**Results Research Question # 2**

Does the provision of reflective scripts affect participant self-regulation to display behaviors outlined in the Thomson et al. (2007) study?

In the previous section, dialogue codes were used to map out how often specific dialogue moves were used, as well as to see if shifts in dialogue could be influenced by the use of
reflection scripts. It is hard to determine if reflection scripts had any significant impact of dialogue moves in PLC sessions, which could be attributed to the fact that the focus of each meeting changed as new problems of practice had to be addressed. Even though outward changes in behavior may not be connected to the intervention, it is possible that participants felt that the intervention had an impact on how they thought about how to interact with their coworkers.

To identify the mediating processes examining the impact of reflective prompts on self-regulation to display behaviors outlines in the Thomson et al. (2007) study, I used a provisional coding scheme rooted in indicators of effective collaboration found in the study, as well as thematic coding using constructivist grounded theory (Charmaz, 1996; Saldana, 2016). Thematic coding was used when analyzing participant interviews and reflections. The adapted coding scheme created from the original study can be found in Appendix J and was used when analyzing the dialogue in PLC sessions. The combination of these two coding schemes was to determine if the reflective prompts changed participant behavior both observably in PLC sessions and internally through how participants felt about the impact of the reflective prompts on their behavior. The following sections were organized into the four themes that organized the reflection scripts found in Appendix I. Only data that are most representative of the theme or how the theme was operationalized either internally or externally are included. Though demographic data had been collected, data did not demonstrate any noticeable differences on account of race or gender. Furthermore, all data presented in the following sections are direct quotes from participants, either through their interviews, dialogue in PLC sessions, or reflection responses. No attempt was made by the researcher to paraphrase any of the qualitative data collected.

**Theme 1: Governance**
The first theme analyzed was that of Governance. This theme examines how well group members established common goals and timely benchmarks.

Reflection Question #1. Highly effective collaborative groups establish mutually accepted benchmarks toward accomplishing their goal. This timetable should be based on all group member input where all members feel respected. What have you done to help guide your group to accomplish effective collaboration as stated in the above description? What actions do you think you should take in the future to help your group accomplish its goals? As you reflect, think: What behaviors exhibited by me and my group fit this indicator? What if anything might need to be improved?

This reflection question was based off indicators pulled from the original study. Though the original Thomson et al. (2007) study had a much larger list of indicators used as survey questions, that list was paired down to create indicators that participants could reflect on that could be transferred to a PLC setting. This means that some of the bulleted statements in the original study were repetitive, or they were not transferable to a PLC because it was rooted in how organizations relate to one another. Finally, the list of indicators was shortened to a list that could be made into reflective questions. The same process was done for all the themes, so that there could be a way of tracking the specific indicators under the themes in the reflection responses, surveys, PLC sessions, and interviews.

The indicators for Governance are:

- Your collaborative group has established a goal and workable, timely benchmarks to accomplish their goal.
• If the group goal or benchmarks are modified, all group members are aware of what must be accomplished to achieve the new goal/benchmark.

• Your group members have established relationships of mutual respect that allow for individual members to contact each other informally to work out problems and ask questions outside of specified formal meetings.

In order to determine whether the reflective scripts had impacted participant behavior, I first examined participant responses to interview questions about focus, and then examined participant responses to survey questions and their answers to the reflective scripts. Following this analysis, I coded dialogue in PLCs to determine if the themes that emerged in the individual participant responses manifested themselves in PLC sessions. The following section examines the evidence found.

Participants responded that they believed that the reflective scripts had increased the focus of their PLC, with all but one participant stating that the reflective scripts increased focus. Almost all responses followed a similar pattern where the interviewee stated that the scripts became a reminder of what they should be doing in each of the sessions. It should also be stated that all participants, no matter the group, stated at numerous times how much they trusted the other group members. Ron stated:

I think they've brought us back on task actually because again, they reminded us of what we should be doing. In fact, at today's [00:03:16] most recent meeting, a lot of the identifiers have reminded us about effective practices such as collaboration goal-setting and things like that and we were able to actually do that today instead of just doing our normal, you know talking about [00:03:31] sports.
Ron came back to this point in the second round of interviews. In this interview, he brought up that before the scripts, the normal day to day in the PLCs were “loose” and more of a gathering. He went on to say that the scripts reminded him and the other group members where they should be. These responses are consistent with the responses in his first interview where he states that the scripts “reminded us about effective practices such as collaboration goal setting and things like that.” In his second interview, Ron stayed consistent in his opinions about the scripts and focus by stating:

Yeah, I think as you could tell from the recordings our normal day-to-day PLCs were [00:01:31] kind of unstructured, very loose, more of a gathering where it was a place for people to unwind and reconnect socially rather than to conduct an actual PLC where we're cut we're planning together [00:01:46] we’re collaborating on assessments and things like that. So the reflective scripts, you know, week to week kind of reminded us where we should be, because it did contain those standards of what a highly effective PLC looks like [00:02:01] based on each Strand and when you think back and reflecting on how you're performing what you're contributing and what it actually looks like in comparison or should look like, it definitely puts you in a different frame of mind for the next meeting [00:02:16] on how to make improvements.

This sentiment was echoed by Chris, a member of Ron’s PLC group, in his first reflection. He included in his reflection response that he believed that the PLC need to do a better job of setting individual and group goals. In his first interview, he discussed how the reflection scripts created structure, even if you could not see it.
What I'm not saying that's necessarily a bad thing. I mean if it's like, you know, you're not watching our PLC today, but it's I almost felt like I had a checklist in my head which isn't necessarily a bad thing. I don't like it's like a lesson plan and you know am I hitting the point of the lesson and so now I had to type up some lesson plan template every day. That would I don't know if I would like that. But yeah, I think the questions are good just to give us some direction that's all and it did today honestly today. It’s kind of felt maybe pressure for this study to do it. Well, I don't know if it was for the great organic reasons that you would want kind of like studying to get an A and rather than learning but [00:03:24] That's you know, so that's what you look like. Yeah. Yeah, I am.

In his second interview, Chris gave more detail on how the reflective scripts had an effect. Chris discussed how the district has not had training in over 7 years on focusing a PLC, but also stated that he does not want SMART goals or the scripting of meetings.

Yes, not to give you a roundabout answer, but there was provided some structure. You know, I haven't had any (in the past), not that I would like a script every time and you know, we've all kind of been in those meetings with SMART goals and whatnot. But it's been at least 7 years in this district that I've seen any effort, you know, to have some sort of a structure so it's easy for meetings to go off the rails … but yes, any structure was better than no structure.

Ben, the final member of the PLC, put how the scripts helped his group focus in the context of the lesson they collaboratively developed in his second interview.
No. I think it (the scripts) actually helps us guide the conversation like where we going.

What are our goals objectives? I think that it helps there because that gives us a jumping off point where we can start bouncing ideas off each other.

Ben echoed this in his second interview, when he stated:

Yeah, I think they did, you know just trying to develop the lesson that you know as a group you're putting together. I think you know those scripts help the questions help, you know, putting together what role each member had, you know and putting together the lesson I think that helped their idea bound, you know collaboration idea bouncing off one another I think it all I think it went really well.

April, a second-grade elementary school teacher, also found the scripts to be helpful and stated in her first interview:

You know, it just kept us very focused in okay, this is what we're going to talk about this week and we stayed focused and what we were talking about instead of thinking of one of the other 45 things that we had to work on.

April stated in her reflections that the focus of the scripts did not extend to the need for clearly defined roles in her veteran PLC. She stated in her first reflection that clearly defined roles should be used in “problem groups” that cannot work together. However, a week later in her reflections, she referred to her group as a “work in progress” because they did split up the work. She did not, however, give any indication that she felt her group lacked the ability to divide up work and, further in her reflections, commends her other group members as people who support each other and do not put down each other’s ideas.
Leslie and Ann, the other members of her PLC, shared similar sentiments about the reflection scripts giving focus to the group. Leslie stated that the reflections helped her be prepared.

I think I like being prepared meaning like, okay, we're going to be talking about driving this week. [00:03:51] Okay, so I come there with my writing materials. My idea is some examples of work that I have rather than other times where we kind of just went into the meeting ... “What do we want to work on this session?” So, when we got down [00:04:21] to meeting time, we went right into that topic rather than like, I don't know chit-chatting first.

Ann shared a similar sentiment in her second interview. “I would say like myself. I'm [00:04:17] trying to focus more and you know what? I mean really get things done.” In her second reflection, Ann stated that she liked writing things down in the reflections because it helped her not forget for the next meeting. Roughly 3 weeks later, Ann discussed that for the first time in her PLC group, they preplanned what they were going to do and that gave the PLC more focus.

Joan, another participant, stated that the reflection scripts did not help with focus, but that this was because she felt they were already a focused PLC.

I don't know that they've really had an effect because I will say that that PLC is very focused. We usually, I'll have kind of an agenda of what we want to discuss and [00:04:16] it usually stays pretty focused. So, I would say in that respect. Maybe it didn't have an effect.

The survey question connected to Governance (see Appendix H) showed a shift in traits connected to Governance. It makes some sense that individual PLC members would have
different perspectives of how their group accomplished different aspects of collective argumentation, especially before seeing a standard rubric. However, it is important to see if opinions changed or became more uniform during the intervention. The USII PLC was very divergent in their opinions at the start of the study as to whether their PLC would formally evaluate the success and failures of their joint activities; one group member agreed with the statement, one was neutral, and one strongly disagreed. What was interesting is not how divergent all group members were at the beginning of the process, but how similar their responses were at the end. By the end of the intervention, all three members of this PLC moved to agree with the statement that their PLC formally evaluated their progress. In the theme of Governance, US II PLC members rated 25% of their responses as neutral, 33.3% as disagree, and 8.3% as strongly disagree. After the intervention 75% of responses agreed with the statement and 16.7% of responses strongly agreed with the statement. No participants disagreed with any of the statements.

The other groups within the study did not have as much of a shift in their responses; however, they gave more positive responses overall to the survey questions in this section. The ELA PLC showed movement toward more positive responses, moving from 16.7% of responses in disagreement with the survey question statement to 8.3% (1 response). It should also be noted that the amount of responses in the strongly agree category fell from 50% to 25%. Most of that change moved to the agree category, which moved from 25% of responses to 50%. It should also be noted that most of the shift from negative responses to positive responses came from one PLC member who was new to the PLC group. One PLC member’s responses were dropped because that member left the study to go on a maternity leave.
The Grade 2 PLC also had one member’s responses dropped because she did not fill out the survey at the end of the intervention. In this PLC group, 50% of statements had neutral responses or disagree responses. By the end of the intervention no responses were negative to the statement; however, 25% of responses were still neutral.

It should be noted that the survey sample is small here; however, the shift from negative to positive responses to the survey questions does show some promise and merits further study. Between all PLCs, there seemed to be a shift in how the members felt about their PLC connected to the indicators in the theme. The first survey question, “Your PLC formally evaluates the success or failure of collaborative activities,” received one neutral response, four agrees, two strongly agrees, and one strongly disagree in the first administration of the survey. In the final administration, those responses shifted to six participants strongly agreeing with the statement and two participants agreeing with the statement. When given the statement “Your PLC has specific procedures and rules it follows to ensure a successful meeting” at the first administration of the survey, four participants disagreed with the statement, two participants responded neutral, one participant agreed, and one participant strongly agreed. This changed in the final administration of the survey, where five respondents agreed with the statement, one participant disagreed, one participant strongly agreed, and one participant remained neutral. The statement “PLC members constantly brainstorm to find solutions for department and district goals” also showed a shift, with three participants strongly agreeing with the statement, one participant disagreeing, two participants responding neutral, and two respondents agreeing in the first administration of the survey. In the last administration of the survey, four respondents agreed with the statement and four respondents strongly agreed with the statement.
Evidence of Governance varied in coded PLC sessions. The USII PLC group had no benchmarks embedded in their sessions prior to the intervention. There was no way to examine Governance in this group because there was no accountability, and each group member could teach at whatever pace they wanted in the manner that they decided would work best. This did change, however, when the lesson study was introduced, which occurred at roughly minute 17 of the January 14th PLC meeting. Because it will be taught by one member and collectively designed by all members, the initiation of the lesson study creates a deadline for the group. In the second coded session, the group does have a goal to accomplish, which is the lesson study. In coded session 3, Chris stated, “okay, let’s do this.” However, in none of the sessions do any members discuss goals for the next meeting.

The ELA PLC, like the USII PLC, did not seem to have specific things they wanted to accomplish in the meetings; however, there were unified external deadlines, such as benchmarks, that forced them to come together and make decisions. In the first meeting, roughly 8 minutes into conversation, Donna stated, “so you gave the benchmark today?” This statement was directed at Wendy and led to Wendy giving a long presentation about what she had been using as the benchmark. The other group members, though interested in what Wendy had done, were not bound to give the same assessment as the benchmark, and no mutually accepted deadlines were discussed. The group members did share resources and plan together; however, this was voluntary, and group members did not need to hold each other accountable for a collaborative product.

The situation in Grade 2 was different; there seemed to be discussions about what was going to be discussed prior to the meetings, as well as the need for a collaborative product. In the first coded PLC, session Leslie stated 33 seconds into the session, “Is a plan still to go over
report cards?” In coded session 2, during minute 3 of the session, Ann stated in response to a conversation about getting minilessons situated, “Cool, that like could be a long-term PLC goal, that would be great like every week like try and think of a minilesson like I just did this today.” Leslie agreed with adding this to the conversation when she stated, “yeah.” Later in the session, Leslie suggested her own addition to the PLC routine, which her group members agreed to do, “I was thinking to like, remember last year at the end of the year when we got together and we're like, all right, let's plan reading. Let's plan this, let's plan that, I almost feel like that would be beneficial, I don't know. What do you guys think? Like would that be more beneficial?” There was less of a sense of the theme of Governance occurring in coded session 3.

Theme 2 & Theme 3: Mutuality & Autonomy

The second and third themes are presented together in these results. The rationale behind presenting these two themes together is that they complement each other in the data collected. The first of these two themes to be evaluated in this section is the theme of Mutuality, which was defined as follows. Mutuality has its roots in interdependence. Groups that collaborate must experience mutually beneficial interdependencies based either on differing interests or on shared interests (Thomson et al., 2007). The following is the reflection question associated with Mutuality.

Reflection Question #3. Individual group members in highly effective groups help each group member accomplish their goals as well as group goals. Each group member in the discussion is able to shape the direction of the collaborative process. In what ways have your actions helped your group accomplish the indicators in the above indicator? How might you change your behavior to more fully realize this indicator in future sessions? As you reflect think:
What behaviors exhibited by me and my group fit this indicator? What if anything might need to be improved?

The modified indicators from the original study used to construct the reflection question were:

- All group members are on the same page about what they want in a final product.
- Group members work through design problems that result in a win-win result for all group members.
- Your sacrifice for the group has achieved a significantly better answer to your problem of practice because you are in the group, as opposed to tackling it alone.

The second theme in this section is Autonomy, which was defined in this study as how much freedom individual members in a group have to help shape the product without disrupting the administrative roles. It also shows how individual group members balance their individual wants with the wants of other group members. In good collaborative groups, individual identity and collaborative identity is in harmony. The following is the reflection questions associated with Autonomy.

**Reflection Question #4.** All group members in highly effective groups critically challenge one another to create solutions that allow each group to create a product of which they can all be proud. In what ways have your actions helped your group accomplish the indicators in the above indicator? How might you change your behavior to more fully realize this indicator in future sessions? As you reflect think: What behaviors exhibited by me and my group fit this indicator? What if anything might need to be improved?

The modified indicators that were associated with this theme were:
• Collaboration significantly helps you achieve group and individual goals.

• The group allows each member to shape the collaborative project based on individual wants and needs.

• All group members take responsibility for themselves and other group members.

In the evaluation of the interview responses, a number of examples of these themes did come up. Group members discussed how they could trust other group members to solve problems together. Some group members explained how the reflection scripts provided supports for them as they collaborated. In the first interview, Shawna stated:

I would say if anything we had I think something came up last week. I think it was about, the January Benchmark, I believe and one group member thought maybe we was [00:06:37] leaning more toward we should give the January Benchmark and then the other group members we were kind of moving away from that I guess because of everything that's going on. So, I think the [00:06:52] having the script in mind during that just keeping that just being mindful that that of those reflection questions that we answered in the conversation that we were having it allowed us to come to a common ground with [00:07:07] that and make a decision and move on. So, without any we clearly heard one another's viewpoints on the January Benchmark. Should we give it? Should we not and we collaboratively came to a decision not to and [00:07:22] moved on from there. So, and I think those keeping that reflection those reflection questions in mind as we were going through definitely in our minds as we were talking.

This, however, did not seem out of form for her PLC group; Shawna referenced in her first reflection that she believed that when a group member wanted to have something amended, all group members try to accommodate that member. Later Shawna referenced the January
Benchmark in her reflections as an example of how the group works to come to agreements. These sentiments were echoed by Shawna’s PLC member Donna in her reflection responses. Donna stated in her first responses that the group would collaboratively modify their goals, and that adaptations were made with contributions from all PLC members. Later Donna also referenced the January benchmark as an example of gaining input from all members before making a decision. Donna explained this further in her first interview response below:

Yeah, I think especially in that last meeting to where one of our group members brought up the January Benchmark and we kind of like, some of us didn't really [00:05:23] feel that we should be doing the January Benchmark. So, we voice our opinions and I feel that like I was one who voiced my opinion and I felt my opinion was valued and we were able to come to a conclusion that like, [00:05:38] maybe this year isn't the best year to be doing the January benchmark and you know we all agreed so I do feel my opinions are valued.

Joan also wrote in her reflections that the group was good at working together.

In the USII PLC group, Ben explained how his group dynamic helped with creating mutual support and work through problems of practice. Ben did not emphasize the role of reflective scripts in his interview response.

We're all going in the same direction. It's just how we get there. So, you know Ron might have a different idea how he assesses a certain, you know time period in history, I might do it a different way, but it's we're all again to the same spot.
Ben went into more depth about accommodating a group member who wanted an essential question changed. Ben stated that then the PLC group worked to accommodate that member.

It is difficult to tell, however, whether the intervention had an effect or just reported what had been then established relationships that previously existed in veteran PLC groups. Chris, another member of the USII PLC, stated in his first reflection that his members could feel comfortable challenging each other and compromising because of rapport that was built over year. April, from the Grade 2 PLC, stated in her first reflection that the group had a willingness to help each other out because of their knowledge of each other’s strengths and weaknesses. Leslie stated in her second reflection that her PLC allowed for the sharing of new ideas and that she believed that all members felt respected. These responses seem to indicate that the ability to engage one another to form interdependencies, where participants felt safe to share ideas, existed prior to the intervention.

Survey results from the Mutuality section showed that overall, group members worked well before the start of the study. Prior to the study when participants were surveyed on the statement “PLC members work to support one another by sharing resources with each other,” six of the respondents stated that they strongly agreed, and three stated that they agreed. These responses stayed pretty consistent when participants were surveyed at the end. It is impossible to give an accurate comparison because two members of the original survey were not in the final survey; however, all responses to the final survey were also either strongly agree or agree. Similarly, when respondents were asked in the first survey if “differing philosophies between PLC members make it difficult to work together,” four responses of all participants stated disagree, and four responses stated strongly disagree. The final survey at the end of the study
showed that all participants still either strongly disagreed or disagreed with the statement.

Similar findings can be shown in the question about whether a participant felt that they could accomplish more on their own than with the group. At the beginning and the end of the study, the majority, or five participants, believed that they accomplished more with their group. The only shift was that strongly agree made up one of the responses in the first survey and three in the final survey. Once again, it should be noted that the sample size of the study is eight people, so future research should be done with larger participant groups. However, after looking at the interviews, reflections, and survey results, it does not appear that the intervention had a significant impact on areas of Mutuality. This could be because group dynamics of trust and compromise were already firmly established in the groups; however, further research should be done before any hard conclusions can be reached.

There was one member who did express some reservation. Leslie stated in her week 4 reflection that she wished that work was split more evenly. It is hard to ascertain whether this was an ongoing feeling or a reaction to a specific week, since the PLC session prior to the reflection was a bit unorganized with participants running around to get their planning notes. The statement that there was an unfair distribution of labor did not come up in any other reflection or in any interviews. It also did not come up in interviews or reflections of the other participants. However, what Leslie might be referring to is a theme that did come up more often, which was a lack of organization of the distribution of labor.

Mutuality and Autonomy appeared in all of the sessions and in all of the groups. However, like with Governance, not all of the indicators were present. The indicators “collaboration significantly helps you achieve group and individual goals” and “the group allows each member to shape the collaborative project based on individual wants” occurred the most for
Autonomy. While the indicators “group members work through design problems that result in a win-win result for all group members” and “all group members are on the same page about what they want in the final product” came up the most for Mutuality, the Grade 2 PLC did have more evidence connected to the use of Mutuality because of the shared collaborative products. The USII and ELA, because of their lack of creating unified products in many of their sessions, did not show as much evidence of Mutuality.

The ELA group did work together to help solve each other’s problems. Donna stated, “A lot of the kids emailed me saying that they couldn’t get on the Google Meet today, and our Google Forms are glitching.” Here the group worked through a design problem of the use of the Google Forms to come up with a solution to the problem that everyone likes. This type of working together to solve a technical problem occurred again in this session when the group is discussing how to best email parents using email or the Genesis system. In the second coded session, a similar use of Mutuality occurred when Wendy introduced a discussion about her co-teacher controlling the breakout rooms in Google Meet, “The only frustrating part of it is if say Milli joins before I join.” The group works on strategies together to solve the problem in a way that allows everyone to contribute.

The USII PLC does not have any PLC specific uses of mutuality in the first coded session since there were no collaborative products. However, once the lesson study was introduced, this changed. In coded session 2, the group works to build a collaborative lesson plan where they work to get on the same page about what they want in their final product. The final product has contributions from all members, such as Ron’s decision to include technology, Ben’s push for more maps, and Chris’s position about the social aspects of war. The third session also connects
to the use of Mutuality centered on a common theme for the Lesson Study. Ben stated that the group would be basing the lesson on the following scenario:

It has to do with a Russian journalist writing a letter to the U.S. government basically asking for the United States to open up the Western Front, you know, the D-Day invasion and in the in the letter it basically talks about all the things that that would help the Russians on the Eastern front.

This decision framed the final product where all members had to agree to be on the same page.

The Grade 2 PLC worked on common problems throughout all their sessions, because they collaboratively designed parts of each other’s lessons. The first coded session demonstrated a continuous discussion of negotiation where the PLC members had to make sure they were all on the same page about the reporting of grades. The group in the second coded session were working together, Ann and Leslie were talking, “All right, so go back to the document day 1, choose an animal and find information about, or should we pick an animal and discuss different websites different resources?” “Yeah, and then we can put them in there, we can put links.”

Coded session 3 also had examples of Mutuality; however, there were fewer examples than in previous sessions, and the topics of discussion continued to shift. Leslie offered the use of resources to get all of the PLC members on the same page, “Okay, so what I'm going to do is not do opinion tomorrow, and I'll add that for Tuesday, the Duck! Rabbit! one and then we can all kind of catch up.” April responded to this by saying, “And then I'll do what you did, and then I'll add the Duck Rabbit for Tuesday and go from there.”

**Theme 4: Administration**
Theme 4 for focus is Administration, which was defined as follows, with the following indicators: Administration is the mechanism that ensures a unified mission turns into a delivered product. The following reflection question was connected to theme of Administration.

**Reflection Question #2.** Highly effective groups have clearly defined roles for each member because it helps the group accomplish its goals more effectively. Conflicts, when they arise, are mediated quickly resulting in conclusions all group members can accept. In what ways have your actions helped your group accomplish the indicators in the above indicator? How might you change your behavior to more fully realize this indicator in future sessions?

The following modified indicators were used to construct the reflection question for Administration.

- There are clearly defined roles for each participant that help the collaborative process move efficiently.
- Conflicts that arise are mediated quickly and efficiently resulting in a conclusion all members can accept.
- Your individual tasks are well coordinated with the task of others in your group.

Interviews and reflection responses showed participants who believed that their PLC was able to handle conflict or rarely had any conflict at all. In her first interview, April stated the following:

I didn't (think the reflections had an impact) because I really don't think our group argues [00:05:23] which is probably some of what you're saying. I have been in other PLC groups that have been very different dynamic wise. But what I did do is I was able to reflect more and [00:05:38] see I was a little more observant on if one of us was
disagreeing how we just kind of did it in a way that you might not realize we were doing. Oh that's good. But maybe we could do this too. [00:05:53] You know, I saw a lot of that that I may not have noticed. I saw more, you know talk that way.

This sentiment was echoed by Chris in the USII PLC in his interview response.

Yeah, so I was left. It's they that [00:06:24] question every week and I just ... I just wrote something quickly like our group requires no conflict resolution, you know, we're all friends which helps so we respect the good, the Bad and the Ugly personally socially professionally, [00:06:39] so I guess we're lucky, lucky in that regard. Frankly. I've never really had a never been a part of the PLC in Colts where I haven't felt valued in that way or you know, I'm speaking for myself [00:06:54] so I'm lucky and that in the middle school and in high school and with different groups of people in different mixes of people young teachers veteran teachers now, but in this specific group, no, culture issues now and I'll does that are [00:07:09] those are those are tell me friendship get a little too much and does it interfere with our you know, our professional responsibilities perhaps but I guess that I would think I would think that is a good problem.

Shawna stated in interview 1 that she believed the scripts allowed her group members to find common ground.

So without any we clearly heard one another's viewpoints on the January Benchmark. Should we give it? Should we not and we collaboratively came to a decision not to and [00:07:22] moved on from there. So, and I think those keeping that reflection those reflection questions in mind as we were going through definitely in our minds as we were talking.
In her first reflection response, Shawna stated that she believes that her group members check in with each other at meetings, and that when group members want things amended, other group members accommodate them. This sentiment was shared by her fellow PLC member Donna, who states in her first reflection that the group works to collaboratively modify goals. Similarly, Wendy, another group member, stated in her second reflection that she was happy that her other PLC members listened to her.

PLC members across all groups complimented each other on their supportive nature; however, no group discussed the effectiveness of having specific roles to complete tasks more effectively. At no point in any of the collected data did any participant discuss that they had designated roles, or that having designated roles would be desirable.

When examining participant responses to the survey section on Administration there was some movement in responses; however, it must be noted that it is a small sample. Respondents answered the question “PLC members bring conflict between members into the open and solve the problem collaboratively,” and in the first administration of the survey, three of the respondents stated that they disagreed with the statement, and one felt neutral about the statement. The rest of the participants either agreed or strongly agreed with the statement. In the final administration, there were no participants who disagreed or strongly disagreed with the statement; however, four of the respondents felt neutral about the statement, while the amount of participants who agree or strongly agreed did not change.

Under the Administration survey question “PLC members hold each other accountable when member does not contribute,” there were some shifts in how different members felt between the two surveys. In the first survey, one of the responses disagreed with the statement,
while three agreed with it, and four of the respondents felt neutral. When the participants were surveyed again at the end of the study, the number of respondents who agreed with the statement rose to six, while one respondent strongly agreed with the statement. No participants disagreed with the statement at the end of the study, and only one respondent was neutral toward the statement. What is interesting about this shift is that it is difficult to determine why there was a change. I could not find instances where group members were explicitly keeping each other accountable. Another surprising result were the responses to the question “You as a member of the PLC group understand your role and responsibility to the group.” In both surveys, respondents all agreed or strongly agreed with the statement without the groups defining roles or establishing Norms.

There is very little evidence of the indicators for Administration in the PLC sessions. There were no clearly defined roles for any of the PLC members in any of the group; however, some group members did take on roles in individual sessions, such as Ann’s role as editor of the collaborative documents in coded session 1 and 2. There was little conflict in the groups, and there was almost no coordination of PLC activities in the USII and ELA groups. Since in the USII and ELA groups there were rarely discussions of a unified product where group members were responsible for bringing anything to the meetings, there was little need for other group members to keep an eye on each other. The Grade 2 PLC did have more shared deadlines and collaborative products so there were opportunities to hold each other accountable; however, there were no occurrences in the meetings were any of the group members were holding other members accountable for work.

*Theme 5: Norms*
Norms were defined in the study as established protocols both seen and unseen that help guide productive work in a group. The modified indicators for Norms in the study were:

- Members believe they can trust one another
- Members respect the opinions of each member
- Members believe that they have a duty to contribute positively to the group
- All members of the group are respected

The theme of Norms was not explicitly part of the reflective scripts; however, it did make up parts of the survey, and the concepts of it appeared frequently in reflections and in interview responses. The purpose of including Norms in the survey was to see if group members trusted their fellow PLC members. I was unaware that the element of Norms would be so pronounced in the study prior to its start.

The Norms section of the survey focused on a number of different indicators including trust and ability to contribute to the group. The question “PLC members feel like they can trust on another” scored very high throughout the study. In the first administration of the survey, five of the respondents agreed with the statement; while three strongly agreed with the statement, none of the respondents disagreed or felt neutral about the statement. At the end of the study, seven participants reported in their survey that they strongly agreed with the statement, and one participant agreed with the statement.

Responses to the survey statement “I ignore suggestions from my colleagues when I assume they won’t work” show shifts between the first and last administration of the survey. In the first administration of the survey, four of the respondents disagreed with the statement, two disagreed with the statement, and two agreed with the statement. In the last administration of the
survey four of respondents disagreed with the statement, three strongly disagreed with the statement, and one participant strongly agreed with the statement. What is interesting is that the participant who strongly agreed with the statement in the last administration disagreed with the statement in the first administration of the survey. The other survey question results did not show much movement; in general, the section devoted to Norms stayed fairly constant showing on a whole that participants felt that they trusted their group members, that their opinions were valued, and that individuals did not pressure other members to accept their ideas in PLC sessions.

These responses are supported in both participant interviews and reflection submissions. Specifically, participants discussed their comfort with and trust in their PLC groupmates. In an interview Donna, a member of the ELA PLC, stated the following when discussing whether she felt her opinions were valued in her group.

So we voice our opinions and I feel that like I was one who voiced my opinion and I felt my opinion was valued and we were able to come to a conclusion that like, [00:05:38] maybe this year isn't the best year to be doing the January benchmark and you know we all agreed so I do feel my opinions are valued.

Shawna and Wendy, two of Donna’s PLC mates, shared a similar impression about the PLC group. Shawna stated:

Yeah, I always do even if the even if it's something that they don't agree with, so even if it was something that we didn't [00:03:32] agree with it's never I never felt that my opinion wasn't valued at all. So we're very open to suggestions in this group and we actually you know, we encourage them.
Wendy stated:

I don't feel like we really come across that might like I feel like everybody's opinions are valued and we feel comfortable enough to even stay are pains if we agree or disagree and we usually don't disagree were usually right on the same page as far [00:05:37] as like what is to comment and what can be done.

Similar opinions were held in the USII PLC group. All of the PLC members felt that their opinions were valued in the PLC sessions. Ron stated the following in his first interview:

I definitely feel like my opinion is valued and again for instance today as an example. I did have in my mind through these reflective standards that I wanted to sort of drift back toward [00:04:46] these highly effective identifiers and I did bring up. I was kind of the one that initiated the discussion of doing a collaborative lesson plan for the future and at no point did anyone even blink and I or hesitate [00:05:01] or anything like that? Everyone was all for it.

He also stated the following in his second interview:

Members were really respectful of my opinions my contributions and anytime that we had differences of opinion on content or pedagogy. We were able to you know, quickly work through those differences whether it was by [00:04:16] talking it out or sharing resources to supplement those opinions. We work really well together.

Trust and a sense of comradery also came up often in interviews. All PLCs stated that they felt comfortable with their PLC group members. Ben stated in his first interview about the trust his PLC has had for years:
Our group is a really good group. So, you know, we are with each other we bust each other's chops. But yeah, we all respect each other and I didn't one of my responses back to hit our department in a hole the history department social those Department. It's like one big family. [00:04:34] Everybody tries to help out everybody. Yeah, we have our different personalities, but I think they all kind of work together and it's comical at times, but I think it's a good group. So yeah, everybody's respected.

Shawna echoed a similar sentiment about her group when she stated the following:

One hundred percent I do, I think I've worked with this group this PLC for, I think we're going on 5 years now, and we've always really been respectful of each other and sharing information sharing materials [00:05:19] and listening to one another's viewpoints on whatever we're talking about.

In a reflection post, Ann in the Grade 2 group referenced how time in a PLC had an impact on her in a different way. Ann in her third reflection stated that though she had been in this PLC for 2 years, she did not feel as willing to speak. She stated that her lack of experience in the grade level and in the PLC made her feel like she gave less input. This sentiment was echoed by Joan in her first reflection about the ELA PLC; she explains a sense of feeling like an outsider in the group a bit because she believed that her role was unclear. Joan was a resource room teacher and she felt as if she has a hard time jumping in. She also stated that she enjoyed the conversations centered around Columbia’s Teacher’s College Readers Writers Workshop because she felt she was able to participate more.

A number of PLC members shared Wendy’s view about their PLC:
As far as the most challenging, I mean, we really didn't I don't feel like we really come across that might like I feel like everybody's opinions are valued and we feel comfortable enough to even stay are pains if we agree or disagree and we usually don't disagree were usually right on the same page as far as like what is to comment and what can be done.

April in the Grade 2 group shared this belief when she stated in her second reflection that her PLC members support each other in their PLC group and that they treat each other as equals. Leslie, another member of the PLC group, shared April’s sentiment, and in her third reflection was thankful that her team can share ideas and everyone is respected. In fact, in no reflections or interviews did any participants state that group members did not respect one another or give support. Each participant stated at some time in the study how much support they get from their group. However, she also expressed that her group already listened to one another and dealt with conflict because of their time spent together.

There were no outward portions where group members expressly gave trusting support to other members; however, there were many incidents where group members expressed frustration and the other members of the group gave support through acknowledging the frustration felt by their group member. In the USII PLC, this came up generally when discussing coaching. Ron was voicing frustration about different schools having different COVID-19 protocols. “And then like I heard apparently at Mizurellia it is like a free-for-all at the track anyone can get on. So a lot of our guys have been going there.” Both Chris and Ben continued the conversation with Ron as he discussed how it was difficult to get places for the girls to practice, and that the boys seemed to be driving all over the place.

The ELA group gave support when the conversations focused on students in a virtual environment and when discussing COVID-19. When discussing the COVID-19 vaccine, Donna
talked about her husband, “Jeff asked me yesterday if I think he should get it. I don’t know, I really don’t know what to think.” Wendy lent support by stating, “I know.” Wendy then gave a story about her own reservations about the vaccine. Conversations about COVID-19 and support were also found in coded session 3, when Shawna explained that her mother was waiting in line for the vaccine, and others were giving her support as she stated that she was worried because her mother is all alone.

The Grade 2 PLC gave support, but most places where trust was built through relationships was connected to the work. The participants do see each other as friends and do see each other outside of work; however, support and Norms were almost always used when a member was frustrated about teaching. An example of this happened in coded session 3, when Leslie stated, “I feel like I just sit at the screen all day. Like I don’t take lunch. I don’t do anything.” Ann responded by acknowledging the frustration and stated, “Oh, you don't know, I gotta get up and walk away, but around my house to do a lap.”

The findings displayed here will be organized more concisely in the next chapter to determine what impact, if any, the intervention had on the participants in the study.

Chapter 5: Discussion

According to research, teacher professional development should be connected to teacher practice, ongoing, and intensive (Darling-Hammond et al., 2009; Little, 2006). Teacher collaboration has been found to support teacher learning (Doppenberg et al., 2012). This is because teacher collaboration can encourage cognitive conflict because of its focus on problem solving, thoughtful consideration of critical feedback, and acceptance of alternative viewpoints in the development of a collective product (Dooner et al., 2008).
Teacher PLCs are a space for teacher collaboration if they are structured correctly. In order for this to happen, a PLC must have the overall objective of increasing teacher effectiveness and student learning (Dufour et al., 2006; Stoll et al., 2006; Vescio et al., 2008). A focus on student learning must also be combined with reflective dialogue that leads to extensive and continuing conversations among teachers about curriculum, instruction, and student development, which must go beyond surface-level exchanges of help (Vescio et al., 2008; Teague & Anfura, 2012; Bausmith et al., 2011).

Research has suggested that reflection-on-action can increase self-regulation leading to a change in teacher beliefs, points of view, and knowledge (Manrique & Abchi, 2015). Reflection-on-action is connected to self-regulated learning theory that is grounded in the hypothesis that learners can be active participants in their own learning through metacognitive, motivational, and behavioral practices (Zimmerman & Moylan, 2009). Self-regulated learning is primarily guided by metacognition, which asks a learner to think about planning, monitoring, and evaluating personal progress toward a goal (Ross-Gordon, et al., 2016).

One way to increase collaboration through metacognitive processes is through collaborative scripts. Studies have shown collaborative scripts to found to increase higher order thinking and metacognitive processes (Valcke et al., 2009) as well as metacognitive processes (Molenaar et al., 2014).

The purpose of this study was to determine if reflective collaborative scripts given to veteran professional educators in established PLC groups would change how they collaborated both internally and externally based on specific prompts connected to effective collaboration. This chapter provides a summary of results and conceptualizes those results in their larger
effects of reflective scripts. Finally, I will explain limitations in the study and make recommendations for further study.

**Summary of Findings**

The following section examines each of the research questions and summarizes the findings connected to them. Furthermore, hypotheses are tested against the original conjectures established prior to the study. The overall findings suggest that the reflective scripts did not have an impact on dialogue moves, and it was difficult to tell if the scripts had any impact on the way that participants acted in their PLC sessions. However, the collaborative scripts may have had some influence on how participants thought about their PLC sessions and collaboration. There may be a number of factors that created the shifts in behavior and dialogue during the study. These possible contributing factors are explored further in the following sections.

**Mediating Process**

The conjectures laid out in the methods section hypothesized that through the use of reflective collaborative scripts, participants would increase behaviors connected to the reflective scripts modeled on the Thomson et al. (2007) study.

The first mediating process was that the stressors and district initiatives would create areas of conflict and problems of practice that will need to be coordinated by the group, where a consensus solution must be reached (Gress et al., 2010), which represents true collaboration.

It is important to see if there were actual stressors on the participants that they felt they had to collaborate and address as a PLC group. In the next section, the different types of stressors will be laid out to demonstrate that the PLC session brought numerous challenges that groups of teachers had to work through collaboratively. In order to stay relatively brief, the topics of the coded sessions will be elaborated upon. Though all sessions were transcribed, the coded sessions
make up the bulk of the analysis and it makes sense to elaborate on the topics discussed in them. The following narratives come from the notes taken on the transcribed PLC sessions; the narratives below are meant to be seen as overviews of the sessions and not meant to go into any specific details of conversation between group members.

The ELA PLC examined the following topics in their PLC over the course of the study. In the first session, PLC members had to go over a common benchmark that they would have to give to students. When this meeting occurred, the teachers were virtual and conversations drifted to the stresses that students felt due to the pandemic, and how the teachers were frustrated that some students would not turn on their cameras. The teachers navigated all of these stressors, while trying to determine what they would use a benchmark for their students.

In the second PLC session, the teachers had to work through a technology problem that developed with their inability to navigate a problem with Google Meet. Conversations turned to providing supports for disadvantaged students who had to work from home and what to do if a student just turns off their camera and leaves class. However, time was also devoted to working on developing writing prompts for the students in the classes, and Wendy spent time sharing what she did already in her class.

In the third PLC session, the ELA group discussed the assumption that the state would cancel the student growth objectives (SGO) for the year due to the pandemic and how the students would not be able to handle the benchmark. The teachers also discussed how it was getting worrisome because of the pandemic. They shared stories and their frustrations about how COVID-19 cases were increasing. The teachers also discussed performance of their students and how they were assessing writing in the virtual environment.
The USII PLC also discussed a number of different topics over the course of the study. The first coded PLC session was devoted almost entirely to the discussion of coaching and how the seasons were going to develop. Though the topic of coaching was an inappropriate topic for a PLC, the group members had to help each other navigate the COVID-19 protocols attached to coaching, and there were real frustrations about what would happen to their seasons if the pandemic got worse.

In the second coded session, the topic of the Japanese lesson study was proposed, and the group worked to construct the overall makeup of the session was devoted to the construction of the common lesson.

The third PLC session was a continuation of the second PLC session and the group negotiated in that session about what would be the best resources to create the well-developed, document-based lesson on D-Day. In this session, all group members had to negotiate with one another and collectively construct the lesson.

The Grade 2 PLC spent their first session negotiating what would be in their report cards for the first trimester. The group members had to go over each of the indicators and assess what they could report and what needed to be put off for the next grade reporting.

The second session was devoted to a common project known as the living zoo, and the PLC members had to negotiate how they would construct this project, which would normally take place in class, at home. The teachers worked to develop digital resources, examined the assessment tools that they used, and tried to construct what different types of resources they used in the past that could help them create the unified project.

Frustration at the pressures brought on by the pandemic made their way into the last session, and the group discussed student writing and possible learning loss. The group worked to
develop strategies to deal with the normal day-to-day teaching deadlines like student reading, assessment of phonic acquisition and fluency of reading, and nonfiction writing.

When looking at the different sessions of each of the PLC groups, there were a number of different topics discussed that did create stressors and a need to work together to solve problems of practice.

The second mediating process is directly related to the intervention. Through the embodiment of the PLC and the reflective scripts, I conjectured that the reflective scripts would elicit metacognitive practices that should encourage participant reflection on effective aspects of collaboration. This was chosen because reflective scripts have been shown to initiate cognitive processes that encourage self-regulation and metacognitive practices (Ifenthaler, 2012). It is difficult to address this mediating process without going into the summary of the findings first. Below is the section devoted to the influence of the collaborative reflective scripts on dialogue moves and internalization of the standards of effective collaboration through metacognitive self-regulated processes. The results are discussed in the following section and broken up by research question.

**Research Question 1**

The first research question was as follows: in what ways can the use of reflective collaborative scripts rooted in the collaborative indicators outlined in the 2007 study by Thomson et al. have an impact on collaborative argumentation in PLC groups according to the coding mechanism developed by Felton and Kuhn (2001)?

Without the appropriate protocols or scaffolds, collaboration can break down to where people take things personally and look to shut down criticism in order to protect their point of view (Dooner et al., 2008). Research has suggested that reflective prompts have been shown to
be an effective way to elicit reflective practices (Wu & Looi, 2012) and self-regulation (Molenaar et al., 2014; Lei et al., 2013; Wang et al., 2017).

The hope is to use reflective prompts to increase collaborative types of dialogue where participants would be able to internalize the prompts and create more collaborative dialogue moves through the coding scheme developed by Felton & Kuhn (2001). In the original study, it was found that adults who were prompted to work to create a consensus built more on their partner’s discussions using the Advance code (Felton & Kuhn, 2001). The study also found that those prompted them to find consensus, which was Agree, Add, Advance, Substantiate, and Aside, as well as the codes for Disagree, Counter-C, Interpret, Clarify-?, and Case-? The scheme was applied in a very different context in this study than it was in the first study, since in the 2001 study participants, both adult and adolescent participants were asked to argue over different issues in a controlled setting. The hope was to replicate the increase in collaborative dialogue using the reflective prompts from the Thomson et al. (2007) study.

This question was examined through quantitative methods using descriptive statistics to describe how the intervention influenced dialogue moves. Participants in PLC sessions were recorded through Google Meet, and dialogue moves were coded and analyzed. These coded moves were organized into “buckets” to determine if certain dialogue moves, or buckets of dialogue moves, became more pronounced. In the original study, the different codes were put into two types of buckets: transactive, or those that connect to another speaker’s response, and non-transactive, which fail to connect to another partner’s preceding utterance (Felton & Kuhn, 2001). The decision was made in this study to use three different buckets, conflict, neutral, and collaborative, to better organize the types of responses different group members made to one another.
According to research, conflict scenarios can elicit behaviors where the arguers have a low concern with how the outcome of the solution will affect the other person in the situation (Davis et al., 2010, 2018). Furthermore, those who engage in arguments could end up defending their position, even against evidence that challenges or invalidates their point of view (Chinn & Clark, 2013; Felton & Kuhn, 2001; Villarroel et al., 2016).

Though research does suggest this, it did not appear in the study. The three PLC groups did not use conflict dialogue moves as a way of working through problems of practice, and instead chose to use more neutral or collaborative moves when in PLC sessions. The use of conflict moves in the ELA PLC made up 4% of all moves in the first session, and then were not present in any of the other sessions. Similarly, in the USII PLC, these moves only made up 2.8% of the conversational moves in the first session, and then were not present in any of the other sessions. There was also a decrease in these moves in the Grade 2 PLC, for which challenge moves made up 3.4% of dialogue moves in the first session, 2.1% of the moves in the second session, and 1.8% of the third session. It should be noted that these moves made up a very small percentage of the moves overall, and because of that, it is difficult to pull any conclusions from this decrease.

As stated earlier, neutral moves made up the largest portion of the of the dialogue moves in the different PLCs. In the ELA PLC, these neutral moves increased throughout the three sessions, making up 39.2% of the moves in the first coded session, 56.5% of the moves in the second coded session, and 56.7% of the moves in the third session. In the USII PLC, neutral moves made up 52.8% of the moves in coded session 1, 60.8% of the moves in coded session 2, and 34.5% of the moves in coded session 3. The Grade 2 PLC also had the highest percentage of neutral moves out of the three buckets, with 48.7% of the total moves being neutral in coded
session 1, 46.3% of all moves in coded session 2, and 42.5% of all moves in coded session 3. There are no clear trends in the use of neutral moves; however, it is safe to say that in the PLC sessions, participants were more likely to use neutral moves than any other type of move.

Collaborative moves were used more than challenge moves and less than neutral moves across all of the PLCs. In the ELA PLC group, the collaborative bucket of moves went down as a percentage of overall dialogue moves, making up 38% of the dialogue moves in the first session, 23.6% in the second sessions, and 17.3% in the third session. In the USII PLC, collaborative moves increased as an overall percentage of dialogue moves throughout, making up 27.1% of the dialogue moves in session 1, 30.1% in session 2, and 53.2% in session 3. The Grade 2 PLC also saw the use of collaborative moves go up throughout the coded sessions, from 37.5% of the dialogue moves in coded session 1, to 43.2% of the moves in coded session 2, to 45.8% of the moves in coded session three.

**Examination of Dialogue Moves in Context**

The buckets that were examined through the one group T-tests were based off my interpretation of the definitions, which is a limitation to the study. However, it does appear that the fluctuations in the individual dialogue moves that made up the neutral, conflict, and collaborative buckets did not show any significant shift in the means before and after the reflection script intervention. Therefore, it is hard to conclude that the reflective scripts had any significant influence of dialogue moves.

Though it appears that there were no significant shifts in the means of the different types of buckets, that does not mean that shifts should not be examined and conclusions drawn, even if those conclusions do not support the original hypothesis for the intervention.
In this study, dialogue moves, after a descriptive statistical analysis and one-sample tests, were examined to see how they fit into the context of the PLC in which they were generated. The rationale for doing this was to see how the dialogue moves clustered in different sessions or if a specific topic was a likely cause of dialogue shifts.

I examined the fluctuations in coded dialogue across the PLCs to determine possible patterns. In examining the different PLC sessions, it appeared that context drove the use of dialogue moves, and that the increase of a dialogue move in one context does not necessarily transfer to another context. For example, in the second coded session of the USII PLC, there was an increase in the use of the move Initiate. It is possible this increase in Initiate came from the increase of structure of the PLC once it decided to adopt the Japanese lesson study format. However, Initiate also went up in the coded session 2 ELA PLC, which occurred at roughly the same time. However, the second coded session in the ELA PLC was less structured than the first coded session, which had less percentage use of Initiate. Furthermore, in the Grade 2 PLC, it was in coded session 3, which had the least structure, that saw the largest increase in the use of Initiate. It might be because the USII PLC used the majority of their first session to discuss the off-topic subject of coaching that there was little Initiate, since the conversation stayed on one off-topic subject. The following paragraphs look at the dialogue moves Position, Add, Agree, Initiate, and Acknowledge. These moves were chosen because of the fluctuations and prominence that they occurred in the different coded sessions.

The use of the dialogue move Position seemed to cluster when used in PLC sessions. When examining the ELA PLC, Position made up 8.1% of the overall dialogue moves in the first session, but clustered around minute 26 to minute 30. The topic introduced at this time was about a survey that was to be administered as part of the benchmark. The survey was not a negotiable
part of the SGO because it was about collecting data. Shawna stated the following, “I have to have my kids retake the survey tomorrow, so once they retake that then I'll feel better because it's a mess right now.” This introduction generated a conversation about the survey and other aspects of the SGO, where different members gave their positions on different aspects of the SGO. The second session also saw a cluster of Position; however, this use occurred primarily between minutes 18:30 and 23 (five occurrences). This cluster was connected to a discussion about getting the COVID-19 vaccine, and the group started giving their position on the common topic of interest. There was a small cluster (three occurrences) of Position, at roughly minute 1:20–5:30; this cluster occurred when Wendy was asked to explain how she was scoring her benchmark. Once again, a topic of interest started a brief cluster of Position moves in the ELA group.

The USII PLC also saw the clustering of the use of Position as well under similar circumstances. In coded session 2, the use of Position went up as a percentage of discourse moves from 10.8% to 25%. Between minute 12 and minute 13, Position was used nine times; this occurred after an initiation of a conversation about D-day and the lesson study. Position clustered again in the session. Between minute 18 and minute 20, Position was used four times. Once again there was an initiation of a discussion about the Lesson study that encouraged participants to give their positions, this time on what type of focus should occur in the lesson study, specifically should there a be focus on the technology of the invasion or the politics.

The Grade 2 PLC also saw a high percentage of Position used in the different sessions. Unlike in the other PLC groups, Position was used by this group throughout the session. This might have more to do with the fact that the PLC was devoted to one topic (report cards), and the participants were moving from one indicator to another throughout the whole session giving their
Position on the different indicators and how to report them. In other words, even though there was no cluster of Position in this session, the context that created the clustering of Position in the other PLC groups was still present.

On first glance, Acknowledge appears to have gone up as the PLC members discussed areas of personal frustration. In the USII PLC, coded session 1 was grounded in frustration about the coaching season of two of the members, and that session saw a larger percentage of Acknowledge. The Grade 2 PLC also saw an increase in Acknowledge in coded session 3, moving from 6.9% of coded dialogue to 14.7%. This happened when topics of conversation moved to personal frustration with the impact of COVID-19 on their jobs. However, the sessions that were more dedicated to personal frustration, such as coded session 2 and 3 of the ELA PLC, saw less use of Acknowledge, though there was not a large fluctuation in the use of the dialogue move throughout the three coded sessions of the different PLC groups. This does not mean that support was not given. The PLC members in this group used Add as a way of building on their partners’ frustration instead of Acknowledge. In these sessions, there is an increase in Add moving from 3% of dialogue in coded dialogue session 1 to 15.9% of dialogue in coded session 2. It is hard, however, to draw any hard conclusions; between minute 11 and minute 17, Add was used 11 times, but for different reasons. This time period in the session was devoted to discussing student essays and group member frustrations. Group members spent time building on the statements of others about how frustrated they were or how bad the original writing samples were. The use of Add during this time was devoted to technical issues and how to solve the problem the group was having when their co-teachers controlled the Google Meet.

Add also made up large percentages of sessions in the other PLC groups. The USII PLC saw the use of Add at 8.1% of all dialogue in coded session 1, 10.7% in coded session 2, and
12.5 in coded session three. In coded session 1, Add was used throughout the session without being tied to any specific topic. It was present when the group discussed sports, what they were teaching, and their coaching experiences. In the second coded session, Add was used when participants offered resources to help build the Lesson Study; once again Add did not cluster, but was used throughout the session. In the final session, Add was also used on the topic of the Lesson Study and resources that could be used.

The Grade 2 PLC saw an increase in Add as well; Add made up 5.4% of the dialogue in coded session 1, 13% of the dialogue in coded session 2, and 17.3% of the dialogue in coded session 3. In the second coded session, Add was used at the beginning of the session the same way it was used in the ELA PLC, to show support by building on another group member's frustration. However, later in the session, Add shifted in its use from being a way to show support to one where the use of Add was clustered around Questions, and was more procedural in nature. The Add in this session focused on what resources could be accessed and what procedures should be used in the inclusion of the “Living Zoo” for this year.

The third coded PLC session mimicked the second PLC session with Add being used at times to give support and at others to help build conversations and collaborative projects by suggesting resources.

It is interesting that the two female PLCs used Add as a way to gain support and the male PLC did not; however, the sample size is too small to draw any conclusions based on dialogue move preferences as it relates to sex. It should be looked at further in a future study how different sexes or genders might use dialogue moves for different ends.
Agree also made up large percentages of some sessions and fluctuated in use between sessions. In the Grade 2 PLC, Agree was used 15.2% of the time in the first coded session, 9.6% of the time in the second coded session, and 3.4% in the third coded session. The third coded session had a number of other moves like Argument, Question, Answer, Clarify, and Add, but had very few instances of Agree. The third coded session focused on the use of Fairy Tales and compare and contrast, breaking away from the typical focus of building the grade reporting. It is hard to tell why that shift almost eliminated the use of the dialogue move Agree, and it might not connected to anything specific to that section of discussion. More analysis should be done to see exactly what context might trigger more of less use of Agree in further studies.

The USII PLC saw a drop in the use of Agree between coded session 1, where it made up 8.1% of the dialogue, and coded session 2, where it made up 1.8% of the dialogue. The absence of agree might just be that the group members were all throwing ideas out. I cannot state with any certainty why this fluctuation occurred; however, the percentage of Agree increased again to 9.4% of the conversation in coded session 3, and there could be something about the brainstorming session that decreased the use of Agree.

In the ELA PLC, Agree dropped from 10.4% of dialogue in coded session 1 to 3.4% in coded session 2. This could have something to do with the increase in Add. The participants in this session were frustrated and building on each other’s frustration, which could have been used as a replacement for just Agreeing with a participant’s frustration, or Acknowledging it; there might have been more of a need to build on a shared frustration in this session. What is interesting is like the USII PLC, the ELA PLC’s use of Agree increases between coded session 2 and coded session 3, going back to 10% of the coded dialogue. Further examination should be
done on this with larger participant groups and a study that looks specifically at the contributions of context to the use of conversational moves.

Initiate fluctuates in many of the sessions as well, across all groups. Initiate increased in the ELA PLC from coded session 1 to coded session 2, moving from 2.2% of the dialogue moves to 10.1%, and to 11.1% in coded session 3. In the USII PLC, Initiate moved from 4.1% of the coded dialogue in coded session 1 to 10.7% in coded session 2. In the Grade 2 PLC, Initiate increased from 4.8% of the dialogue in coded session 2 to 15.5% of the dialogue in coded session 3. The causes of these shifts seem to be rooted in context, and more specifically in the lack of set agendas for the PLC meetings. More topics were Initiated because there was not a singular focus for the PLCs. The use of Initiate in the Grade 2 PLC was the result of moving from a commonly constructed lesson where participants would give their positions on a common topic to a session where there was no common topic of discussion.

Similarly, the ELA PLC also saw a shift in Initiate from a first coded session that was rooted in the SGO to two sessions where the participants no longer had to construct a common assessment. In session 2 and session 3, participants collaborated but did not have a similar focus to keep the PLC from shifting in multiple directions. Interestingly, the shift in the use of Initiate increased from 4.1% of the dialogue in coded session 1 to 10.7% of the coded dialogue in coded session 2. This shift occurred because the group was searching for a focus. In the second coded session, the participants in the USII PLC group were working toward building the structure for the lesson study, which seemed to encourage the use of Initiate. Once this was chosen, the use of Initiate went back down to 6.3% of the coded dialogue moves. Ideal collaboration is both coordinated and interdependent, where learners strive to achieve a shared goal (Winne et al., 2013). What is seen in this study is that reflective scripts on collaboration alone do not seem to
create a shared goal or focus on student achievement, which is described in research as important to effective PLC work (Garet et al., 2001; Guskey, 2002). What seemed to be missing in these PLC sessions was a focus on results and accountability, which allowed for many of the sessions to drift onto multiple topics.

Though it is difficult to determine the exact influence of context on the different dialogue moves in the PLC sessions, context does seem to play a significant role in dialogue moves and should be studied further. It appears that the use of the reflection scripts had no impact on increasing or decrease the types of dialogue moves used; however, certain modest conclusions can be drawn from this limited case study.

There are a number of other reasons why the intervention did not create an increase in collaborative behaviors. Ideal collaboration is both coordinated and interdependent, where learners strive to achieve a shared goal (Winne et al., 2013). In two of the PLC groups, it was difficult to ascertain if true collaboration occurred because there was not actual need for the groups to be interdependent. The ELA group, though they worked together, did not have to use the work collaboratively built. Furthermore, in the USII PLC, only one of the members was committed to teaching the collaboratively constructed lesson.

What is interesting in these findings is how little student learning was assessed. Research suggests that a focus on student learning in teacher’s daily practices are important parts of professional development (Dufour et al., 2006; Prenger et al., 2017; Stoll et al., 2006; Vescio et al., 2008). At no point in any of the sessions was student learning at the center of the discussion. There was a lot of time devoted to teacher practice; however, references to student performance were surface level and dealt with rubrics and overall feelings about students did on an assignment. This lack of focus on student performance might have come from the fact that it was
difficult to ascertain if the PLC groups were assessing students in the same manner. It was also apparent from the study that teachers, though collaborative, did not create products they all used in common. Instead, teachers could choose parts of the collaborative product or shared resources and reject others. These issues may have contributed to lack of conflict because none of the participants had to sacrifice if they did not want to for the greater group.

Ideal collaboration consists of work that is coordinated by the group, as well as where the group in collaboration creates a product that is interdependent. This makes true collaboration mutually interdependent, dynamic, and intended to move a group toward a shared goal in a joint task (Gress et al., 2010). What is lacking in these groups seems to be the ability either through structure or willingness to move forward in a shared goal and to make an interdependent product. Suggestions on how to accomplish this can be found further in the chapter.

**Research Question 2**

The second research question was as follows: In what ways can the use of reflective collaborative scripts rooted in the collaborative indicators outlined in the 2007 study by Thomson et al. affect participant self-regulation to display behaviors outlined in the Thomson et al. (2007) study?

As stated earlier, self-regulated learning is a learning process that is guided by metacognition. It involves the learner to think about planning, monitoring, and evaluating personal progress toward a goal (Ross-Gordon et al., 2016). In this research question, I looked to examine how self-reflective prompts might have an impact on how participants thought about their collaboration.
This research question was analyzed through the examination of shifts in survey results, interview question responses, and entries into reflection journals. The interviews were analyzed through a descriptive coding to ascertain themes present in the Thomson et al. (2007) study.

The assessment of the findings will be provided in the following paragraphs, organized by the themes of collaboration in the Thomson et al. (2007) study.

**Governance**

The theme of Governance and its indicators that were rooted in goals and deadlines was an area where participants seemed to feel they had grown because of the collaborative scripts. The area where the scripts seemed to help the most was in the area of focus. What can be stated is that participants believe that they did grow in the areas; however, it is difficult to ascertain if actual changes occurred in the actions that occurred in the PLCs.

Research does show that reflection initiates cognitive processes, which encourages self-regulation and metacognitive practices (Ifenthaler, 2012). It also shows that question prompts have been shown to be an effective way to elicit reflective practices (Wu & Looi, 2012) and self-regulation (Molenaar et al., 2014; Lei et al., 2013; Wang et al., 2017).

The participants were surveyed about how they felt about a number of the indicators in Governance (see Appendix H). In the theme of Governance, there were four different questions that asked participants to gauge how their group measured up to an indicator. Only groups were assessed to measure whether the PLC felt like they collaborated better by the end of the study; individual responses were not evaluated. In the USII PLC for those four questions, there were four disagree, three neutral, and one strongly disagree. These negative responses did not cluster around one statement. However, the strongly disagree centered on the statement “Your PLC formally evaluates the successes and failures of collaborative activities.” By the last survey, the
group only responded to the statements with agree or strongly agree. The ELA group was much more positive about their group’s performance under Governance, with only one occurrence of neutral and two of disagree; however, at the end, there was only one disagree and two neutrals assigned by the group members. The Grade 2 PLC went from assigning two disagree and a neutral response to the first survey to no instances of disagree and only one neutral in the last survey.

Between all PLCs, there seemed to be a shift in how the members felt about their PLC connected to the indicators in the theme. The first survey question, “Your PLC “formally evaluates the success or failure of collaborative activities,” received one neutral response, four agrees, two strongly agrees, and one strongly disagree in the first administration of the survey. In the final administration, those responses shifted to six participants strongly agreeing with the statement and two participants agreeing with the statement. When given the statement, “Your PLC has specific procedures and rules it follows to ensure a successful meeting” at the first administration of the survey, four participants disagreed with the statement, two participants responded neutral, one participant agreed, and one participant strongly agreed. This changed in the final administration of the survey, where five respondents agreed with the statement, one participant disagreed, one participant strongly agreed, and one participant remained neutral.

Though individual group members may have felt differently about their group's abilities under the theme of Governance, it does seem that they believed that their group was more proficient in the theme. This is interesting when combined with the actual observations of PLC sessions in the study, which will be discussed later.

Further evidence comes from testimony like the following from Leslie:
I think I like being prepared meaning like, okay, we're going to be talking about driving this week. [00:03:51] Okay, so I come there with my writing materials. My idea is some examples of work that I have rather than other times where we kind of just went into the meeting...”

Or, this statement from Ben, “No. I think it (the scripts) actually helps us guide the conversation like where we going. What are our goals objectives?”

However, though it appears that participants felt that they were internalizing the indicators of governance, it is hard to confirm that they actually changed their behaviors. In the ELA group, there were never really any established goals that the members were working toward, though they did collaborate on specific topics of mutual interest like the SGO and benchmarks. However, at no point in the session were any group members assigned anything to accomplish or were they accountable for a mutually created product.

The USII PLC similarly did not give each other specific roles or have a specific deadline to complete the lesson study. It is possible that they did set a date to complete the collaborative lesson; however, no mention of a hard deadline for construction was mentioned during the recorded sessions. It is possible that the reflection sheets did help prompt the group members to establish a workable goal in the USII PLC; however, there is no outward indication that this happened in a PLC session.

The Grade 2 PLC was more organized than the other PLCs and did come to the sessions with specific goals and deadlines; however, these behaviors were part of the PLC culture before the intervention and could be seen in the first coded session prior to the intervention, when the group knew they had to get through grade reporting.
In order for a PLC to be effective, it must have the overall objective of increasing teacher effectiveness and student learning (Dufour et al., 2006; Stoll et al., 2006; Vescio et al., 2008); furthermore, the conversations in PLC sessions must go beyond surface level exchanges of help (Vescio et al., 2008; Tague & Anfura, 2012; Bausmith et al., 2011). What was observed in most PLC sessions was a willingness to help and, in some sessions, a willingness to organize; however, there lacked a sense of accountability, which was reinforced by a lack of internal deadlines to complete tasks or evaluate successes.

It is difficult to ascertain that the reflection scripts had any significant effect on outward behavior. That being said, it does appear that the participants believed that the scripts did help them feel more organized and prepared coming into their PLC sessions, and it is possible that over more time would change behavior. This is, however, conjecture and cannot be confirmed in this study.

**Autonomy & Mutuality**

Like with the theme of Governance, PLC members felt that they had grown in the indicators for Mutuality according to survey results. Because of the repetitiveness of the modified indicators, Autonomy was not surveyed.

What PLC members did show through their responses to the surveys, reflection scripts, interviews, and sessions was that they believed they were able to shape the collaborative products such as the lesson study, living zoo, and the benchmark assessment. Group members considered the other PLC members to be colleagues who would listen to them and take their suggestions. When looking over the data, it is hard to challenge the fact that this is the case; all group members when they decided to contribute did. Only in two situations, one with Joan in the ELA group and the other with Ann in the Grade 2 Group, did the participants feel reserved to
give their input. However, this was an act of self-censuring because they believed they were new to the group. There was no evidence in the sessions that the other group members did not welcome their input.

It is important to revisit the survey results here to gain an overview of how participants perceived their groups at the beginning and the end of the study. The statement “Differing philosophies between PLC members make it difficult to communicate” found no support or even a neutral response in the first and the last administration of the survey. If the previous question is removed from analysis, the USII PLC had two instances of disagree and one neutral to the statements. The two submissions of disagree came from the same participant, who by the last survey, changed his responses to strongly agree and agree. One participant in this PLC group changed one response from agree to disagree; this statement was about the PLC reaching out to experts in the field, which was not observed in any of the recorded sessions. The Grade 2 PLC had positive responses to both the first and the last administration of the survey. In the ELA PLC, there was one statement that did not gain any positive reaction: “PLC members challenge and critique each other when discussing an initiative or new technique.” By the end of the study two participants shifted their responses from neutral to agree.

Furthermore, many participants felt that their opinions were valued. Statements like this one from Donna occurred often.

Yeah, I think especially in that last meeting to wear one of our group members brought up the January Benchmark and we kind of like some of us didn't really [00:05:23] feel that we should be doing the January Benchmark. So we voice our opinions and I feel that like I was one who voiced my opinion and I felt my opinion was valued and we were able to come to a conclusion.
Or Chris when he was discussing conflict and his PLC group

I just wrote something quickly like our group requires no conflict resolution, you know, we're all friends which helps so we respect the good, the bad and the ugly personally socially professionally, [00:06:39] so I guess we're lucky, lucky in that regard.

It is difficult to suggest that the reflective scripts changed participant behavior, though they might have reinforced the culture the groups had already built. Though participants stated that they grew in the survey results in these areas, it was evident that a culture of sharing was present in the PLC groups prior to the intervention. Surveys prior to the study gave the impression that group members valued each other’s opinions, and interviewees always stated that they felt like their opinions were valued.

Though all members were able to contribute to the collaborative products, the contributions were uncritical. Rarely did any PLC member challenge another one in their contribution, even on the merits of what they were submitting to the collaboration. This could be because of a fear of conflict; however, all members felt they could trust each other. It could, however, also be because of the veteran nature of the groups; though these individuals have trust, they could also share too many assumptions, making their PLC a reinforcing mechanism for the culture, and might not feel the need to challenge assumptions they believe are facts (Bausmith et al., 2011; Sargent, 2015; Prenger et al., 2017). The PLC groups might also be too comfortable and share confirmation biases; in a study of Chinese versions of PLCs, the researcher stated that the government had to address what was called “homophilous relationships,” or the tendency to have nonnegative ties with people who share the same beliefs, in their PLC groups, where the group was content but lacked innovation in challenging the status quo (Sargent, 2015).
Administration

Under the theme of Administration, participants did not seem to create defined roles and did not really seem interested in pursuing defined roles. At no point in the study did any participant advocate for or create defined roles for participants. There were roles assigned during certain PLC sessions, but these roles were mainly administrative where a group member agreed to type on a collaborative document.

After looking at all of the data, I think that Ben probably holds an opinion that many of the other participants would agree with. In his first interview he stated:

We don't have roles. But you know, if someone has a question or a or a, you know, or our problem with class or something along those lines, they throw it out there and then the other members a we give suggestions we give ideas and we bounce things off each other.

His PLC colleague Ron in his first interview does state, however, that the reflective scripts are important to him in setting goals, and that by setting goals, there might be a need to create roles in the future.

Whereas the conversation may have been absent entirely previously and it has sort of nudged us into realizing that we don't necessarily have a collaborative PLC short or long-term goal necessarily and that in order to be more effective or if you know, hopefully highly effective that we need to begin as to establish those goals to identify our roles in achieving those goals.

Research suggests that interpersonal tension that arises from negative conflict behaviors makes people uncomfortable, and teachers are no exception to this rule (Dooner et al., 2008).
This can cause fear and discomfort which can shut down collaborative learning (Taylor & Marienau, 2016). Though this might be true, conflicts rarely if ever arose in the participant PLC groups.

Conflicts in groups did not rise to the surface in any of the taped sessions, so it is difficult to ascertain if they were dealt with quickly. In survey results, participants did migrate to the positions that would suggest that they grew in this area, but there is no evidence to either confirm or refute that sentiment.

The survey question where participants were asked if they held each other accountable to contribute saw a shift where all but one of the respondents stated that they believed that their group did this. However, there does not seem to be evidence that anyone was held accountable in any group for work. There were some instances, especially during the construction of the living zoo, that one PLC member did feel that not all members were contributing as much as they should. However, that was only on reflection in one reflection log, and there was no other mention of holding members accountable in any reflection, interview, or PLC session. This might be because there was not much to be held accountable for in the sessions. Since there were no agendas or specific deadlines, it was difficult to hold anyone accountable. Furthermore, no PLC members had to use the collaborative product, and though many participants volunteered to use collaborative resources, no one was forced to use anything they did not want to use in their classes.

**Norms**

Research suggests that innovative teaching is likely to occur when teachers develop trusting relationships in their PLCs (Stoll et al., 2006). Participants in the study stated that they trusted and felt they could rely on the other group members. The group members in the different
PLCs seemed to express many of the values established by Tschannen-Moran which were used by the researcher as a way of defining trust (see Appendix ). PLC members showed caring toward one another and expressed appreciation for one another. Participants believed that their fellow PLC members were willing to share power and were honest with them (Hallam et al., 2015). They were missing one aspect of the facets of trust, however, and that facet was competence. Though group members did engage in solving problems together, they did not really engage in setting standards for their group to meet, at least not in a timely manner. That being said, trusting relationships and Norms were established in the PLC groups throughout the study.

There is little evidence, however, to suggest that there was any direct connection between the reflection scripts and any feeling of trust, respect, or a sense of duty between PLC members. The survey results were overwhelmingly positive in their identification of positive Norm traits and the rejection of negative group traits associate with Norms and trust.

Evidence, however, does suggest that these behaviors were already present before the start of the study and only solidified through the duration of the study. Ben states the following about his group:

Our group is a really good group. So, you know, we are with each other we bust each other's chops. But yeah, we all respect each other … It's like one big family. [00:04:34]

Everybody tries to help out everybody.

There could be a couple reasons for the cause of the modest increase in the attributes of Norms. First, the PLC members already had long standing relationships with one another that the PLC members thought were productive. Secondly, the PLC groups were all influenced by the outside pressures of COVID-19 and virtual teaching. This is not to say that reflect had no
influence at all; further study on the impact of reflection scripts and their impact on a sense of trust and dedication to a PLC groups should be examined further in the future.

Conclusion

The reflective scripts were used to focus participants on their own behaviors. These metacognitive exercises build an internalization of habits that changes self-perception and learner action (Zimmerman & Schunk, 2001). It appears that learner self-perception was influenced by the collaborative scripts; however, it is much harder to determine if that internalization translated into changes in behavior.

There are a number of reasons why this could be possible, most notably the lack of accountability in sessions to produce. Though research has suggested that argumentation can increase opposing viewpoints when coupled with scaffolds (Charness & Dave, 2017; Felton et al., 2015a; Noroozi et al., 2013; Nussbaum et al., 2005. In the PLC sessions I observed in this study, there was a lack of a need to make arguments. This could be because I did not structure the sessions well enough to elicit arguments. This is because success in collaboration depends on strategies that foster dynamic, mutually interdependent interactions and self-regulatory skills individuals contribute to the group (Chinn & Clark, 2013). It could also be that because the PLC groups had been together for a number of years, their close trusting relationship might had brought with it a stagnation in conflict. In a study of Chinese PLCs, the researcher found that the Chinese system had to work to break down the stagnation that came from groups that worked together too long (Sargent, 2015).
Limitations

_The Impact of COVID-19_

It is important to discuss the shift that occurred in the study going into the pandemic. The COVID-19 pandemic had some significant impact on the study that I will share in the upcoming pages. The original study was supposed to run from April through May of 2020; however, COVID-19 created an environment where teachers were navigating all virtual learning, asynchronous teaching, and doing all of this without time to really meet with their colleagues. I decided that it would be wiser to delay the study.

In the originally proposed study, participants were going to be put through tasks to increase tension and collaborative activities such as common grading, dissecting a lesson, or common planning of a lesson that all participants would have to teach. However, I decided not to do this in the final study. COVID-19 and the stresses put on the teachers through the constant changing of their schedules, the adding and removing of requirements such as SGOs, quarantining, and teaching in person and virtually created a situation where teachers were already very stressed out about their profession; creating more in my option might have created unnecessary and harmful emotional stress.

The original study was also supposed to have the participants taped in person; however, in the final study this was not possible since the PLCs were primarily virtual. This medium may have changed the dynamic of the sessions; however, it did help me with transcribing conversation.

COVID-19 also had an impact on the types of conversations in the taped PLC sessions. Many of the taped sessions were influenced either in whole or in part due to the pandemic. The USII PLC was heavily influenced by the pandemic, as the participants were all coaches who had
their seasons upended by the pandemic. Other PLCs spent time discussing the pressures of people getting sick, fluctuations in the teaching schedule, and struggling with online teaching. These pressures found their way into even the most structured PLC sessions.

*The Role of the Researcher*

I am an administrator who provides training for teachers in the district where the study took place. It can be argued that the approach to the research could have resulted in participant coercion, research bias, or exaggeration in the data of analysis. I tried to stem these concerns by sticking to methodology, removing myself from the evaluation of any member in the study. Finally, I made sure that I was not present for the PLC sessions except when I disseminated procedural information, and I made no attempt to influence conversation. In design-based research, it is not uncommon for a researcher to intervene in the study as it progresses; however, besides giving procedural advice, I believed that my position as an administrator in the district might put undue pressure that could coerce participants to change their behavior out of a fear of possible work-related retaliation. The precautions taken to limit my role as an administrator for those in the study were used to help ensure that I worked primarily as a researcher and not as an administrator when engaging with participants. However, it must be said that I do have relationships with multiple district employees, since I have worked in the district for a number of years, and I cannot be certain that participants did not feel pressure to give me the answers they though I would want, especially in the interviews. That being said, it would be difficult for the participants to manipulate all of the dialogue moves they made in sessions. Furthermore, results suggested that the outcome of the study showed that my intervention had not significant impact on dialogue moves.

*Demographics of Participants*
The participant demographics in the study is a significant limitation and could have played a role in the validity of the results, or at least limited the application of the findings. The size of the study was small, only ten participants, and further research should be done to scale up the application of the research design for the study.

The participants also limit the study, since all participants in the study were white and tenured staff. Furthermore, all of the participants had been with their PLC groups for at least 2 years, with each PLC group consisting of the same sex. The USII PLC was all male, and the other two groups were all female. This created a situation where there was little racial, sexual, or years of service diversity in the groups. This fact may limit the study since it is hard to tell whether a research would get similar results with groups that did not share so much homogeneity.

**Research Design**

The participants in the study were all members of PLC groups in the district; one group was a second-grade PLC, one was a seventh-grade ELA PLC, and the final group was a high school USII PLC. The semistructured nature of PLC groups in the district and the lack of a set agenda for each meeting made it difficult to account for the multiple variables in the study. Teachers would bring different topics of need and interest to examine in PLC sessions. This created a situation where context heavily influenced the dialogue moves used during the study. A control group would have been an asset, but impractical. I tried to work to make sure that the teachers used a coded session prior to the intervention as a control; however, this method could not account for the changing topics that happened week to week. A control group could have offset this by ensuring that one group was not getting the intervention as they navigated the different problems of practice faced over the months of December, January, and February of
2020–21. However, this would be almost impossible without creating a lab test where I could control each topic that was discussed, since in a normal PLC setting it is impossible to ensure that groups who are given the control to dictate their agendas are always discussing the same topics.

There are a number of concerns about the longitudinal viability of a study like this. Though there was little evidence to suggest the reflection scripts had an impact on the dialogue moves, there is a sense that the scripts did have some impact according to interviews and the surveys, specifically in the area of focus. It is hard to see how a couple of months of intervention would stick with participants over time, and it might be a good idea to see if the participants still think about the indicators in the reflection prompts almost a full year since the intervention. Data collection may have also presented a limitation; data were collected through a number of means, such as coded taped dialogue, interview responses, reflection responses, and survey results. However, these were not all consistent, and reflections were not always completed. It is hard to tell if participants truly reflected on the questions, since at times they were not filled out by participants, but there was no way of knowing if the topics were not reflected upon or that the participants just decided not to fill out the forms. Furthermore, though coding validity was examined by two other Citi certified doctorate students, as well as my dissertation chair. Much of the act of coding responses relied not only on the words that a participant used, but also their intent when using those words in context. The coding scheme was vast; however, by labeling terms I would always have to decide if a dialogue move fit primarily into one code or the other.

The Thomson et al. (2007) study did have a number of useful definitions and indicators to use to analyze participant responses and how those responses connected to the different themes of effective collaboration found in the study. It would have been beneficial to have a way to use
the study as a rubric to assess collaboration. The PLC sessions were places where internalized behaviors of collaboration could become present; however, it was difficult to ascertain whether specific types of collaborative actions were becoming more prevalent for two reasons. The first reason why it was difficult to ascertain an increase in collaborative behaviors was that it was difficult to turn the indicators into a working rubric. In the original study proposal, the indicators were to be constructed into a rubric to demonstrate growth in collaborative behaviors. The rubric, however, proved to be too vague and the scoring seemed too subjective to be included in the analysis. The second reason why it seemed problematic to use the rubric was the diversity of topics addressed in the different PLC session. The sessions would focus on different topics and sometimes on multiple topics that would lend themselves to different aspects of a rubric which would lead to unverifiable results. However, it is a limitation of the study because a whole area of possible collaborative action could have been assessed.

Finally, the nature of the study presents its own limitation; this study consists of three small case study groups. It is difficult to generalize findings from such a small sample; this does not mean that the sample was too small to create actionable data, but that it is important for further research to be done to examine how collaborative reflective scripts have an impact of participants in PLC groups.

**Recommendations for Future Research**

One of the hopes rooted in the study was that the use of reflective collaborative scripts could be used by professional trainers and management to increase the effectiveness of collaborative groups. It was speculated that the use of the reflective scripts would increase effective collaboration as defined in this study, as well as change dialogue patterns associated with different types of collaboration and argument. Though it is difficult to state what the
specific impact of the reflective scripts was, since they appeared to have little to no impact on outward behavior, but did seem to help focus participants, it is important to see how different aspects of the research plan could be improved to help validity and focus outcomes in future research. In the following section I will give some elaboration on suggestions for future researchers.

**Research Design**

To increase the validity of findings, it would have been helpful to have the PLC groups all pulled from the same grade and subject, this would ensure at least some continuity of topics over the course of the study. The recommendation I would give to future researchers is to work to establish better recruiting methods primarily in an elementary school in a district, since it appeared that the elementary group was the most in lock step of all the groups. Through my work in the district, I can verify that the synchronizing of grading, instruction, and lesson planning was not an anomaly in the Grade 2 PLC group.

It was difficult to keep the different groups accountable for building products in their PLCs. In the study, the USII PLC became much more focused once they knew that they had to produce a product at the end of a couple of PLC sessions. I would not recommend that future researchers make up problems for teachers to solve or script out the PLCs since, according to research, teacher professional development should be connected to teacher practice, ongoing, and intensive (Darling-Hammond et al., 2009; Little, 2006). I would suggest, however, to give more structure to PLCs through PLC scaffolds that provide protocols or a lesson study.

A second place where a new grouping of researchers could devise a way to analyze a study like this is through a slightly different lens. It became apparent when reading through the collected data that PLC members shaped a lot of what they believed was important, which was
heavily impacted by context. Future research may want to examine this further by basing a study completely on a social constructivist framework. In a social constructivist framework, a researcher could better focus on PLC member perceptions of what is important in their established community of practice (CoP). This is because in a true social constructivist framework, and not just one that is informed by constructivist thought like this study, a researcher can formally examine how a group of PLC participants construct their reality, what is perceived as real, and what are the consequences for the group when those perceptions construct a working reality (Patton, 2014, p. 121).

Finally, it is difficult to ascertain if the virtual setting had an impact on dialogue moves in the study. There is no specific evidence that conversations were affected by having them through the medium of Google Meet; however, the fact that the participants were asked to use Google Meet as the stage for their meetings could have had an impact on conversation moves. Google Meet shifts focus on the screen to who is presently speaking, and participants were discussing a number of issues in their homes instead of face to face in a meeting room.

**Demographics of Participants**

The study’s participants were very homogeneous in their groups. This led to a lot of questions about how their familiarity or lack of diversity could have influenced their PLC culture. In further research, I would suggest expanding the study to include a number of diverse PLC groups from the same grade and subject area. By allowing for diversity of participants but controlling the diversity of the PLC, it would let the research be able to control some of the variables and focus on how diverse participants in different PLC groups work through the similar problems of practice (since they are working through the same curriculum), but also be able to
focus on the diversity that might come from how a more diverse set of people interacted with the collaborative reflection scripts.

**Researcher Recommendations**

It was apparent in the study that the participants, though sharing a common PLC, did not have to hold each other accountable or create a collaborative product. That being said, the USII PLC did attempt to create a collaborative product, and the Grade 2 PLC did come very close to collaborative construction. What was lacking in all of the groups was organization for meetings and ways to hold PLC members accountable for increasing student learning. The following paragraphs suggest three possible ideas to scaffold PLCs toward these goals. It is the researcher’s hope that in a more structured PLC, reflective scripts might be able to have more of an effect of participant actions. However, it is difficult to tell if that is the case without first creating the scaffolds necessary to build a working PLC based on the definition that PLCs are “an ongoing process in which educators work collaboratively in recurring cycles of collective inquiry and action research to achieve better results for the students they serve. Professional learning communities operate under the assumption that the key to improved learning for students is continuous job-embedded learning for educators” (Why PLC at Work, n.d.).

Below I will discuss possible options for creating scaffolds that will help PLCs stay free to collaborate on problems of practice of their choosing, but also have supports to ensure efficient meetings that have structures for focus. I think that the inclusion of the following structures would allow a researcher to control some of the variables that were difficult to organize in this study.

The first suggestion is the creation of a PLC cycle. The framework for a PLC cycle came from my reflections on the data collected in this dissertation study, which informed me that
though it is still important to construct a PLC that is free to collaborate and set its own agenda, frameworks must be constructed to ensure that there is accountability and focus. A PLC cycle (see Appendix P) is a set of PLC meetings (5–8 weeks) focused on a particular topic of inquiry. The purpose of the cycle is to use meetings 1 and 2 as a way to plan the cycle by finding a problem of practice or commonly grading student work to find an area for student improvement. The middle weeks are a time to implement the strategies to address the problem of practice and to collect student work to assess the strategies put in place. During the middle sessions, the PLC group focuses on other issues of interest outside of the cycle focus. The final two sessions are devoted to reflecting on the effectiveness of strategies and planning forward. Each PLC should shoot to accomplish 4–6 cycles a year.

The second option is Japanese lesson study, which is a type of collaborative lesson development and evaluation where a group of teachers develop a lesson together, called a “research lesson.” One teacher is chosen to teach the research lesson while the other group members are in the class taking notes on the lesson to see if the group’s conjectures about student learning and lesson design work as expected (Yoshida, 2012).

Protocols are another possible option for PLC groups to increase the structure in PLCs. Protocols are defined by the National Reform Faculty as a “structured processes and guidelines to promote meaningful, efficient communication, problem solving, and learning. Protocols give time for active listening and reflection, and ensure that all voices in the group are heard and honored“ (What are protocols, 2019). Establishing specific protocols for teacher PLCs such as ATLAS or Consultancy can increase the efficiency of a PLC meeting and assure that goals are set without overscripting the PLC.
**Participant Recommendations**

At the end of the second interview, I asked participants what they thought would be a good support for their PLCs and what could make a study using a similar research model better if another researcher, or professional organization decided to use reflective scripts to increase effective collaboration. All participants felt that being able to reflect on their sessions was important and most like the idea of having specific indicators to think about. A number of the participants did give other suggestions, which are listed below.

Ron stated that he believed that the reflection questions would not have the same effect as making participants collaborate together through a lesson study.

I think the lesson study fits perfectly with who we are at Colts, where we're going, what our systems are, and I think that and that was one of my conclusions in my project was that the lesson study is something that can be implemented across PLCs… I think the frequency (of the reflections) was appropriate to being once a week perhaps maybe instead of the open-ended responses, the response style maybe some of them could be more of a multiple-choice survey or something like that, but I think it's fine.

Chris stated that he believed that grounding the PLC group in big takeaways could better focus groups.

Kind of a put the post holes and what are we working toward as a group and that PLC, like what are the what are the big takeaways, is that we really need the kids in history class to know so you can keep going here?

Joan suggested in her final interview that there needed to be more organization and documentation between PLC meetings. She stated:
In my last gen district, we had this ongoing record of our PLC and it was a continually, you know, it was an open working document that we whenever something would come up outside of PLC time. It would be a place where we could, you know, reflect and say, hey this is something interesting to discuss during PLC time, or we would come up with almost like these mini agendas for our PLC.

Shawna stated that she would want a researcher on hand to discuss the questions, “The questions, like I said, I just was unsure. So maybe like you we could have streamed you in or something…we could have run them past you to make sure we're on the right track.”

**Final Conclusions Drawn**

The Colts School District has had to find ways to navigate waters with limited resources. The district has a budget and a tax base that is considerably smaller than surrounding towns. However, this being said, the district has worked to create a vibrant professional learning environment rooted in PLCs. The district has committed to using PLCs to help supplement the lack of other resources for professional development.

As stated earlier, PLCs have been shown to increase student growth when a PLC has reflective dialogue that leads to extensive and continuing conversations among teachers about curriculum, instruction, and student development; these conversations must go beyond surface level exchanges of help (Vescio et al., 2008; Teague & Anfura, 2012; Bausmith et al., 2011).

However, without the proper supports and structures, PLCs can become places where group members work together, but do not ensure that their work increases student learning. It is also true that PLCs are heavily influenced by the context of their collaborative sessions, and that different contexts can create different dialogue patterns. It might be possible by shaping contexts that dialogue patterns can also be shaped, and that those patterns could get a group closer to
effective collaboration. However, based on the findings in this study, it is hard to tell specifically how to construct the appropriate contexts and more studies should be conducted to determine how to create the appropriate supports to generate better collaborative outcomes.

Finally, it has been shown that, at least without the proper structures and supports, reflective scripts alone do not seem to shift actions or dialogue patterns. This study is a small sample, and other studies might show different results. However, based on the information gathered in this study, I would recommend that participants in PLCs, researchers, and managers work on building contexts and structures for collaboration and then possibly introduce reflection questions to support these behaviors, since in this study participants did seem to believe that the reflection scripts helped them internalize appropriate behaviors. Once again, however, more research needs to be done on the subject before any firm conclusions can be drawn.
References


Appendix A
Data Collection Summary Table

<table>
<thead>
<tr>
<th>Data Collected</th>
<th>Collection Medium</th>
<th>Scoring / Coding of Measure</th>
<th>Time of Collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant data will be collected to determine how each participant feels about their group as it connects to indicators found in the Thomson et al. (2007) study.</td>
<td>Survey questions (see Appendix H).</td>
<td>Survey results will be collected to look for changes in survey responses. Since there are only 10 participants surveyed, each response will be tracked for changes.</td>
<td>Beginning of cycle, before the third PLC session, and at the end of the study.</td>
</tr>
<tr>
<td>Dialogue between participants will be assessed to determine if, after the intervention of reflective scripts are enacted, participants will change dialogue according to the adapted Felton and Kuhn (2001) coding scheme.</td>
<td>PLC sessions will be taped and transcribed. Examples can be found in the findings and discussion sections and codebook found in Appendix C.</td>
<td>Dialogue will be coding using a provisional coding (Saldana, 2016) method adapted version of the coding scheme developed by Felton and Kuhn (2001). Participants will be assessed to see if they use more dialogue moves associated with the Felton and Kuhn scheme as they receive the intervention.</td>
<td>Three PLC sessions located before the intervention, roughly 2 weeks into the intervention, and at the end of the intervention.</td>
</tr>
<tr>
<td>Collaborative behaviors will be examined in PLC sessions as they are defined by the indicators found in the Thomson et al. (2007) study.</td>
<td>PLC sessions will be taped and transcribed. Examples can be found in the findings section and discussion sections.</td>
<td>A Concept Coding method (Saldana, 2016) rooted in the indicators found in the Thomson et al. (2007) study will be used by the researcher to find representations of behaviors associated with those indicators in the taped PLC sessions. These indicators will serve as provisional codes</td>
<td>All seven PLC sessions.</td>
</tr>
<tr>
<td>Data Collected</td>
<td>Collection Medium</td>
<td>Scoring / Coding of Measure</td>
<td>Time of Collection</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Participant feelings about collaborative behaviors based on the indicators found in the Thomson et al. (2007) study will be analyzed for themes associated with effective collaboration and the usefulness of the intervention.</td>
<td>Participants will be interviewed. Interviews will be taped and transcribed. Examples can be found in the findings section and discussion sections.</td>
<td>A Concept Coding method (Saldana, 2016) rooted in the indicators found in the Thomson et al. (2007) study will be used by the researcher to find representations of behaviors associated with those indicators in the transcribed interviews (see Appendix J).</td>
<td>Interviews will be administered at the midpoint of the study and at the end of the study.</td>
</tr>
</tbody>
</table>
Appendix B

Coding Scheme (Felton et al., 2001)

Table B1

Argumentative Discourse Coding Scheme

<table>
<thead>
<tr>
<th>Move</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Questions</td>
<td></td>
</tr>
<tr>
<td>Agree?</td>
<td>Question that asks whether the partner will accept or agree with the speaker's claim.</td>
</tr>
<tr>
<td>Acknowledge?*</td>
<td>Question that checks whether the partner is comprehending what is being said.</td>
</tr>
<tr>
<td>Case?</td>
<td>Request for the partner to take a position on a particular case or scenario.</td>
</tr>
<tr>
<td>Clarify?</td>
<td>Request for the partner to clarify their preceding utterance without an interpretation.</td>
</tr>
<tr>
<td>Justify-?</td>
<td>Request for the partner to provide reasons in support of a claim.</td>
</tr>
<tr>
<td>Position-?</td>
<td>Request for the partner to provide their global position.</td>
</tr>
<tr>
<td>Question-?</td>
<td>Simple informational question which does not refer back to the partner's preceding utterance.</td>
</tr>
<tr>
<td>Respond-?</td>
<td>Request for the partner to react to the speaker's utterance.</td>
</tr>
<tr>
<td>Stance-?*</td>
<td>Request for the partner to state their position on an alternate argument.</td>
</tr>
<tr>
<td>Substantiate-?*</td>
<td>Request for the partner to support their preceding claim with evidence.</td>
</tr>
<tr>
<td>Statements</td>
<td></td>
</tr>
<tr>
<td>Accept*</td>
<td>Explicit agreement to a Position-Qualification, Interpret, or Recap.</td>
</tr>
<tr>
<td>Accommodate*</td>
<td>Statement that integrates a point advanced by the partner by qualifying or changing the speaker’s own argument or commitment set without a change in position.</td>
</tr>
<tr>
<td>Acknowledge*</td>
<td>Validation of the partner’s preceding utterance by communicating interest, understanding, appreciation, or attentiveness.</td>
</tr>
<tr>
<td>Add</td>
<td>Elaboration of the partner's preceding utterance.</td>
</tr>
<tr>
<td>Advance</td>
<td>New claim advanced by speaker to strengthen or extend the partner’s claim-set.</td>
</tr>
<tr>
<td>Move</td>
<td>Description</td>
</tr>
<tr>
<td>----------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Agree</td>
<td>Statement of agreement with the partner’s preceding utterance.</td>
</tr>
<tr>
<td>Answer</td>
<td>Response to Question-?.</td>
</tr>
<tr>
<td>Anticipate*</td>
<td>New opposing-side claim advanced by speaker unconnected to partner’s claim-set.</td>
</tr>
<tr>
<td>Argument</td>
<td>New claim advanced in support of speaker’s position.</td>
</tr>
<tr>
<td>Aside</td>
<td>Off-topic or tangential comment.</td>
</tr>
<tr>
<td>Case Answer</td>
<td>Response to Case-?.</td>
</tr>
<tr>
<td>Case*</td>
<td>Anecdote presented to illustrate an argument.</td>
</tr>
<tr>
<td>Clarify</td>
<td>Clarification of speaker’s own argument in response to the partner's preceding utterance.</td>
</tr>
<tr>
<td>Concede*</td>
<td>Explicit concession to an opposing-side claim advanced by the partner.</td>
</tr>
<tr>
<td>Coopt</td>
<td>Attempt to demonstrate that partner’s preceding utterance supports the speaker’s claim-set.</td>
</tr>
<tr>
<td>Counter-A</td>
<td>Critique of the partner’s argument that advances an unrelated claim, rather than addressing the partner’s claim.</td>
</tr>
<tr>
<td>Counter-C</td>
<td>Critique of the partner’s argument that challenges or undermines the strength of the partner’s claim.</td>
</tr>
<tr>
<td>Counter-UC*</td>
<td>Unjustified assertion that the speaker’s position is superior or that the partner’s position is inferior.</td>
</tr>
<tr>
<td>Disagree</td>
<td>Simple disagreement without further argument or elaboration.</td>
</tr>
<tr>
<td>Dismiss</td>
<td>Simple and isolated statement that the partner’s preceding reason is unimportant or irrelevant.</td>
</tr>
<tr>
<td>Framing*</td>
<td>Narrowing the focus or breadth of the argument or setting one or more directions to proceed with an argument.</td>
</tr>
<tr>
<td>Interpret</td>
<td>Paraphrase of the partner's preceding utterance with or without further elaboration; either a statement or a rhetorical question.</td>
</tr>
<tr>
<td>Initiate*</td>
<td>Statement that begins a line of reasoning that does not contain an argument and may conclude with a case question.</td>
</tr>
<tr>
<td>Justify</td>
<td>Claim offered in response to a Justify-?.</td>
</tr>
<tr>
<td>Meta</td>
<td>Comment about the dialogue or speakers.</td>
</tr>
<tr>
<td>Position</td>
<td>Statement of position on the topic of discussion.</td>
</tr>
<tr>
<td>Recap*</td>
<td>Summary of the claim-set advanced by one or both speakers.</td>
</tr>
</tbody>
</table>
### THE EFFECTS OF REFLECTIVE SCRIPTS

<table>
<thead>
<tr>
<th>Move</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reject*</td>
<td>Explicit disagreement with an Accommodate, Interpret or Recap.</td>
</tr>
<tr>
<td>Refuse</td>
<td>Explicit refusal to respond to the partner's preceding question.</td>
</tr>
<tr>
<td>Stance</td>
<td>Response to a Stance-?.</td>
</tr>
<tr>
<td>Substantiate</td>
<td>Evidence in support of a speaker’s own claim that can be offered in</td>
</tr>
<tr>
<td></td>
<td>response to a request for evidence or to set up the speaker’s argument.</td>
</tr>
<tr>
<td>Withdraw*</td>
<td>Retraction of a claim or critique in light of the partner’s preceding</td>
</tr>
<tr>
<td></td>
<td>utterance.</td>
</tr>
</tbody>
</table>

* Codes added to argumentative discourse scheme reported in Felton & Kuhn (2001)

### Table B2

**Metaconversational Moves**

<table>
<thead>
<tr>
<th>Move</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal-setting</td>
<td></td>
</tr>
<tr>
<td>Meta-G GS+</td>
<td>Attempt to establish the goal of the dialogue or redirect off-topic</td>
</tr>
<tr>
<td></td>
<td>conversation back to the goal of the dialogue.</td>
</tr>
<tr>
<td>Meta-G GSc</td>
<td>Refusal to work toward the goal of the dialogue or a simple demand for the</td>
</tr>
<tr>
<td></td>
<td>partner to switch sides.</td>
</tr>
<tr>
<td>Goal Checking</td>
<td></td>
</tr>
<tr>
<td>Meta-G GC+</td>
<td>Check-in on progress toward meeting the goals of the dialogue.</td>
</tr>
<tr>
<td>Meta-G GC-</td>
<td>Taunt or expression of frustration about the progress toward meeting the</td>
</tr>
<tr>
<td></td>
<td>goals of the dialogue.</td>
</tr>
<tr>
<td>Goal met</td>
<td></td>
</tr>
<tr>
<td>Meta-G GM+</td>
<td>Signal that the goals of the dialogue have been met or that time is up.</td>
</tr>
<tr>
<td>Meta-G GM-</td>
<td>Disingenuous claim that the goals of the dialogue have been met to</td>
</tr>
<tr>
<td></td>
<td>foreclose further dialogue about claims and evidence.</td>
</tr>
<tr>
<td>Managing turns</td>
<td></td>
</tr>
<tr>
<td>Meta-P TU+</td>
<td>Explicit and positive attempt to share talking time.</td>
</tr>
<tr>
<td>Meta-P TU-</td>
<td>Attempt to silence the partner or wrest control of talking time.</td>
</tr>
<tr>
<td>Managing Stalls</td>
<td></td>
</tr>
<tr>
<td>Move</td>
<td>Description</td>
</tr>
<tr>
<td>-----------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Meta-P ST+</td>
<td>Signal that the conversation has stalled or an attempt to restart stalled</td>
</tr>
<tr>
<td></td>
<td>conversation.</td>
</tr>
<tr>
<td>Meta-P ST-</td>
<td>Taunt or criticism that the partner is repeating or running out of ideas.</td>
</tr>
<tr>
<td></td>
<td>Managing interpersonal dynamics</td>
</tr>
<tr>
<td>Meta-P ID+</td>
<td>Establishing or reinforcing a tone of respect or setting boundaries for</td>
</tr>
<tr>
<td></td>
<td>interpersonal behavior.</td>
</tr>
<tr>
<td>Meta-P ID-</td>
<td>Insults, ad hominem statements, or overgeneralizations about the partner.</td>
</tr>
<tr>
<td></td>
<td>Exchanging ideas</td>
</tr>
<tr>
<td>Meta-R EX+</td>
<td>Eliciting ideas to drive the dialogue forward.</td>
</tr>
<tr>
<td>Meta-R EX-</td>
<td>Stifling or closing off the exchange of ideas.</td>
</tr>
<tr>
<td></td>
<td>Clarifying meaning</td>
</tr>
<tr>
<td>Meta-R CL+</td>
<td>Checking to clarify the other partner’s meaning or request for more</td>
</tr>
<tr>
<td></td>
<td>information.</td>
</tr>
<tr>
<td>Meta-R CL-</td>
<td>Dismissing ideas as confusing or poorly expressed or clarifying meaning in</td>
</tr>
<tr>
<td></td>
<td>a condescending manner.</td>
</tr>
<tr>
<td></td>
<td>Evaluating ideas</td>
</tr>
<tr>
<td>Meta-R EV+</td>
<td>Positive judgments about the quality of the other speaker’s ideas.</td>
</tr>
<tr>
<td>Meta-R EV-</td>
<td>Negative judgments about the quality of the other speaker’s ideas.</td>
</tr>
<tr>
<td></td>
<td>Maintaining productive talk</td>
</tr>
<tr>
<td>Meta-R PT+</td>
<td>Establishing or reinforcing Norms for the effective exchange of ideas.</td>
</tr>
<tr>
<td>Meta-R PT-</td>
<td>Expressing frustration with the partner for not following Norms for the</td>
</tr>
<tr>
<td></td>
<td>effective exchange of ideas.</td>
</tr>
</tbody>
</table>
## Appendix C

**Dialogue Move Code Book Adapted from Felton and Kuhn (2001)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Definition</th>
<th>Example 1</th>
<th>Example 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question</td>
<td>A simple informational question that does not refer back to the partner’s proceeding utterance.</td>
<td>“Did we do them (report cards) in June, we did right?” (Grade 2 coded session 1)</td>
<td>“When are you teaching D-Day Ron?” (USII coded session 2)</td>
</tr>
<tr>
<td>Initiate</td>
<td>Statement that a line of reasoning that does not contain an argument and may conclude with a case question, starting a new line of conversation.</td>
<td>“So, breakout rooms were good today, like in the classroom we would be putting them in groups.” (ELA coded session 2)</td>
<td>Yeah, Wendy, you have your SGO done right?&quot; (ELA coded session 2)</td>
</tr>
<tr>
<td>Acknowledge</td>
<td>Validation of the partner’s preceding utterance by communicating interest, understanding, appreciation, or attentiveness.</td>
<td>“Oh my god, that’s sad.” (Grade 2 coded session 2)</td>
<td>“Yeah, yeah, that’s true.” (ELA coded session 2)</td>
</tr>
<tr>
<td>Answer</td>
<td>Response to a Question.</td>
<td>“Yeah, I need to fill out the paperwork.”</td>
<td>“I think they control the Meet for a day.” (ELA coded session 2)</td>
</tr>
<tr>
<td>Agree</td>
<td>Statement of agreement with the partner's preceding utterance.</td>
<td>“Yeah, yeah.” (Grade 2 coded session 2)</td>
<td>“Oh, that’s good!” (ELA coded session 2)</td>
</tr>
<tr>
<td>Position</td>
<td>Statement of a position on a topic of discussion.</td>
<td>“It’s funny, in class I don’t focus on, I don’t really get into the, my angle in politics.” (USII coded session 2)</td>
<td>“I think we should tell him we want to group our kids by the first question.” (ELA coded session 1)</td>
</tr>
<tr>
<td>Position?</td>
<td>Request for the partner to provide their global position.</td>
<td>“Are your guys having a lot of Google issues today?” (ELA coded session 1)</td>
<td>“Should we put an NA because it’s enough, we don’t know if it’s applicable?” (Grade 2 coded session 1)</td>
</tr>
<tr>
<td>Code</td>
<td>Definition</td>
<td>Example 1</td>
<td>Example 2</td>
</tr>
<tr>
<td>----------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Aside</td>
<td>Off-topic or tangential comment.</td>
<td>“Oh my god, look you have a belly!” (ELA coded session 2)</td>
<td>“You know I want my girls back.” (Grade 2 coded session 2)</td>
</tr>
<tr>
<td>Add</td>
<td>Elaboration of the partner's preceding utterance.</td>
<td>“Yeah, that’s what I am saying. It was good for them.” (ELA coded session 2)</td>
<td>“I am on the New Deal.” (USII coded session 1)</td>
</tr>
<tr>
<td>Clarify</td>
<td>Clarification of speaker’s own argument in response to the partner's preceding utterance.</td>
<td>“Because when we go to print like if you print them (report cards), it just seems like all the comments from trimester one, two, and three are smooshed together into one paragraph.” (Grade 2 coded session 1)</td>
<td>“It’s just because we are making more work for ourselves. So, then every trimester with the comment what we’re working on, I think the parents know and the kids know because we are all doing solids and liquids lately.” (Grade 2 coded session 1)</td>
</tr>
<tr>
<td>Case</td>
<td>Anecdote presented to illustrate an argument.</td>
<td>“Okay, so I have a girl in my block one that already turned her draft in and I was looking over this morning … I’ve got to say the difference, the fact we went over it and everything … it was lit.” (ELA coded session 2)</td>
<td>“I just, like one girl was saying how she took a situation where she went to an ice-skating tournament or something … and her story is about how one mom forgot all the outfits for the skaters and they were in Connecticut.” (ELA coded session 2)</td>
</tr>
<tr>
<td>Counter-A</td>
<td>Critique of the partner’s argument that advances an unrelated claim, rather than addressing the partner’s claim.</td>
<td>“I know you have been doing this for a long time, but I don’t have 30</td>
<td>“The only thing is some of them put five, and then two questions over put, ‘I’m still trying to</td>
</tr>
<tr>
<td>Code</td>
<td>Definition</td>
<td>Example 1</td>
<td>Example 2</td>
</tr>
<tr>
<td>--------</td>
<td>---------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Counter-C</td>
<td>Critique of the partner’s argument that challenges or undermines the strength of the partner’s claim.</td>
<td>“Well it says narrative … it does say narrative, it does say each of them.” (Grade 2 coded session 1)</td>
<td>In response to a partner stating that they will not use the results of running records in anyway, “No, we are using it for the parents, we are using for the parents so they know where the kids are at.” (Grade 2 coded session 3)</td>
</tr>
<tr>
<td>Disagree</td>
<td>Simple disagreement without further argument or elaboration.</td>
<td>In response to two partners stating that the kids like the narrative essays, “You do have the kids that like the format of formal essays.” (ELA coded session 1)</td>
<td></td>
</tr>
<tr>
<td>Dismiss</td>
<td>Simple and isolated statement that the partners preceding reason is unimportant or irrelevant.</td>
<td>In response to starting to take PLC notes, “Yeah look at our lesson plans, that’s our PLC.” (Grade 2 coded session 2)</td>
<td></td>
</tr>
<tr>
<td>Refuse</td>
<td>Explicit refusal to respond to the partner's preceding question.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reject</td>
<td>Explicit disagreement with an Accommodate, Interpret, or Recap.</td>
<td>In response to a statement that a member could not find a rubric and wondered if there was a folder, “I</td>
<td></td>
</tr>
<tr>
<td>Code</td>
<td>Definition</td>
<td>Example 1</td>
<td>Example 2</td>
</tr>
<tr>
<td>--------</td>
<td>---------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Argument</td>
<td>New claim advanced in support of speaker’s position.</td>
<td>“I am too and then I ask myself, do they really care, am I still doing it? Yeah, because I know they’ll be one kid in the room that will say. Wow. That was awesome.” (USII coded session 3)</td>
<td>“I love the letter, that’s a great idea (a reference to a letter from the Russian foreign minister) and I think once you start doing that, you know, maybe showing a map. My thing is, when I’ve always found with the inclusion kids they get so messed up with the eastern and western front because they think of the United States. Yes, their eastern western is like all mixed up. So when they look at a map and they see like England Atlantic Ocean they are thinking like, New Jersey, Atlantic Ocean, that’s east.” (USII coded session 3)</td>
</tr>
<tr>
<td>Advance</td>
<td>New claim advanced by speaker to strengthen or extend the partner’s claim-set.</td>
<td>“Yeah I know, I think that if they think it’s okay, they will like keep doing it, you know.” (ELA coded session 1)</td>
<td>After a partner states, “We don’t want to overwhelm them.” “Yeah, and we want good work coming back.” (ELA coded session 1)</td>
</tr>
<tr>
<td>Clarify?</td>
<td>Request for the partner to clarify their preceding utterance without an interpretation.</td>
<td>In response to a partner stating that kids today a really into the battle technology, “Not for</td>
<td>In response to a partner stating that she has a specific app on her phone for the library, “Is that</td>
</tr>
<tr>
<td>Code</td>
<td>Definition</td>
<td>Example 1</td>
<td>Example 2</td>
</tr>
<tr>
<td>------</td>
<td>------------</td>
<td>---------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>the girls though?&quot; (USII coded session 2)</td>
<td>umm audiobooks, is...&quot; (Grade 2 coded session 2)</td>
</tr>
</tbody>
</table>
The Effects of Reflective Scripts

Conjecture Map

Outcomes

The PLT will have the following outcomes as a result of participating in the programs:

- Improved collaboration and communication
- Enhanced problem-solving skills
- Increased self-awareness and reflection
- Greater sense of ownership and responsibility
- Enhanced ability to work in teams

Processes

In the program, participants will engage in the following processes:

- Peer coaching
- Reflection sessions
- Collaboration activities
- Problem-solving exercises

Embodiments

The embodiment of the program will include:

- Direct participation in collaborative activities
- Reflection on personal experiences
- Discussion of best practices
- Application of learned skills in real-world scenarios

High Level Conjecture (C1): Participants will develop increased collaborative skills and enhanced problem-solving abilities.

Middle Level Conjecture (C2): Participants will experience improved communication and teamwork.

Low Level Conjecture (C3): Participants will reflect on their experiences and apply new skills in practical situations.

Figure E2
Appendix E

The Intervention Design
Appendix F

Interview Protocol

Prep: Print out the consent letter and ready your recording device (tape recorder or laptop).

Good morning/afternoon. My name is (insert name). Thank you very much for agreeing to participate in this interview about your experiences during the PLC study. My aim is to study your general attitudes about your experiences collaborating and arguing during the 12 sessions of the study.

I would like to interview you about your experiences during the game and what you learned. The interview should last for about 15 minutes. With your permission, I would like to audio-record the interview using either a tape recorder or a laptop.

Your participation in this study is completely anonymous. Your name, identity and place of work/study will not be recorded. If there are any questions that you would rather not answer, please feel free to say you wish to skip the question and move on to the next question. Data from this interview were used solely for the study and will not be published or presented in any other context.

Participation is entirely voluntary and you may discontinue participation at any time.

If you have any further questions, you may contact the university (provide copy of the consent letter).

[Allow time to read/digest the material.]

Do you consent to this interview?

[If no]

Thank you for your time. I appreciate your consideration.
THE EFFECTS OF REFLECTIVE SCRIPTS

[If yes]

Great, thank you for agreeing to participate in this interview. Here are the questions I’d like to ask:

Experimenter: Begin recording.

(see Qualitative Interview Questions below)

1. Did the reflection scripts help you in challenging your PLC members (Why or why not, explain)?

2. Did the reflection scripts help focus your PLC sessions, did it have no effect, or did it push your PLC off task (Explain your answer)?

3. Did you find that your opinions were valued in discussions about your PLC tasks? If yes, ask if they feel that the argumentative scripts help establish Norms?

Okay, I am going to switch the topic a bit. The next questions are going to focus on arguments in your group.

4. What part of discussions about solving the problem proposed to your group did you find the most challenging (why)?

5. Did you find that PLC members were more likely to argue productively with one another in the second session (why or why not, explain your answer)?

6. Did you find the reflection scripts beneficial when arguing in PLC sessions?

7. If you could give any suggestion to the researchers about how to design an environment to elicit better collaboration in the future, what would it be?
Appendix G

Survey Questions

PLC Survey

Please fill out all of the following questions honestly, and to the best of your ability. None of your responses will be shared with anyone except for the researcher.

Code Number

Your answer

NEXT

Governance

Your PLC formally evaluates the success or failure of collaborative activities. *

- Strongly Agreee
- Agree
- Neutral
- Disagree
- Strongly Disagree

Your PLC has specific procedures and rules it follows to ensure a successful meeting. *

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree
### Administration

PLC members bring conflict between members into the open and solve the problem collaboratively.
- [ ] Strongly Agree
- [ ] Agree
- [ ] Neutral
- [ ] Disagree
- [ ] Strongly Disagree

PLC members rely on outside authority (supervisor, principal, etc.) to resolve inter-member conflict.
- [ ] Strongly Agree
- [ ] Agree
- [ ] Neutral
- [ ] Disagree
- [ ] Strongly Disagree

PLC members constantly brainstorm to find solutions for department and district goals.
- [ ] Strongly Agree
- [ ] Agree
- [ ] Neutral
- [ ] Disagree
- [ ] Strongly Disagree

PLC members bring conflict between members into the open and solve them collaboratively.
- [ ] Strongly Agree
- [ ] Agree
- [ ] Neutral
- [ ] Disagree
- [ ] Strongly Disagree
You achieve more in your PLC group than you would alone.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

PLC members challenge and critique each other when discussing an initiative or new technique.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

PLC Members hold each other accountable when a member does not contribute.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

You as a member of the PLC understand your role and responsibility to the group.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree
**Mutuality**

PLC members work to support one another by sharing resources with each other.

- [ ] Strongly Agree
- [ ] Agree
- [ ] Neutral
- [ ] Disagree
- [ ] Strongly Disagree

Differing philosophies between PLC members make it difficult to work together.

- [ ] Strongly agree
- [ ] Agree
- [ ] Neutral
- [ ] Disagree
- [ ] Strongly disagree

Your PLC searches for information to help accomplish goals, including reaching out to experts and researching methods.

- [ ] Strongly Agree
- [ ] Agree
- [ ] Neutral
- [ ] Disagree
- [ ] Strongly Disagree
**Norms**

**PLC members feel they can trust one another.**
- [ ] Strongly Agree
- [ ] Agree
- [ ] Neutral
- [ ] Disagree
- [ ] Strongly Disagree

**I have felt that others in my PLC have ignored or belittled my contributions.**
- [ ] Strongly Agree
- [ ] Agree
- [ ] Neutral
- [ ] Disagree
- [ ] Strongly Disagree

**Even if other members fail to contribute I feel it is my duty to contribute to the group accomplishing its goals.**
- [ ] Strongly Agree
- [ ] Agree
- [ ] Neutral
- [ ] Disagree
- [ ] Strongly Disagree

**I ignore suggestions from colleagues when I assume they won't work.**
- [ ] Strongly Agree
- [ ] Agree
- [ ] Neutral
- [ ] Disagree
- [ ] Strongly Disagree
Some members take advantage of, or strong arm weaker members.

- [ ] Strongly Agree
- [ ] Agree
- [ ] Neutral
- [ ] Disagree
- [ ] Strongly Disagree
Appendix H

Reflection Script Questions

Reflection

Please reflect on the following questions. The reflections you type will be sent back to you before the next PLC meeting.

Reflection #1

Highly effective collaborative groups establish mutually accepted benchmarks toward accomplishing their goal. This time table should be based on all group member input, where all members feel respected.

What have you done to help guide your group to accomplish effective collaboration as stated in the above description? What actions do you think you should take in the future to help your group accomplish its goals?

Your answer
Reflection #2

Highly effective groups have clearly defined roles for each member, because it helps the group accomplish its goals more effectively. Conflicts when they arise are mediated quickly resulting in conclusions all group members can accept.

In what ways have your actions helped your group accomplish the indicators in the above indicator. How might you change your behavior to more fully realize this indicator in future sessions?

Your answer

Reflection #3

Individual groups members in highly effective groups help each group member accomplish his or her goals, as well as, group goals. Each group member in discussion is able to shape the direction of the collaborative process.

In what ways have your actions helped your group accomplish the indicators in the above indicator. How might you change your behavior to more fully realize this indicator in future sessions?

Your answer
Reflection # 4

All group members in highly effective groups critically challenge one another to create solutions that allow each group to create a product, in which, they can all be proud.

In what ways have your actions helped your group accomplish the indicators in the above indicator. How might you change your behavior to more fully realize this indicator in future sessions?

Your answer
Appendix I

Collaboration Coding Indicators

<table>
<thead>
<tr>
<th>Definition</th>
<th>Reflection Question</th>
<th>Indicators</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Governance</td>
<td>Participants seeking to collaborate have to understand how to jointly make decisions. Group members have to find ways to establish common goals and timely benchmarks.</td>
<td>Highly effective collaborative groups establish mutually accepted benchmarks toward accomplishing their goal. This timetable should be based on all group member input, where all members feel respected. What have you done to help guide your group to accomplish effective collaboration as stated in the above description? What actions do you think you should take in the future to help your group accomplish its goals? As you reflect, think: What behaviors exhibited by me and my group fit this indicator? What if anything might need to be improved?</td>
<td>Your collaborative group has established a goal and workable, timely benchmarks to accomplish their goal. If the group goal or benchmarks are modified, all group members are aware of what must be accomplished to achieve the new goal/benchmark. Your group members have established relationships of mutual respect that allow for individual members to contact each other informally to work out problems and ask questions outside of specified formal meetings.</td>
</tr>
</tbody>
</table>

Mutuality

| Mutuality | Mutuality has its roots in interdependence. Groups that | Individual group members in highly effective groups help each group member | All group members are on the same page about what they | “We're all going in the same direction. It's just how we get there. So, you know Ron might |
**Definition**

Collaborate must experience mutually beneficial interdependencies based either on differing interests or on shared interests.

**Reflection Question**

Accomplish their goals, as well as group goals. Each group member in the discussion is able to shape the direction of the collaborative process. In what ways have your actions helped your group accomplish the indicators in the above indicator? How might you change your behavior to more fully realize this indicator in future sessions? As you reflect, think: What behaviors exhibited between me and my group fit this indicator? What if anything might need to be improved?

**Indicators**

Want in a final product.

Group members work through design problems that result in a win-win result for all group members.

Your sacrifice for the group has achieved a significantly better answer to your problem of practice because you are in the group, as opposed to tackling it alone.

**Example**

Have a different idea how he assesses a certain, you know time period in history, I might do it a different way, but it’s we’re all again to the same spot” (B. Wyatt).

---

**Autonomy**

Autonomy refers to how much freedom individual members in a group have to help shape the product without disrupting the administrative roles. It also shows how individual group members balance their individual wants with the wants of other group members.

All group members in highly effective groups critically challenge one another to create solutions that allow each group to create a product of which they can all be proud. In what ways have your actions helped your group accomplish the indicators in the above indicator? How might you change your behavior to more fully realize this indicator in future sessions? As you reflect, think: What behaviors exhibited between me and my group fit this indicator?

Collaboration significantly helps you achieve group and individual goals.

The group allows each member to shape the collaborative project based on individual wants and needs.

All group members take responsibility for themselves and other group members.

“So without any we clearly heard one another’s viewpoints on the January Benchmark. Should we give it? Should we not and we collaboratively came to a decision not to and [00:07:22] moved on from there. So and I think those keeping that reflection those reflection questions in mind as we were going through definitely in our minds as we were talking” (S. Tweep).
<table>
<thead>
<tr>
<th>Definition</th>
<th>Reflection Question</th>
<th>Indicators</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>indicator? What if anything might need to be improved?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Administration**

Administration is the mechanism that ensures a unified mission turns into a delivered product.

Highly effective groups have clearly defined roles for each member because it helps the group accomplish its goals more effectively. Conflicts, when they arise, are mediated quickly resulting in conclusions all group members can accept. In what ways have your actions helped your group accomplish the indicators in the above indicator? How might you change your behavior to more fully realize this indicator in future sessions?

There are clearly defined roles for each participant that help the collaborative process move efficiently.

Conflicts that arise are mediated quickly and efficiently resulting in a conclusion all members can accept.

Your individual tasks are well coordinated with the task of others in your group.

“I just wrote something quickly like our group requires no conflict resolution, you know, we're all friends which helps so we respect the good, the Bad and the Ugly personally socially professionally, [00:06:39] so I guess we're lucky, lucky in that regard” (C. Traeger).

**Norms**

Norms were defined in the study as established protocols both seen and unseen that help guide productive work in a group.

No reflection questions are attached to this indicator.

Members believe they can trust one another.

Members respect the opinions of each member.

Members believe that they have a duty to contribute positively to the group.

“Our group is a really good group. So, you know, we are with each other we bust each other's chops. But yeah, we all respect each other … It's like one big family. [00:04:34] Everybody tries to help out everybody” (B. Wyatt).
<table>
<thead>
<tr>
<th>Definition</th>
<th>Reflection Question</th>
<th>Indicators</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>All members of the group are respected.</td>
<td></td>
</tr>
</tbody>
</table>
Appendix J

Video Consent Form

Rutgers, The State University of New Jersey

IRB Audio/Videotape Addendum to Consent form

You have already agreed to participate in a research study conducted by Christopher Zegar. We are asking for your permission to allow us to include both audio and video recordings as part of that research study. You do have to agree to be recorded in order to participate in the main part of the study.

The recording(s) were used for:

1. Coding of dialogue between participants.
2. Assessing collaborative behaviors using a collaboration rubric.
3. Coded responses were analyzed by the researcher, and two people not affiliated with the district to ensure coding validity.

The recordings will include all conversation that occurs during the taped sessions. Participants’ identities were masked in the transcribing and coding sessions after the completion of the recorded portion of the research. The recorded portions will not be shown to anyone besides the researcher and two coders not affiliated with the district to help ensure validity. After the conclusion of the research the recorded sessions were destroyed.

The recordings were stored on a secure computer, and hard copy materials such as tapes were kept in a locked cabinet in the researcher’s home. Participants will not be identified by their names on any transcript or title on a video or audio tape. Instead participants will receive an identifier number, which will help keep the participant’s identity anonymous.

Your signature on this form grants the investigator named above permission to record you
as described above during participation in the above-referenced study. The investigator will not use the recordings for any other reason than those stated in the consent form without your written permission.

**Figure K1**

*Consent Form*

<table>
<thead>
<tr>
<th>AGREEMENT TO PARTICIPATE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Subject consent:</strong></td>
</tr>
<tr>
<td>I have read this entire consent form, or it has been read to me, and I believe that I understand what has been discussed. All of my questions about this form and this study have been answered. I agree to take part in this study.</td>
</tr>
<tr>
<td>Subject Name: ___________________________</td>
</tr>
<tr>
<td>Subject Signature: __________________ Date: ____________</td>
</tr>
</tbody>
</table>

| **2. Signature of Investigator/Individual Obtaining Consent:** |
| To the best of my ability, I have explained and discussed all the important details about the study including all of the information contained in this consent form. |
| Investigator/Person Obtaining Consent (printed name): ________________ |
| Signature: __________________ Date: ________________ |
Appendix K

Debriefing Statement

Thank you for participating in our study. In mixed method studies, it is sometimes necessary to conceal our hypotheses because when people know what is being studied, they often alter how they argue with one another and react to conflict. However, we do not want you to leave misinformed, so we will now tell you what we were actually studying.

During this study, you were asked to fill out a survey and participate in an interview, as well as participate in seven recorded PLC sessions. You were told that the purpose of the study was to assess collaboration styles. The purpose of this study is to assess the benefits, if any, of reflective scaffolds. In order to test these hypotheses, certain experimental groups were given reflective scripts based on a collaborative rubric. Groups who were prompted in this manner were compared against each other and control groups.

Furthermore, dialogue from the PLC sessions was coded to determine if the reflective prompts had a significant impact on collaborative and argumentative dialogue. It was, therefore, important to not share all of the coding with you, since it may have swayed responses and dialogue.

We apologize for any inconvenience for any information withheld. When people know exactly what the researcher is studying, they often change their behavior, thus making their responses unusable for drawing conclusions about human nature and experiences.

If your participation in this study has in any way upset you, a referral list of mental health providers is attached to this document for your use. (Please remember that any cost in seeking medical assistance is at your own expense.) Rutgers Counseling Services can be reached at (855) 515-5700.

If you have any questions about this study, feel free to ask the researcher, Christopher Zegar, (973) 215-8765, cjz37@scarletmail.rutgers.edu

[ALL STUDENTS MUST INCLUDE THIS SECTION, not the above]: If you have any questions about the study or study procedures, you may contact myself at Christopher Zegar, (973) 294-8865, cjz37@scarletmail.rutgers.edu You may also contact my faculty advisor Dr. Angela O'Donnell, d.odonnell@gse.rutgers.edu

If you have any questions about your rights as a research subject, please contact an IRB Administrator at the Arts and Sciences Institutional Review Board, Rutgers University by phone: (732) 235-2866 or by email: humansubjects@orsp.rutgers.edu

Now that you understand the true nature of our study, we would like to give you the chance to refuse the use of your data for our research purposes. You are free to ask us not to use your data
in our study analysis. If you have any concerns about your participation or the data you provided in light of this disclosure, please discuss this with us. We were happy to provide any information we can to help answer questions you have about this study. Please again accept our appreciation for your participation in this study.

You were given a copy of this form for your records. **Please choose one (1) statement below and sign/date:**

- You have read this debriefing form and you **AGREE** to allow the use of your data for research purposes.

  Agree—Subject’s Signature __________________ Date __________

- You have read this debriefing form and you **DO NOT AGREE** to allow the use of your data for research purposes and would like your data to be immediately withdrawn and destroyed (where possible).

  Disagree—Subject’s Signature __________________ Date __________

Subject Name (Print) ____________________________ Subject ID/# _______
(if applicable)

Principal Investigator Signature __________________ Date __________
Appendix L

Adult Consent Form

CONSENT TO TAKE PART IN A RESEARCH STUDY

TITLE OF STUDY: An assessment of interventions on collaboration in teacher PLCs.

Principal Investigator: Christopher Zegar

This informed consent form provides information about a research study and what were asked of you if you choose to take part in it. If you have any questions now or during the study, if you choose to take part in it, you should feel free to ask them and should expect to be given answers you completely understand. It is your choice whether to take part in the research. Your alternative to taking part is not to take part in the research.

After all of your questions have been answered and you wish to take part in the research study, you were asked to sign this informed consent form. You are not giving up any of your legal rights by agreeing to take part in this research or by signing this consent form.

Who is conducting this research study?

Christopher Zegar is the Principal Investigator of this research study. A Principal Investigator has the overall responsibility for the conduct of the research. However, there are often other individuals who are part of the research team.

Christopher Zegar may be reached at….

Christopher Zegar or another member of the study team will also be asked to sign this informed consent. You were given a copy of the signed consent form to keep.

Why is this study being done?

The purpose of this study is to assess collaboration in your PLC, as well as, the effects of prompting on collaboration. If you choose to participate, this study were conducted with others in your professional learning community (PLC) group, and they must also consent. The study hopes to use the data collected to help inform participants on how to best collaborate in their PLCs. The findings of the study were shared with the participants.

Who may take part in this study and who may not?

Teachers who are part of professional learning communities (PLCs) can participate in the study. Only professional educators who are part of a PLC can participate in the study.

Why have I been asked to take part in this study?

You have been asked to participate in this study because you are a teacher, who participates in a professional learning community (PLC).

How long will the study take and how many subjects will take part?
You were one of approximately 20 subjects recruited voluntarily in their district assigned PLCs. The study will last approximately 7 weeks and will occupy all of your PLC session; however, you will not be asked to participate in work that is not part of the normal running of a PLC.

What will I be asked to do if I take part in this study?

If you decide to participate in the study, you were asked to fill out three surveys: one at the beginning of the research process, one at the middle, and one at the end. The recorded portion of the research will take place over two themed sessions of seven PLCs. Participants were given a problem of practice connected to a theme that is part of your normal PLC (such as test scores, common rubrics, or a district initiative).

What are the risks and/or discomforts I might experience if I take part in this study?

Minimal risks are anticipated from taking part in this study, such as feelings associated with assessing your peers or discussing district initiatives while being videotaped. If you feel uncomfortable with a question, you can skip that question or withdraw from the study altogether. If you decide to quit at any time before you have finished the questionnaire, your answers will NOT be recorded.

Are there any benefits to me if I choose to take part in this study?

There are a number of direct benefits to participating in this study. The study can be used to help guide you in making your PLCs as productive as possible. The debriefing portion of the study, which includes citing your participation as professional work in your summative evaluation.

However, it is possible that you may not receive any direct benefit from taking part in this study.

What are my alternatives if I do not want to take part in this study?

There are no alternatives available. Your alternative is not to take part in this study.

How will I know if new information is learned that may affect whether I am willing to stay in the study?

During the course of the study, you were updated about any new information that may affect whether you are willing to continue taking part in the study. If new information is learned that may affect you after the study or your follow-up is completed, you were contacted.

Will I be paid to take part in this study?

No.

How will information about me be kept private or confidential?

All efforts were made to keep your personal information in your research record confidential, but total confidentiality cannot be guaranteed.
Your responses were kept strictly confidential.

The paper and digital data collected were stored on a secure computer, and any hard copy materials were stored in a locked filing cabinet after it is entered. Your personal identifiers (such as name, address) will not be stored with data from your survey or data from the taped sessions. Instead, you were assigned a participant number. The researchers will see your individual survey responses and the results; however, they were coded by your identifier number and will not have any personal information attached to it. We will not collect any personal identifying information about you and all answers were confidential. At the conclusion of the research the collected data were destroyed, no person besides the researcher will collect and store the data.

What will happen if I do not wish to take part in the study or if I later decide not to stay in the study?

It is your choice whether to take part in the research. You may choose to take part, not to take part or you may change your mind and withdraw from the study at any time.

If you do not want to enter the study or decide to stop taking part, your relationship with the study staff will not change, and you may do so without penalty and without loss of benefits to which you are otherwise entitled.

You may also withdraw your consent for the use of data already collected about you, but you must do this in writing to Christopher Zegar.

Who can I call if I have questions?

If you have questions about taking part in this study you can contact Christopher Zegar (975) 251-5555.

If you have questions about your rights as a research subject, you can call the IRB Director:

New Brunswick/Piscataway ArtSci IRB or the Rutgers Human Subjects Protection Program at (973) 972-1149 in Newark or (732) 235-8578 in New Brunswick.
Appendix M

PLC Cycles

PLC Cycle Form (4–6 Weeks)

PLC Group Members: ____________________________

Topic for Evaluation: ____________________________

Cycle Start Date: ______________
Cycle End Date: _________

<table>
<thead>
<tr>
<th>Why was the topic selected?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How will you accomplish your goal?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>
Provide a summary and reflection of what you accomplished.

What is the next step?

Would you be willing to present at a department meeting? ______________
Cycle Expectations

A PLC cycle is a set of PLC meetings (5–8 weeks) focused on a particular topic of inquiry. The purpose of the cycle is to use meetings 1 and 2 as a way to plan the cycle by finding a problem of practice or commonly grading student work to find an area for student improvement. The middle weeks are a time to implement the strategies to address the problem of practice and to collect student work to assess the strategies put in place. During the middle sessions, the PLC group focuses on other issues of interest outside of the cycle focus. The final two sessions are devoted to reflecting on the effectiveness of strategies and planning forward. Each PLC should shoot to accomplish 4–6 cycles a year.

Cycle topics should be shared with your supervisor before the cycle starts. Cycle forms will be submitted to your supervisor at the end of each cycle.

Your group may be asked by your supervisor to present at a department or faculty meeting.
PLC Discussion Routines

The following link will connect you to a list of protocols for discussing student work and lesson planning in PLC sessions (LINK)

Figure P1
PLC Cycles Presentation

PLC Cycles
Focused, Continuous, Reflective
What is a PLC?

**Professional learning community (PLC)**  An ongoing process in which educators work collaboratively in recurring cycles of collective inquiry and action research to achieve better results for the students they serve. Professional learning communities operate under the assumption that the key to improved learning for students is continuous job-embedded learning for educators.

---

What is a PLC?

**Effective professional learning should...**

- be ongoing
- be job embedded
- be focused on student learning
- be collaborative, critical, and reflective
What is a PLC cycle?

For example:

- **Week 1**: Develop a focus around a problem of practice, and decide on a desired goal
  - Issues that come from student work
  - New instructional strategies
  - Forms of assessment
  - Ect.
- **Week 2**: Implement tactics to accomplish your goal
- **Week 3-5**: Apply tactics to teaching
- **Week 6**: Reflect on evidence collected about the applied tactics
- **Week 7**: Create a path forward based on reflection

In practice...

**Week #1**
Commonly grade student work. Decide on a focus such as improving student thesis statements.
In practice...

**Week # 2**
Collectively decide on a strategy to build complexity and structure in student thesis statements.

In practice...

**Weeks # 3-5**
Work on other things during PLC time. Teach using the techniques constructed in Week 2 and collect student performance data to examine. This could last longer depending on the group focus.
**In practice...**

**Week # 6**
Commonly grade and discuss samples of student work. Reflect on teaching techniques and strategies used. Assess the techniques and strategies for their effectiveness.

---

**In practice...**

**Week # 7**
Decide the next steps. Change techniques, celebrate successes, and possibly decide another focus.
In practice...

Week # 8 (OR LATER)
PLC share out. Sharing could happen at a department meeting, a grade level PLC, etc.
Appendix N

District PLC Focus Planners 2019–20

Figure Q1

PLC Planning Form, Part I

PLC Planning Form

Part I

Areas of Focus (Culinary Arts)
- Establish a classroom culture
- Focus on making engaging lessons that are challenging and enjoyable
- Primary focus on classroom management and lesson planning

Limitations / Hurdles to Overcome
- Very green staff
- No education background
- Elective teachers

Foundational Focus
- Teachers in the culinary arts PLC will focus on creating a positive classroom culture through the exploration of classroom management techniques, identifying effective instructional techniques, and crafting lessons that help students create a personal connection between what they are learning and why it matters.

Figure Q2

Areas Identified for Development and Their Rationales

<table>
<thead>
<tr>
<th>No.</th>
<th>Areas Identified for Development</th>
<th>Rationale/Sources of Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>To engage in collective inquiry through best practices in both teaching and learning. In the PLC, collaboration represents the systematic process in which teachers work together interdependently in order to influence classroom practice in ways that will lead to better results for all students.</td>
<td>The PLC is an ongoing process in which educators work collaboratively in recurring cycles of collective inquiry and action research to achieve better results for the students they serve. Collective inquiry enables team members to develop new skills and capabilities that will lead to experiences and awareness.</td>
</tr>
<tr>
<td>2</td>
<td>In the social studies, students are called upon to be active participants who weigh evidence, engage in historical inquiry, and evaluate sources to create a contextually appropriate dialogue with the past. Professional learning involves reflection and collaboration to increase student growth. In order to increase student learning in the social studies, it is important for teachers to collectively work towards teaching students “ways of knowing” in the social studies. However, since these “ways of knowing” are diverse it is important to give faculty a choice on which aspect of student learning to make their focus.</td>
<td>The social studies department has a list of initiatives that connect to collaborative inquiry and best practices in the “ways of knowing” in the social studies. The following list represents the options for the department. Department members must choose one of the options for his/her goal for the year. Option #1: Lesson Study Option #2 Historical Thinking Skills RAVEN Source Analysis &amp; SHEG (Contextualization, Sourcing, Corroboration) Option #3 Student Dialogue &amp; Questioning (That’s A Good Question / Protocols / Harvard’s Zero Project)</td>
</tr>
</tbody>
</table>
Figure Q3

PLC Minutes Audit

Note. This pie chart represents the time devoted to different topics. At no time was there any critical reflection or critical evaluation in the meeting minutes.
Appendix O

Defined Facets of Trust

**Benevolence:** Caring, extending good will, having positive intentions, supporting teachers, expressing appreciation, being fair, guarding confidential information

**Honesty:** Having integrity, telling the truth, keeping promises, honoring agreements, having authenticity, accepting responsibility, avoiding manipulation, being true to oneself

**Openness:** Engaging in open communication, sharing important information, delegating, sharing decision making, sharing power

**Reliability:** Having consistency, being dependable, demonstrating commitment, having dedication, being diligent

**Competence:** Setting an example, engaging in problem solving, fostering conflict resolution, working hard, pressing for results, setting standards, handling difficult situations, being flexible

https://doi.org/10.1177/0192636515602330