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Perceptions of Urban Secondary Science Teachers Regarding Social Learning Professional Development

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This is to certify that the doctoral dissertation by

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Walden University
2020

Abstract

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MAT, University of Maryland, 2007

BS, University of Maryland, 2004

Dissertation Submitted in Partial Fulfillment

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Doctor of Philosophy

Learning, Instruction, and Innovation

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Abstract

Traditional classroom environments may not motivate students to learn and may lack interactive connections between educators and learners in the classroom. The problem addressed in this research study is the lack of understanding of science teachers' use and perception of innovative social learning strategies implemented in urban classrooms. The purpose of this research study was to establish urban science teachers' perceptions regarding social learning strategies within their classrooms. The conceptual framework of Hall and Hord's levels of use was used. The research questions addressed in this study focused on the perceptions and experiences of secondary science teachers in a large, urban school system. A qualitative case study design was used with face-to-face interviews, reflective journals, and lesson plans based on the social learning professional development. The inclusion criteria encompassed the 8 teachers who attended the professional development regarding social learning, were still employed by this school system, and had used the social learning strategies.. Open coding was used to highlight data and mark sections of the text in codes or labels. The findings demonstrated which social learning strategies the participants found most successful and that teachers found students were gravitated to be part of the learning process. They also realized that social learning is a valuable way to give students interdependence, social skills, ways to solve problems in a real-world manner, and higher-level thinking skills. This study may provide positive social change by improving the understanding of the concerns of educators, enabling facilitators to address these concerns to improve future professional development, as well as improving individual teacher pedagogy.

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Dedication

The dedication of this work is to my son, Joshua Gloster. Courage is the armor that he must wear, so, wear your armor well, my son, wear it with pride. And know that no matter what the battle, I will be at your side.

Acknowledgments

It is important to acknowledge my Mom, Rosemary Macauley, who filled me with the dedication and diligence to complete such a work as this. My father, Kenneth Macauley, should be acknowledged as he taught me to keep trying until you get it right. Also, I would like to acknowledge my committee members who worked tirelessly with me to fulfill my goal: Committee Chair and Content Expert, Dr. Deanne Otto, Committee Member, and Methodology Expert, Dr. Donna Russell, and Dr. Shereeza Mohommed, University Research Reviewer. It is also necessary to acknowledge the educators who devote their lives to assist learners and to become more effective educators.

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Chapter 1: Introduction to the Study

The topic of this research study is to look at the perceptions of the secondary science teachers in a large, urban school district regarding innovative social learning instructional strategies provided to them during a professional development (PD) opportunity. Using PD regarding social learning strategies, science teachers may increase their effectiveness as well as understand their content and pedagogy (Whitworth & Chiu, 2015). One of the potential social implications of the study is an increase in educator efficacy by expanding the skills and knowledge that teachers use for social learning strategies. While this research study focused on science teachers, it is also important that policymakers, community leaders, and parents ensure educators in their school system have opportunities to engage in continuous use of social learning strategies to increase student achievement (Yu, 2015). In this study I used an innovative manner of social learning instructional strategies initiated in a PD provided to teachers in a large, urban school district.

The topic of this study is to use teacher perceptions of social learning of a professional development opportunity that took place in 2012-2013 and their instructional practices. The social implications of this research study were addressed not only by the PD regarding social learning but also addressed teacher perceptions of social learning. The study also allowed teachers to enact on the social learning practices and strategies introduced through the PD that are an innovative part of their instruction. Social implications of this study affect all teachers with the focus on science teachers because science education is the center of interest currently due to the advances in technology

(Whitworth & Chiu, 2015). This research study focused specifically on the science teachers in the large, urban areas. The emphasis on urban areas was the focus of the study as the demand for science is greater in urban areas due to the advances in technology (Nasir & Vakil, 2017; National Education Association, 2018).

While this research study focused on science teachers, it is also important that policymakers, community leaders, and parents ensure educators in their school system have opportunities to engage in continuous PD to increase student achievement (Mapp & Kuttner, 2013). The significance of science as a subject is rooted in using prior knowledge to make informed decisions, understand new concepts, as well as solve problems and use higher-level thinking (Center for Education in Science and Technology, 2018; Glennie, Mason, & Dalton, 2016). Science teachers need PD regarding social learning strategies to assist students with having enough knowledge and skills in science and instruction that is not traditional in methodology but innovative. PD can help teachers become more qualified by providing high-quality teaching (Kennedy, 2016). The purpose of this study was to establish teacher perceptions regarding social learning strategies within their science classrooms. The PD focused on implementing social learning strategies as defined by Bandura (1986). The strategies learned in the PD in this study demonstrated which social learning strategies were most successful in urban, secondary science classrooms. The PD allowed for an understanding of educators' perceptions of social learning and how the PD may change their view of instruction and learning.

Social learning was chosen as a research construct as it uses innovative, student-centered strategies and principles that allow for student engagement as well as

implementing the brain's natural way of learning to enhance pedagogy (Lotz-Sisitka, 2015). One of the potential social implications of the study is an increase in educator efficacy by expanding the skills and knowledge that teachers use for social learning strategies. The research study provided insight into the perceptions of urban secondary science teachers regarding PD they received on implementing social learning strategies. Another insight within the study is to identify social learning strategies that teachers found most successful for their urban science classrooms. Without knowing and understanding the concerns of educators, it is challenging for change facilitators to guide educators as well as the importance of reflection on the part of educators regarding their professional development concerns. Tondeur (2016) stated that PD should aim to improve the opportunity for educators to learn and to allow educators to alter their beliefs and concerns to enable them to take part in instructional practices that are reform oriented. The intent of the social learning PD provided to the potential teacher participants who were a part of this study is just that, to help them inform their philosophy of teaching in hopes teachers might also change their pedagogy in the classroom. The change may be from a traditional approach of direct instruction to a more innovative, social learning method. There is potential for positive social change on several different levels due to the study regarding teacher perceptions of social learning. On a global level, the study may improve understanding of the concerns of educators, enabling facilitators to address these concerns to improve future professional development. Individually, by participating in the study, educators will benefit because they will be reflecting on the social learning strategies presented to them through the PD

they received and how the social learning strategies have impacted their instruction. Sharing these perceptions also has the potential to help other educators in the implementation of social learning strategies.

The remainder of this chapter provides the background of the research, the problem statement, and the purpose of the study. The research questions, nature of the study, and the definitions of terms used fulfill the chapter. Among those aspects of this paper that will be expounded upon will be the significance, assumptions, scope and delimitations, limitations of the study, and the summary.

Background

Educators use a variety of teaching methods in practice in secondary schools. The conventional or traditional method normally includes lecture and rote memorization. The goals of conventional methods focus on the transfer of knowledge (Caine & Caine, 2011). It is within the realm of educators' perceptions of innovative social learning instruction that the gap in the literature exists. This gap demonstrates why the study is needed; to understand teacher perceptions of social learning in urban science classrooms (Tondeur, 2016). This understanding will improve teacher efficacy, make learning more student-centered, and enhance student scholarship.

Traditional classroom environments may not motivate students to learn (Abseysekera, 2016) and may lack interactive connections between educators and learners or between the learners within the class (Sun, 2016). Educators in these environments may view learning as passing knowledge on to students (Saunders, 2015), as well as the presentation of formal information (Sun, 2016). In conventional teaching,

the learning process may not be an active process for learners (Jensen, 2005). In social learning, there is a maximum involvement of brain faculties (Bransford, Brown, & Cocking, 2004). By engaging learners' brains in a more active and student-centered method, educators can seek to help students better understand complicated subject matters and to solve novel problems within new settings (Bransford et al., 2004). The learners' performance may also be improved if educators use pedagogy that has a foundation based upon the greatest use of the inherent abilities of the brain, such as those in social learning strategies.

There is varying research on the effectiveness of PD, as found in this research study regarding social learning strategies. While there is an understanding of the impact of PD on student learning (Dogan, 2016; Lai, 2016), teacher perceptions regarding the impact of social learning strategies on instruction are not understood. There is an establishment of studies on the positive impact of the social learning environments for students (Taylor, 2017; Wang, 2017), however, what is lacking are studies looking at how well urban, secondary science educators are prepared by PD to make the necessary changes in their pedagogy and to implement effective social learning classrooms. Also, of importance is the view of educators regarding how social learning PD has changed their perceptions about instruction and learning. It is important to note educators' perceptions that social learning strategies increase student achievement. There is not a clear understanding of how social learning PD has changed educators' perceptions of instruction and learning.

It is also not axiomatic if educators' viewpoints regarding student achievement changed due to the PD (Lai, 2016). While some studies have shown that PD can impact a change in pedagogy (Wang, 2017), other studies have found that PD does not influence the pedagogy of educators (Sun, 2016). However, no studies have been completed specifically related to social learning in secondary science classrooms. There have been studies completed that demonstrate that PD can increase self-efficacy (Lai, 2016), but studies have not included social learning professional development within an urban setting. A better understanding of educators' perspectives and lived experiences are needed to guide districts seeking to reform or improve teacher instruction with the realm of social learning.

The focus of how students learn best has been at the center of a plethora of research in past decades, and there is much research that supports the position that students learn best with inquiry-based instruction, scaffolded and cooperative learning (Bardack, 2019). When using these innovative methods of instruction, educators become facilitators, coaches, and mentors and focus on what the students are learning (Lai, 2016). These forms of teacher models can lead to scientific competence within the classroom.

To develop scientific competence, students need to begin to think more like experts than novices (Bardack, 2019) which means educators need to help learners acquire not only declarative knowledge and procedural skills but also how to think about problems in terms of a discipline's scientific principles to allow students to adapt to the complexity of the learning process (Yu, 2015). Instructional strategies such as

cooperative and collaborative learning can provide students with the real-life skills necessary to think more like experts.

Accordingly, it is paramount for educators to take notice that the anatomy of the brain is as complex if not more complex as the learning process to plan for the instruction of learners. Neuroscience studies have provided a new framework for rethinking about learning and teaching (Jensen, 2005). The framework is the basis of social learning and the PD necessary to frame the use of social learning. It is within the realm of educators' perceptions of PD based on social learning that the gap in the literature exists. The connection between the social learning strategies used to connect the rethinking of instruction and PD is strong. PD refers to learning opportunities that are ongoing and available to teachers, their schools, as well as their districts (Yu, 2015). When social learning PD is effective, it can be vital to school success as well as teacher satisfaction (Kennedy, 2016). One criticism regarding PD is that of vague goals, its cost, and the lack of data on school improvement that stems from PD (Reeves, 2017). When considering the complex challenges of schools today such as increasing diversity, integration of technology and meeting of academic standards, teachers continue to stress their need for enhancement of their profession as well as building upon their prior instructional knowledge.

In a study conducted by the Stanford Center for Opportunity Policy in Education in partnership with the National Staff Development Council, also known as Learning Forward (Taylor, 2017), the study results provided information on up-to-date information on PD for teachers in the United States. As

of 2017, 78 percent of beginning teachers reported having had a mentor, though not always in the teacher's content area, up from 62 percent in 2000. Mentors provide ongoing PD and observation opportunities for beginning teachers. The Stanford study showed that U.S. teachers spent more time instructing students and less time in PD opportunities with their peers than those teachers in top-performing countries such as Finland and Denmark (Cherry, 2016).

One of the most effective ways to raise student achievement is through impactful PD (Rennie, 2015). More than any other time in history, students need teachers to be effective if they are to develop the higher-order thinking skills they will need to be college or career ready after graduation (Lai, 2016). At the same time, the expectations for student achievement has grown, and the student population is becoming more diverse. The change in diversity means that the need for effective PD for teachers, schools, and districts is critical (Lin-Siegler, 2016). Researchers have shown that one thing that distinguishes high poverty, high performing schools from lower-performing schools is effective collaborative PD for teachers (Shaffer, 2015).

Professional development has become an expectation in the academic world. Educators, as adult learners, are intrinsically motivated, task-oriented, and ready to learn (Cherry, 2016). The assertions of Cherry envelope the work of Bryk (2015) and Lin-Siegler (2016). Educators enjoy opportunities to voice their opinion regarding the direction and pace of their learning (Nederfeld, 2015). Understanding an adult learner is a pertinent starting point for professional development (Lin-Siegler, 2016).

The PD of educators should assist educators in the engagement and motivation of their students as well as integrate educator input regarding how their specific students learn (Taylor, 2017). The PD should be instructional focused as it emphasizes not only content and pedagogy but also student learning outcomes (Macia, 2016). Finally, the PD should be job-embedded to make it relevant and authentic (Shaffer, 2015) as well as provide seamless integration into the school day. Job embedded professional development is valuable as it engages educators in their learning through daily activities and requires that educators consider the possibilities of concepts provided in the PD, novel ideas presented in the PD, and analyze the effectiveness of their actions when using the knowledge gained from the PD (Fullan, 2005).

Professional development within the educational realm refers to strategies and programs that are designed with the improvement of the achievement of learners in mind and usually attempt to change the practices of educators (Shaffer). Successful elements of professional development identified by the researchers Darling-Hammond (2017) in a study based on a correlational analysis, provide a basis for the above statement. Active learning as well as focus on content were some of the features found to be within effective PD. Teachers also stated that they found the focus on content and participation that was cooperative within the PD opportunity to be helpful.

The researchers also identified that follow-up support helped implement new skills or strategies and applying their new knowledge—many of the activities described in the studies aligned with Darling-Hammond's (2017) assumptions about adult learning. Participants of PD need to understand why the PD is necessary, share the experience with

other participants, and be able to use the skills presented in the PD to solve problems or assist their students. These researchers demonstrated that short term PD designed effectively could result in outcomes that are positive for participants (Nederfeld, 2015).

Social learning strategies are one aspect of education that teachers learn in PD. The social aspects built on neuroscience brain research has shown that integrating social strategies into a learning environment can better engage the brain (Rennie, 2015). Specifically, brain research shows how important it is to allow for cooperation, collaboration, positive interdependence, and promotive interaction (Harrison, 2017.). Each of these social learning principles applied in appropriate environments is successful.

The implementation of educational innovations such as social learning is important to bridge the gap between current practices in schools and classrooms with the new desired practices (Hall & Hord, 2011; Hall & Loucks, 1978). Policy, curriculum development, as well as PD, help initiate the change. Professional development offers support to teachers who want to increase their use of social learning strategies in the classroom. Teachers in the study had exposure to social learning strategies and how to implement the instructional method via the PD.

The innovative social strategies are taught as part of a social learning PD program because the innovation will be part of the study. Once the execution of innovation commences, it is important to evaluate the success of that implementation (Hall & Hord, 2011). Understanding where teachers are in the implementation process can be accomplished using Hall and Loucks' (2011) levels of use (LOU) which describes the use of innovation within a spectrum that ranges from no use to full use (Hall & Hord, 2011).

In this research study, LOU provided a framework to explore the challenges and successes associated with the implementation of social learning strategies in the classroom. With this knowledge, instructional leaders can provide the support necessary to help teachers use the innovation more effectively.

The conduction of this research study had two main reasons. First, the study identified what teachers perceive about social learning strategies which will lead to a better understanding of what hinders or facilitates teachers' use of social learning strategies. Knowing teachers' beliefs about the strategies learned in PD will highlight the stumbling blocks that may get in the way of quality implementation. Secondly, learning how teachers perceive social learning strategies provided insight into how PD might better support teachers' implementation of social learning strategies. While facilitating student collaboration is notoriously complex (Hansen, 2016), understanding exactly where teachers philosophically and logistically difficulty with instruction have can improve future PD offerings.

Recent research on mirror neurons confirms that the social nature of human beings is grounded in biology (Mesoudi, 2016). So, the brain is designed to learn by imitation and modeling (Hansen, 2016). Students need to have opportunities to sit with, talk to, and work with each other as part of social learning. Students benefit from imitation, modeling, and having the opportunities to live whatever is being learned (Mesoudi).

It is now clear that throughout students' lives, their brains change in response to their engagement with others, so much that individuals must always be seen to be integral

parts of larger social systems (Hardy, 2016). Part of student identity depends on establishing community and finding ways to belong. The nature of the social relationships within which people find themselves influences learning. The use of this model as part of the conceptual framework of this study will be further explored in Chapter 2, as will how the models will influence data collection and analysis.

Chapter 1 is a preface to this research case study. The background information will include a summary of the research literature that is related to this case study. Then I will describe the gap that exists in the literature, the purpose of the study, the conceptual framework, and the research questions. Chapter 1 also includes a concise synopsis of the methodology used and incorporates the assumptions, limitations, and significance of the study.

Problem Statement

The purpose of this research study was to establish teacher perceptions regarding social learning strategies within their science classrooms. Adolescents represent an increasingly wide range of school diversity that includes social class, levels of language and literacy proficiency, learning abilities, racial and cultural background, past and current experiences, and interests (Hardy). Consequently, educators in urban school districts face many students who are not engaged or motivated to learn (Hansen, 2016). A variety of teaching innovations have been tried to address this problem, including the use of cooperative learning, problem-based learning, and social learning (Barber, King, & Buchanon, 2016). Before being implemented, innovation within the classroom requires training for teachers (Lee, 2016).

Social learning is one such innovation, and its inclusion is important to this study. Teachers lack the required knowledge as to how to use social learning strategies with urban science students. The purpose of social learning PD is to promote active student engagement, and student engagement is a well-established problem in science education (Allen, Gregory, Mikami, Janetta, & Hamre, 2015; Wang, 2017). The problem addressed in this study is the lack of understanding of science teachers' perceptions of social learning strategies implemented with urban students.

This problem is both current, relevant, and significant to the discipline. First, the problem is current. The study of social learning takes place in several ways. Mehta and Kulshrestha (2016) studied a way to impart science education while using social and cooperative skills at the secondary level. The results showed that students' performance improved while they also experienced the ability to develop individual accountability, positive interdependence, and interaction skills needed inside the classroom as well as in the real world. Some studies examine how social learning impacts the process of learning and student mastery (Mehta & Kulshrestha) while other research focuses on the value of social learning in the classroom as well as in college and the job-related world (Lee, 2016). The basis of the studies in this paper is social learning in the classroom.

However, the problem regarding the use of social learning in the classroom and teacher perceptions of social learning is also relevant. Application and execution remain key issues for teachers (Greenhow, Gibbins, & Menzer, 2015). Even teachers who are philosophically committed to the new strategies and paradigm often lack the know-how

to successfully adapt the learning-oriented approaches, particularly in content-driven courses such as science (Greenhow et al., 2015).

Understanding the teachers' perception of social learning related to teachers' level of use of the innovation is relevant to research because it impacts teacher competence, enthusiasm for teaching, and instructional quality (Zimmer, 2018). Some studies have looked at the effectiveness of PD for educators regarding student performance (Howard & Navarro, 2016) while others have looked at the cost-effectiveness of PD (Desimone, 2009) and still, others take the perspective that PD can provide innovative methods of instruction that add to job stability. (Mouza & Barrett-Greenly, 2015). In the first five years of teaching, nearly half of all educators leave the profession so it would benefit the educators as well as students to provide them educators with evidence-based, effective strategies, especially if they are teaching in large urban school districts (Lee, 2016).

Addressing the gap how teachers perceive social learning with urban students is significant to the discipline for several reasons (Zimmer). Cooperative learning satisfies the human desire for connection and social support (Howard & Navarro, 2016). It also keeps students engaged and provides them with academic resources by using their peers to tackle complex tasks that are challenging to complete alone (Saunders, 2015). Cooperative/social learning satisfies the teacher's desire for learning-centered classrooms with an emphasis on building community in classes. Social learning also gives teachers with specific tools that allow them to sequence activities to maximize learning. It is significant to learn more about social learning, particularly in urban classrooms, because students in these locations may not have had exposure to non-traditional instructional

strategies. Learning will be reinforced through personalized instruction, as it supports student academic growth and empowerment (Mouza & Barrett-Greenly, 2015).

Purpose of the Study

The purpose of this research study was to establish teacher perceptions regarding social learning strategies within their classrooms. Teachers may also look at the perspectives of their colleagues regarding the possible change to their viewpoints regarding the use of social learning PD. To accomplish this purpose, I explored science courses taught in a large urban school district regarding the use of social learning strategies related to: (a) teachers' perceptions regarding social learning strategies, (b) how teachers integrate social learning into classroom instruction and their perceptions of the integration, and (c) what documents reveal about teacher perceptions of social learning strategies. The research study may provide new understanding concerning the perceptions of these teachers implementing a social learning instructional model. The impact of the PD will allow teachers to understand their perceptions of social learning.

Research Questions

Central Research Question

The research questions for this case study have a basis in the purpose of the study, the conceptual framework, as well as the methodology. What are the perceptions and experiences of secondary science teachers in a large, urban school district regarding social learning instructional strategies?

Sub questions

Sub question 1: What are the innovative social learning strategies that took place in urban science classrooms, and what are the teachers' perceptions as to the integration of the social learning strategies in their classroom instruction?

Sub question 2: What do urban science teachers perceive to be the most successful social learning strategies employed in their classrooms? Why are they perceived to be successful?

Sub question 3:What are the science teachers' perceptions regarding social learning professional development when undertaking the social learning instructional strategies in the classroom?

Sub question 4:What are the teachers' perceptions about the impact of social learning on instruction and learning in the secondary science classroom?

Conceptual Framework

In this study, the phenomenon of the impact of PD regarding social learning on urban science teachers' instructional strategies focused on the conceptual framework of Hall and Hord's LOU research (2011). The first part of my conceptual framework forms on the research of Hall and Hord's *Levels of Use* model. Hall and Hord's LOU is part of the concerns-based adoption model (CBAM) which offers an approach to study the level at which individuals implement change due to professional development they received (George, Hall, & Steigelbauer, 2006). LOU focuses on how individual teachers implement innovation in the classroom. This model will be used in this study to focus and

identify the perceptions of individual science teachers regarding innovative social learning instructional strategies.

According to Hall and Hord (2011), there are eight levels of use that describe the performance changes as the teacher becomes more skillful in using an innovation. For this study, innovation is the implementation of social learning in the classroom. The use of LOU will provide insight into how the implementation of social learning has progressed, and this further supports what is needed to improve instructional practices. This model was chosen for this study because teacher perceptions have been shown to impact the effectiveness of educators (Hall & Hord) and are an appropriate framework for analyzing professional development (Saunders, 2015). A discussion of the eight levels is in Chapter 2.

The basis of the LOU lies on a large body of research. The LOU was first put forth by Wallace, Dossett, and Hall (1973) who studied a different type of change model, one that would emphasize the personal side of change. This research evolved from Fuller's work (1969) that responded to the innovation focus approach to educational change. Within the conception of educational change, the presentation of best practice presented in terms of discrete innovations or programs that were developed by outside sources and presented to teachers as a packaged product. All teachers had to do was to adopt the innovation to achieve the desired outcome promoted by the developers of the innovation (Hall & Hord, 2011).In many cases, the desired outcomes did not occur.

Work resulted in CBAM and LOU (Wallace et al., 1973). The resulting framework and model have been created to alter the way teachers and PD facilitators

meet the needs of individuals that choose to take part in the process of instructional change. It also addresses the needs of the teachers appropriately based on data gathered from LOU and CBAM's data and diagnostics.

LOU and CBAM have been used and validated in many studies (Hall & Hord, 2011). Anderson (1997) saw the CBAM and LOU as a practical, evidence-based way to focus on the description, measure, and explanation of the change process that can be experienced by teachers implementing the innovation. The LOU and CBAM, described by Hall and Hord (2011), emphasize the diversity and uniqueness of the meaning's teachers give to changes while acknowledging that this implementation is a personal experience.

According to Hall and Hord (2011), concerns can be "the composite representation of the feelings, preoccupation, thought, and consideration given to a particular issue or task" (p.138). The LOU and Stages of Concern were part of the development of the CBAM in the 1970s by a team of researchers at the Research and Development Center for Teacher Education, the University of Texas at Austin (George, et al., 2006). This development had led researchers to test the CBAM for validity, such as in 2006, when it was altered to establish its reliability (George, Hall, & Steigelbauer). Currently, LOU and CBAM continue employment in scope of organizational and research settings as well as educational facilities (Hall & Hord, 2011). These tools assist researchers in guiding the process of the implementation of the innovation at hand.

This framework fits the study approach, research questions, instrument development, and data analysis. The approach of the study was humanistic and used data

based on the teachers' categories and meanings. The LOU provided individual and group case information and will allow for the study of a dynamic process. Since this is a qualitative approach, it was easier to get a full reading on the local situation, conditions, and stakeholders' needs (Yin, 2009). Using LOU also allowed for the use of a case study to understand the perceptions and experiences of the teachers. The LOU provided a way to answer the study's central research question, "What are the perceptions and experiences of secondary science teachers in an urban school district regarding professional development they received on implementing social learning strategies in urban, secondary science classrooms?" The eight concepts provided in the LOU assisted in the formulation of the research questions by providing focus on the description, measure, and explanation of the change process that can be experienced by teachers implementing the innovation. I used the LOU when coding during data analysis of the interview data as well as associated PD and lesson documents

Nature of the Study

For this qualitative study, I used a case study design. This design is defined by Yin (2009) as "an empirical inquiry about a contemporary phenomenon (e.g., the case), set within its real-world context especially when the boundaries between phenomenon and context are not evident" (p. 18). First, this case study was a contemporary phenomenon as it is an event that can be seen and studied at present. Teachers in this study have used social strategies in their classrooms based on what they learned in recent PD training. Second, this study was set within its real-world context, as teachers applied the theories of neuroscience related to social learning in their classrooms. Third, the study

boundaries between the phenomenon of the use of social learning strategies and the context of other learning and instruction variables are not clear. Finally, the case study is commonly using in conducting evaluations (Yin, 2009 p. 141) such as the evaluation of the impact of PD in its effectiveness to impact teachers' beliefs related to social learning strategies and their use of those strategies. These criteria allowed for the choice of case study as methodology for this study.

This research paradigm was also chosen to provide a thick, rich description to present the participants, context, and findings of the study (Merriam, 2016). It was also chosen to investigate the innovative social learning instructional strategies that teachers experienced in the PD. Within the science classrooms in this urban school district among secondary students, the instruction was defined by the Levels of Use with a focus on the social implications of the strategies. The case study provided a deep understanding of the phenomenon of social aspects of social learning strategies and the teachers' use of these strategies.

Regarding methodology, case studies must be carefully defined, require multiple sources of data, and the data must be analyzed systematically. The unit of analysis or case is the instructional biology program in a large, urban school system. Eight to ten teacher participants were identified using purposeful sampling that included teachers who attended a PD regarding social learning in social learning instructional strategies. Each of the participants were asked to participate in an individual interview, provide documents, and to respond to writing prompts.

I am the only person that collected data and completed the data analysis. Data analysis takes place on two levels (Merriam, 2016). The purpose of the first level coding was to construct categories to analyze the interview data, documents, and writing prompts for each case individually. The second level of data analysis was used to examine the coded data for patterns, themes, and possible relationships across the cases. The data evaluated for themes, patterns, and relationships using the constant comparative analysis method (Harrison, 2017). Themes and discrepant data that emerged from the data were evaluated to develop findings from this study that related to the central and the related questions.

The case study methodology was chosen for this study because it allowed for data to be collected from a variety of sources and it used different methods such as interviews, journals, and lesson plans. Using the case study methodology also provided for an in-depth exploration of the perceptions of urban secondary science teachers in its natural context (Harrison, 2017). The grounded theory methodology was not appropriate for this study, as it constructs a new theory (Creswell, 2009). The research in Grounded Theory starts with a hypothesis and theory, and then data is collected to support or ground this theory. Using the phenomenological approach was not appropriate for this study, as this would study the essence of the experience and not develop an in-depth description and analysis of a case or multiple case. A phenomenological approach also describes the essence of a lived phenomenon, and it is more accurate for this study's purpose to provide an understanding of the case of the teachers who participated in the social learning professional development.

Definitions

The following definitions are research-based and presented as significant to this study.

*Active Processing**:*** The internalization as well as merging of knowledge by the learner in such a manner that it is conceptually coherent and meaningful (Caine & Caine, 2011, p. 155).

Constructivism: Theory supported by the idea that individuals can create their understanding of the real world based on their experience as individuals (Becker, 2016).

Levels of use: A framework that incorporates the behavior of individuals and specifies how people are acting concerning a change or innovation (Hall & Hord, 2011).

Orchestrated immersion: Creating a learning environment that holds the attention of learners in an educational experience and allows immersion of learners into the use of social BBL strategies (Caine & Caine, 2011, p. 115).

*Professional development***:** Encompasses all types of facilitated learning opportunities, including credentials such as academic degrees to formal coursework, conferences, and informal learning opportunities situated in practice (Harrison, 2017).

Relaxed alertness: This term demonstrates how educators can combine low threat with a high challenge within the classroom to allow students to maintain confidence while providing opportunities for intrinsic motivation (Caine & Caine, 2011, p. 71).

*Socioeconomic status***:** Often measured in education, stated as the social standing of a group or an individual (Harrison, 2017).

Traditional teaching: Education marked by direct instruction, lectures, seatwork, and students learning through listening and observation (Becker, 2016).

*Reform-based education***:** The use of changes within a school or school system that may have social ramifications that involve the health and well-being of the participants to close the achievement gap (Harrison, 2017).

Social cognition: Describes a focus on the way individuals perceive, encode, process, remember, and use information in social contexts to make sense of another people's behavior (Taylor, 2017).

*Social learning strategies***:** Individuals learn through the interaction with each other, and this learning changes them as individuals but also has the potential to change the groups within which they participate (Harrison, 2017, p. 254).

Assumptions

Several assumptions were the basis of this research study. First, I assumed that the study participants were familiar with the use of the social learning strategies emphasized in the social learning PD. This assumption was important to the study because teachers needed to utilize some level of social learning instruction to gather meaningful data. I also assumed participants' responses, oral and written, were accurate, and represented the knowledge and understanding participants have had regarding the use of social learning strategies emphasized in the social learning PD. This assumption was important to this case study because these are the data on which is the basis of the study. I assumed that the documents were accurate and representative of the uses that teachers voiced about the use of social learning aspects in the PD. This assumption was important

to the study because the teachers' understanding of social learning strategies may affect the teachers' use of social learning strategies.

Scope and Delimitations

This research study has a specific scope that is narrowed both by its topic and participants. Focusing on the topic of the study allowed for the narrowing of the subject. While the elements of PD are numerous, this study focused solely on perceptions of the use of social learning strategies learned in social learning PD training. Second, this study was limited to secondary biology educators within an urban school district in a large, urban school district in the United States. The eight study participants had participated in a PD opportunity related to the use of social learning strategies. The purpose of this study was limited to the teachers' descriptions of their use of social learning strategies and has not included the scope of observable use, or student perceptions of the strategies.

While the framework chosen for this study supported the purpose of this investigation, it also limited the study. The LOU framework is only one part of the diagnostic dimensions of the Concerns Based Adoption Model (CBAM) (Hord, Rutherford, Huling-Austin, & Hall, 1987). Hall and Hord's (2011) LOU has been used extensively for professional development and were then deemed to be the framework for the current study. Different types of changes are possible to ensure the integration of innovation such as social learning strategies namely the use of new materials and the introduction of instructional approaches (Fullan, 2005). The LOU allowed for the study to focus on participant use of social learning strategies in science classrooms.

Limitations

In this qualitative case study, research was inherent to universal weaknesses. One such weakness in this study was the length and depth of the data that may become overwhelming and must be focused. While a case study focuses on a single phenomenon, the issue of generalizability looms larger here than with other types of research. The researcher's narrative description can allow readers to learn vicariously from an encounter (Roulston, 2015). But Erickson (1986) argues that it is the reader and not the researcher who determines what can apply to his or her context. The honesty of the participants and the past connection between the researcher and participants may also have caused bias. Six years before the research began, the researcher was in a supervisory position over the participants but did not work in the school district studied at present. And as Yin (2009) states, the researcher should be open to contrary or deviant evidence that may provide significant theoretical insights.

The limitations of a case study are often related to the research design. The teachers' uses of strategies are explored through the case study to learn more about the implementations of PD but will not consider the students' perceptions or student products. There may be bias due to only one person collecting data (Merriam, 2016; Yin, 2009) as well as recall bias (Roulston, 2015). This threat of bias should be balanced. It is recommended to include triangulation, member checking, reflexive journaling, and an audit trail to address possible researcher bias. The minimalization of the limitations in this study will transpire by being cognizant of the provisions that can be made to address matters such as credibility, transferability, dependability, and confirmability. It may be

necessary to discuss the emerging trends of the data with others so that the researcher can see reality through another set of eyes. Discussion of emerging trends enriches the interpretations or at least takes away some of the biased interpretations. Developing validity standards in qualitative research is challenging because of the necessity to incorporate rigor and subjectivity as well as creativity into the scientific process (Roulston, 2015). These concepts will be discussed further in Chapter 3.

Significance

When considering the significance of a study, it should be determined whether the study will provide an advancement in knowledge within the field of study. The contribution to social change and the use of the innovation should also be noted when considering the significance of the study. In reference to the advancement of the discipline, this study facilitated conversations of how urban science educators might carry out instructional strategies related to brain-based learning, since it addresses pedagogical approaches that are effective for students in urban school districts and assist educators in realizing their learning potential as well as inform administrators as to the readiness of educators regarding professional development. Additionally, this study explored the teachers' use of social learning strategies, which is foundational for future studies to explore whether varying levels of use lead to different outcomes. It was the goal of this study that administrators and researchers may gain a better understanding of teachers' perceptions and use of social strategies which has the potential to advance the discipline

and to impact future PD that will consider teachers' use of strategies so that they are better able to facilitate the social learning process.

About improving practice, this study may facilitate the change process in future implementation regarding social learning strategies at the individual classroom level and the district level. At the individual classroom level, study participants may encourage a time of reflection that may be beneficial to educators as they consider their methodology and philosophy and help to advance the practice of instruction (Rennie, 2015). Ultimately, the positive social change aspect of this research study lied with the educators who serve in urban school systems with impoverished students in urban school districts that may find the recommendations of this study useful in providing optimal classroom environments in their district. At the district level, this study may improve practice because it might provide insight related to how to provide best PD that will help educators effectively utilize student-centered to develop instructional strategies (Gilboy, 2015), which may have a positive impact on future professional development provided to these urban science teachers.

There are several ways that this study may contribute to positive social change and innovative practices. Besides the impact this study may have on improving future PD for science educators, it might also help address the job stability of teachers in urban schools. New educators receive assignments to challenging schools and classrooms that have little supervision or support from administration and are often in need of professional development (Skiba, Ormiston, Martinez, & Cummings, 2016). One way to assist new science educators is to provide ongoing PD that will allow educators to stay up

to date on emerging tools in technology and the latest research on how to effectively assist student learning. Even though educators have shown to favor student-centered instruction such as project-based, problem-based, and brain-based learning (Sharma, 2016), it is often not provided to teachers in high risk, high-stress teaching placements (Skiba, Ormiston, Martinez, & Cummings, et al., 2016).

Summary

This chapter included a case study design within a qualitative study. The background section included a summary of the research literature related to this study. The problem statement addressed in this study was the teachers' use of the social aspects of social learning professional development is not well documented. It was the purpose of this study to establish teacher perceptions regarding social learning strategies within their classrooms. Next, I introduced Hall and Hord's use-based model (LOU), which will be the conceptual framework used in this study. In terms of the methodology of this study, the case involved science courses taught in a large urban school district, and the participants were educators within the district. This case study included science courses taught in a large, urban school district with teacher participants who had completed the PD. Data was be collected using the CBAM survey completed by science teacher participants (for descriptive statistics only), interviews, online written responses, documents such as grade-level standards for Biology courses as well as PD documents. Within this study, a discussion of assumptions, limitations, and significance resulted. The significance of this study was that it will contribute to advance knowledge, improve

practice, and positive social change through student achievement, teacher efficacy, and satisfaction, and citizens that are 21st century ready (Dibenedetto, 2016).

Chapter 2: Literature Review

The purpose of this research study was to establish the perceptions of secondary science teachers regarding social learning strategies within their science classrooms. Urban science teachers do not regularly receive professional development which ultimately can result in poor academic and social outcomes for students within this setting. To locate information on social learning strategies, their implementation, and teachers' attitudes toward as well as elf-efficacy in using these strategies, I searched multiple databases: EBSCOHost, ProQuest Dissertation and Theses database, ERIC, and JSTOR. Search terms included teacher, attitude, perception, social learning, LOU, teacher perceptions, efficacy, and self-efficacy. In this section, I offer a discussion of topics relevant to social learning strategies with a focus on teacher implementation, use, and perceptions in science classrooms in an urban school system to improve teacher efficacy through professional development.

Literature Search Strategy

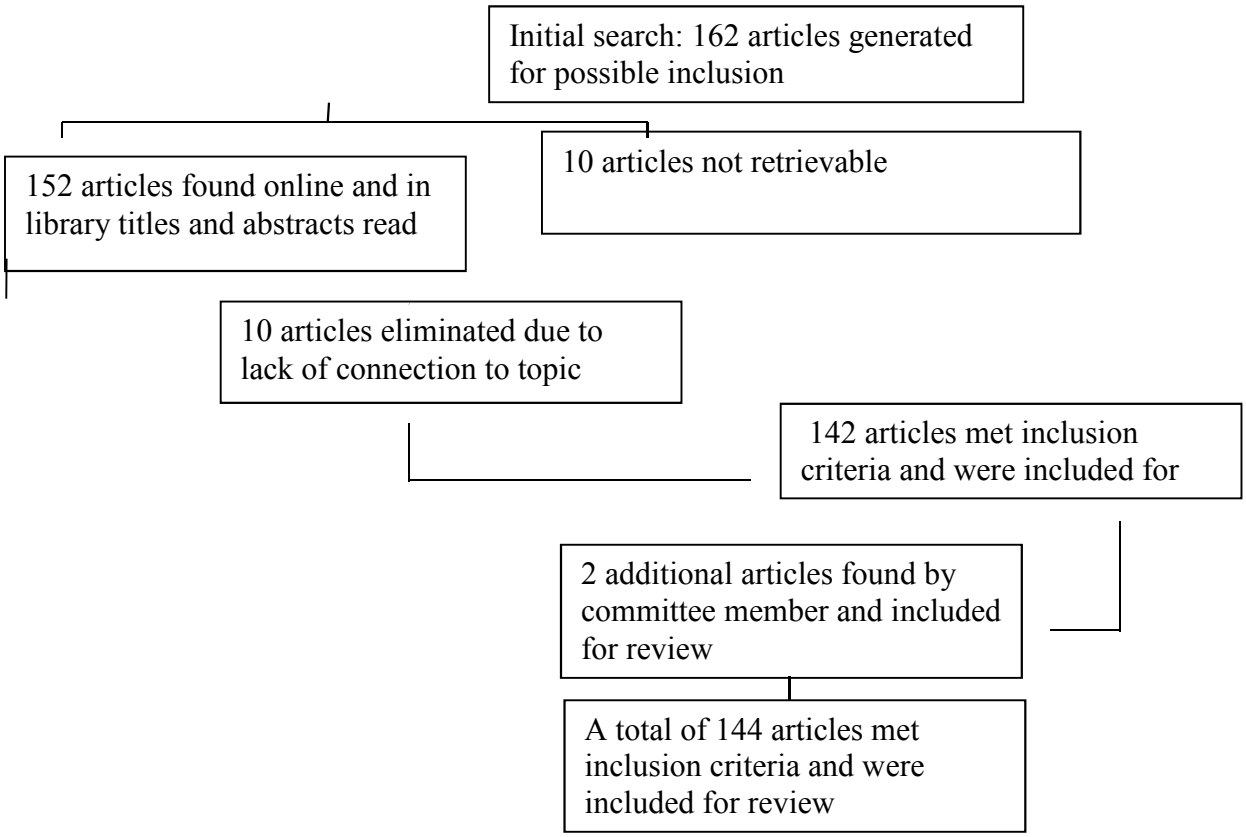
The objective of the literature search strategy was to distinguish published and peer-reviewed articles and studies relevant to professional development within the realm of education and social learning instruction. Figure 1 illustrates the steps taken during the literature search. A standard search strategy was used for the literature review involving the exploration of online databases such as Walden University Library, JSTOR, EBSCO Host, Sage, ProQuest, ERIC, Teacher's College Record, Education Research Complete and Google Scholar using keywords followed by the evaluation of the references of relevant articles, and websites of relevant organizations. Figure 1 demonstrates the

number of articles reviewed for the study. Examples of keywords that were utilized are: *professional development, brain-based learning, social learning, educators' viewpoint of professional development, use of professional development in urban school districts, secondary science professional development, studies using social learning, studies using professional development in secondary science settings, perceptions of educators, impact of professional development, evaluate teacher professional development, social learning professional development, concern model professional development, and neuroeducation professional development*.

It is of note that synonyms, as well as alternate spellings, are related terms in a broader or narrower sense and variations of the words such as singular or plurals. Key authors regarding brain-based learning and PD searched by names such as Caine and Caine, Jensen, Crawford, Willis, and Bransford, Brown, and Cocking, Vygotsky, Dewey, and Biggs. Key questions were developed to identify relevant information for the literature search strategy based on the research questions posed in Chapter 1. These questions will guide the search for literature and research to address the research questions of the study.

Figure 1

Literature Search Strategy Flow Chart



Articles that were considered to provide evidence regarding the research questions in Chapter 1, the articles addressed one of the variables and either processes or outcomes regarding professional development or brain-based learning strategies. Limiters were used, such as the term peer review, year, or English language. The articles were also sorted by relevance and most recent information and helped to provide this study with a conceptual framework.

Conceptual Framework

The conceptual framework for this research study is the LOU model (Hall & Hord, 2011). In this section, I will describe the elements that make up the levels of LOU. The LOU is part of a larger model called Concerns Based Adoption Model or CBAM (Hall & Hord, 2011). The three diagnostic dimensions of the CBAM are the stages of concern (SOC), LOU; and innovation configurations (IC) (Hall & Hord). Table 1 describes each of the levels. Each of these CBAM components is a construct with measuring tools that can be used to assess the innovation implementation process for either individual, school, or district. The stages of concern process include a questionnaire, open-ended statements, and an interview and enable leaders to identify teachers' attitudes and beliefs toward a new initiative. The innovation configuration uses a map that creates a clear image of what makes up high-quality implementation. Very few studies use all three constructs of the CBAM model (Hall & Hord, 2011). In this study, I will only use the LOU construct of the CBAM, as it will provide a framework in which I will be able to determine teachers' use of strategies they have learned in the social learning PD.

Table 1

Levels of Use

Level of Use	Typical Statement
Nonuse	"I've heard about it but, honestly, I have too many other things to do right now."
Orientation	"I'm looking at materials about the innovation and considering using it sometime in the future."
Preparation	"I've attended the workshop, and I've set aside time every week for studying the materials."
Mechanical Use	"Most of my time is spent organizing materials and keeping things going as smoothly as possible every day."
Routine Use	"This year, it has worked out beautifully. I'm sure there will be a few changes next year, but I will use it the same way I did this year."
Refinement	"I recently developed a more detailed assessment instrument to gain more specific information from students to see where I need to change my use of the innovation."
Integration	"Not everyone has all the skills needed to use the program so that it has the greatest impact on student learning. I've been working with another teacher for two years, and recently a third teacher began working with us."
Renewal	"I am still interested in the program and using it with modifications. Frankly, I'm reading, talking, and even doing a little research to see whether some other approach might be better for the students."

Note: Adapted from *Taking Care of* Change by Hord, Rutherford, Huling-Austin, and Hall, (1987) Alexandria, VA: Association for Supervision and Curriculum Development and Southwest Educational Development Laboratory (summary from p. 16).

Eight levels of how teachers act or behave with a change have been identified and verified through the research of two researchers. Hall and Hord (2011) stated that "since the Levels of Use deals with behaviors, it was possible to develop operational definitions for each level" (p. 69). These definitions enable change facilitators to place an individual at one of the levels (Hall & Loucks, 2011). The first distinction to be made is whether the

individual is a user or nonuser (Figure 2). Three nonuse and five use levels have been identified and are described briefly in the following paragraphs to support the current study.

Level 0: Nonuse

The level of nonuse is the lowest level in which the user has little or no knowledge of the innovation, no involvement with the innovation, and is doing nothing toward becoming involved (George, et al., 2006). Concerning this study, a teacher may know nothing about social learning or has very limited knowledge of efforts to develop the innovations in this area. A teacher at this level takes no effort to gain information beyond reviewing a description of the innovation when it comes to their attention. This level teacher does not communicate with others about social learning beyond acknowledging that the instructional strategies exist (Hall & Hord, 2011). Teachers at this level may move forward to level 1 or may stay at Level 0.

Level 1: Orientation

Orientation is level 1 and is the second level of nonuse. In Orientation, the teacher acquires information about the innovation, teachers the time constraints, and extra effort necessary to implement the innovation. (Hord, et al., 1987). With this study, a teacher is in the act of acquiring information about social learning or has explored the value of the orientation and its demands upon their time. Teachers at this level know general information about the innovation such as its origin, characteristics, and implementation requirements. They seek material that is descriptive about innovation. These teachers look for opinions and knowledge of others through discussion or

workshops. Teachers at this level need to exchange information, materials, or ideas about the innovation and possible implication of its use (George, Hall, & Steigelbauer, et al., 2006). Teachers at this level tend to advance to level 2.

Level 2: Preparation

Level 2 is also still considered non-use and is called preparation. In this level, teachers are preparing to use the innovation for the first time. They know logistical requirements, necessary resources, and timing for initial use of the innovation as well as details of initial use for students. Level 2 teachers tend to seek information related specifically for the use of innovation within their classroom (Hall & Loucks, 1978). Discussions at this level are necessary for the initial use, and teachers join with others to plan for the preparation for first use (George et al., 2006). Participant teachers in the social learning PD were at least at a level 2 and had gained enough information to employ the innovation for the first time. Teachers at this level tend to move to the mechanical use stage (Hall & Loucks, 1978).

Level 3: Mechanical Use

Level 3, or mechanical use, is the lowest level of the "use" levels. In level three, teachers focus most of their effort on day-to-day and short-term innovation use with little reflection time (George et al., 2006). The changes in this level of use are made more for the teacher than for the student. The teacher is mainly motivated to use a stepwise attempt of the innovation, often resulting in superficial use. To this study, teachers at this level spend most of their time preparing materials, and some teachers tend to stay at this level. The knowledge of the teacher at this step is on a day-to-day basis to fill the requirement

for using the innovation (Hord, et al., 1987). At this point in the levels of use, the teacher requests information about the management of things such as the amount of time required to use the innovation, scheduling, and logistics (Hall & Hord, 2011). Materials and resources are used collaboratively to reduce flow problems related to the use of social strategies. The next level of use diverges into two parts.

Level 4A and 4B: Routine and Refinement

Level 4 is broken into 4A and 4B and are called routine and refinement. During the 4A routine level, teachers are working to stabilize the innovation (Hall & Hord, 2011). In this level few changes are made in the current use. Little preparation or thought to improving the strategies or their consequences is considered. At this point, teachers understand not only long-term requirements but also short-term requirements for using the innovation with the least amount of stress or effort possible (Hord, et al., 1987). The teacher does not seek out information for the use of the innovation. During discussions between teachers using the innovation, the current use of the strategies is part of a discussion with no reference to ways of changing the use. In Level 4B or refinement, teachers are in a state where they vary the use of the strategies to increase the impact on students. The variation between Levels 4A and 4B is due to the knowledge of both long term and short-term outcomes for the student. At level 4B, the teacher knows the cognitive and affective effects of the strategies on the student and ways to increase the impact on the student. Discussions by teachers at this level show ownership of modification to change the student outcomes (Hall & Hord, 2011). The next level finds teachers collaborating with their colleagues to find the best way to use the innovation.

Level 5: Integration

Level 5, called integration is the level that the teacher uses to combine their efforts to use the new strategies with strategies that may be related and used by their colleagues (Hall & Hord). Teachers know how to coordinate their use of the strategies with colleagues to provide a collective impact on students. At times, teachers solicit opinions and information to work with other teachers to utilize innovative strategies. Discussions by teachers in using the innovation tend to center on increasing student impact through working together to share personal use of the strategies (George, Hall, & Steigelbauer, et al., 2006). With relation to this study, the integration level showed collaboration among teachers, providing social learning innovations for students. It is at this point that teachers begin exploring alternatives to or major modifications of the strategies presently in use.

Level 6: Renewal

Renewal, or Level 6, is the state in which the user reevaluates the quality of the innovation, seeks major modifications of or alternatives to the current innovation to achieve increased impact on students (Hall & Hord, 2011). Teachers also achieve increased impact on students, examine new development in the field, and explore new goals for self and the school system. It is at this level that teachers know of alternatives that could be used to change or replace the present innovation that would improve the quality of student outcome. Teachers seek information and materials about other innovations as alternatives to the present innovation or for making major adaptations in the innovation (George, Hall, & Steigelbauer, et al., 2006) and can explain how the use of

social strategies made them feel more capable within their teaching positions. Within this study, the focus of teacher participants in the PD focused on the identification of major alternatives or replacements for the current strategies (Hall & Hord, 2011). Within this study, teachers identified at level 6 teachers plan activities that involve the pursuit of alternatives and explored other innovations or strategies of use in combination with or in place of the present strategies to develop more effective means of achieving client outcomes.

The phenomenon of studying how science teachers implement skills they have learned in PD has been studied using several different models. The first is the TPCK model, which stands for technology, pedagogy, and content knowledge (Koehler, Mishra, Kereluik, Shin, & Graham, 2015). In one study, teachers' professional development using social learning and wikis was examined using the TPCK model and researchers determined that technology can be used to track teacher growth and encourage increased content knowledge and creative pedagogy (Chen, 2016). Another model sometimes used to study the phenomenon of teachers' application of new strategies is Rogers' diffusion of innovation model (Murray, 2011). For example, in a district-wide mobile device curriculum implementation, the diffusion of innovation model was used to examine teachers' buy-in as well as to critically examine their model of implementation (Sun, 2016). And even newly designed models, such as the technology adoption and gratification (TAG) model, with recent validation, claims to include elements not considered in previous models such as the diffusions of innovation theory (Murray, 2011). However, since this study is not focused on technology, and rather on

understanding how teachers have used and applied a teaching strategy learned in PD, the level of use model, was chosen as the conceptual framework for this study.

This research study benefitted from this framework in several ways. First, it provided a framework for the case study methodology. The levels of use model (Hall & Hord, 2011) was examined the individual cases, and a cross-case analysis via the data sources was completed. Second, they provided a way to examine an innovation that is not necessarily technology focused. The other potential conceptual frameworks had technology innovation assumptions built into the LOU model allowed for flexibility in interpretation and explanation of how teachers have implemented changes in social learning. The eight levels of the LOU provided focus on the description, measure, and explanation of the change process that can be experienced by teachers implementing the innovation to create the research questions for the study. In this way, this study also benefitted from the framework.

Literature Review Related to Key Concepts

There are four major topics that are critical to understand in the design and implementation of this study. These topics are (a) social learning and professional development, (b) characteristics of social learning, (c) teacher perceptions of social learning, and (d) urban students and social learning.

Social Learning Professional Development

Research on the effectiveness of social learning professional development focuses on a variety of study methods. Some researchers have studied the idea that teachers need training in neuroeducation using the work of Willis (2015) a neurologist who studied the

rising numbers of students' evaluations for conditions such as ADD to epilepsy. Within classroom observations, Dr. Willis (2015) found high rates of boredom and stress among students, and teachers who often had little understanding of these neurological reasons for their students' behavior. Dubinsky (2017) found that neuroeducation has made tremendous strides in the past decade, making the science of how the brain learns available to educators in very practical terms.

Dubinsky (2017) also found that the professional development itself was not brain-friendly and began building PD around the concepts of Caine and Caine (2005) and using more social learning opportunities as well as moving in the PD. The Montclair Kimberley Academy intentionally redesigned how they structured their PD so they would model the importance of the very research that they promote in their classrooms. Another study provided by Valtonen (2016) focused on pre-service teachers, specifically planning, instruction, assessment, and reflection. There were 98 teacher candidates, 17 university faculty, 28 university supervisors, and 163 master teachers focused on using brain-based learning to improve teacher preparation by helping teachers identify students' strengths, weaknesses, and affinities and by providing them appropriate adjustments when necessary. The goal of brain-based learning PD, then, is to understand how teachers can make use of the opportunities provided within the PD to focus on the development of students' thinking to become engaged in the growing changes.

Social learning professional development, sometimes called neurodevelopmental methodology, has been studied, but not extensively. Neuroscience studies have provided a new framework for rethinking about learning and instruction (Dubinsky, 2017; Jensen,

2005). Sharples (2016), in a quantitative study, found that preservice and master teachers who received social learning training for a year performed significantly better on the Performance Assessment of California Teachers (PACT) exam. In another study, social learning in an informal setting at a zoo was found to increase both science content knowledge and pedagogy of teachers (Pecore, Bohan, & Haeussler, 2016). Dubinsky (2017) implemented a program called BrainU, where middle and high school science teachers received instruction on neuroscience. The program's purpose was to model inquiry and social learning strategies to teach neuroscience and allow teachers to personally experience the impact that these methods can have on methodology and pedagogy. The social learning PD departed from a traditional setting, which promotes smaller goals as a starting point and promoted a more global initiative approach to stir teachers' and students' excitement and instill a desire to achieve dreams (Sharples, 2016).

Few studies have focused on social learning PD. One study used five social learning professional development workshops to all ACT faculty and field supervisors. Lombardi (2015) focused on these workshops as they encompassed social cognition, neuromotor skills, higher-order cognition, memory, and patterning. The study addressed the question of whether significant effect differences exist in assessment scores for those secondary education candidates trained in neurodevelopmental methodology (ND) versus those candidates not trained in ND methodology. The study targeted candidates in the four most populated education teaching fields within the college and state: science, mathematics, English, and social studies. Qualitative results showed that ND trained educators scored higher on assessments than non-ND-trained traditional teachers in the

following content: planning, assessment, engagement, reflection, and total assessment scores (Lombardi, 2015, p. 75).

As far as teacher learning is concerned, results from this study corresponded to previous studies such as knowledge of ND methodology improved the teacher's ability to identify learner needs, make instructional decisions based on task analysis, and successfully differentiate instruction (Otaiba, 2015). Datnow (2017) stated that when students were taught in a way that is incompatible with how students learn, there is a neglect of the natural strengths of their minds which leads to the portrayal of students' abilities as deficient. This research connected with the current study by focusing on the ND methodology that teachers can use to advance their students' understanding and mastery.

Not all research on social learning PD shows positive results. In a study by Ehiobuche and Justus (2016), the effectiveness of social learning teaching on teacher attitude, achievement, critical thinking, and self-efficacy dispositions took place with no significant effect found. It is an unexpected result to obtain no difference between groups concerning self-efficacy and attitude scores since social learning is student-centered. Some studies presented positive effects of social learning on attitude scores (Van Dam, 2016). The author discussed the fact that the students in the experimental group took five courses as well as Biology, while the study took place. They received social learning just in the Biology course; however, in other courses, mainly conventional teaching was used by instructors. The use of conventional teaching could make it difficult for students to change their learning and studying habits as they probably have had difficulty in adapting

to this new environment and teaching. In my study, students were only presented with social learning strategies in science as well, and this may be a weakness in the results.

Professional development in social learning strategies may change the pedagogy of participating educators, but since few studies address this directly, this is not certain. It may be helpful for every educator to have professional development regarding neuroscience to become accustomed to the concepts of the study of neuroscience (Ehiobuche & Justus, 2016). When considering today's learners, educators are considered the lifelong learners needed to hold on to for access to state of the art opportunities that are open to those who have acquired the optimal set of skills (Willis, 2015). Educators who have adapted to the knowledge of the brain's functions will have the motivation and optimism to follow the ever-growing research and to use this to their advantage in the classroom (Jensen, 2005).

At Deloitte University in Dallas, brain-based learning and social learning strategies are being used in the updated curriculum. These changes are being made to meet the needs of students (Van Dam, 2016). The learning design principles increasingly use evidence brain-based learning practices such as using learning sessions that are reduced in accordance with research from Jensen (2005) which provides more personalization. Another principle used at Deloitte (Van Dam, 2016) is that classroom programs are designed to support student engagement (Ehiobuche & Justus, 2016). Lecture experiences are to a minimal. Professional development that addresses social learning strategies will provide educators with the basic understanding regarding the

science of learning, but further studies are needed to know how effective social learning strategies are in changing educator pedagogy.

Characteristics of Social Learning

Social learning theory has been advanced to explain cognitive phenomena as well as overt behavioral functioning (Bandura, 1969; Bandura & Walters, 1963). This model has been updated to connect information processing concerns and behavioral emphases. Particular attention is given to the impact of social variables such as the behavior of models, direct experience, and the function of reinforcement (Zaki, 2016). Social learning success is dependent upon the different methods teachers use with students and have certain characteristics. A review of the literature shows that there are common characteristics of all types of social learning, even if the strategy is different. In the following section a discussion of, modeling, face-to-face interaction, and positive interdependence takes place.

Modeling

The most common characteristic that comes up in current research is that social learning includes modeling, which is also known as imitation or observational learning. Research has shown that modeling is an effective instructional strategy in that it allows students to observe the teacher's or peers' thought processes through student behavior, responses, observations of their group discussions, and assessments (Bandura, 1986). Research has also shown that modeling can be used across disciplines and in all grade and ability level classrooms (Chen, 2016). Modeling can is useful as a scaffolding technique, but only if the teacher considers the students' position in the learning process.

Teachers first model the task for students, and then students begin the assigned task and work in their group using observation and imitation (Chen).

Teachers who use student-centered modeling will engage students who have acquired knowledge of the target concept and are capable of modeling the concept for other learners (Fraser, 2015). A classroom that is student-centered provides for support among peers. It is not only the students that must be engaged and motivated for this strategy to be successful. Teachers need a positive attitude towards such a teaching strategy. Otherwise, it will not achieve the intended goal. A positive attitude might lead to the teacher achieving success and becoming more motivated in-class activities by participating as a facilitator and role model, offering support and assistance to all learner groups (Hallisey, 2017).

Face-to-Face Interaction

Another important characteristic of social learning is face-to-face interaction. Peer group interaction is an integral part of higher-quality teaching, and learning strategies (Hallisey) and face-to-face interaction is an important piece of social learning (Bowers, 2015). Novice teachers occasionally give students a single task to complete as a group and allow them to do whatever they need to get the job done (Jones & Alcock, 2015). In most high school classrooms, this means using the divide and conquer method whereby students split up the work, complete their specific parts at home and essentially create a collection of individualized assignments (Hallisey, 2017). There is no doubt that face to face interaction remains critically vital to the educational experience. Both teachers and students will be able to take more from experience both in terms of social skills and

interaction, and this in addition to educational expertise and practical knowledge (Bowers, 2015).

Promoting face-to-face interaction is a foundational characteristic of social learning. The result of the face-to-face interaction occurs when students are given time in class to discuss, ask questions, and to support each other in the completion of the task (Jones, 2014). It is not only the final product that matters in social learning but also the ongoing dialogue process that is a critical part of individual and group success. Face-to-face interaction supports social learning which is the focus of this study.

However, in a digital world, face-to-face can also be defined in virtual space rather than a physical one. There are many social learning opportunities where students never stand next to one another, but instead use digital tools. New technologies and developments are transforming the way that students, groups, and societies communicate, learn, and work (Balakrishnan, 2016). When students come together in a social sense to learn in the digital era, they encompass issues of cognitive authority, creative, ethical, and responsible use of digital media. The students' use of digital tools such as laptops, smartphones, smartboards, and class response systems can encourage and help to develop specific pedagogies and the introduction of social learning environments. These learning environments are learning tools and meeting the targeted learning goals of the school (Hallisey, 2017). Many teachers find that technology in a school setting would increase engagement and preparation (U.S. Department of Education, 2017). It was posited by Duffy (2018) that "the phenomena of Web 2.0 provide for students an unprecedented way to access, socialize, and co-create" (p. 248).

Positive Interdependence

Another characteristic of social learning is called positive interdependence which is the belief that the individual is dependent on the contributions, inclusion, and success of others in the group to be successful (Johnson and Johnson, 2016). Those students with a strong sense of positive interdependence believe that there is value in learning from the ideas and contributions of others (Cherry, 2016). Johnson and Johnson (2016) posited that helping students develop positive interdependence is important to successful social learning. Since this element is solely contingent on the quality of the task assigned to each group, creating task interdependence requires that the assigned task requires participation from each member of the group.

Task interdependence is generally a set of rules and requirements to determine how information, materials, and expertise shared between team members assigned to the interdependent task as in social learning (Philip, 2016). It is a functional way to plan structured work through defining interdependencies between tasks and elaborating roles for the students involved in the work (Scager, 2017). The positive interdependence results in promotive interaction as members of the group encourage each other and facilitate group members' efforts to learn (Loewen, Lester & Duncanson-Hales, 2016). It is of note that goal interdependence is also important (Bertucci, Johnson, Johnson, & Conte, 2016). For everyone's goal achievements to be positively correlated so that individuals perceive that they can reach their goals if and only if the others in the group also reach their goals (Bertucci et al., 2016). Concepts such as copying down notes or answering recall

questions will not force positive interdependence and will not reap the benefits of social learning (Scager, 2017).

Collaborative in Class Strategies

The first way to encourage the fundamentals of social learning is to have students work collaboratively in class with their face-to-face peers. The first way to encourage the learning that is fundamental to social learning is to have students work collaboratively in class with their face-to-face peers in group investigations. Before embarking on group investigation, teachers may find it helpful to demonstrate and practice skills with their class (Balakrishnan, 2016). These skills are intended to make group members aware of how they behave as group members and not concentrate solely on what they wish to say. The research shows that there is a plethora of short activities that develop the social and learning skills needed for successful group discussion and interaction (Cohen & Lotan, 2015). All the basic cooperative learning skills offered by these authors are part of the ongoing interaction among students in all cooperative learning methods. Examples of these social activities would be Think-Pair-Share or Walk Around Survey demonstrated in the professional development that is the foundation of this study.

The literature shows a variety of strategies that teachers implement with varying success. One such strategy is called Jig Saw. The Jig Saw structure (Aronson & Patnoe, 1997) consists of giving an assignment or problem for students to solve and involves four major steps. Students in the class are divided and assigned heterogeneous study teams called home groups (three to six members in each group). The academic material is broken down into smaller topics and presented to the student in text form. Each member

of the homegroup is then assigned a different topic and is responsible for learning that portion of the assigned material (Meyers, 2015). Students from different home teams but with the same assigned learning portion meet with each other to discuss and help each other learn the common material, forming expert groups. After learning their portion of the material in their expert groups, students return to their home groups to teach their home team members what they have learned.

This scenario would work well in a biology class when the teacher's objective is to have students understand the role of antibodies, white blood cells, and histamines in fighting disease. Students would first form home groups using colored index cards; red, green, and blue. In the home groups, each student would be assigned one of the three topics and provided an informational sheet about the topic. Only one student in the homegroup would be assigned to each topic and would be responsible for explaining relaying what he/she learned in the expert group back to his home group Sabah, 2016). In a study completed by Mengduo (2016), the Jigsaw strategy implemented with 6th-grade students helped them with learning about physical and chemical properties. The cooperative jigsaw instruction yielded significantly better acquisition of scientific concepts related to physical and chemical changes compared to traditional learning (Bailey, Voyles, & Durik, 2015).

While the Jig Saw strategy is successful most of the time, there are limitations to this strategy. While it is possible for ESOL, learned disabled students, or accelerated students to develop into a community of learners that models the process of open information exchange which characterizes science (Lotz-Sisitka, 2015) this is not always

the case. Problem behaviors during group collaboration have been one major concern voiced by some teachers attempting to implement these structures in their classrooms. Teachers also find it challenging to make assessment completion equitable (Schuter, 2017). Even with its weaknesses if the strategy is not the only social strategy a teacher uses, it can be helpful for many students.

This jigsaw collaborative and social strategy relates to social learning in that it considers students' ability, cultural norms, and working and learning styles when considering the makeup of the learning teams (Lotz-Sisitka, 2015). The assessment also depends on the length and purpose of the collaborative task. For short collaborative tasks, observer feedback or individual or group reflection would be appropriate. However, if the purpose is to attain skills and knowledge, typical assessments such as group presentations, quizzes, checklists, or other types of reports may be appropriate. The reflection connects to social learning as the learning environment is kept safe for students and helps to motivate the learning process.

One struggle a teacher often deals with when implementing cooperative learning is how to put together functional groups; however, there are in-class cooperative strategies. Too little is known about group composition to provide much guidance for creating the ideal group. Practical advice is available from many sources, but such advice can be vague or misleading (Erkins, 2016). Scientific work on group composition is noticeable, but that work often takes place in unrealistic laboratory settings that constrain the kinds of effects that occur, and the efforts made to manage those effects (O'Reilly & Parker, 2012).

Another way a teacher can encourage positive independence and create groups is through reciprocal teaching or asking members to assume specific roles when considering a problem. Reciprocal teaching requires students to work together in their assigned roles to achieve a task-related goal (Bowers, 2015). Examples of roles maybe a recorder or reporter. Teachers may also choose to assign colored cards to students on their way into the classroom, and each color signifies a different group. A simple method of placing students in groups is to assign students a group number as they walk into the room. There are many ways to get student talking in the classroom using social learning strategies.

Another in-class cooperative study is called Numbered Heads Together (NHT). There are five studies conducted in small, urban, culturally, and linguistically diverse schools in six-grade science classes. Students were given a number card as they entered the classroom, and teachers compared the effects of NHT. Each group of 3-4 students received a dry erase board, markers, and a cleaning cloth. When teachers direct questions to the class, students discussed and develop answers together then wrote their responses on their whiteboards and when asked to show their responses, they flipped their whiteboards to show their response (Maheady, Smith, & Jabot, 2013). Teachers found that student on-task rates grew by over 30% and quiz scores by more than 20% under NHT conditions (Maheady, et al., 2013). These statistics are compared to the traditional teacher asking questions while students raised their hands if they knew the answer (Bowers, 2015). This strategy is an effective, quick, and formative social assessment with students sharing short answers, or students may draw diagrams or images. This strategy does not promote higher order thinking as much as other social learning strategies.

Getting students talking in science classrooms is difficult even with the strategies stated in the previous paragraphs. Another form of social learning is inquiry-based learning which encourages students to communicate in a scientific manner (Lazonder, 2016). Teachers encourage students to find solutions to real-life problems by asking questions, designing investigations, analyzing data, making interpretations, drawing conclusions, and reporting findings (Lazonder). A descriptive case study of one teacher emerged from another larger project. The teacher discovered that before she could have a scientific discussion with her students, she to understand her students and their way of speaking.

Teachers must be able to expect pushback from their students and to change the classroom culture and physical makeup of the room (Barth-Cohen, 2016). This teacher also found that inquiry-based learning must include student interaction, something she did not encourage when she used her traditional means of instruction. Finding that she was not familiar with social learning techniques, the teacher that participated in the study opted to take additional professional development workshops which showed a predisposed interest in the topic. Although the scientific community advocates the use of scientific discourse in the classroom, its implementation proves hard to achieve.

Within this study (Birt, 2016), different aspects of social learning are evident. Cooperative learning demonstrations by the teacher created a learning environment where students work together in small groups in a positively interdependent manner. The activities that students completed are structured so that students need each other to accomplish their common tasks (Barber et al., 2016). Another aspect of social learning is

collaborative learning. Open communication must take place between students to complete a project or task. The teacher will create an environment that allows students to share their strengths and work on their weaknesses together (Lai, 2016). Modeling is a social learning strategy whereby the teacher or students demonstrate a new concept or approach to learning. The teacher creates an environment that allows students to learn by observation and shared experiences (Lai). The detection of social learning strategies within the classroom should be apparent. While observers detect the social learning strategies within the classroom, social learning strategies should also provide a connection to the community surrounding the schools.

Social Learning Connected to Community

Another category of social learning strategy is one that gets students not only connected with their peers as they learn but also with their community. Connecting students to the community is the focus of service projects that research shows promote opportunities to cultivate deeper understandings of diversity, social justice, and themselves. Buchanan and Rudisill (2015) utilized undergraduate teacher candidates from two different regions. Three themes framed the discussion: preconceived notions about teaching in diverse settings, how preconceived notions were overcome or reinforced and teachers stating that they learned about themselves as a teacher (Buchanan & Rudisill, 2015). Findings suggest that service-learning, emphasizing multiculturalism, and social justices have to potential for empowering prospective teachers to confront injustices and to begin deconstructing lifelong attitudes and constructing socially just practices. To organize this program, the teacher was a facilitator. Students formed their groups and

decided the subject of their project, which made the learning more personal and created student buy-in towards the work (Buchanan & Rudisill).

There is a considerable agreement in the academic community that service-learning is a multi-tiered pedagogy that can be implemented at any level of education, preschool through graduate school. Flores (2015) recommended that in teacher education programs that field experiences and goals be collaboratively developed to minimize the asymmetry between the teacher and student. Also, types of community experiences should be varied to provide multiple perspectives on societal issues and critical and reflective papers, and discussions should be planned to confront any preconceived biases or beliefs. Multiple perspectives allow students to have face-to-face meetings to share their ideas which is an integral part of social learning.

The data for Flores' (2015) study were collected by written reflections and in-depth interviews. Professors' observations were used to corroborate the data from interviews and reflections. The results revealed that service-learning could have an impact on teacher candidates' disposition toward teaching in diverse settings. It caused the teacher candidates to examine the limited expectations they had for the children their families and their communities (Flores, 2015). By working with students in their community settings, the teacher candidates realized that we are all teachers and learners. Their public-school partners' stories illuminated the challenges and obstacles they faced in their communities. One participant's journal regarding a student she worked with stated, "I was teaching her and at the same time learning from her."

Other studies have followed service-learning projects that involve students, parents, staff, and the surrounding community (Newman, 2015). Over the past few decades, researchers and teachers have increasingly recognized the importance of K-12 school climate and connectedness. Newman (2015) recommends school climate reform as a data-driven strategy that promotes healthy relationships, school connectedness, and dropout prevention. In schools with supportive norms and service-learning programs such as positive relationships and structures, students experience less violence, peer victimization, and punitive disciplinary actions which can result in high levels of absenteeism and reduced academic achievement. While service-learning groups tend to focus on the task and a larger group of students, they still provide students with a positive social learning experience.

Social community learning strategies relate to social learning because they allow a reduction in the level of distress in not only teacher candidates but also students (Chung, 2015). Students become distressed when they lack the resources to solve a problem, have little or no control over a circumstance, and experience repeated situations of intense and prolonged stress (Jensen, 2005). When the teacher candidates arrived at schools filled with diversity, they had preconceived notions and were not prepared to relieve the distress from students. When this occurs, the brain will lose its ability to interpret subtle cues from the environment correctly, revert to familiar tried and true behaviors, and is less able to use higher-level thinking skills. This study was invaluable to this group of students as it made the teacher candidates focus on their biases and see the students' challenges (Jensen, 2005).

A program called Public Participation in Scientific Research (PPSR) which includes citizen science, refers to partnerships between scientists and non-scientists as well as students to research a topic of interest (Hmelo-Silver, Liu, Gray, & Jordan, 2014). One benefit of PPSR is the opportunity it provides students and ecologists to develop skills required for effective collaboration between researchers and students (Conrad, Shewmake, Shows, & Nickelson, 2016). PPSR also uses "near-peer" teaching where a student at a slightly more advanced school level teaches a less-advanced student (Hmelo-Silver, Liu, Gray, & Jordan). Teachers using this method report a more thorough understanding of the content material, improved communication skills, and improved leadership skills (Fairman, 2015). This strategy can easily fit into urban science classrooms and would benefit not only today's students but tomorrow's society (Fairman, 2015).

Social Learning Connected Globally

The last social learning strategy category is one that connects learners beyond their classroom and connects them more globally. Tools are now available to facilitate social learning that is unconstrained by spatial and temporal boundaries among team members (Goldie, 2016). Social learning can change social media to a means of facilitating knowledge and allows students to connect by allowing them to behave the way they do in a natural and social means. It is not a deliver system analogous to classroom training, e-learning, or even mobile learning. Instead, it is a powerful approach to sharing and discovering a whole array of options, some of which we may not know we need such as more informed decision making and an intimate, expansive, and dynamic

understanding of the culture and context in which we work. Mobile devices and easily created cloud communities offer access to opportunities for apprenticeships, mentoring, and peer learning in global and local communities (Goldie, 2016). The new social tools do not replace training, knowledge management, and communications practices used today. They augment them (Salmona, 2015).

While not often the focus of the debate, the role of social media in science should be part of the conversation on digital literacy. New Common Core and Next Generation Science Standards emphasize science literacy, but little guidance provided to teachers on how to achieve these goals in a digital era takes place. Some of the most creative and engaging science conversations are happening in informal, online forums such as Canadian astronaut Chris Hadfield, Commander of Expedition 35 live tweeted from space to over 1.1 million followers last year (Halpin, 2016). As forums such as Twitter, YouTube, and Facebook (Greenhow, et al., 2015), become new generators of useful information, students need guidance on how to find accurate and reliable sources of scientific information. These forums do not replace to need for training on traditional forms of research, and rather it is another layer of the 21st-century competencies. The ability to sift through excess news stories, differentiate fact from opinion, and organize and synthesize data to communicate scientific ideas are not skills learned by being an everyday user of social media. For most students, this must be taught (Salmona, 2015).

There are many ways that students can use social media in the science classroom to discuss their findings and knowledge with the global community. Twitter generates science news in the classroom (Halpin, 2016). Students can follow scientists or

journalists and communicate what they have learned with their followers. Feedly is a news aggregator that is perfect for classrooms and research projects. Students learn to filter, and curate content based on their interests or research on Feedly (Halpin, 2016). Vine allows students to document and share science happenings in the classroom and the global community (Johnson & Johnson, 2016). Finally, Easel.ly helps meet Common Core standards with infographics (Harrison, 2017).

The Common Core requires students to be able to translate quantitative data into visual forms and helps students create shareable visualizations that tell a story or communicate an idea. Infographics are graphic summaries that can assist learners in understanding ideas and information (Johnson & Johnson, 2016). For students to develop infographics, they inevitably grapple with the complex ideas around a topic and how to display them visually for others. Meyers (2015) describes his use of infographics at the secondary level. After comparing several infographics, students were asked to decide which was the best infographic and why. The determination of the best infographic required students to cite evidence for their choices and encouraged them to think deeply about their choices. He then had students sketch how they might display information visually on a topic and, after that, develop their infographics using various tools, such as ease.ly. The important consideration in developing infographics is that students understand the content and then translate this understanding through purposeful design and organization (Eymur & Geban, 2016). Social media is not just for chatting as it can be used to connect the student to content, and a global audience for their projects.

Using social learning strategies that connect students to a global world can also allow students to become lifelong learners (Meyers, 2015). By using these sites and teaching students how to navigate through all the information on the Internet, teachers are providing a novel way for students to learn. Learning is also a continual process, lasting a lifetime. Learning and work-related activities are no longer separate; in many situations, they are the same. Many of the processes previously handled by learning theories, especially cognitive information processing, can now be off-loaded to or supported by technology. The new social learning has become the norm and is part of the educational process (Eymur & Geban).

Kyndt et al. (2015) found that the vote count made by participants of the study regarding cooperative learning demonstrated that cooperative learning has more positive effects than the traditional learning conditions by 85 findings to one with 48 findings showing no difference. When taking all dependent variables together, the vote count shows that cooperative learning has more positive effects than the traditional learning condition by 85 findings to one by observing group study and task specialization. This study listed Jigsaw and think-pair-share (Kyndt, et al., 2015). Think-pair-share is described as a cooperative discussion strategy which works in three phases; (1) Think. The teacher provokes students' thinking with a question or observation. Students take a moment to think about the question. (2) Pair. Using a partner, students pair up to talk about their answers. They compare their mental or written notes and identify the answers they think are best, most convincing, or most unique; (3) Share. After students talk in

pairs for a few minutes, the teacher calls for pairs to share their thinking with the rest of the class (Meyers, 2015).

Social learning reaches a global proportion when students become citizen scientists, collecting, and communicating with researchers around the world. Citizen science projects have become popular with families, teachers, and students. People who support environmental protection for their communities are contributing to a citizen science project (Bonney, 2015). Citizens may choose to join the Neighborhood Box Turtle Watch in which individuals or groups who find a box turtle, take a photo of it, write anything of note about the turtle such as its physical attributes and location and then submit this information to the citizen science program (Jones, Childers, Stevens, & Whitley, 2012). Another citizen science project is known as the Great Pollinator Project, which is a conservation-related project in New York City. Researchers asked volunteers why they joined the program and replied with varied responses such as the subject of the study, contributing to science, being outdoors, and social factors (Johnson & Johnson, 2016). Overall, citizen science has an important role to play in achieving conservation outcomes, and findings indicate learning and values as top motivations and the field of citizen science can build on and benefit from motivations research.

Some projects focus on how human beings have always organized themselves into groups and communities based on shared identity. This identity may forge in response to a plethora of human needs such as political, economic, or social. As group identities become stronger, those individuals that hold them organize into communities shared values and create structures that reflect their beliefs (Ehiobuche & Justus, 2016).

One such project (Becker, 2016) demonstrates how students can use and how they value the use of Twitter inside the science classroom. Becker's (2016) project allowed students to connect with disparate populations, minimize traditional barriers such as time, geography, and space. Also, since science communication has influenced an expanding array of media through which scientists can now connect directly with the public, Twitter was used in Becker's study to bring together scientists, secondary science students, and teachers using out of school, monthly science chats. Hopper (2016) had a similar study using videoconferencing, which enabled both locations to hear and see each other in real life. A third project involved fourth-grade students at two different Texas schools that tested two parts of the Trinity River Basin. Student tested turbidity, nitrates, ammonia, temperature, pH, dissolved oxygen rate, and the presence of aquatic life. Students could decide which project they were interested in and how to go about comparing data. They used a Skype-like tool called Bridgit to talk during class and summarized their data during a conference call. The project was both relevant and authentic to students because the location was close to both schools, students completed the task using cooperative learning as well as project-based learning as well as 21st-century skills (Chen, et al., 2015; Hopper, 2016).

Social learning strategies are diverse and reach students in groups, schools, and communities. One of the inevitable challenges that teachers face is determining the most effective teaching strategies for their students (Chen, Hernandez, & Dong, 2015). Also, instructors must consider which skills will be most practical for students entering the workforce where building relationships and productivity go together. To meet this need,

many teachers are using active teaching strategies such as brain-based learning or social learning strategies as well as state of the art technology (Hopper, 2016).

These strategies strive to create group situations that will foster support and feedback systems while developing decision making, problem-solving, and social interaction skills. Some studies have shown that students who are taught using cooperative learning are more successful than students taught with more traditional methods. The main point of this study focuses on teachers' perceptions of social learning strategies. The empirical analysis provided considerable support that active participation in social learning strategies had a positive relationship with students' academic performance and to the success and autonomy of teachers. The gap in the studies revolves around citizen science programs and their benefit globally (Becker, 2016). This study will expand on the current research by focusing on teachers' use and perception of success of those social learning strategies and the outreach they have to their community. This study will add understanding to how successful teachers are in using social learning strategies with urban students.

Facilitating Social Learning Strategies

In many ways, all learning is social (Caine & Caine, 2011) in that the accumulated knowledge gained by scores of others down through the ages. Even the solitary reading of a book or Web page is social as it puts the reader in touch with all the people who influenced the authors' thinking and writing. Both face-to-face and virtual collaborations have been shown to increase learning motivation, create better and more innovative results, and to develop social and cross-cultural skills (Adamson & Darling-

Hammond, 2015). Learning in a community of learners who share knowledge, questions, skills, practices, progress, and passion for a subject is how adults learn when they participate in their communities of work and professional practice (Rienties, Heliot, & Jindal-Snape, 2016). There are many forms of social learning, such as group investigation, cooperative learning, informal cooperative learning, and formal cooperative learning.

Group Investigation

Before embarking on group investigation, teachers may find it helpful to demonstrate and practice skills with their class (Sharan & Sharan, 2015). These skills are intended to make group members aware of how they behave as group members and not concentrate solely on what they wish to say. The research shows that there is a plethora of short activities that develop the social and learning skills needed for successful group discussion and interaction (Sharan & Sharan). All the basic cooperative learning skills offered by these authors are part of the ongoing interaction among students in all cooperative learning methods. Examples of these social activities would be Think-Pair-Share or Walk Around Survey, as evidenced in the professional development that is the foundation of this study. The Walk Around Survey helps students to summarize or activate information and promotes the retention of knowledge using engaging strategies designed to rehearse and practice skills to move knowledge into long-term memory (Jacobs, 2016).

To facilitate a group investigation, teachers need to design tasks that do not relate to any extrinsic reward that may trigger intergroup comparisons and competition (Jacobs,

Power, & Inn, 2016). The design of tasks will allow all groups to base their goal on the learning task, it must be sufficiently complex to permit a variety of subtopics to be identified, or for different points of view to be expressed. Mutual assistance in the group is multilateral and made possible because everyone has something to contribute that not paralleled by other group members (Johnson & Johnson, 2016). Teachers should monitor group members as they receive feedback about the extent to which they accepted the equitable distribution of time that allows everyone a chance to express their thoughts (Dugas, 2016).

A group investigation begins when the teacher poses a broad, multifaceted problem or question such as "What and how do animals eat?" Students plan which aspects of the problem to investigate and what resources to use (Dugas, 2016). They ask questions about the topic, form groups to seek answers about their questions, and to interpret and integrate information considering their knowledge, ideas, experience, and abilities. The stages of implementation of group investigations are class determines subtopics of the problem and organizes research groups, groups plan their investigation, groups carry out their investigations, groups present their findings, and both the teacher and students evaluate the projects (Poonpon, 2017). The teacher can easily facilitate these stages of a group investigation and followed by students.

Cooperative Learning

Although cooperative learning has many ancestors and can be traced back at least 2000 years, it is only in this century that there has been the development of a theoretical base, systematic research, and systematic teaching procedures for cooperative learning

(Johnson & Johnson, 2016). There are five major elements of cooperative learning (Sharan & Sharan, 2015). Positive interdependence is the most important of these elements. Students must perceive that it is to their advantage if other students learn well and that it is to their disadvantage if others do poorly. The achievement of positive interdependence through mutual goals (goal interdependence), division of labor (task interdependence), dividing resources, material, or information among group members (resource interdependence), and by giving joint rewards (reward interdependence) is paramount to the success of social learning (Johnson, Bolshakova, & Waldron, 2016).

Besides, cooperative learning requires face-to-face interaction in which teachers encourage students to express their positive interdependence behavior (Johnson, Bolshakova, & Waldron, 2016). It also requires teachers to include individual accountability for each member of the cooperative learning group for mastering the material to be learned and for providing appropriate support and assistance to each other. In a study performed at the University of Minnesota (Hyun, Ediger, & Lee, 2017), undergraduate science students were observed using cooperative learning, interviewed, and surveyed about their experience. The results demonstrated a positive response from professors as well as students as teacher and students alike found themselves becoming a learning community. Teachers found that they felt comfortable discussing the material to be learned while facilitating the process, help students to assist each other to learn the material, and encourage students to work hard (Hyun, et al., 2017) with their teacher and each other. Johnson and Johnson (2016) found that cooperative learning works best when teachers facilitate in an environment that is non-threatening. Teachers help students to

work in a cooperative matter, physically set up the classroom in ways that promote collaboration and encourages students in the process of interdependence. Challenges of cooperative learning (Sharan & Sharan, 2015) include how to include ESOL students as well as students who are not as advanced as the rest of the class, differentiation, and simply placing students in groups.

Research shows that the classroom atmosphere that teachers organize is a key ingredient in the success of cooperative learning. In support of this statement is the idea that students need to feel comfortable with classmates and to be willing to share ideas, to ask questions, and to take risks (Fraser, 2015). In truly cooperative classrooms, the teacher will hold classroom meetings to discuss classroom norms. Meetings have been shown to create a safe venue for teachers to air feedback and suggestions on how the class is functioning. Another step a teacher may take to form a cooperative learning environment is called Team Then Teacher (TTT) (McCormack & Garvan, 2015). The strategy encourages students to move away from relying exclusively on the teacher and to first consult with their team rather than the teacher. Classrooms have many routines such as passing out papers, getting into groups, and focusing on the teacher when necessary (Reddy, 2019). It is worth the time to practice the routines and to renew the practice if the routines are not working well. To facilitate cooperative learning, teachers must consider the arrangement of the classroom. Students need to sit close together and use quiet voices which will foster cooperation. Teachers should also provide space for students to walk around to visit all groups if necessary and for the teachers to visit all groups as well. Preferably, students should be sitting with their groups all the time so as not to waste time

to move to get into groups. Groups may be changed each quarter to allow students to work with a wide range of partners (Davidson & Major, 2016). In addition to team building and developing a classroom environment that promotes cooperation, there is a need to see the difference between formal and informal cooperative learning.

Formal Cooperative Learning

There are two main forms of cooperative learning: formal and informal. Formal cooperative learning allows students to work together for various amounts of time so they may achieve a common learning goal. These goals may include solving problems or making higher level decision making together (Reddy, 2019). In order for cooperative learning to be formal, teachers organize it to include these five elements: "making a number of decisions whereby teachers specify the objectives for the lesson and decide upon the groups size, assigning students to groups, roles within the groups assigned, provide the materials needed to conduct the learning, and arrange the room to be conducive to group work (p. 321). The discussion of some of these steps takes place in previous paragraphs.

One element is important in facilitating formal cooperative is to explain the task and the positive interdependence. Observations will be conducted regularly by the teacher as the student group works. If necessary, the teacher will intervene to assist the students in task completion and working cooperatively (Fraser, 2015). Another element important to facilitating formal cooperative learning is to monitor the students' learning and intervene within the groups to provide task assistance or to increase students' interpersonal group skills. The teacher regularly will make observations and collect

information as each group works and only intercedes to assist students in the completion of the assigned task. The third element in the process of formal cooperative work is to assess students' learning and to help students process how well their groups functioned (Freeman et al., 2016). Learning group members will then discuss the effectiveness of their work and any improvements they may make in the future.

Overall, teachers who facilitated cooperative learning found that their students helped to accomplish the group's goal, came to class prepared, provided constructive feedback to their peers and had a higher likelihood of receiving better test scores and final course grades at the end of the semester (Berger, 2015). Changes in higher education across disciplines may encourage modifications in the way teachers select and implement their teaching strategies. With the rise in new technology and smart classrooms, cooperative learning is in the process of being reconceptualized as a pedagogical concept (Berger).

The fourth element in the facilitation of social learning is assigning roles within the groups. A group exists for a reason or purpose and has a goal shared by the group members. The people in the group have some relationship or are connected. Teachers help students to recognize this connection by assigning roles. Perhaps students are working on a group project, and the teacher may assign a student to be the leader, another student to be the reader, a student to be the reporter, and perhaps a writer. The assignment of roles allows students to share what happens to fellow group members collectively and from a teamwork perspective, the teacher facilitates interdependence (Cohen & Lotan,

2015). Group members interact and communicate with each other. Formal and informal rules, roles, and norms of the group control the interactions of group members.

The completion of the fifth element in the facilitation of social learning is by the teacher or the students (Cohen & Lotan, 2015). It is the creation of an environment within the classroom that allows for group work to be accomplished. The physical classroom may be set up in rows of desks which is not conducive to group work. Desks may be moved into groups of 4 or perhaps two, depending on the assignment. If the teacher wants students to report out their results later, she may create a circle of desks so students can speak to each other face to face. The students in each group will want to stay in the group due to member and teacher influence

Informal Cooperative Learning

Informal cooperative learning consists of having students work together to achieve a joint learning goal collaboratively. The collaboration takes place in temporary groups that last from a few minutes to one class period (Johnson, & Johnson, 2016). Informal cooperative learning can be used to engage students in the content of the lesson, focus attention on tasks, or to build a conducive learning environment (Jones, 2014). Students will then summarize information and precede the next session while providing closure for the instructional session. The organization of informal cooperative groups takes place so that students engage in three to five-minute focused discussions before or after a lecture and in two to three-minutes turn to their partner discussions interspersed throughout a lecture (Johnson, & Johnson, 2016).

Challenges of Facilitating Cooperative Learning

While social learning has many names, facilitating students working together is not always easy, it has its challenges. The literature highlights a number of these. The first is that cooperative learning has contrasted with competition but seen in groups that have not grasped the process of social learning. Macpherson (2015) stated that "competition is working against each other to achieve a goal that only one or a few can attain". When students are in competitive situations, goals of the group become the goals of each individual. However, if an individual student chooses to work by themselves, their goal may not be related to those of other group members (Macpherson, 2015). The personal gain is not conducive to cooperative learning, and so teachers must provide opportunities for students to practice their collaboration skills. Much of the focus of facilitating social learning is what was the focus in the PD, not how teachers feel about implementing the strategies, or their challenges and successes.

The research on facilitating social learning often focuses on working in cooperative groups, social communication, and working with interdependence. The gap that remains is to what extent the professional development related to facilitating social learning that teachers receive is being used in the classroom. This gap is important because it impacts the self-efficacy of the teacher, the success of students, and the goal of making students members of their community outside the school. While some studies explored lack of time to implement these strategies (Johnson & Johnson, 2016), lack of understanding of how to implement these strategies (Millis, 2016), and the lack of motivation for students due to these strategies (Arends, 2016), this study will explore the

perceptions of teachers regarding facilitating social learning based on the principles of social learning. This study will expand on current research by increasing the understanding of how the PD teachers a forum to discuss the use of modern methods of social interactions for learning. This study will add understanding to the gap by providing teacher perceptions of social learning implementation, share their responses for other teachers and administrators to read, and reflect on how to improve professional development for teachers.

Assessing Social Learning

If teachers value social learning, they usually choose to assess not only the product constructed through social learning but also the process of students' interactions during that learning. In education, most of the change has focused on teaching and learning. Some are calling for a corresponding change in educational assessment. This view of assessment as the driver of educational change is of great importance (Greenstein, 2016). Assessment can be formative or summative with both makings learning more meaningful (Brown, Harris, & Routledge, 2016). While there are benefits to assessing social learning such as allowing students to become more autonomous in their learning, there are also challenges such as members of a group becoming a social loafer or not performing to the best of their ability (Torre, 2016). During social learning, students are engaged (Brown et al., 2016) with factors that increase engagement such as control, choice, challenge, complexity, and caring (Greenstein, 2016). The organization of this is a discussion of the methods, benefits, and challenges of assessing social learning.

Methods of Assessing Social Learning

Assessing social aspects of learning can be done by students, by the teacher or both. Teachers who guide students have been encouraged to set out and explain the intended outcomes so that students can share and understand the expectations as they work with their peers (Fazio & Carrow, 2015). Assessment that is conducted at the end of the activity to rank students' abilities for reporting is known as summative assessment (Torre, 2016).

In contrast, the aim of formative assessment is providing feedback for students on their performance to improve and accelerate their learning during the learning process (Ng, 2016). The formative assessment might include continuous assessment and feedback from teachers, dialogue between teachers and students about the assessments, and agreement between teachers and students regarding the criteria for success (Webb, & Gibson, 2018). Other examples might be signaling like thumbs up/down or reviewing, displaying with graphic organizers, and questioning (Greenstein, 2016). However, students' motivation to use feedback to improve their learning is essential (Fazio & Carrow, 2015). The professional development provided for the teachers involved in the study at hand involved both summative and formative assessment in group settings.

There are several approaches to conducting the formative assessment, which is also known as assessment for learning (AFL) which is a common approach to assessing social skills. There are ten guiding principles, including aligning assessment to teaching and learning, allowing students to take part in the assessment process, or analyzing and reporting students' results (Webb & Gibson, 2018). With AFL, the assessment process

has now shifted from primarily unidirectional, from teachers to students, to multidimensional, involving peer-peer and self-assessment. Informative assessment students carry the responsibility for assessing their progress not only related to content but for how they are contributing to the group's progress. In contrast to summative assessment, the aim of formative assessment is at providing feedback for students on their performance to improve and accelerate their learning. Examples may include continuous assessment and feedback from the teacher, dialogue between teachers and students about the assessment, an agreement between teachers and students regarding the criteria of success (Ng, 2016). The utilization of many forms of formative and summative assessments in social learning has value.

In social learning peer-peer assessments are common (Panadero & To, 2019). Peer assessment is not a single, undifferentiated educational strategy. For example, researchers from the University of Ulster identified ten different models of peer assessments (Layton, 2015). These ranged from traditional proctor model in which senior students tutor junior students, to the more innovative learning cells, in which students in the same year form partnerships to assist each other with both course content, personal concerns, and assessment (Layton, 2015). There are seldom enough opportunities for formative assessment and getting feedback from faculty to develop skills and concepts significantly. Peer assessment, a form of formative assessment, provides opportunities for additional self and peer assessment of a formative kind.

In a study by Jones and Alcock (2015), peer assessment and grading were found to be a reliable and valid approach to assessing not only for mastery but also social

learning. This finding supports the study by the fact that a teacher often supports peer assessment by providing students with assessment rubrics to ensure consistent and reliable peer assessments (Jones & Alcock). Peer assessment mirrors the kinds of informal assessment activities that take place daily in the world of work: self-assessment and peer judgments are more common and can often have a more powerful influence on personal work than formal appraisals (Layton, 2015). Peer assessments have been successfully used to assess social learning.

Online peer-to-peer formative assessments of social learning approaches characterized by positive interdependence are in research. The positive interdependence can be accomplished using rubrics, checklists, narratives, or agreement/disagreement from each small group (Chai, Tay, & Lim, 2015). Formative assessment in on-line learning for social learning may also include self-reflection. To encourage self-reflection, teachers allow students to freely express their opinions, allow students to help the teacher decide how well their learning is going, ask other students to explain their ideas and create activities that increase students' interest in science. This help teachers to become self-regulated learners. In a study by Lu and Law (2015), one hundred and eighty high school students engaged in peer assessment using an online system. When both assesses and assessors were analyzed, student assessors identified problems and gave suggestions (Lu & Law, 2015). The identification shows that student assessors were self-reflective about the assessment and that their creativity and interest in science was peaked.

In addition to formative and peer assessment, summative assessments are also used to evaluate student learning, social skill acquisition, and academic achievement after

a defined instructional period. Rubrics are often used to evaluate the quality of individual as well as group contributions to a task (Greenstein, 2016). The rubric consists of performance criteria with ratings and can help students in developing, revising, and judging their work and can also provide feedback to students (Panadero & To, 2019). Assessment rubrics serve to maintain marking consistency and quality of marking and sharing an assessment rubric with students can develop their assessment capabilities and enhance their autonomy (Panadero & To, 2019). In some cases of group work, individual students can be assigned specific roles and tasks within the group and can be directly, individually, or as a group assessed against the performance of these roles. Assessments based on post-output individual evaluations can be in the mode of individual report, essay, presentation, or poster as most appropriate to the learning outcomes criteria (Greenstein, 2016). There are also summative assessments based on the indirect use of the group-produced output, which is more complex than the other examples given.

The essential feature here is that although the assessment process begins with an assessment of the group, not of the individual (i.e., report, artifact, performance, etc.). There is then a process of individual modulation of the group grade to arrive at the summative grade for each student. The process must be carried out carefully to ensure that not only the volume and quality of each student's contribution to the group output but also the recognition of their final grade but that each student's achievement of the intended learning outcomes compares against assessment criteria. Summative assessment of social learning demonstrated and discussed in the current study's professional development.

Benefits of Assessing Social Learning

Assessing social learning is beneficial to both teachers and students. First, it is beneficial to teachers. Formative assessment of social learning allows teachers to make informed decisions about instruction, understanding, and mastery of a concept (Clark, 2015). Formative assessment within a group setting also reinforces self-regulated learning strategies among students (Gallardo, Geraldo, & Castano, 2016). The accomplishment of self-regulation took place by allowing students to be both the student and the teacher and to play an intricate role in the process of learning. By providing ongoing assessment in a group setting, teachers learn which students understand the material, are working cooperatively, and value the discussion with peers (Gallardo, et al., 2016).

But assessing the quality and process of social learning benefits not only teachers but also students. In the last decade, the 21st-century competencies have been prevalent in schools. Social learning can be used to teach each of the competencies such as collaboration, real-world problem solving and innovation, self-regulation, social awareness, and skilled communication (Voogt, Erstad, Dede, & Mishra, 2016). These skills will aid students whether they go to college after secondary school or locate a job. Furthermore, cooperative learning, as a teaching pedagogy, capitalizes on adolescents' desires to engage with their peers, exercise autonomy over their learning, and express their desires to achieve (Van Veelen, Sleegers, & Endedijk, 2017). Social learning suggests that students reflect on their learning. Reflection in learning is also known as

deliberate learning. That is, learning with a specific goal rather than generalized learning and learning that the student intends to retain (Gallardo, Geraldo, & Castano, 2016).

The use of teams within the classroom using pairs of student heterogeneity set the stage for critical thinking (Brookfield, 2015). The emphasis on critical thinking depends on identifying and challenging assumptions and subsequently exploring and conceptualizing alternatives. Using peers to reflect, discuss, and evaluate concepts allows students to cooperative behaviors which can acquire not only teamwork skills, but metacognitive skills advocated by Sun (2016). For students, structured group work can also promote problem-solving at a higher level than possible with individual effort alone. Students reflect on individual steps involved in problem-solving and specific strategies or approaches they used in the process of reaching problem solutions and finally underlying rationales for their ideas (DeHei, 2017).

The benefits of social learning for students are varied. Social learning encourages meaningful student involvement (Huang, 2017). Social learning can encourage motivation, commitment, and connection to coursework. Social learning also promotes a positive academic, social, and cultural outcome (McLoughlin, Burns, & Darvill, 2015; Vygotsky, 1976). Students can develop strong connections to other students and teachers as well as enhance lifelong critical thinking and community building skills.

Challenges of Assessing Social Learning

While there are many benefits to assessing social learning, the literature shows that assessing it can be a challenge. The first challenge is to determine whether to assess the group or the individuals within the group. In a quantitative study (Huang, 2017), the

engineering students group participants' academic performance was measured employing homework and unit tests. Each test lasted 3 hours and consisted of six to eight engineering problems covered in the major learning points of lessons. The results of the study research demonstrate that it may be better to evaluate individuals working within the group, not the group. A proposed assessment method by the researchers might be to assess successful cooperative teams learning performance (McLoughlin, Burns, & Darvill, et al., 2015). The team score might average that of the individual team members, which would provide an objective index of the team performance. The results of the study suggest that in a successful group, a group in which individual knowledge transfer process takes place helps all the team members achieve a higher score (Purzer, Fila, & Nataraja, 2016).

Another challenge comes into play when students assess their peers. In a paper written by Chai, Tay, and Lim, et al., (2015), the authors posit that peer assessment is "fuzzy" because it considers the vagueness and imprecision of words instead of numerals to provide greater flexibility. Saborit, Fernandez-Rio, and Estrada, (2016) suggested that team members give confidential evaluations of the extent to which they feel that each of their teammates is or is not fulfilling their responsibilities. Evaluations may cause students to feel pressure when asked to confront their teammates with complaints or to evaluate their participation even when done confidentially (Saborit, 2016). Others find this unacceptable and suggest assigning individual scores to each student in a numerical form.

When an individual within a group expects others to do all the work, this social loafer causes problems for the group, particularly related to assessment. Social loafing (Arevalillo-Herraez, 2015) may significantly reduce educational gains. Experience shows that the unbalanced contribution problem (social loafing) happens more than expected. In some cases, group members may carry the weight of the social loafer, but in other groups, there is a strong negative motivational effect, and the other team members may reduce their effort (Huang, 2017). A major concern with this typical approach happens when significant differences exist between scores obtained by each member in a team in their respective individual assessments. Teachers applying peer assessment techniques, whether traditional or online forms are all faced with one serious issue: threats to the process resulting from unfairness (bias in favor of preferred peers), distortion of marking, low-quality comments and mismatches between grades and comments (Dingel, Wei, & Huq, 2016).

Summary

Assessing social learning literature range from rubrics to projects. Benefits of assessing social learning include increased motivation, self-regulated learning, and gaining cooperative work skills. There are also challenges of assessing social learning, including classroom management skills and the original training of students to use cooperative skills as well as students who do not participate in the group activity. The gap that remains is how teachers view assessing social learning. This gap is important because part of assessing cooperative learning is how students work together or whether they are working together. While some studies explored cooperative learning, as a

teaching pedagogy, which capitalizes on adolescents' desires to engage with their peers, exercise autonomy over their learning, and express their desires to achieve, this study explored the perceptions of teachers when using cooperative learning strategies. This study also expanded on current research by allowing teachers time to self-reflect on the success or challenges of social learning. This research study added understanding to the gap by receiving teachers' perceptions, opinions, and shared experiences when using social learning in their classrooms.

Teacher Perceptions of Social Learning

Teacher perceptions of social learning are important to explore for several reasons. First, social learning has proven to be a successful instructional strategy. Buchs, (2017). Second, the successful relationship between instructional strategies and clear objectives can heighten by social learning strategies (Sun, 2016). Third, if teachers perceive social learning as too complex to attempt in their classrooms, they may not be willing to implement the strategies in their classroom (Huang, 2017). Fourth, teachers want to motivate and engage their students, and social learning has been proven to do just that (Buchs). Finally, social learning provides a way for teachers to differentiate by content and by the student (Subban & Round, 2015). I will discuss the literature on this topic organized into teacher perceptions and challenges of implementing social learning.

Teacher Perceptions of the Benefits of Social Learning

Teachers perceive social learning in several ways. Teachers positively perceive social learning because they see it as impacting their self-efficacy as well as students' motivation, engagement, and achievement. Efficacy involves a teacher's attitude and

beliefs toward working with students and may directly correlate to a teacher's ability to produce the desired result (Donohoo, Hattie, & Eells, 2018). Self-efficacy perceptions regarding social learning indicate teachers' evaluation of their abilities to bring about positive student change by using social learning strategies (Webb & Gibson, 2018). Teachers who believe effective teaching impacts student learning, and who also have confidence in their own teaching abilities through social learning, persist longer, provide a greater academic focus in the classroom, and exhibit different types of feedback than teachers who have lower expectations concerning their ability to influence student learning (Webb & Gibson). When teachers believe they can perform their roles in social learning successfully, they will engage more fully in that role and display a high sense of self-efficacy and achieve a positive outlook regarding social learning.

The literature also shows that teachers like social learning because it allows for differentiation within the classroom in both content and student groups. Differentiated instruction, as an application of social learning, offers a framework for addressing learner variance as a critical component of instructional planning. Subban and Round (2015) believe that utilizing different approaches as well as many other varied styles of instruction such as social and brain-based learning, enhances the learning environment. For example, creating small groups of different learning levels, different learning styles, and cultures will allow differentiation of student product (Subban & Round, 2015). Creating small groups with different assignments based on the same topic will allow for differentiation of process and product. There is high value for differentiation within

classroom settings by most teachers and their perception of social learning and its impact on differentiation is positive.

Social media has provided teachers with additional ways to increase social interaction, not only among students within their courses but also with a larger, more authentic audience outside their courses. Teachers' perceive social networking websites to be for connecting people primarily, collaboration, and interaction (Irwin, Ball, Desbrow, & Leveritt, 2016). Teachers do not always see that sites such as Facebook have a use for a variety of purposes in addition to creating and maintaining social connections (Hew, 2018). The use of these social networking sites (SNS) might also be for learning processes, as a task management tool, or student activism. Hew (2018) found that the main use of Facebook was for social interaction and maintaining relationships which is why some teachers do not use SNS's in their classroom. McCarthy (2017) used Facebook in her classroom as a virtual classroom providing a platform for students to produce academic and social interaction with peers in their first year of the university experience. Approximately 93% of the students reported that Facebook helped to develop academic relationships with the students in the class (McCarthy, 2017).

Similarly, Sharma (2016) found that Facebook supported students to maintain contact with their teacher. In a recent study (Soomro, Kale, & Yousuf Zai, 2016), found that the perceptions of pre-service teachers are positive, yet in-service teachers perceive Facebook and other SNS's to have social purposes and not educational purposes. In the qualitative study, there were 128 participants with none of the participants using Facebook for educational purposes, but all used Facebook to communicate with each

other or parents. Participants replied to the Likert Scale question, “Facebook can be used to listen, evaluate, and to learn from ideas of others” in a negative manner. The participants, however, scored the question “Facebook can be used as a platform to discuss classes” in a positive manner. The perception of preservice teachers was that Facebook’s use was for collaborative learning. In contrast, faculty did not show a positive perception of the instructional use of Facebook in addition to their regular teaching procedures (Sharma, 2016). This study demonstrates that positive perceptions of a teacher would alter his/her use of Facebook as an instructional tool.

Despite the merits of SNS’s supporting educational purposes, they are not widely used in education today (Sharma, 2016). In a study by Chen (2016), found that the successful integration of mobile learning technologies (i.e., mobile phones, notebooks, etc.) in education primarily demands that teachers’ adequacy and perceptions of such technology should be determined. In a study by Chin and Chen (2016), teachers assigned students GPS and a two-dimensional bar code system to enable students’ effectiveness in organizing material. Two teachers had the knowledge and a positive perception of using these devices in their classrooms, but six teachers did not know how to use the devices and had negative perceptions regarding the difference in outcome after using these devices. Although many studies have been carried out to investigate educational potential of SNS’s and teacher perceptions, we still have very limited understanding of what student and teacher perceptions are towards using these sites for collaborative learning activities (Hew, 2018).

Teacher Perceptions of Challenges of Social Learning

While teachers perceive many positive aspects of social learning, they also perceive many challenges. The most commonly cited negative perception is the lack of time to create a social setting and differentiated assignments if necessary. Kagan and Kagan (2009) cite time consumption for teachers to prepare social learning lessons and the time it takes students to complete a social learning activity as a barrier to teachers' implementation. Teachers may see these factors as causes of stress and may present itself as teachers feel unsure how to implement specific social learning structures (Willis, 2015).

Another challenge addressed in the literature is the gap between in-service programs that demonstrate social learning strategies and what teachers facilitate in class (Marzano, 2017). Quality in-service programs that train teachers to explore new instructional strategies and administrative accountability play a vital role in the instructional effectiveness of a school (Slavin, 2019). Allowing teacher feedback and reflection following social learning in-service instructional sessions also gives a voice to the teacher in the classroom which may allow teachers to attempt using social learning in their classrooms and to persevere when obstacles arise (Farrell & Jacobs, 2016). In-service and pre-service instruction leans toward what administrators deem necessary for effective pedagogy. Gullickson (2019, p. 284) notes, "Both what is taught in these training sessions and what is needed by the teachers are vital if training is to fit the needs of the teacher." Teachers' perceptions of the quality of social learning PD is often

negative as it does not demonstrate how to use the activities, how to plan for the activities, time to reflect or share with other teachers (Slavin, 2019).

When teachers choose to implement social learning, they need to determine how they organize their class (i.e. composition and size of the groups), the type of task (level of complexity), the mode of instruction (small or whole group), patterns of communication (language needed to mediate learning), and the types of academic and social behaviors expected from the students (Webb & Gibson, 2018). The complexity of this process may be overwhelming and affects their perception of social learning strategies. Furthermore, given that teachers' discourses in classrooms are critically important as they provide students with insights on how to think and respond (Chen, 2016) while simultaneously having the potential to scaffold and mediate student learning (Webb & Gibson, 2018). It is not surprising that some teachers find challenge by the sheer complexity of managing all the different dimensions of social learning. The challenge does not mean that teachers should desist from trying but, rather, it raises issues about the importance of providing teachers with opportunities for ongoing professional development in the application of social learning in their classrooms (Fuhrmann, Fernandez, Hochgreb-Haegele, & Bilkstein, 2018).

Teacher perceptions of social learning range from nonuse, understanding, to build upon the social learning activity. The gap that remains is the gap between what teacher perceive of social learning and the PD opportunities they share. This gap is important because teacher efficacy is low due to what they perceive as a lack of correlation between how they are shown to teach and what happens in their classrooms. Teachers are not sure

how to approach social learning in their classrooms, there is no accountability for the teachers or the administrators, but social learning is known to be successful in classrooms (Chen, 2016). While some studies explored the complexity of social learning (Fuhrmann, Fernandez, Hochgreb-Haegele, & Bilkstein, 2018), reflection and evaluation or lack of time to create a social environment (Chen, 2016), this study will explore the of teachers' perceptions regarding PD using social learning as its focus. This study expanded on current research by highlighting the importance of teacher perception and ensuring that teachers training is in the skills needed to implement social learning through quality PD. This study expanded on current research by ensuring that social learning experiences are well structured (Gillies, 2016), tasks are complex and challenging (Cohen & Lotan, 2015), and provide teachers with examples of how teachers dealt with group composition, task construction, and will document current development in the literature that either supports or challenges teachers' perceptions. This study will add understanding to the gap by allowing teachers to reflect on social learning and its complexity which may change their perceptions from negative to positive and may provide additional insight to be used to improve professional development related to social learning. Teachers' views of social learning as the complex is not surprising and raises questions about the importance of providing teachers with ongoing professional development in the application of social learning and brain-based learning in their classrooms.

Urban Students and Social Learning

Urban students have a unique demographic that provides a challenge when teacher attempt to implement social learning. This topic is important to explore for a few

reasons. First, the English Language Learner (ELL) population of the urban classroom is growing and has grown by 19% in the past three years (Herandi, 2015). Urban students come from low-income and low support homes, which lower their chance of success in schools (Harrell-Levy, 2018). Second, urban students struggle with their place within the social grouping of their classrooms and with their teacher-student relationships (Barth-Cohen, 2016). Third, students in urban settings struggle with their responsibility and accountability within a group setting. The students in urban schools have unique challenges that may impact how teachers implement social learning.

Urban Student Demographics

Much research shows that urban students are unique learners in a few ways. Inner-city schools and colleges are ethnically diverse (Herandi). English Language Learners (ELL) add challenge to teachers when attempting to set up social learning groups yet also provide a rich environment by bringing different viewpoints and cultures to the classrooms. In many cases, cooperative learning provides urban students an opportunity to be grouped not only heterogeneously by academic performance, but also by gender, or language proficiency. Students in urban schools do not always have the opportunities for discussion, for learning from each other, and for encouraging each other to excel due to teachers' unwillingness to attempt social learning or teachers' lack of knowledge of social learning. One of the positive aspects of social learning is how students feel free to interact across ethnic backgrounds. Working together in a cooperative setting allows students to have the opportunity to look at the merits of work completed in their groups (Cohen & Lotan, 2015).

The literature also shows that urban students often have trouble in school because compared to their suburban peers, urban students are more likely to live in low-income households (Ramnarain, 2019), to have been educated in under-performing high schools within low-income neighborhoods, and to be the first generation to attend college (Harrell-Levy, 2018). Thus, many urban students lack the financial and familial support for post-secondary education. Urban students are most likely to have to devote a substantial proportion of their off-campus time to jobs that support their household or to care for family members (Tong et al., 2014). Although such students may have limited time for homework, their sense of domestic responsibility has the potential to be highly motivational if educational activities can emphasize practical skills, social skills, and career connections.

Michael Casserly (Murphy & Bleiberg, 2019), the executive director for the Council of the Great City Schools, addressed these distinct urban demographics with respect to science learning by urban students, "Student poverty, parent education, home resources, English-language proficiency and other factors outside our control work in tandem like a perfect storm to dampen our results in urban science education in ways that few others have to contend with" (p. 119). This statement was in response to the National Assessment of Educational Progress report of Grades 4 and 8 (Keiffer & Thompson, 2018) which found that performance in urban public school was well below the national average. In 9 of 10 major cities that participated in the study, more than half the eighth-grade students failed to demonstrate the basic understanding of science (Webb & Gibson, 2018).

The attribution of poor performance of urban school students to issues of race and income within urban settings (Voight, 2015). Voight documents that Hispanic and African American urban public-school students continue to score lower than Caucasian and Asian students on standardized science test scores in their senior year. Also, statistics from New York State indicate that precollege urban classroom is likely to be led by highly qualified teachers than those in suburban or rural settings (Tong et al., 2014). Thus, bright students with high potential may be arriving in college classrooms with deficits from their pre-college classrooms (Tong et al., 2014).

Successes and Challenges of Implementing Social Learning with Urban Students

A review of the literature reveals some successes when using social learning strategies with urban students. Social learning encourages students to cooperate across racial lines that permit students to learn about one another as individuals (Voight, 2015). Research on effective teaching supports the premise of the importance of positive teacher-student relationships at school. Among consistent findings in the literature is that achievement enhancement demonstrates high expectations for all students, coupled with a classroom climate characterized by encouragement, support, and working in groups (Bickford, 2015).

Also, urban students' perceptions of interpersonal connectedness to others at school and belonging to the school culture are associated with academic and psychological well-being (Penuel, 2015). Social contextual variables seem to play a role in both academic and affective outcomes of inner-city schools. The results of a study by Angrist, Cothodes, Dynarski, Pathak, and Walters (2016) confirmed that urban students

who like school and those who dislike school has different social experiences not only with their teachers but also their peers. Students highly satisfied by school cite more support from their teachers and peers than those expressing less satisfaction with school and lack of social interactions. Successful school for at-risk students may involve altering the classroom environment or learning environment to include social learning with cooperative learning in small groups (Noddings, 2016). Bowers states that (2015) future research recommendations should include an expanded direct measurement of students' classroom behavior. For example, peers are important contributors to the classroom social environment. Observation of peer interactions would allow a richer understanding of the social world of the classroom ecology and psychological environment of the school.

Social learning can allow urban students to be successful with the Next Generation Science Standards (NGSS). The NGSS increase academic rigor and demand that all students apply science and engineering practices (i.e., develop and use models), and crosscutting concepts (cause and effect, patterns) across a range of disciplinary core ideas such as properties of matter (Penuel, 2015). The NGSS encourages social learning and urban students working cooperatively in small groups to replicate the world outside their classroom. Social learning will also allow urban students to become more familiar with enhancement to technological capabilities, cyberlearning opportunities, and virtual laboratories that require coordination of student and teachers alike Penuel, 2015). As the nation's student diversity continues to grow rapidly while the NGSS are expected to be

implemented across states, science teaching for non-dominant students equates to science teaching for all students who may begin with social learning (Lee, 2016).

However, there are unique challenges for teachers wanting to encourage their urban students to work together. Johnson, Bolshakova, and Waldron, 2016 discussed the impact of race and ethnicity on students' learning in urban U.S. schools. The study focused on effective classroom practices for assessment, instruction, and curriculum. The authors discovered that there must be future policy and practice regarding race and ethnicity in science education. In another study, Sun (2016) found that cooperative learning is especially effective with students from diverse cultural backgrounds, urban students, ESOL students, and students with disabilities.

Other studies highlight problems some teachers have with implementing cooperative learning with urban students because they find it can create discipline problems. For example, studies have found that teachers perceive cooperative learning to be loud, with one student doing all the work while other students socialize, along with difficulty in choosing groups may also provide a challenge for those teachers who do not want to attempt social learning (Dingel, et al., 2016). Students may also socialize or ignore or belittle groupmates whom they perceive to be underachievers (Gillies, 2016; Slavin, 2019). Another reason a teacher would not want to attempt cooperative learning is the fact that there are free riders in most groups, that is, students who let others complete the group work without input from them (Celestino & Marchetti, 2015). Some students may have difficulty working in groups that teachers have selected but allowing students

to choose their groups may also provide issues. Managing social learning is a valid concern for teachers.

One of the challenges of cooperative learning is to reduce typical hierarchies of who is academically astute and who is not (Arevalillo-Herraez, 2015; Cohen & Lotan, 2015). Students or teachers may be uncomfortable with the use of cooperative learning for many reasons. One reason may be that they do not understand the underlying principles of social learning and have attempted to adopt techniques to employ social learning strategies (Dingel, Wei, & Huq, 2016). But teamwork seems to foster a high level of student motivation and a sense of responsibility for some groups to succeed, it also creates challenges such as scheduling conflicts, uneven distribution of workload, and dealing with disagreements among group members (Chen, 2016).

In another study of urban, African American students, the authors investigated where there was a difference in the level of students who received instruction in traditional methods or cooperative learning (Penuel, 2015). Teachers used the Jigsaw Method with the experimental group and lecture/note method with the control group (Tsay & Brady, 2015). Results indicated that there was no significant difference in academic levels between the two groups of urban students. In another study, data were collected in the form of surveys and teacher interviews and demonstrated that intervention students frequently used cooperative behaviors such as interpersonal skills and cooperative communication (Ozkurkudis & Bumen, 2019).

Teachers did express some concerns with cooperative learning such as students appearing to show difficulty with and reluctance about cooperative activities as well as

the focus of students when working in groups and the noise level of the students in social learning groups. Teacher concerns related to classroom management are important to consider when studying social learning in urban environments. Even if teachers understand the benefits of social learning, if the management of an entire classroom is too difficult, teachers may revert to more traditional methods of instruction.

It is apparent from the results of the urban schools cooperative learning research (Skiba, Ormiston, Martinez, & Cummings, et al., 2016) that cooperative incentives themselves are not sufficient to increase urban student achievement. Group study methods that provide group rewards based on the quality of a group product are not sufficient enough to increase urban student achievement (Naykki, Laru, Vuopala, Siklander, & Jarvela, 2019). Group study methods that provide group rewards based on the quality of a group product have not been found to improve urban student achievement either (Naykki, et al., 2019)., Aa review and meta-analysis built upon intrinsic motivation, extrinsic incentives, and performance indicates that incentives are tied indirectly to performance (Herandi, 2015). Intrinsic motivation can be used to predict more variety in the performance quality where incentives were a predictor for the quantity of achievement. At the same time, intrinsic motivation predicted more variety in the quality of performance whereas incentives were a better predictor of the quantity of performance.

The second ingredient that is necessary but not always present is individual accountability (Johnson and Johnson, et al., 2016). That is, the best learning efforts of every member of the group must be necessary for the group to succeed in an inner-city

setting, and the performance of each group member must be visible and quantifiable to other group members (Johnson and Johnson, et al.). There are conflicting results research related to the elements that influence how urban students work together in groups. However, it appears that intrinsic motivation is more influential than extrinsic methods in boosting achievement. What these studies did not address was whether the social skills they learned benefited them in ways other than achievement.

Teachers of urban students who want to implement social learning must deal with a purview of unique issues ranging from ELL students to students who have never worked in groups and preparing them for the future and NGSS (Johnson, Bolshakova, & Waldron, et al., 2016). The gap that remains is understanding the challenges and successes of social learning, according to teachers. This gap is important because social learning will help students master the NGSS, which will prepare students for the world outside the classroom, whether they are working or attending college (Mangiante, 2017). This study expanded on current research by focusing on teachers' perceptions of implementing social learning strategies. This study also added understanding to the gap providing data from participants demonstrating the challenges and positive aspects of social learning in the classroom.

Summary and Conclusions

The literature on social learning ranges from total acceptance of the learning theory to teachers not wishing to attempt to use this learning strategy. Data from study results in the last five years have led researchers to conclude that social learning is a valuable way to give students interdependence, social skills, ways to solve problems in a

real-world manner, and higher-level thinking skills (Jones, 2014). The gap that remains is to understand educators' viewpoints of how social learning PD has changed how they view instruction and learning. This gap is important because social learning uses innovative, student-centered strategies and principles that allow for student engagement as well as implementing the brain's natural way of learning to enhance pedagogy (McCormack & Garvan, 2015).

While some studies explored successes such as those directed towards factors affecting the education of at-risk, urban schooling and social learning strategies and other studies have focused on reducing typical hierarchies of who is academically astute and who is not, this study explored the viewpoints of high school science teachers regarding social learning in their classrooms. My research study expanded on current research regarding how teachers use social learning strategies associated with social learning. It is challenging for change facilitators to guide educators as well as the importance of reflection on the part of educators regarding their professional development concern and add understanding to the gap and expand on current research by focusing on social learning and the willingness of teachers to adopt this strategy.

The methodology of this study will be discussed in the next chapter. I discuss the methodology for this study. In particular, I discuss the study design and approach, setting and sample, data collection procedures, instrumentation, and data analysis procedures. Also, I identify threats to quality research, my role as the researcher, and how I managed the protection of participants' rights.

Chapter 3: Research Method

The purpose of this qualitative case study was to establish teacher perceptions regarding social learning strategies within their science classrooms. The main research question of this study is: What are the perceptions of secondary science teachers in an urban school district regarding professional development they received on implementing social learning strategies in urban, secondary science classrooms? The examination of the effectiveness of social learning professional development needs completion. Better understanding educator's classroom activities as well as their outlook of how learning and instruction are crucial to making positive social change.

Chapter 3 is organized into five sections to characterize and define the methodology used in the qualitative study. In the first component, research, and rationale contains the research questions, the identification of the research method and the rationalization for the chosen methodology. The second component, the role of the researcher, describes my role as observer and participant, reveals any relationship I had with the participants, specifies possible bias, and a plan to address any ethical issues. In the third component, methodology, the identification of the population of participants, the characterization of instrumentation, and a discussion of the data collection instruments adequacy takes place. Issues of trustworthiness such as credibility and transferability in the next component of the study and also includes a section regarding ethical procedures such as IRB permission and protecting the confidentiality of the participants.

Research Design and Rationale

This research study has one central research question, and four related research questions: The basis of the research questions for this study are in the conceptual framework and the literature review.

Central Research Question:

What are the perceptions and experiences of secondary science teachers in a large, urban school district regarding social learning instructional strategies?

Sub questions (SQ)

SQ1. What are the innovative social learning strategies that have employment in urban science classrooms, and what are the teachers' perceptions as to the integration of the social learning strategies in their classroom instruction?

SQ2. What do urban science teachers perceive to be the most successful social learning strategies employed in their classrooms? Why are they perceived to be successful?

SQ3.What are the science teachers' perceptions regarding social learning professional development when undertaking the social learning instructional strategies in the classroom?

SQ4.What are the teachers' perceptions about the impact of social learning on instruction and learning in the secondary science classroom?

Table 2

Alignment of Teacher Interview Questions with Research Questions

Interview Question	CRQ	RRQ1	RRQ2	RRQ3
IQ1: What are your perceptions of social learning strategies now? Before the PD?	X	X	X	
IQ2: Did you use the social learning strategies from the PD? What were the results? What are your perceptions regarding implementation?	X	X		
IQ3: When thinking about the social learning PD, did you find it helpful when you attempted to use the strategies in the classroom?	X		X	
IQ4 Do you think that social learning applies to science? Why/why not?	X		X	
IQ5: What challenges/successes did you have with social learning strategies?	X		X	
IQ6: How do you think the social learning strategies from the PD will affect learning in your science classroom?	X	X	X	X

The phenomenon explored in this research study was the perceptions and experiences of secondary science teachers in an urban school district regarding PD they received on implanting social learning strategies. Of the multiple flexible factors in education that can impact educator and learner success outcomes positively, PD is one of the most important (Darling-Hammond, 2017). Educators' perceptions of their students' learning as well as their own experiences, are an essential part of a teaching practice that is successful. While there are differences in educational systems and settings, research demonstrates that higher teacher self-efficacy has a decisive ramification on student outcomes (Bilgin, Karakuyu, & Ay, 2015). Professional development in urban, secondary science classrooms based on teacher perceptions and concerns can offer a way to implement innovative educational strategies that have application within classrooms. Voicing concerns also allows educators to create dialogic communities of learners among

educators (Vygotsky, 1978) and deviate from "passive instructional strategies to constructive and interactive instructional strategies" (Lin-Siegler, 2016, p. 208).

I used a case study design for this qualitative study. The case study research method is frequently used in education to focus on a phenomenon or case and retain real-world perspectives that are necessary to respond to the research questions of this study (Merriam, 2016). Yin (2009) found that a case study could be defined in two parts. In the first part, Yin defined case study as an empirical study in which a phenomenon can be studied within its context (p. 16). In the second part, Yin added, that case studies often include multiple variables of interest, and therefore relies on multiple sources of data, or evidence, and benefit from being studied through a theoretical lens (p. 17). This study fits both of Yin's criteria for a case study design. First, studying professional development is a phenomenon that benefits from being studied in context. Using this method, I will be able to explore complex and simple aspects of the phenomenon of the concerns involved in participation in social learning professional development programs, the concerns educators have regarding implementation, and the impact PD has on learning and instruction.

Secondly, this research study also fits into Yin's second part of the definition of a case study design. The case study pertains to the eight teachers who received the PD. Several values need to be studied to best describe the teachers' perceptions of the effectiveness of social learning professional development. Values within this study included that of educators' perception and concerns of how they have implemented what they learned in the PD, educators', lessons that teachers found most effective with urban

students, and how educators' see the PD's influence on their view of learning and instruction.

Three sources were used to study the phenomenon; teacher interviews, transcripts of journal prompts completed by educators and documents from the professional development and teacher lesson plans. The case study methodology was appropriate to use in this research because of the questions to be answered, the extent of control over behavioral events, and the degree of focus on contemporary events rather than historical events. Yin (2009) posits that case studies use evidence from a variety of sources such as those found in this study (interviews, writing prompts, and documents). The last reason that a case study was an appropriate design for this study is that I used a theoretical lens to frame the study. The Hall and Hord's (2011) Levels of Use Model provided structure to the research design and data analysis.

Role of the Researcher

I was be the only person responsible for the collection, analysis, and interpretation of all data. I also transcribed all of the interview data. I was the facilitator of the original professional development (PD) when I was the supervisor of science educators in this urban school environment. While this is true, I no longer hold this position and have not been employed by this district for six years. I have no relationship with the participants other than for this case study. To be more transparent, I will keep a reflective journal to write down any form of bias that may appear during the study.

Because I was the facilitator of professional development in 2013, the potential for researcher bias exists. At the time of the PD, I was in a supervisory role with the

science educators, but I have not had employment by this district since 2013. I have not had contact with the participants since the PD, nor will I have contact with them in the future other than the study. The questions in the interview process are neutral and do not demonstrate a specific answer given by the respondent. The collection of further data followed the interviews through the use of journaling and lesson plan documentation. The control of researcher bias through the development and adherence to strict research design protocol provides for stability within the study. I took precautions in participant selection, during data collection, and data analysis.

The sample frame used in the target population of teachers that attended the social learning professional development provided the sampling size. This sample represents only a portion of the target population which required the careful examination of whether the selected sample fits the study objective and therefore overcomes the sample frame limitations. The participants were selected based on their attendance in the targeted professional development and not based on criteria that are differential but rather proportional. Selection bias did not occur in this study because the participants could not choose if they attended the professional development nor did the exposure to the PD influence teacher perceptions of the use of social learning within their classrooms. The selection of participants reflects the target population and no due influence was placed upon participants to respond in one set manner. Participants originated from the same general population of science teachers within a large, urban school district. The diagnostic studies and measures such as interviews, journaling, and lesson plan documentation corroborate with each other, and patterns emerged through the data. The

interviewer's interaction was standardized to reduce interviewer bias. All of these measures were employed to alleviate bias in the selection of participants.

First, in the participant recruitment phase, I invited all teachers still employed at the district who attended the social learning professional development to be part of the study. The inclusion of all teachers reduced research bias related to who participates in the study. Secondly, during data collection, I took precautions to reduce researcher bias by being conscious of the words I used with participants in both written and verbal communication. The interview was an instrumental conversation and was conducted to provide data and not to serve the ends of the researcher (Kevan, 2017). All interview questions were created ahead of time and I was conscience to not ask leading questions during the interviews (Appendix A). Researcher bias was addressed during data analysis by coding data twice, once at the case level, and a second time to analyze across the cases.

Similar precautions were taken to address the potential for perceived power issues that may impact the study. While the practice of obtaining data is to be free of viewpoints, it is also sensible to conclude that qualitative research demonstrates a power relationship between researcher and participant (Robinson, 2016). In the interview there was a disproportional power relation because I was the one asking the questions and creating the agenda. I attempted to show knowledge regarding the content of the study without attempting to overpower participants. It was necessary to discuss the emerging trends of the data with others so that the researcher could see reality through another set of eyes.

To do this, I shared with participants the interview protocol, the purpose of the interview, pose clear questions, allowed participants to finish their comments without interruption, engaged in active listening as well as continually assessing the validity and reliability of the statements made by participants. While I have no job-related power over potential participants or any professional relationship with the study participants, I was the one who provided the PD, so participants may be hesitant, to be honest in their responses. I addressed this both in writing and during the interview.

I have acknowledged that although I was the one who provided the professional development that is the topic of the research study but has not had an affiliation with participants since 2013, I reminded participants that they were describing their concerns regarding the implementation of the professional development they received, not evaluating my ability to deliver professional development. Management of this power relationship takes place by being aware of the issue of potential bias. Additionally, the use of reflective writing prompts, and a collection of lesson plans provided an opportunity for participants to share something they may not have shared in the face-to-face interviews. When blinded outcome assessment is not possible, it is useful to modify the outcome definition or method of assessment to reduce the risk of bias.

Methodology

Participant Selection Logic

The methodology chosen for this qualitative research study was a case study design. Data sources include a face-to-face interview (Appendix A), participant reflective journal (Appendix C), and PD documents as well as teacher lesson plans. This section

includes a rationale for the selection of participants, instrumentation, procedures for the recruitment of participants, and issues of trustworthiness.

The population for study participants was a group of science educators from a large, urban school district who received professional development regarding social learning between the years 2012-2013. There are two criteria I used for determining who was eligible for inclusion in the study. The first was that the participants attended the social learning PD voluntarily for his or her personal growth during the 2012-2013 school year. Second, the educator must still teach high school science in the same urban district in which they were when they received the PD.

Several procedures helped to determine the appropriate number of participants for this study. By viewing the district website, I determined that of the 145 educators who completed the PD, 30 are still teaching science in the district. The sampling strategy is to select eight to ten participants to be invited to participate in the study. Yin (2009) states that when applying sampling logic to case studies, the sampling must be operational of the entire pool of potential respondents and then a statistical procedure for selecting a specific subset of respondents will represent the pool. Within this research study, the researcher wishes to determine the prevalence or frequency of a phenomenon and thus meets these criteria. Chen (2016) posited that the sample size of a study provides independent measures and that there were no significant differences in the collection of data in small sample sizes as opposed to larger sample sizes. Lee, Miller, and Januszyk (2014) used a sample size of 9 teachers in a study regarding the motivating factors of

professional development for online faculty. Within this study, the data provided a rich cache of data on which to base the results of the study.

In the target study, a purposive sample was appropriate. Frequently used, purposive samples take place in qualitative research (Miles & Huberman, 1994). The main goal of purposive sampling is focusing on particular characteristics of interest which will best enable the answering of research questions. These techniques need the judgment of the researcher to choose individuals and cases that will best enable the answering of research questions and to meet the study's goal. They are normally used to choose a comparatively small number of participants. In this study, ten to twelve participants who were considered informative based on their experience will be chosen to participate (Lewis, 2015). The idea of saturation is helpful but provides little practical guidance for estimating sample sizes for robust research before data collection (Creswell, 2009).

Instrumentation

There were three sources of data for this research study, interviews (Appendix A), reflective journal prompts (Appendix C), and documents from lesson plans (Appendix F). Each of the data sources requires a specific type of instrumentation.

Interview Protocol

The interview data source required two types of instrumentation, the actual interview questions asked of the participants, and the protocol used for the interviews (Appendix B). The interview protocol involved me providing a detailed explanation regarding what the study encompasses and the participant selection process. I also asked

questions regarding interviewee's background, such as education level, demographics, and institutional perspective on the topic of the study. Each of the interview questions were aligned with the research questions as seen in Table 2.The confidentiality of each participant takes place when they were interviewed at a face-to-face location in a local library conference room to provide privacy. During a phone call, we set up the time and date of the interview. Participants were asked to bring a lesson plan that had already been completed using the techniques from the PD. Participants were not be asked to complete a new lesson plan regarding the strategies used in the PD.

Interviews were audio-recorded and were completed in roughly 30-45 minutes to allow each interviewee time to respond to questions with extra time allotted as necessary accurately. This length of time was needed to build rapport with participants before asking interview questions. The interviewer provided each interviewee enough time to respond to questions and expand upon their answers where possible. I also wrote memos throughout the study regarding ideas for codes after the interview or responses from the participants as examples. While conducting the interviews, I made every effort to respect the participants' comfort within the process to ensure openness in responses and to achieve a richer understanding of their perceptions.

After the interview, I summarized what I heard to discuss any misconceptions I had of their responses. At the end of the interview, I introduced the next phase of data collection, explained the protocol for the reflective writing prompts, and asked for a lesson plan document. Recordings from the digital recorder on my iPad were password protected with only myself having the knowledge of the password. The recordings were

kept in a locked file cabinet in my home office as was all written materials such as the writing prompt described below.

The interview questions were written and aligned using the conceptual framework (Table 1) of the Levels of Use and aligned with the study's research questions. The interview questions and their alignment to research questions and conceptual framework are in Table 2. When designing interview questions, alignment with the conceptual framework took place. First, the research questions and the methodology alignment took place. Then the elements of the framework aided in the development of interview questions aligned with not only the framework but also the research questions.

Table 2 contains the interconnectedness between the research questions, conceptual framework, and the aligned interview questions. The interconnection allowed for the focus to remain on the problem of the study and for the researcher to explore the phenomenon of social learning PD and to ensure the consideration of the conceptual framework.

Reflexive Journaling

The second data source for this research study was reflective writing prompts (Appendix C). The journal data source required two types of instrumentation; the actual journal prompts and the protocol for sending out the reflective journal prompts. Development of the reflective writing prompt questions will be described in detail in the next section. The purpose of the writing prompt was to engage in creating transparency in the research process by way of triangulation of data as well as a reflection tool for the educator participants.

Triangulation is a technique that facilitates the validity of data through cross verification from two or more sources (Yin, 2009). It has been suggested by Percy, Kostere and Kostere, (2015) that the participants use writing prompts reflect on the phenomenon and to share their experiences to enrich the depth of the data. The use of reflective writing prompts participants to make their perceptions, viewpoints, and experience known as part of the data generation, research design, and data interpretation process. It has been pointed out by Reeves (2017) that "researchers are not always made aware of the muddle, confusion, mistakes, obstacles and errors" (p. 263) found in data. The use of reflective journals can linearly clarify the research process. Writing prompts and reflective journals have been kept in a locked drawer in my home office to ensure participant privacy.

I followed a strict protocol for sending out the reflective journal prompts (Appendix C) which aided in the triangulation of data, further outcomes which strengthen the research and increases the transparency of the findings as well as providing insight

into participants' perceptions and levels of use. After the interview, I told the participants that I will be sending them an email each day, for the next five days with a reflective prompt. I asked the participants to respond to the prompts with a one-paragraph reflection. I asked participants to keep all the reflections and return them all to me by email seven days after the first prompt was sent out.

In addition to the interview questions, the reflective journal prompts were designed to align with the conceptual framework. Table 3 contains the interconnectedness between the research questions, conceptual framework, and the aligned reflective journal prompts. The study was designed to understand or develop supports for an implementation process which can be driven by the results of the study. This research can be used to rethink the innovation as in Lyytinen, Yoo, and Boland (2015) to design training as in Uttal et al., (2016) or to a greater extent, understand the development of where individuals are in the process of change (Darling-Hammond, 2016). Since the research questions and journal prompts are regarding educators' perceptions and viewpoints, the instrumentation is appropriate.

Table 3

Alignment of Teacher Reflective Journal Questions with Research Questions and Conceptual Framework

Reflective Journal Questions	CRQ	RRQ1	RRQ2	RRQ3
RJQ1: How do you feel about your implementation of social strategies as part of your teaching? What are your strengths and weaknesses in facilitating social learning with urban students?	X	X	X	
RJQ2: Looking at the level of use table, where would you place yourself in your implementation of social learning into science teaching? Explain your thinking.	X	X	X	X
RJQ3: Concerning the lesson plan that you shared with me, why was this lesson particularly memorable or successful?	X	X	X	

Documentation

The third data source for this research study was the documents, as seen in Table 3. A list of documents to be collected for this study include:

1. Social aspects of social learning strategies lesson plans used with participants as a way to have them experience social learning as students. This document was from the professional development that was previously completed during the training session discussed in this study.
2. Professional development documents submitted by the participants from previous PD sessions collected by me at the end of the PD.
3. Participants provided a lesson plan identified as effective with urban students. The determination of the effectiveness of the lesson by the teachers in the study was based upon formative assessments and taking the pulse of the class

understanding. The teacher participants observed what students were doing, completed reflections that allowed for self-analysis, used formative assessment to inform their instruction, and provided students time to assess their learning and communicate their progress independently. The assessment of observations reflected in the participant interview responses as well as journal entries.

Table 4

Documents aligned with Research Questions

Research Question	Document	Questions	Purpose
RSQ #1: What are the social learning strategies employed in urban science classrooms, and how do teachers integrate them in classroom instruction?	Activities completed during social learning PD Walk Around Survey, Carousel Brainstorming	How does the understanding of social learning compare from what the teacher learned in PD	Comparing perspectives voiced during PD activities to perspectives voiced in interviews will show how educator's perceptions have changed, if at all.
SQ#3: How helpful was their professional development when undertaking the above tasks in the classroom?	Lesson Plan submitted by an educator	How does the lesson plan compare to what the teachers say occurred in class?	The lesson plan submitted will be used to compare what the educator said happened during the lesson.
SQ# 4. What are the teachers' viewpoints about the impact of social learning on instruction and learning in the secondary science classroom?	Lesson Plan submitted by an educator	How does the lesson plan apply the principles of social learning learned in PD?	The lesson plan will help determine how this applies to educators
SQ#2: What are the most successful social learning strategies that teachers employed in urban, secondary science classrooms?	Social learning strategies **used with** participants 3-2-1, Walking Flashcards, Frayer Model, Windowpane, Scenes from a Hat. Example lessons completed previously in classrooms.	How understands the educator regarding evolved since PD, if at all?	Comparing the teachers' understanding of the implications of social learning during PD activities to what teachers share in interviews may show how educators' views about learning and instruction have changed, if at all.

One document used in the analysis is the activities educators participated in during the PD. These activities were used to verify or determine if views and understanding have changed since the PD training, as seen in Table 4. These documents were obtained by reviewing information received during professional development. This

information was kept by me and included comments about the educators' first views on social learning before the PD and exit slip requesting their perceptions of social learning after the PD. It was important to establish content validity for each data source. The face-to-face interviews allowed guidance regarding their experiences and perceptions regarding the use of social learning. When using participants' reflective journaling, it was important to establish validity by providing patterns and have these patterns scrutinized. The documents collected for analysis, including lesson plans, were used to provide evidence of the use of social learning strategies within the classroom. It was also important to establish the validity of the PD documentation by connecting the PD experience to the use of social learning strategies. These documents were compared to the interview questions for analysis to see if the educators' perceptions regarding social learning strategies had evolved.

Lesson plans. Another document used in the analysis was a lesson plan that educators brought with them to the interview as an example of a social learning lessons that went well in their classrooms. These lesson plans were used to help answer four research questions, as seen in Table 3. These documents were examples of strategies used in participants' classrooms and not new lesson plans for utilization during the study.

There were four sources of data for this study including (a) face-to-face interviews, (b) participants' reflective journaling, and (c) documents collected for analysis including lesson plans and (d) professional development documentation.

Procedures for Recruitment, Participation, and Data Collection

The procedures for this qualitative case study are described below, including recruitment, sampling, and data collection.

Recruitment Procedures

Recruitment of the participants followed a set procedure, including both email and snowball recruitment procedures. Of the 145 educators who completed the PD, 30 have employment in the area. Of the 30 teachers that have employment in the area, a sample size of eight to ten teachers were available for this study.

The inclusion criteria encompasses those teachers who attended the professional development regarding social learning in an urban secondary school were asked to be included in the study. Teachers should have employment in the school district in which the study took place to identify with the urban secondary school setting. Teachers to be included in the participation of the study were also able to minimize ethical criteria such as not disclosing the names of other participants.

The exclusion criteria for this research study would be those teachers who did not attend the professional development that is the basis of this study. The exclusion of teachers who had not implemented the instructional strategies demonstrated and discussed in the professional development excluded them from participation. Some teachers deemed participation in the study to be detrimental to their employment in the district, and this excluded them from participation in the study.

To recruit participants, I followed the procedures below:

1. The creation of a website provided teacher accessibility.

2. Emails were on an open website for easy access by teachers.
3. The sampling strategy was to select eight to then participants from the eligible 30 educators.
4. I identified the respondents through the email as meeting the inclusion criteria through calling or emailing the respondents.
5. I sent an email with the Informed Consent Form to the respondents who met the inclusion criteria and requested a time for a face-to-face interview at a local public library conference room.
6. If more than eight to ten educators responded to the recruitment email, the first eight to ten who return the signed Consent Form were study participants.
7. If less than eight educators respond to the recruitment email, a follow-up email was sent, reminding educators of the study.

Snowball Recruitment

8. If the minimum number of participants still cannot be recruited, the participants who have agreed to be part of the study will be contacted to request that they can talk to individuals they know, that meet the study's criterion (Appendix H).
9. I will provide these participants with a script that can be used to recruit other participants.
10. This snowballing technique will be used only if the minimum number of participants not recruited.

Data Collection Procedures

For data collection, the instruments used in this research study align with the data sources and research questions.

Face-to-Face Interviews

1. I scheduled a face-to-face interview with each participant at a local public library conference room.
2. I requested that each participant bring professional development documents and lesson plans.
3. I discussed the informed Consent Form with the participant.
4. We both signed the informed Consent Form before the beginning of the interview via email.
5. The interviews were recorded using a digital recorder.
6. The interviews lasted between 30-45 minutes.

Reflective Journaling

The second instrument of data collection was reflective writing prompts (Appendix C). The alignment of the research questions and conceptual framework provides questions seen in Table 1.

1. I collected data from participants in the form of a reply to email prompts.
2. I sent out one email per day, for three days.
3. Participants were asked to respond to the reflective prompt, and to return all three prompts by the seventh day after the first email was sent out.

Documents

The third source of data is the documents/lesson plans (Appendix F).

1. I requested documents related to the professional development training from the original training packets that educators received during their workshop.
2. I requested that participants identify one lesson plan of a social learning lesson they felt worked best with their students.
3. I asked that they bring a printout of this lesson to the interview. This document aligned with the second research question, related to which social learning strategies educators found most successful.

After the interview completion and all documentation was received, I sent a thank-you email to the participants describing my gratitude for their time and effort after their participation in the study concludes. The estimated time for participants to respond was two weeks.

Data Analysis Plan

According to Yin's model of data analysis, I used thematic inductive analysis to do within-case and then across case analysis as an example of within the case analysis where "each case is treated as a comprehensive case in and of itself" (Bilgin, Karakuyu, & Ay, 2015). Each transcript was read to allow for coding and themes to emerge involving five steps: reading and re-reading, initial noting, developing emergent themes, searching for connections across themes, and moving to the next case will provide cross-case analysis whereby the researcher attempts to see the processes and outcomes that occur across many cases to understand how they are "qualified by local conditions and

will develop more sophisticated descriptions and more powerful explanations" (Miles, 2014, et al., p. 174.).

Interview

Each recorded interview was transcribed verbatim by the researcher. At this time, I created a master list with the participant's name and the alphanumeric pseudonym, e.g., P1, P2, used to de-identify the data. The verbatim transcription provided a method for the researcher to interpret the words of each participant outside the context of the interviews (Percy et al., 2015). Participants were asked to bring an example of their completed lesson plans regarding the professional development that has already in their classrooms. Participants were not asked to complete an activity for the study.

The recorded interviews also allowed for more accurate coding of information. Open coding was used to highlight data and mark sections of the text in codes or labels by linking a line, sentence, or paragraph to each case. This type of coding may create a large number of codes and sorted into order or groupings, which is called axial coding. In coding, it was important to listen to what participants were saying but also to look at what the participants were doing, what was taking place, the information each participant was giving, how the structure of the interview impeded, maintained, or supported the actions or statements. During this coding, it was important to look for behaviors, settings, relationships, and conditions surrounding the participants (Percy et al., 2015).

Nonverbal communication from the participants can send wordless cues to me and was recorded in note form. Of note was the participants' body language, use of voice, touch, and distance as well as the use of time to respond to questions. The use of eye

contact was also of note as it comprised the actions of looking while talking and listening frequency of glances, and blink rate. I wrote handwritten notes relating to non-verbal behaviors as well as voice quality, pitch, rate, volume, and speaking style that may portray stress or passion regarding the subject (Reeves, 2017). I used writing memos as a means to write down ideas throughout the research study.

Figure 6 demonstrates the process of creating codes to theory for case studies.

Steps

1. First, I reviewed the transcript to create identifiers for each unit of meaning. For this study, a unit of meaning is a paragraph. I created an identifier phrase or word for the paragraph.
2. Next, I completed axial coding to group codes or labels given to words or phrases. The initial identifiers, open codes, were grouped into categories within each case.
3. Next, I reviewed the axial codes for the case and identify the themes within this case.
4. After the coding of all cases, I then looked at the themes resulting from each case and develop cross-case themes.

This process created a rich understanding of the common traits among participants and their shared experiences regarding PD and social learning. Discrepant cases may emerge. I searched for and discussed the elements of the data that do not support or might contradict explanations. In this case, I studied the cases and may need

to revise, broaden, or use the data to confirm the patterns that are emerging from the data analysis.

Reflective Journal

Data collected from the reflective writing prompts was also coded (Figure 3). Moniz (2015) found that patterns should be considered as varying forms and not just stable regularities. To this end, I looked for similarities, differences, frequency, sequences, correspondence, and causation (p. 155). This can be seen in Figure 2.

1. First, I saved all the email responses to the prompts as a double-spaced document so that codes emerged between the lines of text.
2. Next, I highlighted the responses and created an identifier that summarized the content of the participant's response.
3. After I completed this coding, I reduced these initial codes by creating categories of responses.
4. Next, I included these codes in my within-case analysis for each participant.

Documents

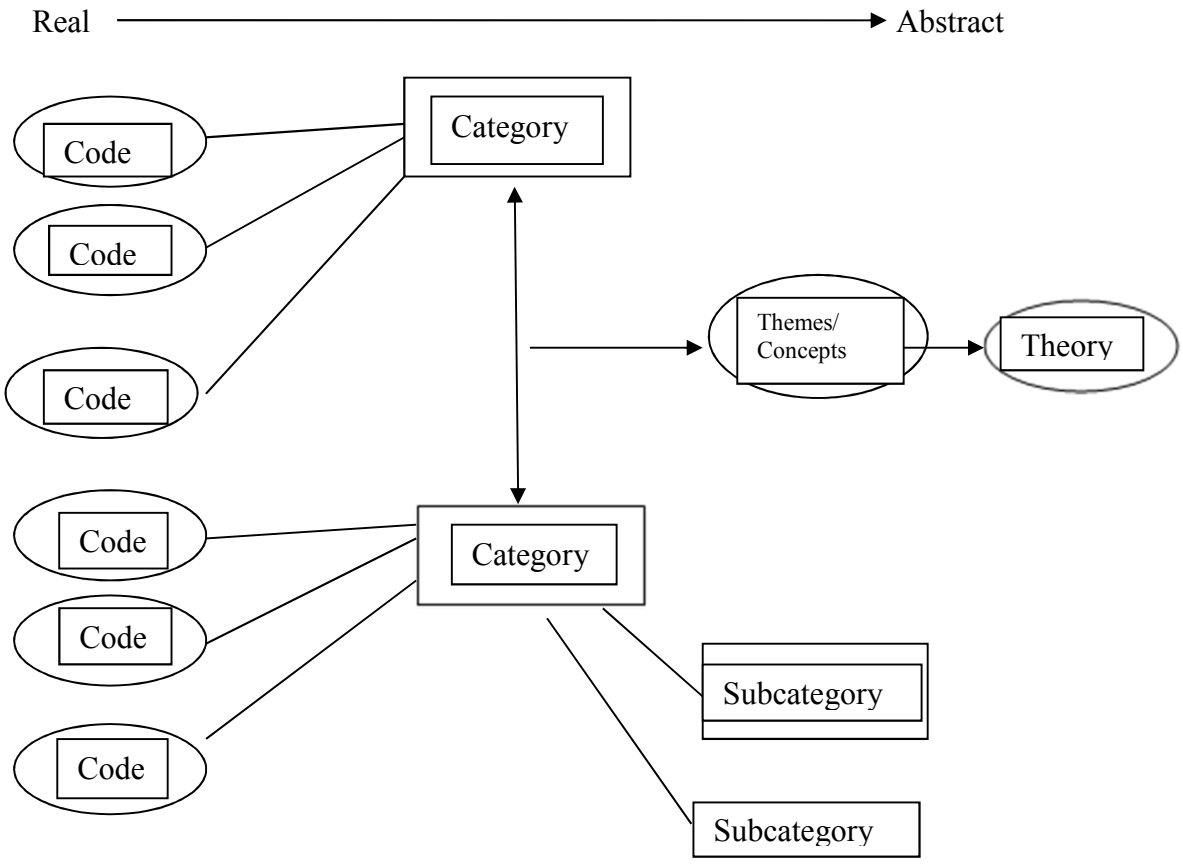
Review of documents allowed for surrounding a specific setting and provided for an unobtrusive method of obtaining data-rich in portraying the values and beliefs of participants in the setting.

1. First, I reviewed the lesson plan document for each participant. I identified the aspects of the lesson that were related to the RQ questions for this study. I created a list of codes for each lesson plan.

2. Next, I reviewed the professional development plan for each participant. I identified the aspects of the professional development plan and created a list of codes that were related to my study purpose.
3. Finally, I used my coding structures from the documents in my thematic analysis of each participant's case.

Figure 2

Codes to Theory Model for Qualitative Research



Alignment between the research questions, conceptual frameworks, and coding is imperative to the reliability of the data. When creating the research questions, it was beneficial to use the conceptual framework or topic to create a diagram or big picture of the problem. Aligning the codes to the research questions and conceptual frameworks allowed the diagram in a narrative form that demonstrates how the relationship of the key factors influenced the relationships. All of the factors of the research methodology in this study were consistent with the relationships and context in the conceptual frameworks.

Issues of Trustworthiness

The trustworthiness of qualitative research is organized around the credibility, transferability, dependability, and confirmability or objectivity of the study. The first issue of trustworthiness is credibility. The definition of an issue of trustworthiness is criteria that involve the establishment of results that are believable from the participants' perspective (Reeves, 2017). Within this study, data from each participant was explored to establish a description that was rich the experiences of the participants.

Credibility

A full review of journal entries, member checking, and triangulation of data was completed (Fusch & Ness, 2015) to increase credibility. A scheduled follow-up interview by telephone lasted 10-15 minutes to check the accuracy of the information provided. Yin (2009) suggested that pattern matching, explanation building, use of logic models, and addressing rival explanations" will allow for internal validity as well (p. 45).

Member checking was accomplished during the interview but also after the completion of coding to provide a chance to assess and comprehend what the participants

intended to do through his or her words or actions. The process of member checking allowed participants to contribute more information through the review of the process (Fusch & Ness, 2015). In this study, member checking was accomplished by follow-up interviews with participants to complete reactionary responses to the original interview and transcripts.

The accomplishment of triangulation of data through the use of the initial 30-45 minute interview, a 10-15-minute follow-up interview for member checking, reflective participant writing prompts, and lesson plans were mandatory. If the conclusion of each of these steps is the same, validity will be well-established. It is also relevant to use multiple means of data collection: interview (Appendix A), participant reflective writing prompts (Appendix C), and documents such as lesson plans. Triangulation has many benefits including "increasing confidence in research data, creating innovative ways of understanding a phenomenon or case, revealing unique findings, challenging or integrating theories, and providing a clearer understanding of the problem" (Morse, 2015, p. 254).

Within this research study, the formation of triangulation occurred between the interview, the reflective writing prompts, and the documents/lesson plans. Triangulation occurred from the facilitation of the validity of data through the cross verification from the three sources. Writing prompts were used after the interviews were concluded as a method of confirming or discounting a code or theme that has emerged and the discovery of possible discrepant information. Inclusion of more than one data source confirmed the feedback of each participant in different contexts and at different times. The inclusion of

data sources allowed participants the means to share their ideas, feelings, perceptions, and interpretation of their experiences.

Transferability

The second issue of trustworthiness is transferability. This issue of trustworthiness refers to the degree that the results of the research can be generalized to other settings (Morse, 2015). Yin (2009) suggested that specific research questions will assist with external validity, while vague questions will hinder external validity. The promotion of transferability may also be necessary to explore discrepant cases and to explain the data in relation from one participant to the next (Morse et al.). I identified and analyzed the discrepant data and possible negative cases as an integral part of testing for validity. Discrepant data or data that cannot be accounted for by a specific explanation may point to meaningful errors.

It was also necessary to analyze the discrepant data from the viewpoint that it may not be persuasive as in the example of the interpretation of the negative data is itself in doubt. It is in this manner that I rigorously examined both the discrepant data and supporting data to determine if it was more credible to modify or retain a conclusion. It was also necessary to ask others for feedback on the conclusions to check for bias or flaws in my logic (Miles, et al., 2014). Analysis of case studies can expand upon the transferability of the data through contextualization and transparency (Sampson, 2017).

The researcher can enhance transferability through a thorough description of assumptions central to the study. The accomplishment of thick description (Bickford, 2015) uses sufficient detail to evaluate the extent to which conclusions can be drawn and

can be transferred to other times, settings, situations, and people. The use of purposive sampling places participants in groups relevant to criteria that fit the research questions. "Sample sizes are also determined by the concept of theoretical saturation or the point in data collection when new data no longer bring additional insights to the research questions" (Boddy, 2016). The sample size may reduce or increase the transferability of the results of the study.

Dependability

The third issue of trustworthiness is dependability (Noble, 2015) which emphasizes the need for the researcher to account for the changes that occur in research. Yin (2009) recognized the emphasis of the incorporation of accurate operational metrics for the study. When corrective measures are employed, for example, questions posed to pursue the data gathering sessions and the methods of data analysis should be composed of successful studies that are comparable.

The development of rapport with participants and the comprehension of the culture of the educator participants before the collection of data dialogue takes place may also increase the dependability of the study. Assurance amid the participant and the researcher is important so that the researcher can progress to an acceptable understanding of the environment and to build trust between the actors involved may also increase the dependability of the study (Miles et al., 2014).

There is a connection between credibility and dependability since, in practice, a demonstration of credibility allows for the ensuring of the latter. This connection is made clear by the overlying methods such as repeat interviews, audit trails kept through

researcher logs, and triangulation via an interview, writing prompts and reflective writing prompts. The interview precedes the collection of educator reflection writing prompts and the collection of lesson plans. Each of these points of data will provide codes and themes that provide for the dependability of the study when they are similar or the same. Finally, the reflective writing prompts kept by educators may confirm data that are collected and add to the richness of existing research.

Audit trails are transparent descriptions of the steps taken in research from the initial steps of the study to the development and findings of the study. The audit trail in this study will consist of raw data, including written notes, audiotapes of the interviews, and educator reflection journals. The audit trail also consists of summaries such as condensed notes or theoretical notes, process notes such as procedures, and personal reflections completed by the researcher (Miles & Huberman, 1994).

Confirmability

The fourth issue of trustworthiness is confirmability refers to the degree that results of cooperation by others (Miles, et al., 2014). There are many ways to establish confirmability within a case study. The completion of the evaluation of the study leads to reflection upon the employment of particular techniques such as questioning techniques and their effectiveness. The reflective commentary may also include a record of the researcher's possible bias or first impression of each data collection session (Miles & Huberman, 1994). I used reflective journaling throughout the study to create a record of my biases and first impressions of the data.

Member Checking

Additionally, member checking is considered by Birt (2016) to be the single most important method to increase a study's conformability, and trustworthiness as each participant can confirm or deny the accuracy of transcriptions. Study participants can be asked to read verbatim transcripts regarding their comments. A brief 10-15-minute phone interview allowed participants to react to the transcripts and make any necessary changes. The phone interview allowed the participants to verify that their intentions match the words that were recorded and confirm that the data was accurate.

Miles and Huberman (1994) suggested that "participants be asked if they can offer reasons for particular patterns or themes observed by the researcher" (p. 254). Miles and Huberman (1994) also considered that an important benchmark for confirmability is the length to which the researcher can admit his or her proclivities and the use of audit trails which allow the researcher to follow the path of the research step-by-step interview process.

The last issue related to trustworthiness is intercoder reliability. To ensure that the coding themes of the interview transcripts and participant writing prompts had been coded as consistently as possible, each transcript was coded twice at least two weeks apart (Miles and Huberman, 1994) and then compared. Intercoder reliability refers to the consistent manner in which the researcher codes and these codes then lend themselves to more suitable codes that will then be analyzed (MacPhail, 2015).

Ethical Procedures

Ethical procedures were addressed through the internal review board (IRB), obtaining consent from participants, full disclosure to participants, and reducing power issues between myself and the participants. Researchers have the responsibility to protect the participants in their studies. It is imperative to receive consent from participants to decide as to whether or not they wish to participate in the study. I assured the study participants have a comprehensive understanding of the methods and purpose to be used in the study and any involved risks as well as the study requirements. (Yin, 2009). Participants were made aware of IRB approval (number 02-06-20-0335172) and were also made aware that they could withdraw from the study at any time.

In this research study, I used direct consent because it is an agreement that is obtained from the participant to be engaged in the study. Participants received a copy of the consent form. The competence of a person's capacity is of relevance. Based on the individual's capability to evaluate, acquire, and retain information, he or she is presumed competent (Sampson, 2017). Consent must still be received, and therefore each participant must have the capacity to consent. The participants signed the informed consent form immediately before the beginning of the face-to-face interview.

I planned to reduce power differences by encouraging disclosure and authenticity between myself and the participants. There was no power relationship between the participants and the researcher, nor will one be employed. Although the situation of being interviewed by a researcher may present power issues, steps were taken to eliminate this relationship by creating rapport with participants, providing adequate time for responses,

and allowing participants the opportunity to read their responses after the data collection process. I reduced my bias by reflective journaling throughout the study to identify biases and offset them. In this journal, I wrote down the first impressions or emotions regarding possible bias. Journaling was ongoing throughout the study with careful attention to any possible bias. The researcher will take immediate steps regarding any issue of bias.

I ensured that participants understood the methods I used to protect their confidentiality including (a) creating a master list with their names and alphanumeric identifier that is stored in a locked safe in my home, (b) securing all data during collection and analysis by using login protected laptop and computer, and (c) securing all data during storage by copying the digital data onto a flash drive and locking it into my home safe, and (d) after the required five years I will destroy the paper data by shredding and the digital data by physically destroying the flash drive.

I interacted with the participants to comprehend their social constructs (Wyer, 2015). The comfort and trust of the participants are paramount to the success of the study. Participant risk may include a variety of diverse situations, such as emotional stress or potential job hazards. As a researcher, I exercised my best judgment as to ensure there is not an invasion of privacy as well as protection providing a confidentiality agreement (Appendix I) for each participant. To protect the participants' confidentiality, they were assigned a pseudonym or number. The storage of this data is secure in my home on a personal, password-protected computer and interviews and interviews conducted at a separate location from their school.

All participants were secondary science educators in urban secondary schools who received social learning professional development. My position as supervisor for the science educators did not impact the study as I no longer hold the position. Participants are educators who I supervised three years before the study and do not hold a supervisory position any longer. Each participant will be aware of my role in the study.

Several measures will be taken to secure data integrity and confidentiality.

Data Security

1. Before transcription, I gave each participant an alphanumeric pseudonym, e.g., P01, P02, P03. I created a master list that linked the participant's name to the alphanumeric identifier. This safe storage of the master list provided a separate document. The master list will be shredded after the required five years.
2. The paper documents, such as lesson plans, are kept in a locked cabinet at my residence.
3. All forms and confidential transcripts are kept on my password-protected personal computer.
4. All data has been downloaded and stored on a password-protected personal computer.
5. All other files are stored digitally on my login protected iPad and then saved on a USB. This information was also stored in a locked cabinet in my home.
6. Audio-recorded interview data was saved confidentially in digital audio format on a password-protected personal computer.

7. Email journal prompts received from the participants, were copied and pasted into word processing documents, and the original Email deleted.
8. The use of Microsoft Office on a password-protected personal computer for collecting, coding, and storing the data provided a way to ensure the integrity of the data.
9. A backup of all files will be in a portable encrypted USB drive in a locked safe in the researcher's home.
10. The data will be destroyed after five years as Walden University requires. The paper documents will be shredded and discarded. Digital data stored on a USB drive is to be destroyed.

Summary

In this chapter, a description of the qualitative research method was discussed. A rationale for this case study design included the need for studying the case in context, and the need for multiple data sources to understand the phenomenon best. In the role of the researcher section, I described my relationship to the study and addressed ethical issues of these roles, and how I will address these issues. The majority of this chapter included a description of the methodology that will be employed. In the participation selection logic section, I described the identification of educators from the east coast urban public school and the criteria for participation in the study. The development of collection instruments, protocols for procedures, and how instruments align with the research questions, are also included. A detailed description of how the data will be collected and the data analysis

plan followed. There will be a completion of a discussion regarding the issues of trustworthiness related to the case study design. The chapter ended with how I plan to abide by ethical procedures.

The data from qualitative studies describes the components of the proposed case. The discovered descriptions are not easily reduced to numbers but rather find the results in the details of human behavior, emotions, personality characteristics, and experiences of individuals. Qualitative research, such as that found in this study, requires the flexibility that allows the researcher to understand the data as it emerges during an interview session or survey questionnaire. Researchers must document and observe behavior, patterns, points, opinions, and other forms of information without the full understanding of how this will make the data meaningful. The findings presented in Chapter 4 will demonstrate the potential for merging theory and practice.

Chapter 3 posited a description of the project and that of potential findings. The section summarized possible results to open-ended questions by using a survey and writing prompts with participants of the social learning professional development. Section 4 will continue the research study with headings such as setting, demographics, data analysis and collection, trustworthiness, the results of the study, and a summary. The report containing data that was collected and then processed in response to the problems posed in Chapter 1 will be in Chapter 3.

Two fundamental goals drove the collection of the data and the subsequent analysis. Those goals were to develop a base of knowledge regarding the teachers' understanding, integration and use of the social aspects of social learning that they

completed in PD, and to determine how the use of social learning strategies science teachers learned in social learning PD reflected in Hall and Hord's LOU. Chapter 4 will also reflect on results and themes and conclude the study. The next section will also address the strengths and weaknesses of this study, the limitations, and possible recommendations to address the issue of the perception of urban Science teachers regarding social learning.

Chapter 4: Results

The purpose of this study was to establish teachers' perceptions regarding social learning strategies within their science classrooms. The central principle of this research study was to understand the perceptions of the PD for urban secondary science teachers implementing a social learning instructional model. The research questions for this study were:

Central Research Question:

What are the perceptions and experiences of secondary science teachers in a large, urban school district regarding social learning instructional strategies?

Sub questions:

SQ1. What are the innovative social learning strategies that took place in urban science classrooms, and what are the teachers' perceptions as to the integration of the social learning strategies in their classroom instruction?

SQ2. What do urban science teachers perceive to be the most successful social learning strategies employed in their classrooms? Why are they perceived to be successful?

SQ3.What are the science teachers' perceptions regarding social learning professional development when undertaking the social learning instructional strategies in the classroom?

SQ4.What are the teachers' perceptions about the impact of social learning on instruction and learning in the secondary science classroom?

This chapter begins with a brief restatement of the methodology of the research, an examination of the study instruments and participants, and the presentation of the results. A discussion of data analysis and results will follow this examination, and the results of the study will be presented. The chapter will conclude with an assessment of the origination and implication of the outliers and data.

Setting

This study setting was teachers in science departments within an urban school district. The teachers that participated in this study teach physics, biology, chemistry, and environmental science. One condition that may have influenced teacher participant responses might have been the overall use of the social learning strategies. Teachers that used social learning strategies more often than other teachers may have responded differently. Because of the teacher's investment in the extension of their instructional strategies and the need to address science classrooms in general, this school district provided an opportunity to understand the perceptions of teachers as well as the stakeholders that are actively involved in the development of the new curriculum on social learning to the current instruction. Study participants consisted of eight secondary science teachers who participated in the social learning PD and are all currently working in the associated school district. Data derived from the interviews and lesson plans provide an important complement to the reflective journals since they help to validate or problematize the use of the social learning strategies within the classroom**.**

Sampling/ Bias

The data collection was based on a purposive sampling where participants voluntarily committed to the study. However, some bias may be assumed on my part as I presented the PD in the school year 2012-2013 and the supervisor of participants at that time. I have not been a supervisor in this school district since the 2012-2013 school year, nor have I been in contact with the participants since the PD. Also, participants in this study may have strong feelings about the topic of the study, which may be reflected in their perceptions and may not be generalizable.

By comparing the current data with existing data shows that a larger body of knowledge exists and suggests that the study's population was both valid and representative of the population. Each element of the research design, execution, and analysis of this research study was rigorous, supported by prior research, and transparent. Research instruments were devised to reduce both my and teacher participant bias.

The three instruments used consisted of a design that developed and were customized to specific teacher roles that each participant held within the urban school system, which ensured relevant responses. The use of comparative analysis was useful in evaluating interviews and journal prompts across science content such as those found in teacher participants (physics, biology, chemistry, and environmental science). A rhetorical analysis added to the comparative analysis to assess both implicit and explicit meanings to further the analysis of the perspectives of teachers regarding the social learning professional development and inclusion of social learning strategies.

Instrument design also confirmed the data. The interview questions were created specifically to evaluate teacher perspectives and central research questions of the research study (Appendix A). The thorough scope of the study, including the focus on urban science teachers using social learning instructional strategies and their perceptions of the success and challenges as implementation, further supports the confirmability of the data.

Demographics

Data were collected from eight teacher participants. There were six females and two male participants. Years of teaching ranged from 1 year to 35 years. Table 5 demonstrates the demographics of participants. Two of the educators had doctorate degrees and four had master's degrees. All of the teachers had degrees in education and two teachers had degrees in their science content areas. Participants were employed full time by the urban school district in which the PD took place. Each teacher participant lived in the same geographic area surrounding the urban school district of the study. Limited details about each individual participant is known to protect confidentiality. Participants were given the identifier A for the participant and a number when they were interviewed (i.e., A1 was interviewed first). Table 5 describes the demographics of the research participants with regards to their years of experience in teaching as well as their educational background.

Table 5

Demographics

Participant	*Years of teaching experience*	*Level of education*
A1	35	Doctorate
A2	28	Master's
A3	10	Master's
A4	8	Doctorate
A5	1	Master's
A6	4	Master's
A7	20	Master's
A8	3	Master's

Data Collection

The research instruments included face-to-face interviews, lesson plans, and reflective journal prompts presented to a group of teachers who participated in a PD regarding social learning strategies in the school year 2012-2013. These participants emailed me their lesson plans. They also responded to the journal articles and emailed me these responses. I did (or did not) receive all participants' lesson plans and/or journals. I requested these document multiple times via email. The IRB approval number for this study was 02-06-20-0335172.

Interviews

Face-to-face interviews were scheduled with each participant at a local library conference room. Each participant was asked to bring professional development documents and lesson plans to the interview. The consent form was discussed with each participant, and interviews were recorded on a digital recorder and I took notes regarding body language and impressions. Each interview lasted between 30-45 minutes. I interviewed eight participants. There were no variations from the data collection plan sited in Chapter 3 or unusual circumstances within the interviews.

Reflective Journal

The second instrument of data collection was reflective writing prompts (Appendix C). The alignment of the conceptual framework and research questions can be seen in Table 1. I collected data from participants in the form of a reply to email prompts with one email sent out per day for three days. Participants were asked to respond to the prompt and to return all three prompts by the seventh day after the first email was sent out. All participants adhered to these steps. No variation from the data collection plan or unusual circumstances occurred. I collected eight reflective journals.

Lesson Plans

The third source of data is the documents/lesson plans (Appendix F). I requested documents related to the professional development from the original training packets that educators received during their PD. A lesson plan was also requested that teachers identified as a social learning instructional strategy that they felt worked best with their students or was most successful. There were no variations from the data collection plan

outlined in Chapter 3 of this study, nor were there any unusual circumstances while collecting data. I collected eight lessons plans.

Data Analysis

Data Reduction

There are central steps regarding the coding of data. The reduction of data into meaningful pieces and assigning names for each of the segments is essential to the process of data analysis. The combination of codes into themes and patterns creates broader categories is the next step in data analysis, which is followed by the creation of comparisons in data graphs, tables, and charts. These steps are the basis of qualitative data analysis. Miles, (2014) added more details to the process which I followed. These details included writing marginal notes, drafting summaries of interview notes, and taking note of these relationships among the different categories.

To move from coded units to larger representations including categories and themes, it was necessary to prepare and organize data such as transcripts for analysis. Then this data was reduced into themes through the coding process then condensing codes. Finally, the data was represented in tables, figures, and discussions. Field notes were kept to note any relationships among categories of data.

Codes, Categories, and Themes

Specific codes and themes emerged from the data. One such theme was that of "all or none". This theme refers to the use of social learning strategies from the PD opportunity. Six of the eight participants used the strategies on a regular basis while two of the participants rarely used the strategies. In consensus, all eight participants found the

social learning strategies to include the benefits of collaboration in the classroom which proved to be a theme within the data collection. Participant A7 stated "more prepared for real-life social situations" due to the joint effort of students.

To get a sense of the database as a whole, I read and reread the transcripts several times to immerse myself in the details and to get a sense of the interview before looking for codes. Writing memos in the margins of transcripts helped to explore the database. The memo writing was followed by scanning of the data then a rapid reading by approaching the data in a fresh sense to allow for reduced bias and a different perspective. Memos are described by Miles et al. (2014) as short phrases, ideas, or key concepts that occur to the reader and are not just "descriptive summaries of data but are attempts to synthesize in them into the higher level of analytical meanings." (p. 95). In the present research study, taking memos was completed every day during and after each interview session and used as a way to track the progression of code and theme development (Corbin & Strauss, 1990). In Table 6, I describe the data analysis, strategies, and outcomes from my analysis.

Discrepant Cases

A discrepant point uncovered during data collection and analysis emerged when participants were asked "what are the teachers' perceptions as to the integration of the social learning strategies in their classroom instruction**".** Six of the eight participants responded positively and found value in the use of social learning strategies. One of the participants found the use of social learning strategies to be "sophomoric" while another participant did not use the strategies on a regular basis due to the "traditional

background" of her school's administration. This discrepancy was found early in the stage of data collection and analysis, so it was investigated further. Participants were asked to further explain their use of social learning strategies during the initial interviews.

Table 6

Data Analysis Activities

Data Analysis	**Analytic Strategies Activities**	**Analytic Outcomes**
Managing and organizing the data	Preparing files and units. Ensuring ongoing storage is secure. Selecting mode of analysis	File naming system and organizing database files and units of text, images, and recordings. Creation of long-term file storage plan.
Reading and memos emergent ideas	Taking notes while reading Sketching reflective thinking Summarizing field notes	Written memos leading to code development, reflections over time, and summaries across files
Describing and classifying codes into themes	Working with words Identifying codes Applying codes Reducing codes to themes	Naming initial codes List of code categories and descriptions Assign codes to units of text, images, and recordings Finalized codebook
Developing and accessing interpretations	Relating categories/themes/families/patterns Relating categories/themes/families/patterns to conceptual framework in literature	Contextual understandings and diagrams Theories and propositions
Representing and visualizing data	Creating a point of view Displaying and reporting the data	Matrix, trees, and models Account of findings

Notes. Taken from Data Analysis and Representation, Sage Publications, Reeves, 2017 https://us.sagepub.com/sites/default/files/upm-assets/79660_book_item_79660.pdf

Within the process of coding is the involvement of making sense of the collection of text from the interviews and journal prompts. Seeking out the evidence for the code from different databases being used in the study and then assigning a label to the code. In the case of the first outstanding code, I coded in relation to my research questions. Table 7 demonstrates coding by research questions via the interviews.

Table 7

Coding by Research Question: Interviews

	Central RQ	RQ1	RQ2	RQ3	RQ4
A1	Collaborative Use in Future outside of school Learning is Social Community building Student-centered	Carousel Brainstorming, Four Corners Windowpane Team building	Adapted Carousel Brainstorming Low prep/movement/active /formative assessment	Already used them/student enjoy/easy to employ/work well in project based	Science and learning are social, novel, motivates towards competition among AP students
A2	Too much prep Chaotic Loud Lack of knowledge Role of teacher not clear	Four Corners Talking Drawing 4-2-1/difficulty with grouping, assessment	Did not use too often/liked low prep strategies, students' opinions, discussion in groups	Never used them before/rarely use them now	Surprised by student work, better than expected, worked together, needs to work on grouping
A3	Team Building Communication Environment Student as teacher	All/Challenge Envelopes/students accepted widely	All of the strategies from the PD. Some were good for beginning of lesson. Formative	Did not use previously, now uses them constantly and consults with colleagues	Active, teams, added to toolbox, use with colleagues, students teachers, reevaluation of content and process
A4	Cooperation, peer teaching, carry outside of classroom	Majority/Jigsaw/Hot Seat, students enjoyed, gravitated towards	See RQ1:Students were successful, retained information, informed instruction	Already use them constantly,	Reflection/reevaluation, active, different than other teachers, engaging, motivation
A5	Active, enjoyment, teams, academic talk Lack of knowledge Learn from each other	All/Challenge Envelopes/Walk Around Survey	New teacher, student engagement, exciting, no one to share with, student as teacher	Never used them, weren't shown in teacher ed program	Prior knowledge, new to students/teacher, summarizing, peer teaching
A6	Intermittent success, time consuming, not traditional in traditional school	Few/Talking Drawings/Jigsaw/4-2-1, 4 Corners, worked on a quarterly basis, not used widely	Rare use, afraid to be observed while using them, not traditional, used quiet and controlled strategies	Has heard of them, colleagues in other schools use them	Teams, peer teaching, collaborative, chaotic, not focused, adequate time to evaluate and discuss, content
A7	Lack of knowledge, seen in other classrooms with success, wanted to try	Majority/not Windowpane/2 Minute Talks, diverse from traditional method	See RQ1:Activation of prior knowledge, cognitive, summarizing	Mild use before PD, constant use with department members	Retained information, Added to lesson plans Issues with assessment, solving
A8	Lack of knowledge Colleague uses	All/Jigsaw/Challenge Envelopes, used stand and deliver prior, difficulty adjusting but had mentor	Jigsaw for text reading, students saw how collaboration assists them	Never used them before PD, constant use with colleague,	Colleagues share Better way than Shown in teacher prep Reflect with colleagues

Central Research Question: What are the perceptions and experiences of secondary science teachers in a large, urban school district regarding social learning instructional strategies?

The research study sought to obtain insight into the perceptions of urban, secondary science teachers regarding social learning strategies. These social learning strategies were presented to teachers of this urban school district through a professional development opportunity in the school year 2012-2013. Generally, participant responses express a favorable viewpoint toward social learning strategies. However, the secondary science teachers interviewed in this qualitative study are not necessarily shared by all participants. The concurrence among participants was that social learning strategies promote collaborative and cooperative learning, are student-centered, and can be implemented outside of the classroom. The data collected from the eight teachers in this study indicated varying levels of satisfaction with their implementation of the innovative method of teaching, the future use of the strategies, and how to alter the strategy to meet the needs of their population. Participant A1 noted, "When students work together to solve complicated physics problems, they can hear how others think about the problems, their thought process while solving the problem, and how they can contribute to the solution. Each strategy can be changed to meet the needs of different classes and different content areas". While participant A2 stated, " I find that teaching needs to be more structured with the teacher directing students what to do and how they need to complete the task. Not that I lecture too much, but we do use worksheets and textbooks every day. Students do the work independently, and I find they have success with this method".

These two outlooks are in direct opposition to each other, yet each found success in the use of specific social learning strategies presented at the PD.

Additionally, all eight teachers strongly reported the value of peer teaching, collaborative work, the use of higher-level thinking skills as well as problem-solving skills. Participants found that these skills were valuable as the students left the secondary classroom to join the workforce or to attend college. Though the teacher responses and reflections indicate support of the use of social learning strategies, two participants found the strategies to "require teacher prep when they do not have time to spare" or "would like to use them but do not have the support of other department members or administration". These two teachers were veteran teachers who tended to find success with the methods "that they have always used". In an interview, one participant reiterates that as a new teacher, she "did not have anyone to share the strategies with or to work them through" before using them in the classroom.

Teacher Perspectives Regarding Their Experiences with Social Learning Strategies

Each of the eight teachers expressed that they found positive results when using social learning strategies. Participants A1 and A4 had already been implementing social learning within their classrooms and embraced the opportunity to add to their repertoire. They each found students gravitated towards the opportunity to be a part of the teaching and learning process as well as have a certain amount of control over how they learned the content. These two participants also found the strategies to be easily adaptable to their populations as well as their content as one teaches Biology, and the other teaches Advanced Placement Physics. Participants A2 and A6 were reluctant to use the novel strategies as they viewed them as chaotic or not traditional enough for their

administrators. As new teachers, participants A8 and A5 found the use of the strategies to be invigorating and an opportunity to advance their teaching skills as well as classroom management skills. The remaining teachers had minimal use with social learning. Still, they found success in each of the strategies they attempted, whether they used the strategies for activating prior knowledge, use as cognitive activities, or as summarizing exercises to inform their instruction. One of these teachers reported that " The students are motivated to imitate their classmates and to contribute to the discussions or projects. It's a more natural way of learning as the brain is social, students are social, and learning is social".

SQ1: What are the innovative social learning strategies that took place in urban science classrooms, and what are the teachers' perceptions as to the integration of the social learning strategies in their classroom instruction?

The social learning strategies used in the urban science classroom were diverse. All teachers used the Four Corners Strategy as a cornerstone for debates. This entails the generation of a controversial statement or question related to the topic of study with four options or choices for students. As first students think independently, then they join the group that is aligned with their thoughts in the corner of the room, discuss the topic and their response or opinion and finally present their statement to the class. Students can then as a whole class, debate the issues and possibly change their opinion. While each of the teachers used this strategy, not all teachers used the strategy for the same reason. Some teachers used Four Corners to activate prior knowledge, others after the reading of a short text and one teacher as a review after a unit of study. This particular strategy allowed students in one Biology classroom to "reevaluate their position as their group

discussed options and to change which corner or stance, they original made". Teachers found this particular strategy to help students develop critical thinking skills, decision-making skills, and to develop deep listening abilities. All eight teachers found it to be an effective formative assessment to inform their instruction moving forward as well as a means for students to move, work independently, in small groups, and as a whole group. "The work is collaborative and meaningful," stated participant A7.

Another strategy employed by the eight participants was Challenge Envelopes. Teachers found it to facilitate a review or higher-level thinking of a topic. The challenge questions are generated by students for students to challenge each other. The class is divided into small groups and given an envelope. On the front of the envelope, the group writes the challenge question and are encouraged to use higher-level questions. Each group then generates the answer or criteria for a response and places this inside the envelope. The envelopes are scrambled around the classroom, and when a group receives an envelope, the question is to be addressed and then checked against the answer inside the envelope. Each group will then place their own response inside the envelope and send it back into circulation. As the envelopes filled with responses, the groups are to compare their responses to others inside the envelopes. Participant A2 did not find this strategy to be successful as "My students are too immature for advanced thought regarding a topic. Their questions were sophomoric". Other teachers, such as A3, found that it stimulated students and created a competitive spirit within the classroom. "Each group attempted to outsmart the next group".

The interview questions were supported by the reflective journal entries (Appendix C) from the eight participants. Six of the eight participants found the

implementation of social learning strategies to have a smooth transition from direct instruction. They all agreed that it was necessary to have time to set up their classroom environments and prepare the students for the use of social activities in their classrooms. However, the eight teachers also agreed that once the initial phase was overcome, the integration of the strategies employed in the PD was successful as they had clear learning goals, full participation of students working independently, and then cooperatively, the pace of learning was increased. There was a positive energy in their classrooms. While not every successful class looks the same, teachers found that their particular population were making strides toward learning from each other and meeting the goals of the lessons.

SQ2: What do urban science teachers perceive to be the most successful social learning strategies employed in their classrooms? Why are they perceived to be successful?

Predominantly, the eight urban science teachers found the strategies that allowed students to be active, naturally triggers social interaction, and allows for each student to add to the learning process. One of the most referred to strategies was Carousel Brainstorming. In this strategy, students move around the room to different stations and use conversation and reflection. The teachers all used this strategy as a way to discuss and discover prior knowledge before studying a new topic. Students begin by being placed into groups no larger than three, if possible. Each station has a sheet of paper or whiteboard with a term or topic written on it. Students go to a station and read what is written. They then discuss the topic and are given a certain amount of time (30 seconds) to write down their thoughts. When time is up, the teacher will tell students to move in a

clockwise direction and read what has been written by the previous group. They are then to write an original response. This continues until each group has participated at all stations. To extend this strategy, it was suggested in the PD that teachers ask students to read the responses written at their original station. They will then circle 3-4 of the most essential or important ideas according to the topic of discussion. This allows students to spend time critically evaluating all the possible terms and make decisions about what are most representative of the given topic. If time allows, students may share their findings with the whole class.

The eight participants found this strategy to be successful as it facilitated learned engagement, triggered natural collaboration, used critical thinking, reflection, and self-organization by students. Students learned by observing each other or by modeling for their classmates, then extracting information and making an interpretation. As participant A5 stated, “It allowed students to get directly involved in their learning.” Participant A7 noted, “There was nothing passive about this learning strategy”. The strategies that participants found to be successful empowered the learners as “sometimes it takes the advice of a fellow student to help a student re-focus on the task at hand and to think in a diverse manner”.

The interview responses from the eight participants are also supported by their reflective journal entries. Teacher participants see themselves are role models to be observed by students. When they collaborate with each other regarding social learning strategies, the use of social learning increased. Teachers found themselves to be facilitators of learning rather than giving direct instruction for the majority of class time.

Their perceptions of this experience was that the social learning provided students an opportunity to guide their own learning and to gain knowledge from their peers as well as their teacher. Within the reflective journal prompts, teachers were asked to reflect on the success of the social learning lesson plan they submitted as an example of what they had implemented in their classrooms. Six out of eight teachers reported that the lesson plans allowed students to gather information from each other, be able to express their opinions in a small group and then in a whole group setting, and to relate their activities to the world outside the classroom as they were gaining conversational and listening skills.

Within the reflective journal prompts, teachers were also asked to consider their placement on the Levels of Use table. Table 8 describes each of the Levels of Use. Teacher placement on the Level of Use table correlated with the success of the use of social learning strategies: the higher the Level of Use, the more successful the strategies were in the classroom. The Levels of Use protocol enables teachers to determine if they are at the non-use stage of using the social learning strategies (Participant A2) or the renewal stage (Participants A1, A3, and A4) with a variety of stages in between. In the non-use stage, Participant A2 found that the use of social learning strategies to be time-consuming or that the "old way of teaching works just fine".

Participants in the Renewal Stage found themselves to be modifying the strategies as they researched new ways to implement them and finding other approaches to be more effective for the students. Teachers that were still working through the challenges associated with grasping the creation of the classroom environment, student involvement, and implementation of the social learning strategies tended to measure their level of use

as in the Preparation or Mechanical Use stage (Participants A5, 6, and 8). Participant 7 stated that she found herself to be in the Integration stage, where she was working with her department to infuse their lessons with social learning strategies (Integration Stage).

Table 8

Participant Level of Use

Participant	Level of Use	Comments
A1	6 Renewal	It is important to keep the novelty in teaching and learning. If there is a new way of teaching, let me try it
A2	0-1 Non-Use to Orientation	I tend not to use social learning but then I want to know more about the strategies that seem like they would work with my population of students.
A3	5 Integration	I know how to use social learning and work with colleagues to make it a departmental adoption. On weekends I am still researching ways to collaborate with other departments or ways to increase student impact.
A4	6 Routine	Reevaluation of the strategies, their use in each unit, and how to modify the strategy has a major impact in the way I view education. Using social learning is incredible but looking for innovative ways of making adaptations is even better.
A5	4B Refinement	I know the requirements of how to use the strategies and feel comfortable doing so. The reason I may not be in the next level is that I have not spent too much time researching or changing the way I use the strategies. I would like to work with others.
A6	3 Mechanical	I have not focused on the long term use of the strategies but go by day by day content and lesson plans. I tend to use them when I need to fill my lesson plan and I do not want to try the same thing that the students have done many times. My department is not cohesive, and we do not share ideas.
A7	8 Renewal	I have discussed the strategies with all 6 members of my team and we definitely have focused on ways to change the strategies. Sometimes it is a small thing like making groups larger or having students work independently more often than getting into a group.
A8	8 Renewal	Since I focus on alternatives or replacements of the strategies so that they can be applied to different groups of students and different content, I find myself to be Level 8, renewal.

SQ3: What are the science teachers' perceptions regarding social learning professional development when undertaking the social learning instructional strategies?

The teachers that participated in this study all attended a professional development opportunity in the school year 2012-2013 regarding social learning strategies. They stated that they look to "teacher professional learning as an important strategy for supporting the complex skills students need to be prepared for further education and work" (participant A1). When reflecting upon the social learning PD, teachers found it to develop mastery of content, extend problem-solving skills of students, provided effective communication and collaboration, and embedded the social learning strategies within the PD. The PD was content focused and used social learning strategies associated with the curriculum content of the participating teachers.

Active learning was also included to provide teachers with the opportunity to enlist in the style of learning of students. It also included active learning where the teachers were provided with the opportunity to engage in the same style of learning they are designing for their students. Highly contextualized and authentic artifacts were deeply embedded in the PD. When reflecting on the PD from this study, teachers also noted that it supported collaboration (Participant A4). Teachers from across the district worked together to create communities that could positively change the culture of instruction within their schools and across the district. Participant A5, a new teacher, enjoyed the PD as it "provided a coaching opportunity and support. It also shared the presenter's

expertise of the science-based content and how to use evidence-based practices for individual teacher needs".

When responding to the reflective journal prompts, all eight participants found that an adequate amount of time was provided to learn, practice, implement and reflect upon the new strategies that could facilitate change in their practice. The teacher found it to be important that they had time to reflect on, make changes to their current practices, and illicit feedback from each other and the presenter. Both feedback and reflection helped the teachers to thoughtfully move toward the expert visions of practice (Participant A3).

SQ4: What are the teachers' perceptions about the impact of social learning on instruction and learning in the secondary science classroom?

The implications of social learning within the classroom vary from participant to participant. The majority of the participants found that modeling provides an alternative to shaping new teaching behaviors. Instead of using shaping, which is operant conditioning, modeling can provide a faster, more effective means for teaching new strategies. To promote effective modeling, teachers found that the following four conditions existed in their classrooms: attention, retention, motivation, and reproduction. Teachers also found that their position regarding social learning impacted student opinions of the learning strategies (Participants A2 and A6).

Teachers also found the impact of social learning strategies on instruction and learning to promote self-efficacy that allowed students to build confidence towards learning. Students were more likely to engage with the content when they believed they were capable of implementing the strategies and mastering the content collaboratively

with their peers. Teacher participants also found that the social learning strategies promoted self-regulation, whereas the students had their ideas about what was correct or incorrect and chose actions appropriately. As Bandura (1969) stated, learning is not always behavioral. It is a cognitive process that takes place in a social context. Teachers perceived the social learning strategies in their classroom as a way for students to connect with content in an intellectual and emotional manner.

When contemplating the impact of the learning strategies through their reflective journal prompts, teachers stated that they found benefits for both themselves and students. Social learning became a trigger to learning through collaboration with peers on the task at hand and the content to be learned. From a teacher's point of view, the social learning strategies facilitated learner engagement (Participant A2), brought about self-organization among learners (Participants A7 and A8). They can be used in various parts of a lesson or unit of study such as a formative assessment, activation of prior knowledge, or a cognitive activity in the middle of the lesson (Participants A3, 4, and 5).

Summary of Analysis

Evidence of Trustworthiness

It is pertinent to address how this qualitative study established that the findings were credible, transferable, confirmable, and dependable. The constructs of credibility, transferability, dependability, and confirmability are the basis of qualitative research trustworthiness. The definition of an issue of integrity is criteria that involve the establishment of results that are believable from the participants' perspective (Reeves, 2017). Within this study, data from each participant was explored to establish a description that was rich in the experiences of the participants.

Member checking was accomplished during the interview but also after the completion of coding to provide a chance to assess and comprehend what the participants intended to do through his or her words or actions. The process of member checking allowed participants to contribute more information through the review of the process (Fusch & Ness, 2015). In this study, member checking was accomplished by follow-up interviews with participants to complete reactionary responses to the original interview and transcripts. All eight participants agreed that the data recordings and attributed information were accurate.

I identified and analyzed the discrepant data and possible negative cases as an integral part of testing for validity. Discrepant data or data that cannot be accounted for by a specific explanation may point to meaningful errors. Participant 2 was considered to be a non-user of the social learning strategies, and Participant A6 was leery of using the strategies due to observation by traditional administrators who did not support innovative teaching methods. It was also necessary to analyze the discrepant data from the viewpoint that it may not be persuasive as in the example of the interpretation of the negative data is itself in doubt. It is in this manner that I rigorously examined both the discrepant data and supporting data to determine if it was more credible to modify or retain a conclusion. It was also necessary to ask others for feedback on the findings to check for bias or flaws in my logic (Miles, Huberman, & Saldana, 2014). The participants voluntarily chose to partake in the study and were not chosen to elaborate, modify, or refine a theory.

There is a connection between credibility and dependability since, in practice, a demonstration of reliability allows for the ensuring of the latter. This connection was

made clear by the overlying methods that I employed, such as repeat interviews, audit trails kept through my logs, and triangulation via an interview, lesson plans, and reflective writing prompts. The interview precedes the collection of educator reflection writing prompts and the collection of lesson plans. Each of these points of data will provide codes and themes that provide for the dependability of the study when they are similar or the same. Finally, the reflective writing prompts kept by educators may confirm data that was collected and added to the richness of existing research.

There are many ways to establish confirmability within a case study. The completion of the evaluation of the study leads to reflection upon the employment of particular techniques such as questioning techniques and their effectiveness. The reflective commentary may also include a record of my possible bias or first impression of each data collection session (Miles & Huberman, 1994). I used reflective journaling throughout the study to create a record of my biases and first impressions of the data as well as making a regular email statement to my mentor within the Ph.D. program.

Results

This research study used three qualitative instruments: teacher interviews, lesson plans, and reflective journaling. These instruments were used to evaluate teachers' perspectives on social learning strategies presented to them at a professional development opportunity in the 2012-2013 school year. During the 2012-2013 school, all the participants were employed at the same urban school district as science teachers and attended the social learning professional development. All of the eight participants are still employed in the same urban school district. An analysis of data that was collected was analyzed through coding and themes. The findings were triangulated through the

three instruments and compared to memos created by me. The larger issues were broken down into smaller parts and compared to the memos that I created. An analysis, comparison, and contrast and regrouping into categories and themes were completed. In the following section of this research paper, the themes for each question are addressed.

Sub Question 1

Research question one asked: What are the innovative social learning strategies that took place in urban science classrooms, and what are the teachers' perceptions as to the integration of the social learning strategies in their classroom instruction? This question created two main themes. Themes that were generated were: *All or none and Collaboration among peers.* Each of these existing themes created subthemes.

All or none. Overall, the participants in the study expressed a positive attitude toward social learning strategies in science education. The concurrence among the participants was that they had used the social learning strategies from professional learning development with success. Still, the amount of time spent using the strategies in the classroom varied. Six of the eight participants used the strategies regularly if not daily. Participant A1 noted, " I found the strategies to be very successful in the AP Physics classroom. When students work together to solve complicated physics problems, they can hear how others think about the problems, their thought process while solving the problem, and how they can contribute to the solution". Additionally, all participants expressed positive attitudes about the social learning strategies they did attempt or use daily. Participants A5 and A8 were new to teaching and loved sharing the strategies with their students, and they both said they "found them to be novel and engaging for students" and "My students are very diverse. That is what I like about social learning; it

naturally differentiates. Students discuss things on their own level. Some students become natural leaders and model the behavior for others". Participants A1, A3, A4, A5, A7, and A8 used the social learning strategies several times each week or daily, and the strategies provided an active, engaged, and motivated classroom.

However, in contrast, participant A2 noted, "To be honest, it takes too much time to prepare for all of the new ways of teaching. Teachers do not have the time to move their desks around, make sure students are on task when they are allowed to talk through the entire lesson or to read up on how to make it work in their classrooms. I used a few of the strategies with success but could not maintain the use of them in the classroom on a regular basis". While participant A2 did find success with the Four Corners strategy when discussing controversial science topics, she rarely used the other strategies for the reason stated. Another teacher (A6) believed that her traditional school would not support the use of social learning strategies. While she did a few of the social learning strategies successfully in her classroom, she chose the options that were "most traditional". Overall, each of the eight participants found success with social learning to varying degrees.

Collaboration among peers. In consensus, all eight participants found the social learning strategies to include the benefits of collaboration in the classroom. In their perspectives, student retention and self-esteem increased as well as their sense of responsibility (Participant A3). They also perceived that the collaboration among students allowed for exposure to understanding the different perspectives of their classmates (Participant A4) as well as the development of oral communication skills and leadership skills (A8). It was posited by Participant A7 that students who used the strategies were

"more prepared for real-life social situations". Teacher responses to the collaboration of students via the use of social learning strategies were abundantly positive and supportive.

Summary

Teachers overall responded positively to the social learning strategies presented in the PD. The amount of use of the social learning strategies varied from daily to occasionally. However, teachers found that students collaborated among their peers and that student retention was increased as their sense of responsibility increased. One of the responses repeated by more than one teacher was that social learning strategies can naturally be used to differentiate instruction in a diverse population such as the urban school district in the study.

Sub Question 2:Success Through Critical Thinking

Research question two asked: What do urban science teachers perceive to be the most successful social learning strategies employed in their classrooms? Why are they perceived to be successful? Themes emerged from the collected data: *Success through critical thinking/problem solving and use as formative assessments.* Each teacher had their favorite strategies that they used in their classrooms. Participant A1 was familiar with social learning before the PD, so she had experience setting up her classroom for each strategy and found each one to be successful when "tweaked to an AP class". She found the use of each strategy to be successful when they "incorporated a self-assessment or peer assessment for reflection to incorporate higher thinking skills". When using the Four Corners approach to controversial topics in science (evolution, global warming, stem cell research), teachers found that when students began working independently, then

joining a group to discuss their opinion, they utilized problem-solving skills s as well as their desire to be social. All 8 of the participants attempted the strategy called "Walk Around Survey" that allowed students to talk to each other and find out what their classmates knew about a topic and then reflect on their responses independently.

Formative Assessment

Teachers found this to be successful as it was a formative assessment as well as an activating strategy. Six of the eight participants employed a strategy called Carousel Brainstorming that allowed for movement around the room while working with a partner to respond on whiteboards to a topic in the unit of study. Teacher participants found this strategy to be successful due to student retention of information as well as their exposure to diverse perspectives regarding the topic. The Carousel Brainstorming activity also served a way for teachers to inform their instruction moving forward as they reviewed the student responses. Finally, six teacher participants found success with the Jigsaw strategy due to its use with large reading texts that are used on standardized tests. This strategy also allowed each student to become an expert on the subject and report back to their team, which teachers believe in supporting self-esteem. Participant A2, who does not use social learning strategies, often found the Jigsaw strategy to "support student reading and written expression. It could also be used an informal assessment."

Summary

Teachers found specific social learning strategies to be successful in their classrooms and in their individual content areas. The social learning strategies allowed students to use higher order thinking skills such as reflection and metacognition. Strategies from the PD could also be used as formative assessments to inform teacher

instruction moving forward. In a time of high stakes testing, it is important to these teachers to assign students large reading texts. When employing some of the innovative methods of students become the expert on part of the text, teachers found that students were able to obtain more information as well as support each other.

Sub Question 3: Embedded Learning

Research question three asked: What are the science teachers' perceptions regarding social learning professional development when undertaking the social learning instructional strategies in the classroom? Themes emerged from the data that was collected: *embedded learning for teachers and choice*. Each of the eight teacher participants attended a professional development opportunity for social learning strategies in the school year 2012-2013. When asked this research question, teachers responded positively as the strategies were embedded into the PD. Each teacher was able to take part in the student process and create the product that students in their classrooms would produce.

The PD also created a collaborative setting among teachers of the same content (science), which was rare for their school district. Participant A8 found that the PD emulated active learning, which would be created in her classroom through the use of social learning strategies. Other participants (A3 and A4) found that the presenter should have a deep knowledge of the content as well as how to teach it and to recognize the same in the participants. It was also stated (Participant A7) that the PD allowed for choice and flexibility. "I find that teachers are like students. They need and welcome choice. It was also helpful to know that modifications could be made to fit our particular population, and this was addressed in the PD".

Small Steps

Overall, teachers embraced the idea that the PD used small steps to assist them in all of the nuances of social learning strategies. If these strategies were to become part of their daily teaching, teachers "must be able to apply the task yourself a little at a time over a period of time to incorporate student differences and choices" (Participant A6). The participants also embraced the idea that they would be able to report back to each of their departments as to what took place as a result of implementing the strategies. This was possible because the PD addressed science teachers from the same district as well as the same content area.

Summary

The PD was deemed successful for two main reasons: teachers were able to embrace small steps in gaining the subtleties of the strategies. When implementing the new strategies, it was important to teachers to take their time and implement the strategies in their own time. It was also meaningful to teachers to learn the strategies within the PD opportunity. They were able to visualize what students would be doing and what the outcome would look like. Teachers were also able to implement the strategies within their science content areas based on the embedded learning.

Sub Question 4

Reflection and Reevaluation

Research question four asked: What are the teachers' perceptions about the impact of social learning on instruction and learning in the secondary science classroom? While teacher responses varied, the overall theme that emerged regarding research question four was: *reflection and reevaluation.* To address research question four, teacher participants used reflective journals to determine the impact of social learning on instruction within their science classrooms.

Of the eight respondents, seven teachers stated that one of the most impactful facets of social learning on instruction and learning in their classrooms was that of reflection on the process needed to complete the social learning strategies, how students were impacted and how they as teachers were able to instruct their students based on their abilities, interests, and social interactions. Teachers also found the PD allowed for the reevaluation of the strategies and how they were implemented as well, whether they were sustainable in their classrooms. Teachers found that the reflection on the social learning strategies was necessary as "it's a process that helps to collect, record and analyze everything that happened in the lesson" (Participant A5).

Another teacher participant (A8) stated that reflection "allowed teachers to move from experiencing the innovative way of teaching to understanding the strategies and how they impact the students as well as the instruction". It was perceived by Participant A3 that students took the time to reflect on "what they knew as well as well as the knowledge of their peers". Since reflection is deliberate, structured thinking about choices, it is an integral part in improving instruction and learning. Through reflection, "we as educators can look clearly at our successes and struggles and consider options for change" (Participant A7).

Student reflection and reevaluation is an integral part of the learning process. Teaching students to reflect on their work by "noticing and correcting their own mistakes as well as which activities allowed them to be successful is a vital part of the learning experience" (Participant A6). It was stated that "far too many classrooms leave reflection out of the equation of learning" by Participant A1. Teachers who promote reflective classrooms can ensure that students will be fully engaged in the process of making meaning and, in the end, higher-level thinking (Lee, Miller, & Januszyk, et al., 2014). Students who are able to reflect on their work enhance its meaning. Reflecting on experiences can encourage insight and complex learning. Reflection can be accomplished alone or can be enhanced when we ponder our learning with others.

Current Experiences

Teacher participants also found that students tended to reflect on current experiences and create links between them (Participant A4). By using the social learning strategies, students "were able to draw forth from their cognitive and emotional information from visual, auditory, kinesthetic, and tactile abilities" (Participant A8). When reflecting, students acted upon "how to process the information and synthesize and evaluate data" (Participant A1). In the end, reflecting also means applying what students have learned to contexts beyond the original concepts in which we have learned something.

Use of Strategies

The data reflected a general culture that embraces the social learning strategies that were presented at the PD from the school year 2012-2013 and find value in using these strategies in their urban science classrooms. The data also suggests that teachers

perceive that these strategies provide opportunities for students to collaborate and form higher-level thinking skills as well as problem-solving skills. Teachers also agreed that the strategies could be used as formative assessments as well as activating strategies within their science classrooms. The majority of the teacher responses were unanimous with their approval of social learning theories that provide reflection and reevaluation on the part of students and teachers alike.

Embedded Professional Development

Teachers also agreed that the PD was successful because the strategies were embedded within the PD opportunity, and the teachers could take part in the very activities they were presenting to their students. Teachers found that when they had time, it was beneficial to collaborate to extend the strategies further and to differentiate instruction based on this extension. One teacher perceived social learning strategies as successful when used with rarely used other strategies. Another teacher found the strategies to be successful but was afraid to be observed while using them in a traditional school that did not embrace "novel" teaching methods.

This is an indication that no matter the level of use on Hall and Hord's Level of Use table, teachers found that the social learning strategies provided students with an innovative, student-centered, collaborative method of learning and retaining material. Interview data also demonstrated teachers perceiving that students retained more information and were more engaged while using the active learning, demonstrating excitement for learning and motivation towards adding to the success of their group and the class as a whole. This data further indicates that the teachers perceived the strategies

to prepare students for real-life experiences after secondary schools such as work or college.

Teacher Peer Observations

Teacher interview data also suggested that PD and teacher collaboration using the strategies from the PD played a role in shaping teacher perceptions of the strategies. When teachers were able to observe each other taking part in one of the strategies and viewing the characteristics and essence of the learning and instruction, they were better able to use the strategy. Teachers also perceived the modeling to be invaluable in successfully implementing the strategies.

This perspective aligns with existing research (Reeves, Hung Pun, & Chung, 2017), which suggests that collaboration during lesson planning predicts student achievement. The teachers' participants from this study deemed the professional development to be effective as it enabled them to develop new knowledge and skills that they need to address students' learning challenges. From the reflective journal entries, teachers found the PD to be effective not only because the strategies were embedded but also because it required thoughtful planning followed by careful implantation with feedback to ensure it responded to teachers' learning needs. The teachers felt comfortable putting their new knowledge and skills to work in the classroom.

Summary

This qualitative case study was conducted with eight urban, secondary science teachers. Participants shared information about their experiences and teaching practices related to social learning strategies they obtained from a professional learning opportunity in the 2012-2103 school year. They also shared their perceptions of their use

of the social learning strategies, the success of the strategies as well as their impact on instruction and learning, as well as the PD opportunity regarding the social learning strategies. From the analysis of the interviews and journal prompts, themes arose. The themes appear consistent when viewed across each research question.

Sub Question 1 explored the various social learning strategies that took place in urban science classrooms as well as teacher perception of the integration of social learning strategies in their classroom instruction. Two themes, *All or none and Collaboration among peers,* emerged. The coding of teacher participant responses designated that teachers in this study perceived most social learning strategies to be collaborative. In their perspectives, student retention and self-esteem increased as well as their sense of responsibility. It was also found that while the majority of participants used all or most of the social learning strategies, one of the teachers found that the strategies were not feasible for her classroom. Those teachers that used the social learning strategies implemented them regularly with success. The teacher who did not use social learning strategies found them to be "time-consuming and not as successful as traditional methods". Teacher perceptions demonstrated that the social learning strategies demonstrated in the PD were valuable to seven of the eight participants.

Sub Question 2 looked at teacher perceptions of the success of social learning strategies and their impression of why the strategies were successful. From these questions as well as other questions, two themes were identified, *Success through critical thinking/problem solving and use as formative assessments.* Teachers indicated that the use of social learning strategies was valuable in informing their instruction going forward. Many of the strategies such as Walk Around Survey or Carousel Brainstorming

demonstrated not only students' prior knowledge but also the possible gaps in instruction. Teachers also indicated that while students were involved in the social learning strategies, students analyzed their methods and responses as well as the responses of their peers. Teachers perceived their students to think in a goal-directed way that was purposeful. Students also reflected upon their knowledge actively and carefully with a wide range of thinking skills. Teachers observed students focus on the process of making judgments about what was taking place in the classroom because the strategies they employed provided opportunities to step back and think about how they solved problems and how the strategies they used were appropriate for achieving their goal.

Responses to Sub Question 3 explored teachers' perceptions of the PD opportunity when teachers implemented the social learning strategies within their classrooms. A theme emerged from the data that was collected: *embedded learning for teachers.* Teachers valued the idea that the social learning strategies that were presented in the PD had a direct connection to instruction and content in their classrooms. They perceived the PD to be grounded in day-to-day instructional practice and designed to enhance their content-specific teaching practices with the intent of improving their students' learning. The PD experience required active teacher involvement in cooperative work based in the use of the social learning strategies they would employ in their classrooms.

Sub Question 4 asked teacher participants what they perceived to be the impact of social learning on their instruction and learning in the secondary science classroom. While teacher responses varied, the overall theme that emerged regarding research question four was: *reflection and reevaluation.* While these two concepts are separate,

they are also related. Reflection is the process of considering social learning strategies and their impact on instruction and learning. Reevaluation is the process of the teachers making an assessment or judgment about the impact of the social learning strategies on instruction and learning within the science classrooms. Teachers found that by reflecting on their pedagogy, they were supporting real-time decisions about what was the best practice for their context while also evaluating their practice. Reflection on the impact of social learning within their classrooms was noted in teacher reflective journals as it took place after the act of teaching. Teachers reviewed and evaluated their past teaching methods to learning from the new strategies and then applied each to their future instruction.

Chapter 4 has described the data collection process and how that data was analyzed for meaning and themes, as well as the measures that were taken to ensure the trustworthiness of the study. This chapter has also described the resulting findings from data analysis and the results. Chapter 5 correlates the results with the literature that has been established regarding social learning strategies. Recommendations for further research will be made in Chapter 5, as well as the limitations of the study. A discussion of the implications for positive social change that may result from the findings will be discussed as a conclusion of this study.

Chapter 5: Data Analysis

The purpose of this research study was to establish teacher perceptions regarding social learning strategies within their science classrooms. It is within the realm of educators' perceptions of innovative social learning instruction that the gap in the literature exists. This gap demonstrates why the study was needed; to understand teacher perceptions of social learning in urban science classrooms. Chronicling the current practices within urban science classrooms may lead to the progression or identification of best practices to guide social implications. One of the potential social consequences of the study was an increase in educator efficacy by expanding the skills and knowledge that teachers use for social learning strategies. While this research study focused on science teachers, it was also essential that policymakers, community leaders, and parents ensure educators in their school system have opportunities to engage in continuous use of social learning strategies to increase student achievement (Yu, 2015). The study used an innovative manner of social learning instructional strategies initiated in a PD provided to teachers in a large, urban school district.

My research study supports existing literature, and it expanded upon previously known teacher perceptions of social learning strategies. The findings indicated that the teachers value the collaborative nature of social learning strategies as well as the extension of student higher-level thinking and problem-solving skills. Teacher participants' positive and negative experiences informed learning and instruction and indicated the importance and value of specific innovative social learning strategies over others. Teacher participants' perceptions characterized the social learning strategies as a

way to teach the students how to work together after secondary school, including work and college experiences.

Interpretation of the Findings

The conceptual framework provided by Hall and Hord's LOU (2011) provided the structure and definition of the findings within this study. The results of this study were also interpreted through the existing literature on the topic. Within the following sections, there is a presentation of the interpretations of the findings that are related to social learning strategies within urban science classrooms. I explored the perceptions of science teachers who have participated in a professional learning opportunity regarding social learning strategies with the conceptual framework as a guide. Teacher perceptions and teacher responses informed the findings by the use of Hall and Hord's theoretical framework, the review of literature, and guidelines that follow coding.

Evaluation of Findings

In this study, the phenomenon of the impact of PD regarding social learning on urban science teachers' instructional strategies focused on the conceptual framework of Hall and Hord's LOU (2011) which is part of the CBAM. The CBAM offered an approach to study the level at which individuals implement change due to professional development they received (George et al., 2006). LOU focuses on how individual teachers implemented the innovation in the classroom. This model was used in this study to focus on and identify the perceptions of individual science teachers regarding innovative social learning instructional strategies.

Educator Use of Social Learning Strategies in Urban Classrooms

Teacher participants in this qualitative study demonstrated awareness of the aspects of social learning strategies within their urban, science classrooms, even though they may not have used these strategies frequently in the past. The literature in the Level of Use (Hall & Hord, 2011) has an analogy to the results of the study. For example, the CBAM (Hall & Hord) provides a construct with measuring tools used to assess the innovation implementation process for individuals, schools, or districts. The results of the study indicated that the teacher participants in this study also reflected LOU (Hall & Hord, 2011).

Those teachers who frequently used the social learning strategies from the PD opportunity that is the basis of this study reportedly compared to the levels of use known as a routine use, refinement, integration, and renewal. Participant A1 stated that she found the use of the social learning strategies to be very helpful in her AP Physics classrooms while she is "researching new ways to implement the strategies to suit my population of students." Her use of the strategies places her LOU at the Renewal Level.

Teacher Participant A2 found the social learning strategies to be "too time-consuming" for her class schedule and considered herself to be between Level 0 (nonuse) and Level 1 (orientation). Participant A6 compared her use of social learning strategies to Level 2 (Preparation Use) as she knew the logistical requirements and timing for the innovative method of teaching yet used the strategies a few times in her classroom due to her fear of administrative feedback. Participants A4 through A7 demonstrated regular use of the social learning strategies within their classrooms, understood their impact on students and discussed their use with colleagues (Routine, Integration, and Renewal).

This study focused on the identification of alternatives to the current teaching strategies used and teacher perceptions of these strategies.

Positive Interdependence Using Social Learning Strategies

One characteristic of social learning is positive interdependence, which is the belief that the individual is dependent on the contributions, inclusion, and success of others in the group to be successful (Johnson & Johnson, 2016). Teachers in this study perceived the social learning strategies provided in the PD to promote interaction between student group members to learn from each other and to achieve their goals.

Bertucci, et al., (2016) found that everyone's goal achievements should be positively correlated so that individuals perceive that they can reach their goals, if and only if, the others in the group also reach their goals. Teacher participant A7 posited that the social learning strategies allowed "students and teachers a way to realize their unique skills and abilities and to share them." Another study teacher participant (A8) liked that "each student can be more skilled in some areas and less skilled in other areas which assists them in learning from each other." Specific strategies such as Jigsaw Approach (discussed in Chapter 2) promoted collaborative work by allowing students to accomplish multiple tasks at once and giving the students a sense of individual responsibility within the group (Merriam, 2016). Teachers can foster this sense of positive interdependence by creating activities that require shared outcomes, rewards, and goals.

Professional Development

Dubinsky (2017) found that professional development was not always brain-friendly and began building PD that was job-embedded by using more social learning opportunities within the PD. Dubinsky also used the concepts found in the research of

Caine and Caine (2005) to be useful. Caine and Caine recognized the brain to be social and that every brain simultaneously perceives and creates parts and wholes. Since the PD that is the basis of this study was job-embedded, it demonstrated an on-going process that allowed teachers to form a connection between what they learned in the PD and daily practice (parts to wholes).

It also was designed to enhance the teachers' content-specific instructional practices with the intent of improving student learning (DeHei, 2017). Participant A1 stated that "professional teacher learning is most valuable when it can be easily applied to the classroom within any lesson." It is of note that PD for teachers should provide "active learning so that the teachers can enlist the learning style of students" (Participant A4). It was the overall consensus of the teachers in this study that the PD opportunity was valuable because it was "results-oriented, practical, and interactive" (Participant A8) and used the very social learning strategies that teachers were implanting in their classrooms.

In summary, there is a connection between the results of this study and the current literature on social learning strategies and professional development. Hall and Hord (2011) provided the conceptual framework for the Levels of Use of social learning strategies to which each teacher identified. Teachers also perceived the social learning strategies to provide for positive interdependence within their classrooms and the teachers' perceptions aligned with Bertucci, et al.,(2016) theory regarding goal achievement within groups of students. Finally, concerning professional development, teachers perceived job-embedded PD to be a successful means of providing learning opportunities to implement innovative social learning strategies. Within this study there was not a disconfirmation of the known literature. However, correlation knowledge of

teacher perceptions regarding learning strategies and the use of the learning strategies is an extension of this study.

Limitations of the Study

Universal weaknesses limited this study. The honesty of the participants and the past connection between myself and the participants may cause bias. Six years before the research began, I was in a supervisory position over participants but have not worked in the study school district or contacted any of the participants in the past six years. As Yin (2009) states, the researcher should be open to contrary or deviant evidence that may provide significant theoretical insights. To address the threat of bias, I minimalized influence by the use of triangulation, member checking, reflexive journaling, and an audit trail to solve any possible researcher bias.

The size of the participant sample is also considered a limitation of the study. The total number of participants in this study was eight. Since this was purposive sampling, the participants had to fit the criteria of the research questions and did provide theoretical saturation. There may be bias due to one person collecting data (Merriam, 2016). Discussions with my mentor and methodologist diminished the threat of bias. These discussions addressed matters of credibility, transferability, dependability, and confirmability. It was necessary to take precautions to avoid researcher bias.

Recommendations

I recommend that the completion of further research into both the topics of teacher perceptions of social learning strategies and professional development takes place. I also suggest that a larger sample size includes other urban area school districts for the return of further information regarding the topic of study. The perspective of science

educators is essential as they are an integral part of the school curriculum and high stakes testing. They may also collaborate with teachers of other content areas to incorporate new ideas to add to the innovative social learning strategies across the curriculum.

Additionally, research with stakeholder groups may provide insight into what is successful for teachers and impacts students' success inside the classroom as well as after secondary school. These stakeholders may include families of students and administrators of the urban secondary schools but may also include elected officials such as school board members. If schools are going to build support for on-going success using social learning strategies within urban schools, they will need advocates for improved PD programs and student educational needs. The business community can hire graduates with skills and abilities that are necessary, such as collaborative skills and problem-solving skills that are a part of social learning strategies. Staff and faculty can take the lead to provide stakeholders the data and other information to be productive partners surrounding student achievement. Information sharing will need to be transparent. Achievement data will need to be clear, accurate, and meaningful.

Implications

There are several implications of this study. The data and findings of this study may add to positive social change that is positive by pointing improvement in already established educational programs as well as in the preparation of pre-service teachers. Dissemination and publication of this study may assist in bringing awareness to diverse ways of providing meaningful instruction to students. The participants in this study shared their unique experiences and perceptions as teachers who work with advanced, bi-lingual, individual education students, and the general population of students in their

urban science program. By sharing these perceptions in a broader sense, this study may help to inform instructional methods and the needs of this particular faction of teachers. The sharing of viewpoints may lead to more advanced and current instructional resources and improved results for students. Conclusively, by sharing this study on a broader basis, it may contribute to the improvement of teacher practice, the experiences of students in urban school districts, and the community workforce.

Recommendations for Response by Teachers and School Districts

School districts can support teachers and students by providing further job-embedded, active professional development programs regarding social learning strategies. These programs can evaluate the needs of teachers and students and the necessary skills for becoming a successful member of the 21st century. Individual teachers can support other faculty members by recognizing the need for collaborative skills among teachers and students alike. Teachers in this study recognized a need for social learning strategies within their classrooms and schools and evaluated their instructional methods and sought additional PD to improve student skills and prepare them for what comes after secondary school.

I found that the secondary science teachers in this study cared about social learning strategies and the collaborative skills of their students. Teachers in this study also cared about extending their instructional tools and in discussing innovative methods of implementing meaningful instruction with their colleagues. The social learning skills used in the PD opportunity created a cooperative, collaborative, higher-level thinking, and problem-solving classroom. The teacher participants welcomed opportunities to

advance their skills and develop a community of learners who gained from the experience and knowledge of one another.

Conclusion

The design of this study examined and researched the topic of teacher perceptions of social learning strategies within urban area secondary science classrooms. The literature on the use of innovation such as social learning skills indicates that these strategies can add to current instruction, improve student achievement, and allow teachers to reflect on meaningful, job-embedded professional development opportunities (Bandura, 1969; Cherry, 2016; Hall & Hord, 2011; Lai, 2016:, Macia, 2016; Mehta & Kulshrestha, 2016; Zimmer, 2018). Information was gathered via a qualitative case study to see how social learning strategies and the PD affected secondary science teachers. By using interviews, lesson plans, and reflective journals from teachers, data was gathered and analyzed through qualitative methods that allowed for the identification of differences, similarities, possible patterns, and themes.

This study found that teachers who used the social learning strategies cared about student engagement, active learning in their classrooms, collaboration among students, obtaining problem-solving and higher-level thinking skills, and new ways to complete formative assessments. The teachers expressed their need for professional instructional development that was job-embedded and content-specific. They also valued the use of the social learning strategies within the professional development opportunity that is the basis of this study. Teachers embraced the chance to collaborate with other teachers in their content areas and to have the time to practice the social learning strategies before implementing them in their classrooms. This study also found that teachers viewed the

use of the social learning strategies as well as the professional development would improve their schools if they committed to the change in instruction and continued to pursue ways to build upon the knowledge-based in the professional development activities. For professional development to be valuable to teachers, it must be something that can be used immediately in the classroom and have feedback from other teachers to empower peer collaboration to promote positive social change. Learning best practices is a vital part of teaching, but practicing this proven methodology is even more valuable as it can enhance the school's instruction by improving its teachers.

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Appendix A: Interview Questions

Interview Question	CRQ	RRQ1	RRQ2	RRQ3
IQ1: What are your perceptions of social learning strategies now? Before the PD?	X	X	X	
IQ2: Did you use the social learning strategies from the PD? What were the results? What are your perceptions regarding the implementation of these innovative strategies?	X	X		
IQ3: When thinking about the social learning PD, did you find it helpful when you attempted to use the strategies in the classroom?	X		X	
IQ4: Do you think that social learning applies to science? Why/why not?	X		X	
IQ5: What challenges/successes did you have with social learning strategies?	X		X	
IQ6: How do you think the social learning strategies from the PD will affect learning in your science classroom?	X	X	X	X

Appendix B: Interview Protocol and Questions

Study Topic: Perceptions of Urban Secondary Science Educators Regarding Social Learning Professional Development

Introduction: You have been asked to participate in this interview based on you volunteering to partake in this study and your participation in the Professional Development regarding strategies in social learning in urban science classes. Furthermore, the researcher believes that you have a great deal to share about teaching and providing reading instruction to science students in an urban setting. The objective of this research project is obtaining urban science educators' perceptions of social learning strategies in their classrooms. This case study will not aim to evaluate your pedagogy or experiences. Rather, I am trying to illustrate urban science teachers' pedagogy, attitudes, beliefs, and perceptions about providing social learning strategies to students.

Interview Questions:

1. What are your perceptions of social learning strategies now?
   Possible prompts: What were your perceptions of social learning strategies before the PD?
2. Did you use social learning strategies from the PD?
   Possible Prompts: What were the results? What were your perceptions of the implantation of social learning strategies?
3. When thinking about the social learning PD, did you find it helpful when you attempted to use the strategies in the classroom?
   Possible Prompts: What specifically was helpful from the PD when you used the strategies?
4. Do you think that social learning applies to science? Why/why not?
   Possible Prompt: What strategies do you find most successful in your urban science classroom?
5. What challenges/successes did you have with social learning strategies?
   Possible Prompt: Did these challenges keep you from using social learning strategies again?
6. How do you think the social learning strategies from the PD will affect learning in your science classroom?

Appendix C: Reflective Writing Prompts

Reflective Journal Questions	CRQ	RRQ1	RRQ2	RRQ3
RJQ1: How do you feel about your implementation of social learning strategies as part of your teaching? What are your strengths and weaknesses in facilitating social learning with urban students?	X	X	X	
RJQ2: Looking at the level of use table, where would you place yourself in your implementation of social learning into science teaching? Explain your thinking.	X	X	X	X
RJQ3: Concerning the lesson plan that you shared with me, why was this lesson particularly memorable or successful? Did you find this social learning strategy to be innovative?	X	X	X	

Appendix D: Writing Prompts for Data Collection

Introduction: You have been asked to participate in the weekly writing prompt activity based on you volunteering to partake in this study and your participation in the Professional Development regarding strategies in social learning in urban science classes. Furthermore, the researcher believes that you have a great deal to share about teaching and providing reading instruction to science students in an urban setting. The objective of this research project is obtaining urban science educators' perceptions of social learning strategies in their classrooms. This case study will not aim to evaluate your pedagogy or experiences. Rather, I am trying to illustrate urban science teachers' pedagogy, attitudes, beliefs, and perceptions about providing social learning strategies to students.

Week One Writing Prompt: Please respond in the notebook provided for you.

How do you feel about your implementation of social learning strategies as part of your teaching? What are your strengths and weaknesses in facilitating social learning with urban students?

Week Two Writing Prompt: Please respond in the notebook provided for you.

Looking at the level of use table, where would you place yourself in your implementation of social learning into science teaching? Explain your thinking.

Week Three Writing Prompt: Please respond in the notebook provided for you.

Concerning the lesson plan that you shared with me, why was this lesson particularly memorable or successful?

Appendix E: Level of Use Table for Week Two Writing Prompt

Level of Use	Description	Typical Statement
Level O: Non-Use	A teacher takes no action concerning the strategy	"I've heard about it but, honestly, I have too many other things to do right now."
Level 1: Orientation	A teacher seeks information about the strategy	"I'm looking at materials about the innovation and considering using it sometime in the future."
Level 2: Preparation	A decision is made to adopt a new strategy, and the teacher is actively preparing to implement it	"I've attended the workshop, and I've set aside time every week for studying the materials."
Level 3: Mechanical	Early attempts to use the strategy, it can feel awkward	"Most of my time is spent organizing materials and keeping things going as smoothly as possible every day."
Level 4A 4B: Routine/Refinement	Established patterns of use, go beyond the routine by assessing their impact by using the new strategy	"This year, it has worked out beautifully. I'm sure there will be a few changes next year, but I will use it the same way I did this year."
Level 5: Integration	Teachers are actively coordinating with others to use the strategy	"Not everyone has all the skills needed to use the program so that it has the greatest impact on student learning. I've been working with another teacher for two years, and recently a third teacher began working with us."
Level 6: Renewal	Teachers seek more effective alternatives to the established use of the strategy	"I am still interested in the program and using it with modifications. Frankly, I'm reading, talking, and even doing a little research to see whether some other approach might be better for the students."

Appendix F: Documents/Lesson Plans

Table 3: Documents aligned with Research Questions

Research Question	Document	Questions	Purpose
RQ #1: What are the social learning strategies that have employment in urban science classrooms, and how do teachers integrate them in classroom instruction?	Activities completed during social learning PD Walk Around Survey, Carousel Brainstorming	How does the understanding of social learning compare from what the teacher learned in PD	Comparing perspectives voiced during PD activities to perspectives voiced in interviews will show how educators perceptions have changed, if at all.
RQ#3: How helpful was their professional development when undertaking the above tasks in the classroom?	Lesson Plan submitted by an educator	How does the lesson plan compare to what the teachers say occurred in class?	The lesson plan submitted will be used to compare what the educator said happened during the lesson.
RQ# 4. What are the teachers' viewpoints about the impact of social learning on instruction and learning in the secondary science classroom?	Lesson Plan submitted by an educator	How does the lesson plan apply the principles of social learning learned in PD?	The lesson plan will help determine how this applies to educators
RQ#2: What are the most successful social learning strategies that teachers employed in urban, secondary science classrooms?	Social learning strategies used with participants 3-2-1, Walking Flashcards, Frayer Model, Windowpane, Scenes from a Hat	How understands the educator regarding evolved since PD, if at all?	Comparing the teachers' understanding of the implications of social learning during PD activities to what teachers share in interviews may show how educators' views about learning and instruction have changed, if at all.

Appendix G: Invitation to Participate in the Study

Dear Invitee,

My name is Mary Macauley. I am a doctoral student at Walden University's Educational Program. I am kindly requesting your participation in a doctoral research study that I am Conducting: Perceptions of Secondary Science Teachers Regarding Social Learning Professional Development. The intention is to assess how teachers who participated in the social learning professional development in the school year 2012-2013 regard and perceive social learning strategies within their classrooms. The study involves completing an interview, a reflective journal, and providing social learning lesson plans that you have already completed. Participation is completely voluntary, and you may withdraw from the study at any time. You may also decline to answer any of the questions in the interview or reflective journals. The study is completely anonymous; therefore, it does not require you to provide your name or any other identifying information. If you would like to participate in the study, please read the Informed Consent Letter below. To begin the study, please send an email to the address below. Your participation in the research will be of great importance to assist positive social change within secondary science classrooms. Thank you for your time and participation.

Mary Macauley

M.S. Doctoral Student, Walden University

Appendix H: Email for Snowball Recruitment

Dear [Mr. / Ms. LAST NAME],

Thank you for your interest in the study Perceptions of Urban Secondary Science Educators Regarding Social Learning. I am writing to ask whether you would be willing to request the participation of friends or colleagues who may also be interested in participating in this research study. You are under no obligation to share this information. If interested, please ask potential participants to contact me at the email or phone number listed below. All participant information will be kept confidential.

Thank you for your time and consideration.

Sincerely,

Mary Macauley

Mary.macauley@waldenu.edu

301-906-9042 cell phone

Appendix I: Confidentiality Agreement

Name of Signer: _____

During the course of my activity in collecting data for this research: "Perceptions of secondary science educators in an urban school district regarding professional development they received regarding social learning" (IRB Approval 02-06-20-0335172).

I will have access to information that is not to be disclosed and will be kept confidential. I acknowledge that the information must remain confidential, and that improper disclosure of confidential information can be damaging to the participant.

By signing this Confidentiality Agreement, I acknowledge and agree that:

I will not disclose or discuss any confidential information with others, including friends or family.

I will not in any way divulge, copy, release, sell, loan, alter, or destroy any confidential information except as properly authorized.

I will not discuss confidential information where others can overhear the conversation. I understand that it is not acceptable to discuss confidential information, even if without the use of the participant's name.

I will not make any unauthorized transmissions, inquiries, modification, or purging of confidential information.

I agree that my obligations under this agreement will continue after the termination of the job that I will perform.

I understand that violation of this agreement will have legal implications.

I will only access or use systems or devices I am officially authorized to access, and I will not demonstrate the operation or function of systems or devices to unauthorized individuals.

Signing this document, I acknowledge that I have read the agreement, and I agree to comply with all the terms and conditions stated above.

Signature: _____ Date:_____