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# High School Teachers' Experiences and Perceptions Facilitating Student Discourse and Collaborative Structures for English Language Learners in Biology

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Walden University
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Abstract

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MS, Walden University, 2018

BS, University of Central Florida, 2004

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

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## Abstract

The problem that was addressed in this study was that the academic needs of English Language Learners (ELLs) were not being met in biology classes in high schools in the local district because teachers were not consistently facilitating instruction using the required strategies of student discourse and collaborative structures. The purpose of this qualitative study was to explore teachers' successes, challenges, and need for supports when using the required strategies with their ELLs. Knowles' theory of andragogy and Shulman's theory of pedagogical content knowledge guided this study examining how the adults' learning of the required strategies impacted their ability to implement them effectively. The research questions asked about the teachers' successes, challenges, and need for supports when using the required strategies. This study employed a basic qualitative inquiry design using semistructured face-to-face interviews of 11 high school biology teachers. Analysis of the data using a five-phase cycle, revealed that teachers were successful implementing the required strategies when they built positive classroom environments and relationships, modeled with examples, and put multiple structures into place. They faced challenges addressing students' negative feelings and addressing students' lack of motivation. The identified needs included access to ongoing support and the ability to observe other teachers' instruction to improve their own practice. This study may contribute to positive social change by providing administrators and teachers with information they can use to improve facilitation of the required instructional strategies which may close the achievement gaps between ELLs and English-speaking students.

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# Dedication

I dedicate this dissertation to my late father, Frank Edward Aber Jr., who supported every educational journey I have embarked upon; I thank him for loving me unconditionally and for never letting me give up. I also dedicate this dissertation to my husband, Aaron, and our three boys, William, Lucas, and Gabriel, for their endless patience, love, support, and encouragement throughout this ride.

# Acknowledgments

I would like to acknowledge the endless support, guidance, and patience of my dissertation chair, Dr. Brenda J. Kennedy. She encouraged me through the loss of my father, the experiences that the pandemic brought us, and the entire dissertation process. I would also like to acknowledge the support and guidance from my committee member, Dr. Debera Balthazar. And finally, thank you to the teachers who participated in this study; you are the reasons we will make positive social change.

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# Chapter 1: Introduction to the Study

The number of students in U.S. public education whose primary language is not English is increasing. According to the National Center for Educational Statistics (NCES, 2018), the population of English Language Learner (ELL) students in the United States increased from 3.8 million students in 2000 to 4.8 million students in 2015. As the ELL population continues to grow, the issue of how to provide an equitable, rigorous, and conducive education remains unclear (Lachance et al., 2019). Teachers face increasing demands to not only teach ELL students the standards within the curriculum, but to also facilitate the students' development of English and their primary language. Instructional strategies specifically designed for ELL students are crucial for their learning (Lee et al., 2019). These strategies include ensuring that ELL students are receiving grade-appropriate rigorous content; language content with collaborative structures; and varied, rich, subject-based discourse about the content (Lee et al., 2019).

Student discourse and collaborative structures provide ELL students in Grades 6 - 12 with multiple lasting benefits. The strategies provide opportunities for ELL students to process their learning as they are learning the language and new content (Ernst et al., 2017; Estrella et al., 2018; Gupta, 2019; Guzman-Orth et al., 2019; Irby et al., 2018; Von Esch & Kavanagh, 2018; Wu et al., 2019). In specific studies in middle and high schools, teachers' use of these instructional strategies was directly related to increased ELL student language and content knowledge acquisition (Estrella et al., 2018; Gupta, 2019; Irby et al., 2018). Additionally, Garza et al. (2018) found that lessons incorporating oral

and written interactions and dense cognitive language increased ELL students' science and language achievement. Research indicates that the use of collaborative structures increases and maintain students' proficiency in analyzing science vocabulary (Casey et al., 2018; Garza et al., 2018; Joseph-Orelus, 2019).

What is not yet understood are teachers' experiences facilitating high school biology instruction using the required instructional strategies of student discourse and collaborative structures for their ELL students. The aim of this study was to explore teachers' successes, challenges, and need for supports when facilitating these instructional strategies. This study was needed to support educators' professional practice; I examined teachers' experiences during facilitation of effective instructional strategies. This research may bring about positive social change by furthering knowledge of ELL students' patterns of social relationships. Social change occurs because of multiple changes that take place in social and nonsocial environments (Lee et al., 2022). High schools contain social environments such as hallways, courtyards, and the cafeteria. Allowing students to experience social relationships through cooperative learning structures and intentional discourse in the classroom may better prepare them to enter society with an open mind and an objective attitude (Irby et al., 2018).The study results could further school and district administrators' understanding of the knowledge and resources that teachers need to successfully facilitate effective strategies for ELL students.

Chapter 1 is the introduction of this study and includes background information, the problem statement, the purpose of the study, and the three research questions (RQs) that were explored. Chapter 1 also includes the conceptual framework for the study, the nature of the study, key related definitions, and discussion of the assumptions, scope and delimitations, and limitations of the research. The chapter concludes with discussion of the significance of the study and a summary of key points from the chapter.

## Background

Student learning is improved and is more sustainable when teachers have a high self-efficacy (Bandura, 1998; Hattie & Anderman, 2019). However, there is conflicting research on whether the amount of teaching experience influences teaching self-efficacy (Clark, 2020; Cruz et al., 2020; Lopez & Santibanez, 2018; Montoya, 2018; Yough, 2019). Researchers have also found that teachers' perceptions of ELL students have an impact on both instruction and ELL student learning (Byfield, 2019; Garcia et al., 2019; Giles & Yazan, 2020; Guzman-Orth et al., 2019; Hong et al., 2019; Kim, 2020; Lachance et al., 2019). These perceptions include teacher biases towards ELL students and a low importance for implementing student culture and specific instructional strategies in their lessons (Byfield, 2019; Garcia et al., 2019; Giles & Yazan, 2020; Guler, 2020; Guzman-Orth et al., 2019; Hong et al., 2019; Kim, 2020; Lachance et al., 2019; Santibanez & Gandara, 2018; Wood et al., 2018). Second language acquisition affects content learning (Aljumah, 2020; Fan, 2018; Franco et. al., 2020; Heineke et. al., 2019; Lachance, 2018; Lam, 2020; Lee et. al., 2019; Mickan et. al., 2019; Tedick & Young, 2018). Researchers

have also found the role of setting high expectations, the value of teacher collaboration, and teaching the language with the content, improves student outcomes (Aljumah, 2020; Fan, 2018; Franco et. al., 2020; Heineke et. al., 2019; Lachance, 2018; Lam, 2020; Lee et. al., 2019; Mickan et. al., 2019; Tedick & Young, 2018). Quality professional development (PD) for teachers of ELL students can directly affect ELL student learning. Finally, researchers have found that quality PD opportunities for teachers of ELL students include follow-up and on-site coaching, observation, and reflection, and teacher collaboration (Babinski et al., 2018; Li & Peters, 2020; Meskill & Oliveir, 2019; O'Hara et al., 2020; Ralston et al., 2019; Rutherford-Quach et al., 2018).

Although there is a great deal of research on which instructional strategies are effective for ELL students, the literature review exposed a gap in knowledge regarding teachers' experiences using these strategies. In this study, I attempted to address this gap in the literature in two ways. What was not yet understood was the teachers' experiences facilitating high school biology instruction using the required instructional strategies of student discourse and collaborative structures for their ELL students. First, I explored participating teachers' successes and challenges when facilitating these instructional strategies. Second, I explored what participating teachers feel are the supports they still need to effectively facilitate these strategies. This study was needed to support educators' professional practice. An examination of teachers' experiences during facilitation of these effective instructional strategies could lead to improved ELL student learning (Clark, 2020; Cruz et al., 2020; Giles & Yazan, 2020; Yough, 2019).

## Problem Statement

The local problem was that the academic needs of ELL students were not being met in the 13 high schools in the local school district because teachers were not consistently facilitating high school biology using the district's required instructional strategies of student discourse and collaborative structures according to reports from school administrators. Additionally, teachers in the district had requested guidance on these specific topics. Research into these experiences to determine successes, challenges, and needed supports could provide administrators and other teachers of ELL students with information that they could use to improve their facilitation of these effective instructional strategies. The research problem was that although the instructional strategies of student discourse and collaborative structures have been shown to be effective means of teaching high school biology to ELL students (Estrella et al., 2018; Gupta, 2019; Guzman-Orth et al., 2019; Irby et al., 2018), teachers in the local school district were not consistently using these strategies, according to current school administrators within the district.

Teachers have an impact on student learning and influence student achievement (Hattie & Anderman, 2019; Teig et al., 2018). The types of instructional strategies that teachers use also influence learning (Ernst et al., 2017; Estrella et al., 2018; Gupta, 2019; Guzman-Orth et al., 2019; Irby et al., 2018; Von Esch & Kavanagh, 2018; Wu et al., 2019). Furthermore, teachers need ongoing support when facilitating effective instructional strategies to have a positive impact on learning (Babinski et al., 2018; Li &

Peters, 2020; O'Hara et al., 2020; Ralston et al., 2019). Although researchers have investigated these issues, they have not explored teachers' experiences when implementing the instructional strategies that help ELL students learn in high school biology. Several researchers have indicated that a study on teachers' experiences could provide information that might improve student learning (Clark, 2020; Cruz et al., 2020; Giles & Yazan, 2020; Yough, 2019).

## Purpose of the Study

The purpose of this qualitative study was to explore teachers' successes, challenges, and need for supports when facilitating high school biology instruction using the required strategies of student discourse and collaborative structures for their ELL students. The gap addressed was the lack of literature on teachers' experiences when implementing instructional strategies that help ELL students learn in high school biology. An increased understanding about this issue could further administrators' understanding of what teachers need to successfully facilitate instruction for ELL students that involves student discourse and the use of collaborative structures.

## Research Questions

Although there is an abundance of current research showing that these strategies improve ELL student learning (Casey et al., 2018; Estrella et al., 2018; Garza et al., 2018; Irby et al., 2018; Joseph-Orelus, 2019; Scalise & Clarke-Midura, 2018; Townsend et al., 2018; Von Esch & Kavanagh, 2018; Wu et al., 2019), and the local school district requires teachers to use the strategies, teachers at the school are not effectively

facilitating instruction using student discourse and collaborative structures, according to reports from school administrators. The RQs for this study were as follows:

RQ1: What are teachers' successful experiences facilitating high school biology instruction using the required instructional strategies of student discourse and collaborative structures for their ELL students?

RQ2: What challenges have teachers experienced when facilitating high school biology instruction using the required instructional strategies of student discourse and collaborative structures for their ELL students?

RQ3: What supports are still needed for teachers to increase the fidelity of the required instructional strategies of student discourse and collaborative structures for their ELL students?

## Conceptual Framework for the Study

The purpose of this qualitative study was to explore teachers' successes, challenges, and need for supports when facilitating high school biology instruction using the required strategies of student discourse and collaborative structures for their ELL students. I used the theories of andragogy (Knowles, 1973) and pedagogical content knowledge (PCK; Shulman, 1987). Although andragogy has an emphasis on adult learning and PCK has an emphasis on teaching, they were suitable for the study because adult learning can affect teaching. More specifically, adult learning on how to effectively teach can have an impact on instruction and ultimately student learning (Babinski et al., 2018; Li & Peters, 2020; O'Hara et al., 2020; Ralston et al., 2019).

Knowles (1973) described how adult learning improves when the focus is on the process of the learning, rather than the content of the learning, in his theory of andragogy. Knowles argued that the process of learning is affected by changes in self-concept, previous experiences shaping future learning experiences, the readiness of the learner, and the internal motivation for learning. Knowles also found that adults need control over their own learning for it to be effective upon implementation or use. As andragogy addresses the specific needs of adults as learners and the process of adult learning, I used the theory to describe participating teachers' experiences of learning about student discourse and collaborative structures and their implementation of the newly learned concepts.

PCK encompasses the connection between knowing the content and knowing how to effectively teach others that content. Shulman (1987) defined PCK as teachers' understandings and variations of content knowledge in the facilitation of student learning. He identified three key concepts of PCK: how to present the content knowledge; the learning factors that may be associated with the specific content; and the choice of instructional strategies. I investigated teachers' experiences facilitating strategies for ELL students in high school biology. I used the theory of PCK to understand science teacher' application of new instructional strategies.

The conceptual framework supported the creation of the RQs used in this study. The theory of andragogy facilitated the development of questions that relate to the teachers' experiences focusing on adult processing of how to implement the instructional

strategies rather than the procedures of implementing them. PCK theory facilitated the development of the of interview questions that related the content being presented to students and how teachers present the content. Both theories relate to RQs 1 and 2, which focus on teachers' experiences of effective implementation and the challenges they encountered.

The theories of andragogy and PCK also informed the development of the interview questions and the data analysis of the resulting interviews. I collected data by conducting multiple interviews of biology teachers of ELL students. The analysis of the interview data was accomplished on two levels. First, single interviews were analyzed through coding and categorization. Then, a comparison of commonalities and differences was carried out to identify emerging themes. These emerging themes were used to characterize observations or causal properties of the study. The conceptual framework and its connection to this study are more thoroughly explained in Chapter 2.

## Nature of the Study

In this study, I explored the participating teachers' experiences in relation to their successes, their challenges, and the supports they feel are still needed. I performed a basic qualitative inquiry of high school biology teachers of ELL students in a local school district. To address the RQs in this qualitative study, I administered semistructured interviews.

This study was best suited to a basic inquiry approach because it required an investigation into a real-world context and pertained to a specific situation that could

inform other situations (see Denzin & Lincoln, 2018). Additionally, Merriam and Grenier (2019) noted that the purpose of conducting a basic qualitative study is to identify the meaning of experiences or phenomena. Semistructured interviews are best when the research aim is to collect open-ended data, learn about the participants' beliefs and experiences, and provide some structure with an interview protocol that still allows for probing and follow-up questions (DeJonckheere & Vaughn, 2019). After collecting the data, I used qualitative content analysis to identify themes and the meanings of those themes (see Mayring, 2021). This basic qualitative approach was based on the theories of andragogy (Knowles, 1973), and PCK (Shulman, 1987).

## Definitions

I use the following terms throughout the study:

*Collaborative structures*: An instructional strategy that allows students to process their learning in a structured, timed, role-assigned, and content-specific interaction (Kagan & Kagan, 1994). Specific collaborative structures include think, pair, share; stand, share, sit; rally robin; jigsaw; and numbered heads together.

*English Language Learner* (*ELL*): A term that refers to learners whose primary language is not English. They do not speak, read, or write in English proficiently and are in the process of acquiring the language in an educational setting (Florida Department of Education, 2011).

*Inquiry-based instruction*: A type of instruction that allows students to learn science by posing questions, modeling, problem solving, developing claims, collecting

evidence, justifying reasoning, and exploring topics. This type of instruction exposes students to real-world phenomena, allowing them to link prior experiences to new concepts (Schwab, 1960).

*Pedagogical content knowledge* (*PCK*): A term that represents the combination of content knowledge and knowledge of how to effectively teach others that content (Shulman, 1987). The three key concepts of PCK are the strategies for how to represent content knowledge, the learning implications that may be associated with the specific content, and the choice of instructional strategies (Shulman, 1987).

*Second language acquisition*: A term that refers to the process of learning a new language; it only occurs after a first language has been learned and utilized, whether in educational or personal settings (Krashen & Terrell, 1983).

*Student discourse*: An instructional strategy that occurs when students are given a content-based topic to discuss with a partner or a small group of their peers; it is timed and structured with individual roles, and it allows every member to speak (Wisconsin Center for Education Research, 2017).

*Teacher self-efficacy*: A term that refers to a teacher's belief that they can effectively teach content to students; such beliefs affect how effective that teaching is for students (Bandura, 1998).

## Assumptions

This study is based on six assumptions. The first assumption was that the participants would understand the design and the purpose of the study. I also assumed

that the participants understood the interview questions and could correctly express their experiences and perceptions with their answers. Another assumption was that the participants felt content with the study's ethical procedures utilized and trusted that all the data collected would only be used for the intended purpose. I assumed that there were diverse responses and experiences due to the participants' range in teaching experience and levels of self-efficacy. Additionally, I assumed that the participants responded to the interview questions truthfully and candidly and were able to remember their experiences to the best of their ability. Finally, I assumed the presence of bias on the part of the participants and myself. I further discuss mitigation strategies for these assumptions in Chapter 3.

## Scope and Delimitations

The study included 11 biology teachers at four different public high schools in the local school district. I explored teachers' experiences facilitating student discourse and collaborative structures for ELL students in biology. The four selected high schools were appropriate because they have a high population of ELL students. Although many researchers have found that student discourse and collaborative structures improve ELL student learning (Babinski et al., 2018; Li & Peters, 2020; O'Hara et al., 2020; Ralston et al., 2019), researchers have not explored teachers' experiences, including strengths, weaknesses, and need for supports when facilitating these instructional strategies. The focus of this study was solely on teachers' experiences using these strategies with biology classes that include ELL students. At the time of the study, the four high schools served a

total student population of 8,200, including 1,950 biology students. Of the biology students enrolled in these four schools, 1,020 of them were currently identified as ELL students.

For the conceptual framework for this study, I used two theories: andragogy and PCK. Andragogy theorizes how adult learning improves when the focus is on the process of the learning, rather than the content of the learning (Knowles, 1973) and PCK describes the connection between knowing the content and knowing how to effectively teach others that content **(**Shulman, 1987). I included both theories because neither theory would provide adequate information to describe the phenomenon independently. Combining these two theories allowed for exploration of the adult teachers' learning experiences and the application of their learning to their classroom facilitation. The delimitations of this study included time and the selection of participants. This study was confined by time as I was the only researcher. In the local school district, all science teachers of ELL students are expected to use student discourse and collaborative structures. I included only biology teachers in the study, as this course is the only state-assessed course in high school science in the state in which the study was conducted. Additionally, only biology teachers who had 2 or more years of teaching experience were interviewed; this excluded from analysis the experiences of new teachers with less PD and training for teaching ELL students. Because the study elicited rich and thick description based on participant experiences, it may yield findings that may be more

transferable to other school districts with similar student demographics (Merriam & Grenier, 2019; Tenny et al., 2021).

## Limitations

The purpose of this qualitative study was to explore teachers' successes, challenges, and need for supports when facilitating high school biology instruction using the required strategies of student discourse and collaborative structures for their ELL students. Limitations for this study included small sample size, possible participant bias in answers, and subjectivity. Creswell and Guetterman (2019) identified that small sample sizes prevent generalizations in qualitative research. I did not attempt to generalize findings, only to explore teachers' experiences for potential transferability to other school districts. Possible participant bias in answers were addressed by framing the interview questions as open-ended and by wording the questions differently to improve participant engagement (Creswell & Guetterman, 2019; McSweeney, 2021). Merriam and Grenier (2019) cautioned that researchers can exhibit subjectivity and bias based on their previous experiences. To overcome potential subjectivity and bias during the analysis of interview answers, as a former biology teacher of ELL students, I implemented procedures such as the audit trail and adhered to my interview protocol. These strategies are explained further in Chapter 3.

## Significance

The purpose of this qualitative study was to explore teachers' successes, challenges, and need for supports when facilitating high school biology instruction using

the required strategies of student discourse and collaborative structures for their ELL students. Although there is extensive research demonstrating that student discourse and collaborative structures improve ELL student learning (Casey et al., 2018; Estrella et al., 2018; Garza et al., 2018; Irby et al., 2018; Joseph-Orelus, 2019; Scalise & Clarke-Midura, 2018; Townsend et al., 2018; Von Esch & Kavanagh, 2018; Wu et al., 2019), there is little research regarding teachers' experiences using these strategies. This study may advance knowledge in the field of education by addressing a gap in the literature on teachers' experiences when applying instructional strategies that help ELL students learn in high school biology. In addition, the study may support educators' professional practice by identifying the successes, challenges, and support still needed to improve ELL students' learning through effective instructional strategies. Using study findings, school and district faculty can potentially identify and develop professional learning and supports to improve instruction. This study may also promote social change in the field of education. With more supports and professional learning on effective instruction for ELL students, educators may be able to aid in closing the achievement gap between ELL students and their non-ELL peers to better prepare these students for postsecondary life.

## Summary

The purpose of this qualitative study was to explore teachers' successes, challenges, and need for supports when facilitating high school biology instruction using the required strategies of student discourse and collaborative structures for their ELL students. Chapter 1 included an introduction that described the topic of the study and a

background that briefly summarized the research literature related to the topic and described the gap in knowledge addressed in the study. The chapter also included the problem statement, the purpose of the study, and the three RQs. I described the theories of andragogy and PCK and how they served as the conceptual framework for this study. This chapter also included the nature of the study; definitions of key concepts; assumptions that were made; the scope, delimitations, and limitations of the study; and the significance the study for the field of education. A review of current literature relating to the purpose of this study and the RQs is included in Chapter 2.

# Chapter 2: Literature Review

The academic needs of ELL students are not being met in the 13 high schools in the local school district because teachers are not consistently facilitating high school biology using the district's required instructional strategies of student discourse and collaborative structures, according to reports from school administrators. According to current school administrators within the district, since 2018, ELL students have not been provided opportunities to process their learning with the same rigorous expectations as their grade-level peers using student discourse or collaborative structures. Although the instructional strategies of student discourse and collaborative structures have been shown to be effective means of teaching high school biology to ELL students (Casey et al., 2018; Estrella et al., 2018; Garza et al., 2018; Irby et al., 2018; Joseph-Orelus, 2019; Scalise & Clarke-Midura, 2018; Townsend et al., 2018; Von Esch & Kavanagh, 2018; Wu et al., 2019), district teachers are not consistently using them.

The purpose of this qualitative study was to explore teachers' successes, challenges, and need for supports when facilitating high school biology instruction using the required strategies of student discourse and collaborative structures for their ELL students. The gap that was addressed concerned a lack of literature on teachers' experiences when implementing the instructional strategies that help ELL students learn in high school biology. Teachers are not effectively facilitating the strategies that have been shown by current researchers to be effective. Consequently, ELL students' needs are not being met, and their learning is being negatively affected. Chapter 2 includes my

literature search strategy, the conceptual framework, a literature review related to key concepts, and a summary.

## Literature Search Strategy

The purpose of this qualitative study was to explore teachers' successes, challenges, and need for supports when facilitating high school biology instruction using the required strategies of student discourse and collaborative structures for their ELL students. The literature review includes peer-reviewed journal articles, books, other research studies, and dissertations. I used multiple academic databases to identify relevant literature related to the topic, including Academic Search Complete, APA PsychInfo, Complimentary Index, the Directory of Open Access Journals, Education Source, ERIC, Sage, ScholarWorks, ScienceDirect, and SpringerLink. Thoreau Multi-Database Search was used as the primary tool to search across the multiple databases.

I used the following keywords and combination of search terms: *instructional strategies, best practices, English Language Learners, ELL, ESL, English as a second language, ELL teaching, professional development, second language acquisition, science education, second language learning, teacher preparation, secondary science, teacher self-efficacy, self-efficacy in teachers, culturally responsive teaching, culturally relevant instruction, teacher perceptions or attitudes, teacher beliefs,* and *assessment.* The results of the initial searches were refined through search filters, which narrowed the results to peer-reviewed literature published in the last 5 years in academic journals with full-text availability. Although searches were limited by publication dates, studies prior to the 5-

year period were also included to provide practical and valuable perceptions about andragogy and PCK, in addition to the development of instructional strategies specifically for ELL students. Review of literature led to additional keywords and search terms, including *faculty development*, *teaching methods*, *second language learning*, *teaching self-efficacy*, and *culturally relevant pedagogy*. To organize the resulting literature collected from the multiple searches, I used a database citation management program. I grouped the literature into five categories: teacher self-efficacy, teachers' perceptions of ELL students, second language acquisition, instructional strategies, and PD. I discuss these topics in the literature review.

## Conceptual Model and Framework

The conceptual framework for this study consisted of the theories of andragogy (Knowles, 1973) and PCK (Shulman, 1987). Because educators are expected to facilitate student learning using instructional strategies and learning styles best suited for the students' ages, the teachers become learners as well. Teachers, therefore, are continual learners and must be given the same educational opportunities to learn through strategies and learning styles best suited for adult learners (Knowles, 1973). Additionally, teachers relate what they know about teaching to what they know about the content they teach, and this affects the practice of teaching (Shulman, 1987).

### Andragogy

Knowles's (1973) theory of andragogy describes how adult learning improves when the emphasis is on the process of the learning, not simply the content of the

learning. Knowles identified that previous learning theories were based on the learning behaviors of animals and young children and did not address factors that affect adult learning. Knowles then applied psychotherapy studies and concepts of teaching to develop his theory of andragogy. As adults have more life experiences and educational experiences than a traditional student, teaching adults, or andragogy, requires different strategies than teaching younger students. So rather than teaching students how to use intentional discourse and collaborative structures, teachers require opportunities for experiencing how the strategies are effective and for relating these instructional strategies to those they have already been successful.

Andragogical theory is based on four assumptions: learners become less dependent as they age, learners mature with experience, adult learners are more willing to learn what they need to learn as opposed to what they should learn, and adult learners are oriented to learn for immediate application rather than applications to be implemented later in life (Knowles, 1973). Knowles (1973) asserted that learners become less dependent as they age, but other researchers have found that this dependence is related to self-motivation and requiring less direct instruction (Hiatt & Fairbairn, 2018). Teachers still need to experience the application of the concepts of collaborative instruction and intentional student discourse to teaching for them to learn best practices and effective implementation.

Knowles (1973) also contended that adults need the opportunity to apply and learn through experience for new ideas nearly immediately, rather than building on

knowledge for later in life. Teachers need to implement newly learned instructional strategies promptly and time to reflect on these practices for them to become effective. Knowles has continued to study adult learning to extend the definition of andragogy to the application of andragogy. Knowles et al. (2015) described andragogy as a process consisting of specific elements. This process is not about delivering information but providing the skills and resources necessary for a learner to obtain the desired skills. I focused on the possibility that teachers' experiences implementing specific instructional strategies could be a basis for improving instruction and teacher self-efficacy and, subsequently, student learning. The specific elements of andragogy include preparing the learners, providing an appropriate climate, preparing the lesson, diagnosing the needs, setting the purpose, developing the learning activities, and then evaluating the learners' progress (Knowles et. al., 2015).

As andragogy addresses the specific needs of adults as learners and the process of adult learning, it is approach for investigations of teachers' learning and their experiences applying the newly learned concepts. Knowles (1973) also found that adults need control over their own learning for it to be effective upon implementation or use. I investigated teachers' successful experiences, struggles, and need for supports when facilitating specific instructional strategies for ELL students in high school biology and, therefore, was guided by the process of adult learning.

**Pedagogical Content Knowledge**

PCK is the combination of content knowledge and knowing how to teach others that content effectively. Shulman (1987) defined PCK as teachers' understandings and variations of the content knowledge in the facilitation of student learning. He identified three key concepts of PCK: how to represent the content knowledge; the learning implications that may be associated with the specific content; and the choice of instructional strategies. Shulman began conceptualizing PCK because general instruction was based on dated curriculum that only required the teacher to have a strong background or advanced degree in the content itself. With educational policy changes, the requirement to evaluate teachers emerged and with that, systems for these evaluations needed to be developed for consistency and equality. Shulman continued his work with PCK and revised some of his earlier concept to include practices such as classroom management and presenting content in smaller chunks, further proving the point that both content knowledge and instructional methods play an equal part in effective learning.

Shulman (1987) explained why science teachers are teachers as opposed to scientists. This is not based on a difference in content knowledge or in the depth of that knowledge, but the perspective, as science teachers have a teaching perspective and scientists have a research perspective (Cochran, 1997). The theory of PCK incorporates the idea that teachers will know common misconceptions of a scientific concept and be able to address them while introducing a new concept, thus facilitating effective learning. For teachers to be able to facilitate student learning, they must understand and effectively

use the curriculum and instruction, both components of PCK. In this study, I investigated teachers' experiences facilitating strategies for ELL students in high school biology, so the theory of PCK guided how the application of new instructional strategies is delivered by science teachers.

## Literature Review Related to Key Concepts

Teachers' self-efficacy affects ELL student learning and there are several factors that influence teaching self-efficacy including the availability of ongoing support; learning about the students' and the community's culture; building relationships with students; teachers' own experiences and struggles with learning; and how much experience teachers have in the field of education (Bandura, 1998; Cho et al., 2020; Clark, 2020; Cruz et al., 2020; Gkolia et al., 2014; Glock et al., 2019; Hattie & Anderman, 2019; Lopez & Santibanez, 2018; Malo-Jurera et al., 2018; Montoya, 2018; Thomas et al., 2020; Whitaker & Valtierra, 2018; Yough, 2019). Additionally, teachers' perceptions of ELL students have an impact on both instruction and ELL student learning (Byfield, 2019; Garcia et al., 2019; Giles & Yazan, 2020; Guler, 2020; Guzman-Orth et al., 2019; Hong et al., 2019; Kim, 2020; Lachance et al., 2019; Santibanez & Gandara, 2018; Wood et al., 2018). Furthermore, second language acquisition effects the content learning and when content teachers hold high expectations for ELL students, collaborate with language acquisition teachers, and teach the language with the content, student outcomes are enhanced and maintain better developed learning (Aljumah, 2020; Fan,

2018; Franco et. al., 2020; Heineke et. al., 2019; Lachance, 2018; Lam, 2020; Lee et. al., 2019; Mickan et. al., 2019; Tedick & Young, 2018).

The types of instructional strategies that help ELL students learn effectively include student-centered instruction, inquiry-based instruction, intentional student discourse, and performance-based assessments (Casey et al., 2018; Ernst et al., 2017; Estrella et al., 2018; Gupta, 2019; Guzman-Orth et al., 2019; Irby et al., 2018; Joseph-Orelus, 2019; Scalise & Clarke-Midura, 2018; Townsend et al., 2018 ; Von Esch & Kavanagh, 2018; Wu et al., 2019). Additionally, PD that includes follow-up and on-site coaching, observation and reflection, and allows time for teachers to collaborate has supported teachers' facilitation of science content to ELL students (Ankeny et al., 2019; Babinski et al., 2018; Li & Peters, 2020; Meskill & Oliveir, 2019; O'Hara et al., 2020; Ralston et al., 2019; Rutherford-Quach et al., 2018).

**Teacher Self-Efficacy**

Teacher self-efficacy is a teacher's belief that they can effectively teach content to students and this belief directly affects how effective that teaching is for students (Bandura, 1998). Student learning is improved and is more sustainable when teachers have a high self-efficacy (Poulou et al., 2019). Teachers with a high sense of self-efficacy ascribe student success to elements within their control, such as collaborating with other teachers for help and motivating students to learn as opposed to elements outside of their control, such as the students' family life or socioeconomic status (Bandura, 1998). Teachers with a strong sense of self-efficacy also demonstrate an enthusiasm for

teaching, a commitment to the teaching profession, a high level of persistence, and the ability to motivate students (Bandura, 1998; Hattie & Anderman, 2019). As this study investigated teachers' experiences facilitating specific instructional strategies, I anticipated that the teachers with a high level of self-efficacy would exhibit a better application of the strategies than teachers with a lower level of self-efficacy.

Researchers are conflicted on whether the amount of teaching experience influences teaching self-efficacy (Clark, 2020; Cruz et al., 2020; Lopez & Santibanez, 2018; Montoya, 2018; Yough, 2019). Some researchers have found that the level of self-efficacy is directly related to the number of years of teaching experience, the fewer years of experience, the lower the teacher self-efficacy (Clark, 2020; Cruz et al., 2020). However, other researchers have found no correlation to the years of teaching experience and the level of self-efficacy (Lopez & Santibanez, 2018; & Montoya, 2018). Several factors influence teaching self-efficacy including the availability of ongoing support; the students' and the community's culture; building relationships with students; the teachers' experiences; and teaching experience (Cho et al., 2020; Clark, 2020; Cruz et al., 2020; Glock et al., 2019; Malo-Jurera et al., 2018; Montoya, 2018; Thomas et al., 2020; Whitaker & Valtierra, 2018; Yough, 2019).

### *The Availability of Ongoing Support*

Teachers need ongoing support for increased self-efficacy (Glock et al, 2019; Lopez & Santibanez, 2018; Malo-Jurera et al., 2018; Montoya, 2018). Lopez and Santibanez (2018) and Montoya (2018) interviewed over 3700 teachers and found that

ongoing support for teaching ELL students are necessary to build teacher self-efficacy and meet the educational needs of these students. Additionally, Malo-Jurera et al. (2018) conducted a mixed method study to produce an in-depth analysis of teachers' self-efficacy towards teaching ELL students and found that without ongoing, the teachers' relationships with ELL students was undermined, leading to decreased student engagement, decreased student performance and decreased teacher self-efficacy. Furthermore, Glock et al. (2019) conducted a comparative study of two groups of 120 teachers of ELL students, one receiving routine and ongoing support and one group only receiving the initial introduction to the instructional strategy. Glock et al. (2019) found that the latter group, as compared to the group receiving the ongoing support, experienced significantly more stress, a decreased feeling of self-efficacy, and lower student performance, leading to increased teacher burnout.

### *The Students' and the Community's Culture*

Teachers who have an understanding and knowledge about the students' and the community's culture have an increased sense of self-efficacy (Cruz et al., 2020; Glock et al., 2019; Thomas et al., 2020; Whitaker & Valtierra, 2018). Teachers that know about the students' culture can develop lessons more engaging to ELL students, which improves student learning and teacher self-efficacy (Cruz et al., 2020; Thomas et al., 2020; Whitaker & Valtierra, 2018). Thomas et al. (2020) conducted a study to determine if a community-based program helped teachers gain a better understanding of the students' culture, but Whitaker and Valtierra (2018) investigated how to motivate

teachers to want to teach ELL students. Both studies used teacher interviews and focus group data to show that culturally relevant lessons motivated teachers and students, leading to increased teacher self-efficacy (Thomas et al., 2020; Whitaker & Valtierra, 2018). Cruz et al. (2020) investigated the areas to which 245 teachers felt the least self-efficacious and found that the teachers who knew the community's cultural backgrounds had a significantly higher self-efficacy towards creating engaging lessons and delivering content to ELL students. Similarly, Glock et al. (2019) investigated the level of teacher stress and burnout from 245 teachers and found teachers who had a strong understanding of the cultural beliefs of the community showed significantly higher self-efficacy towards teaching their ELL students.

### *Building Relationships with Students*

Building relationships with ELL students also improves ELL student learning and teacher self-efficacy (Cruz et al., 2020; Malo-Jurera et al., 2018; Yough, 2019). Yough (2019) investigated if an intervention program to help teachers build relationships with their ELL students affected teacher self-efficacy and found that the intervention group teachers had an increased sense of self-efficacy when they were able to build strong relationships and trust with their ELL students. Similarly, Cruz et al. (2020) found that teachers had an increased sense of self-efficacy when the ELL students had trust that their teachers cared and implemented aspects of relationship building into the lessons from a qualitative case study of 245 teachers. Additionally, Malo-Jurera et al. (2018) found that

teachers who implement culturally responsive teaching techniques facilitated building strong teacher-student relationships, leading to increased teacher self-efficacy.

### *The Teachers' Experiences*

Teachers' personal experiences prior to teaching also have an impact on their self-efficacy towards teaching ELL students (Cho et al., 2020; Montoya, 2018). Cho et al. (2020) sought to determine levels of self-efficacy of a group of novice teachers and what factors contributed to their perceived levels. The researchers found that the teachers' life experiences, such as struggling with learning disabilities, being former ELL students, and coming from single-parent homes, enabled them to feel more prepared to meet the diverse needs of their ELL students (Cho et al., 2020). In a similar study, Montoya (2018) also sought to determine the levels of self-efficacy of a group of novice teachers through interviews and focus groups and found that the teachers who had experienced struggles with their own learning disabilities had higher levels of self-efficacy towards meeting the needs of their ELL students.

### *Teaching Experience*

The number of years of teaching experience may also influence teacher self-efficacy towards teaching ELL students, although conflicting data exists on this topic (Clark, 2020; Cruz et al., 2020; Lopez & Santibanez, 2018; Montoya, 2018). Clark (2020) and Cruz et al. (2020) conducted studies on teacher self-efficacy for novice and experienced teachers. While Clark (2020) specifically investigated the issues these teachers encountered when instructing ELL students that affect self-efficacy and Cruz et

al. (2020) investigated the effects of relationship building and teacher self-efficacy, both studies found that the more experienced teachers consistently reported a higher sense of self-efficacy as compared to novice teachers. However, Lopez and Santibanez (2018) and Montoya (2018) both conducted studies that found no difference in reported self-efficacy levels between novice and experienced teachers. While Lopez and Santibanez (2018) specifically sought to determine if a PD program for teaching ELL students effected teacher self-efficacy and Montoya (2018) sought to determine if the teachers' self-efficacy was related to their personal educational experiences, both researchers concluded that there was no significant difference of self-efficacy between the novice and experienced teacher subgroups.

**Teachers' Perceptions of English Language Learner Students**

Teachers' perceptions of ELL students have an impact on both instruction and ELL student learning (Byfield, 2019; Garcia et al., 2019; Giles & Yazan, 2020; Guzman-Orth et al., 2019; Hong et al., 2019; Kim, 2020; Lachance et al., 2019). These perceptions include teacher biases towards ELL students, the impact of teachers' low value of ELL students' culture, and the challenges for instructing ELL students (Byfield, 2019; Garcia et al., 2019; Giles & Yazan, 2020; Guler, 2020; Guzman-Orth et al., 2019; Hong et al., 2019; Kim, 2020; Lachance et al., 2019; Santibanez & Gandara, 2018; Wood et al., 2018). Additionally, researchers are conflicted on whose responsibility it is to facilitate ELL students' language learning: the ELL department or the general education teachers (Guler, 2020; Hong et al., 2019; Kim, 2020; Lachance et al., 2019).

### *Teachers' Existing Biases*

Common teacher biases towards ELL students include ideas that the parents of ELL students are unable to support learning at home, the students cannot perform as high as their non-ELL peers on standardized assessments, and ELL students are not motivated to learn, and (Byfield, 2019; Garcia et al., 2019; Giles & Yazan, 2020; Guzman-Orth et al., 2019; Santibanez & Gandara, 2018). In a qualitative case study of 154 teachers, Santibanez and Gandara (2018) investigated the most frequent perceptions of teachers of ELL students and found that nearly every participant believed that parents of ELL students could not help their students with homework or support continued learning at home. In a similar case study, Byfield (2019) found that teachers believe that parents of ELL students are not only unable to help with learning at home, but that some parents are unwilling to help with learning at home based on socioeconomic status. Garcia et al. (2019) sought to determine if teachers ranked students' ability based on ethnicity in a quantitative correlational study and found that teachers of ELL students believed their students were unable to demonstrate mastery of the content through standardized assessments. Similarly, Guzman-Orth et al. (2019) investigated how ELL students best demonstrated mastery of the content, however, the researchers used a qualitative case study and found teachers believe that ELL students are unable to perform well on standardized assessments but are able to demonstrate mastery through student-task assessments. In another qualitative case study, Giles and Yazan (2020) found that teachers believe ELL students are unmotivated to learn and do not place a high value on

education, but nearly all of the teachers in the study changed their belief after attending a PD series for motivating and engaging students.

### *The Impact of Teachers' Low Value of ELL Students' Culture*

Many American teachers do not implement student culture into lessons because they do not see the value culture can have in education for students with different ethnicities from their own (Byfield, 2019; Giles & Yazan, 2020; Hong et al., 2019; Wood et al., 2018). Byfield (2019) found that teachers who reflect on their teaching and their perceptions of students' culture improved ELL learning and overall classroom instruction. When teachers broaden their views and learn to incorporate things that students' value into their lessons, student learning improves (Byfield, 2019; Giles & Yazan, 2020). Additionally, Giles and Yazan (2020) found the teachers' bias that ELL students are unmotivated to learn changed drastically after implementing lessons that involved the students' background, culture, and family's beliefs. In two qualitative case studies of veteran teachers of ELL students, Hong et al. (2019) and Wood et al. (2018) found that teachers expressed significant improvement in their teaching when lessons included community involvement.

### *Teachers Perceived Challenges of Instructing ELL Students*

Teachers believe that instructing ELL students is overwhelming and excessively time-consuming (Garcia et al., 2019; Guler, 2020; Guzman-Orth et al., 2019; Hong et al., 2019; Kim, 2020; Santibanez & Gandara, 2018; Wood et al., 2018). One of the biggest challenges teachers of ELL students encounter is the different levels of their English

language proficiency (Guler, 2020; Santibanez & Gandara, 2018; Wood et al., 2018). While Santibanez and Gandara (2018) explored elementary teachers' perceptions, Wood et al. (2018) explored middle and high school teachers' perceptions, but both groups of researchers found the teachers' most concerning challenge was addressing the varied needs of the ELL students and planning for language differentiation in addition to content variation. Guler (2020) also identified the challenge of varied levels of bilingualism; however, she found that teachers felt this challenge could easily be overcome with more diverse instructional materials and resources.

Teachers also expressed feeling overwhelmed by instructing ELL students because of the additional instructional strategies required in their lesson planning (Garcia et al., 2019; Guzman-Orth et al., 2019; Hong et al., 2019; Kim, 2020). Kim (2020) sought to determine what misconceptions teachers have about instructing ELL students and found that the teachers believed their ELL students needed additional instructional strategies added to lessons that would not benefit the rest of the student in the classroom. Similarly, Hong et al. (2019) explored teachers' beliefs about instructing ELL students and found that teachers felt the pressure to incorporate instructional strategies that were specific to supporting ELL student learning. However, both groups of researchers reported a shift in teacher mindset about this misconception after participating in PD and collaborating with the English Speakers of Other Languages (ESOL) department (Hong et al., 2019; Kim, 2020). It is often difficult to assess ELL learning through mainstreamed multiple-choice assessments without providing the assessment in multiple languages, a

daunting task for monolingual and bilingual teachers (Garcia et al., 2019; Guzman-Orth et al., 2019). In similar studies, Guzman-Orth et al. (2019) and Garcia et al. (2019) found that student-task assessment provides the teacher with a more accurate reflection of student learning, however, this required extensive planning and increased the teachers' feeling of being overwhelmed.

### *Opposing Beliefs Regarding Responsibilities for Teaching ELL Students*

There are opposing beliefs as to who holds the responsibility to develop an ELL student's English language development, the content teacher or the ESOL teacher (Guler, 2020; Hong et al., 2019; Kim, 2020; Lachance et al., 2019). A third belief is that it is a collaborative effort by the general education teacher, the paraprofessionals who provide in-class support for ELL students, the ESOL department, school-based leadership, and district support staff to support English language development (Hong et al., 2019; Kim, 2020; Lachance et al., 2019). Lachance et al. (2019) explored teachers' perceptions of their ELL students and found that they understood and were able to explain their role in the English language development process for their ELL students as a collaborative process. Similarly, Hong et al. (2019) explored teachers' perceptions of their ELL students and found that the teachers who collaborated with paraprofessionals, the ESOL department, and district support staff felt more effective with their teaching abilities. Additionally, teachers who advocate for ELL student education and participate in the second language acquisition process believe their students demonstrate greater learning gains and learn to become advocates for themselves (Hong et al., 2019; Kim, 2020).

Conversely, Guler (2020) conducted a qualitative case study of in-service, K-12 public school teachers of ELL students and found the teachers felt it was the ESOL department's responsibility to teach the students the English language and the general education teacher's responsibility to teach the content, and are therefore not responsible for the ELL students' English language development.

**Second Language Acquisition**

Second language acquisition only occurs after a first language has been learned and utilized, whether in educational or personal settings (Slabakova, 2021). There are five stages of second language acquisition: silent and receptive; early production, emergence of speech, intermediate fluency; and continued development of language (Krashen & Terrell, 1983). During the first stage, silent and receptive, students begin learning vocabulary of the new language, but do not speak it or have a true understanding of the words. In the next two stages, students begin to speak short phrases and then short sentences (Krashen & Terrell, 1983). During the intermediate fluency stage, students learn to write in the second language, speak in complex sentences, and begin thinking in the second language (Krashen & Terrell, 1983). Finally, during the continued development of language stage, students learn the intricacies of the language and can speak, read, and write fluently. Krashen and Terrell (1983) stated it takes a student 2 years to reach the final stage of second language acquisition and up to 10 years to master the new language.

In the local school district, biology is typically taken in a student's sophomore year, when ELL students have already strongly established a primary language other than English (Heineke & McTighe, 2018). Therefore, second language acquisition affects the content learning (Aljumah, 2020; Fan, 2018; Franco et. al., 2020; Heineke et. al., 2019; Lachance, 2018; Lam, 2020; Lee et. al., 2019; Mickan et. al., 2019; Tedick & Young, 2018). Current researchers identified the vital role of setting high expectations, the value of teacher collaboration, and teaching the language with the content, results in enhanced student outcomes and better developed learning (Aljumah, 2020; Fan, 2018; Franco et. al., 2020; Heineke et. al., 2019; Lachance, 2018; Lam, 2020; Lee et. al., 2019; Mickan et. al., 2019; Tedick & Young, 2018).

### *The Role of Setting High Expectations*

When teachers hold high expectations for ELL students, those students perform higher on standardized testing and retain the content information longer (Fan, 2018; Franco et. al., 2020; Heineke et al., 2019; Lam, 2020). In a qualitative study of 25 teachers of ELL students, Fan (2018) found that when students were held to high expectations, their fears for failure lessened as they pushed themselves harder. In a similar qualitative, but longitudinal study, Heineke et. al. (2019), found that when ELL students were held to higher expectations, they retained the content knowledge longer. Heineke et. al. (2019) also found that with high expectations, teachers need to focus on prioritizing the skills and knowledge the students need to master the content and language. Franco et. al. (2020) and Lam (2020) also noted the value in holding high

expectations for ELL students and both found that these expectations need to be supported with specific instructional strategies to enable the students to meet those expectations. Franco et. al. (2020) found that students were better able to meet high expectations when language mapping was implemented for students to visualize their linguistic and content growth. Lam (2020) identified that teachers' high expectations were better met when student-centered learning was the primary method of instruction and students were assessed for learning, rather than assessment of learning. Regardless of the instructional strategies recommended, current researchers identified that teachers who hold high expectations for their ELL students see better learning gains for these students (Fan, 2018; Franco et. al., 2020; Heineke et al., 2019; Lam, 2020).

### *The Value of Teacher Collaboration*

When content teachers collaborate with language support paraprofessionals and second language teachers, ELL students demonstrate higher learning gains for the content and for the acquisition of the second language (Aljumah, 2020; Fan, 2018; Franco et. al., 2020; Lachance, 2018; Lee et., 2019). When teachers were actively involved in problem solving activities and able to contribute their struggles and positive experiences with ELL students' learning, the teachers were able to develop stronger, more engaging lessons (Aljumah, 2020; Fan, 2018). Furthermore, Aljumah (2020) found that when content and language acquisition teachers collaborate to develop lessons that incorporate the specific language histories of the ELL students, the students retained the content longer.

Dual language classrooms also improve ELL student learning of the content and the second language (Franco et. al., 2020; Lachance, 2018; Lee et. al., 2019). In dual language classrooms, ELL students and their English-speaking peers learn the content in both English and in a second language, this typically being Spanish in the United States (Guilamo, 2019). Teachers in dual language classrooms also typically have language support from language paraprofessionals and language teachers, requiring extensive teacher collaboration to maintain consistency and to support the language teachers with the content and the content teachers with the language (Guilamo, 2019). Lachance (2018) found that both the English-speaking and ELL students demonstrated stronger mastery of the content in a qualitative case study, as the science content had Spanish-based vocabulary that facilitated the learning of the content for the ELL students and the learning of Spanish for the English-speaking students. In similar studies, Lee et. al. (2019) and Franco et. al. (2020) found that teacher collaboration in dual language classrooms was a necessity for teacher preparedness, student engagement, and improved student learning.

### *Teaching Language with the Content*

It is the responsibility of the content teachers to support ELL learning of the content as well as the learning of the language (Heineke et. al., 2019; Lachance, 2018; Lee et. al. 2019; Mickan et. al., 2019; Tedick & Young, 2018). Heineke et. al. (2019) sought to determine how ELL students can learn science when English was not their primary language and found that teachers who integrate the language and content

improve conceptual learning and highlight the supportive nature of science learning. In a similar qualitative study, Lachance (2018) sought to determine the impact of language in a science classroom and determined that science learning was enhanced when applied to language learning for ELL students. Additionally, second language acquisition is supported when taught along with subject-specific content (Lee et. al., 2019; Mickan et. al., 2019; Tedick & Young, 2018). Mickan et. al. (2019) determined human memory is strongly activated when the process of learning content is applied to the learning experiences of language acquisition. When teachers apply the acquisition of a second language to their subject-specific knowledge, the content learning has more meaning and is retained by the student longer (Lee et. al., 2019; Tedick & Young 2018). Lee et. al. (2019) found that ELL students use language purposefully in a science classroom. Additionally, Tedick and Young (2018) identified that science teachers offer pedagogical knowledge that support the acquisition of a second language.

**Instructional Strategies**

Teachers' use of ELL instructional strategies is directly related to ELL student learning (Estrella et al., 2018; Gupta, 2019; Irby et al., 2018). ELL students need access to specific instructional strategies because they need to learn the content and a second language concurrently (Estrella et al., 2018; Gupta, 2019; Irby et al., 2018; Von Esch & Kavanagh, 2018; Wu et al., 2019). Therefore, this dual need cannot be met without additional supportive instruction. Teachers who effectively use ELL instructional strategies have students who perform higher on standardized assessments, retain the

content longer, progress through the stages of second language acquisition quicker, and are more motivated learners (Ernst et al., 2017; Estrella et al., 2018; Gupta, 2019; Guzman-Orth et al., 2019; Irby et al., 2018; Von Esch & Kavanagh, 2018; Wu et al., 2019).

ELL students learn best with student-centered activities, inquiry-based activities, with intentional student discourse (ISD), and through reciprocal teaching (Casey et al., 2018; Estrella et al., 2018; Garza et al., 2018; Irby et al., 2018; Joseph-Orelus, 2019; Scalise & Clarke-Midura, 2018; Townsend et al., 2018; Von Esch & Kavanagh, 2018; Wu et al., 2019). Studies also indicate that ELL students demonstrate their learning best through performance-based tasks (Ernst et al., 2017; Estrella et al., 2018; Guzman-Orth et al., 2019). In the local school district, there is a requirement for teachers to use ELL instructional strategies routinely, such as student discourse activities and collaborative structures.

### *Student-Centered Instruction*

Lessons that are student-centered rather than teacher-centered lead to better learning and have led to greater learning gains (Garza et al., 2018; Irby et al., 2018; Von Esch & Kavanagh, 2018; Wu et al., 2019). According to Garza et al. (2018) and Irby et al. (2018), student-centered instruction allows ELL students to process their learning by hearing their peers discuss the content and collaborating through their own experiences in a safe, small group setting. While Garza et al. (2018) found ELL students performed better in classrooms using speaking and listening strategies in student-centered

cooperative learning activities as opposed to ELL students learning in teacher-led classes, Irby et al. (2018) found ELL students earned more learning gains on standardized assessments after experiencing frequent student-centered instruction.

Additionally, Von Esch and Kavanagh (2018) and Wu et al. (2019) argued that student-centered learning allows the ELL students to integrate their learning of a second language with the content. Integrating second language acquisition into the science content permits ELL students to demonstrate their learning through their primary language and the secondary language, showing improved understanding of the science content (Von Esch & Kavanagh, 2018; Wu et al., 2019). Von Esch and Kavanagh (2018) also found that teachers who shifted their focus from utilizing different instructional strategies independently to integrating multiple strategies into a single lesson improved ELL student science comprehension. Similar to Von Esch and Kavanagh (2018), Wu et al. (2019) found that integrating multiple strategies improved ELL student learning, but also found that ELL students demonstrated more learning gains when teachers utilized multiple instructional strategies and multiple types of formative assessments, such as reading, writing, and speaking assessments. Although it is required for ELL students to experience student-centered collaborative lessons at least once per week in the local school district, high school science teachers are not utilizing this instructional strategy routinely or consistently.

### *Inquiry-Based Instruction*

Inquiry instruction allows students to learn science through modeling, problem solving and exploration, supporting ELL student learning (Estrella et al., 2018; Joseph-Orelus, 2019; Scalise & Clarke-Midura, 2018; Wu et al., 2019). This type of instruction exposes ELL students to real-world phenomena, allowing them to link prior experiences within their primary language, to new concepts in English and has led to ELL students scoring higher on standardized achievement assessments than ELL students only exposed to direct instruction (Estrella et al., 2018; Wu et al., 2019). Wu et al. (2019) found that ELL students' hand-written science notebooks from both inquiry-based instruction classes and direct instruction demonstrated a significant improvement of science content understanding and promoted science and engineering concept learning, which also improved mathematical conceptual learning (Wu et al., 2019). Scalise and Clarke-Midura (2018) researched the effect of science simulations that directly supported the learning goals and found that these simulations allowed ELL students to explain their understanding of science concepts. In a similar study, Joseph-Orelus (2019) found that instruction that integrates simulations improved ELL student learning of biology concepts by fostering inquiry skills, promoted inquiry skills, and improved scientific literacy for ELL students.

### *Intentional Student Discourse*

ISD occurs when students, given a content-based topic to discuss with a partner or a small group of their peers, is timed, structured with individual roles, and allows every

member to participate in the speaking (Casey et al., 2018; Townsend et al., 2018). ISD has shown to improve ELL student learning of science concepts and retaining that content (Casey et al., 2018; Honeycutt et al., 2014; Townsend et al., 2018). ISD also offers the teacher a more accurate reflection of ELL student learning (Casey et al., 2018) and supports academic language development for ELL students (Townsend et al., 2018). Furthermore, Honeycutt et al. (2014) found that combining ISD with deliberate student scaffolds provides ELL students with critical supports early on in their second language acquisition and as the students' confidence grows with the language, the amount and depth of the scaffolds are reduced, and learning gains grow exponentially.

According to Casey et al. (2018) and Oczkus (2018), reciprocal teaching is a supported ISD instructional strategy that incorporates predicting, questioning, clarifying, and summarizing. The teacher models the techniques for students, and then the students become teachers for their peers, thereby combining ISD and small-group collaborative structures (Oczkus, 2018). Casey et al. (2018) investigated ELL science students' experiences during reciprocal teaching that involved making predictions, summarizing events, creating their own teacher-like questions, and clarifying unknown academic vocabulary using ISD and collaborative structures. Casey et al. (2018) argued that ELL students had an increased understanding of the science content and the second language during the reciprocal lessons and retained the content throughout the school year, but Oczkus (2018) found equal learning gains from ELL students and their English-speaking peers following reciprocal teaching lessons.

### *Performance-Based Assessment*

Performance-based assessment, which measures students' abilities to demonstrate mastery of a concept or learning goal outside the traditional multiple-choice or short answer test. ELL students demonstrated higher-order proficiency in life science performance tasks as opposed to conventional tests (Ernst et al., 2017; Estrella et al., 2018; Guzman-Orth et al., 2019). Both Ernst et al. (2017) and Estrella et al. (2018) investigated ELL students' abilities to apply conceptual knowledge when given performance-based tasks as formative assessments, and Guzman-Orth et al. (2019) investigated how students interacted with the formative tasks as a form of assessment. All three studies found that the students not only performed better on these performance-based formatives, but also on standardized summative assessments as a result (Ernst et al., 2017; Estrella et al., 2018; Guzman-Orth et al., 2019). However, the local school district currently does not utilize performance-based assessments, for summative or formative evaluation.

## Professional Development

Teacher PD is a form of continuing education that occurs throughout a teacher's career to improve instruction and student learning (Popova et al., 2018). There are five phases of PD: building the knowledge foundation; observing examples; reflection; implementing the new knowledge; and collaborating with others (Popova et al., 2018). In the first phase, teachers learn the new topic or strategy and the research that supports its effectiveness. In the second phase, teachers observe models of the practice in action as

examples, allowing the teachers to develop a practical application of the topic (Popova et al., 2018). In the next two phases, teachers are given time to reflect on their own practice and future implementation and to plan to change their practice to incorporate the new strategy (Popova et al., 2018). Finally, teachers are given time to refine their practice after implementation by collaborating with experts or other teachers using the strategy.

Quality PD, including multiple components, affects the likelihood that teachers will implement the learning into their own classroom and the effectiveness of the implementation (Babinski et al., 2018; Li & Peters, 2020; O'Hara et al., 2020; Ralston et al., 2019;). Quality PD for teachers of ELL students can directly affect ELL student learning (Meskill & Oliveir, 2019; Rutherford-Quach et al., 2018). Researchers have indicated that quality PD opportunities for teachers of ELL students include follow-up and on-site coaching, observation and reflection, and teacher collaboration (Babinski et al., 2018; Li & Peters, 2020; Meskill & Oliveir, 2019; O'Hara et al., 2020; Ralston et al., 2019; Rutherford-Quach et al., 2018). In the local school district, teachers have access to PD opportunities for supporting ELL students during the school year and throughout the summer; however, they may still require additional supports.

### *Follow-Up and On-site Coaching*

Teachers need follow-up after attending new PD to ensure they are implementing the new strategy or program correctly and effectively and on-site coaching to improve implementation (Ankeny et al., 2019; Babinski et al., 2018; Meskill & Oliveir, 2019; Li & Peters, 2020; Ralston et al., 2019; Rutherford-Quach et al., 2018). Both Babinski et al.

(2018) and Ralston et al. (2019) found that PD that offered on-site coaching after the initial workshop improved teaching practice and the literacy skills of the ELL students in the teachers' classes. Furthermore, Ralston et al. (2019) found that a cycle of PD workshops, implementing the strategy, more PD, and then on-site coaching improved implementation over traditional PD with follow-up coaching. While Ankeny et al. (2019) and Meskill and Peters (2019) found that on-site coaching improved PD implementation, they determined that pairing a language teacher with the content teacher enhanced the effect of coaching. This practitioner partnership model gave more insight into the learning of ELL students, allowing teachers to utilize differentiated instruction (Ankeny et al., 2019; Meskill & Peters, 2019).

In similar studies, Li and Peters (2020) and Rutherford-Quach et al. (2018), found that follow-up and on-site coaching were necessary but required additional factors to make implementation effective to improve ELL student learning. Immediate implementation of the strategies learned in the PD with frequent formative assessments of ELL student learning are also required to improve learning (Li & Peters, 2020; Rutherford-Quach et al., 2018). However, Li and Peters (2020), included research components for the PD participants to improve teacher implementation, and Rutherford-Quach et al. (2018), required the purchase of a specific company's series of PD that showed an increase in ELL student learning.

### *Observation and Reflection*

Providing teachers with the opportunity to observe effective implementation of the strategies learned in a PD and reflect on the strategies are also components of quality PD (Irby et al., 2018; Meskill & Oliveir, 2019; O'Hara et al., 2020; Ralston et al., 2019). Allowing teachers to observe effective implementation of new strategies learned from a PD improved the teachers' own implementation (Irby et al., 2018; O'Hara et al., 2020; Ralston et al., 2019). Irby et al. (2018) found that PD that provided teachers the ability to observe effective implementation and time to reflect on these observations, the methods of the PD were not discussed, whereas Ralston et al. (2019) explicitly described the methods and additionally found an increase in teacher efficacy because of the PD. Additionally, PD that provided time for teacher reflection allowed teachers to grow as educators, leading to improved ELL student learning (Meskill & Oliveira, 2019; O'Hara et al., 2020). Although O'Hara et al. (2020) focused only on novice teachers, Meskill and Oliveira's (2019) included novice and experienced teachers, showing a major paradigm shift from two independent studies. Ultimately, PD that incorporates detailed times for teachers to reflect on their own learning and reflect on the observations of effective implementation lead to consistent and effective practices that improve ELL student learning (Meskill & Oliveira, 2019; O'Hara et al., 2020; Ralston et al., 2019).

### *Teacher Collaboration*

Another component of quality PD is to build teacher collaboration time into the framework or provide teachers the time to collaborate during the PD (Babinski et al.,

2018; Hiatt & Fairbairn, 2018; Meskill & Oliveir, 2019; Ralston et al., 2019). Current researchers who investigated how to improve PD for ELL teachers found that teacher collaboration time not only increased the teachers' willingness to use the strategies, but also plan to use them in future lessons, even when their first attempt at implementation did not demonstrate the expected learning outcome (Babinski et al., 2018; Hiatt & Fairbairn, 2018; Ralston et al., 2019). Teachers felt more comfortable failing at implementation when they knew they were able to collaborate with their peers afterwards to improve their future practice (Babinski et al., 2018; Ralston et al., 2019). Although Ralston et al. (2019) found that teachers who were given time to collaborate and plan together before trying the new strategy experienced a more positive initial implementation, Babinski et al. (2018) found that teacher collaboration time needed to continue throughout the year to fine-tune the facilitation of the strategy for it to positively affect ELL student learning. Additionally, PD that provided time for teacher collaboration frequently and routinely, regardless of when the collaboration time began, improved the frequency of teacher practice, leading to improved ELL student learning (Hiatt & Fairbairn, 2018; Meskill & Oliveir, 2019). Furthermore, Meskill and Oliveir (2019) found that PD that encouraged teachers to collaboratively design and debrief on the use of the new strategy fostered an environment that allowed teachers to grow as professionals, ultimately positively affecting ELL student learning.

## Summary and Conclusions

A review of current literature identified several themes regarding teacher self-efficacy, teachers' perceptions of ELL students, second language acquisition, instructional strategies, and PD. One theme is that teachers' self-efficacy affected student learning (Cho et al., 2020; Clark, 2020; Cruz et al., 2020; Glock et al., 2019; Malo-Jurera et al., 2018; Montoya, 2018; Thomas et al., 2020; Whitaker & Valtierra, 2018; Yough, 2019). Several factors influenced teachers' self-efficacy including the availability of ongoing support; learning about the students' and the community's culture; building relationships with students; the teacher's own experiences and struggles with learning; and the amount of experience the teachers have in the field of education (Cho et al., 2020; Clark, 2020; Cruz et al., 2020; Glock et al., 2019; Malo-Jurera et al., 2018; Montoya, 2018; Thomas et al., 2020; Whitaker & Valtierra, 2018; Yough, 2019). Another theme was that teachers' perceptions of ELL students had an impact on both instruction and learning (Byfield, 2019; Garcia et al., 2019; Giles & Yazan, 2020; Guzman-Orth et al., 2019; Hong et al., 2019; Kim, 2020; Lachance et al., 2019). Current researchers identified that these perceptions included teacher biases towards ELL students and a low importance for implementing student culture and specific instructional strategies in their lessons (Byfield, 2019; Garcia et al., 2019; Giles & Yazan, 2020; Guler, 2020; Guzman-Orth et al., 2019; Hong et al., 2019; Kim, 2020; Lachance et al., 2019; Santibanez & Gandara, 2018; Wood et al., 2018). More so, researchers were conflicted on whose responsibility it is to facilitate ELL students' language learning: the ELL department or

the general education teachers (Guler, 2020; Hong et al., 2019; Kim, 2020; Lachance et al., 2019).

An additional theme was that second language acquisition affected content learning (Aljumah, 2020; Fan, 2018; Franco et. al., 2020; Heineke et. al., 2019; Lachance, 2018; Lam, 2020; Lee et. al., 2019; Mickan et. al., 2019; Tedick & Young, 2018). Current researchers found that when content teachers held high expectations for ELL students, collaborated with language acquisition teachers, and taught the language with the content, student outcomes and learning improved (Aljumah, 2020; Fan, 2018; Franco et. al., 2020; Heineke et. al., 2019; Lachance, 2018; Lam, 2020; Lee et. al., 2019; Mickan et. al., 2019; Tedick & Young, 2018). Another theme was teachers' use of ELL instructional strategies was directly related to ELL student learning (Estrella et al., 2018; Gupta, 2019; Irby et al., 2018). Researchers discovered that ELL students learned best with student-centered activities, inquiry-based activities, with ISD, and through reciprocal teaching (Estrella et al., 2018; Gupta, 2019; Irby et al., 2018; Von Esch & Kavanagh, 2018; Wu et al., 2019). Researchers also indicated that ELL students demonstrate their learning best through performance-based tasks (Ernst et al., 2017; Estrella et al., 2018; Guzman-Orth et al., 2019). The final theme showed that quality PD for teachers of ELL students can directly affect ELL student learning. Quality PD opportunities for teachers of ELL students included follow-up and on-site coaching, observation and reflection, and teacher collaboration (Babinski et al., 2018; Li & Peters,

2020; Meskill & Oliveir, 2019; O'Hara et al., 2020; Ralston et al., 2019; Rutherford-Quach et al., 2018).

Although researchers have shown what teacher-related factors can affect ELL student learning and which instructional strategies improve ELL student learning, no literature on teachers' experiences when implementing the instructional strategies that help ELL students learn in high school biology currently exists. Research into these experiences to determine successes, challenges, and need for supports could provide administrators and other teachers of ELL students with information specifically related to this issue.

Contained in this chapter was an explanation of the literature search strategy, the conceptual framework that guided this study, a literature review related to teacher self-efficacy, teachers' perceptions of ELL students, second language acquisition, instructional strategies, and PD. In Chapter 3, I discuss the basic qualitative study research design and rational, the role of the researcher, the methodology, and addressed issues of trustworthiness.

# Chapter 3: Research Method

The purpose of this qualitative study was to explore teachers' successes, challenges, and need for supports when facilitating high school biology instruction using the required strategies of student discourse and collaborative structures for their ELL students. In this chapter, I describe the research design and rationale and my role as the researcher. I also describe the methodology I used for this study, including the participant selection logic; the instrumentation that was used; the procedures that were used for recruitment, participation, and data collection; and the data analysis plan. The chapter concludes with discussion of issues of trustworthiness and a summary.

## Research Design and Rationale

Qualitative research centers on observing and describing a phenomenon, requiring analysis of participants' behaviors and perspectives (Burkholder et al., 2019). For researchers to analyze behavior and perspective, they must incorporate their own perspectives into the analysis. Qualitative data describe people's life experiences and offers potential meanings to them (Denzin & Lincoln, 2018). The RQs and the conceptual framework underpinned this study. Additionally, I developed the RQs based on the conceptual framework and the literature review. This section includes the RQs, a rationale for the research design, and considerations of other designs.

### Research Questions

The purpose of this qualitative study was to explore teachers' successes, challenges, and need for supports when facilitating high school biology instruction using

the required strategies of student discourse and collaborative structures for their ELL students. The RQs for this study were as follows:

RQ1: What are teachers' successful experiences facilitating high school biology instruction using the required instructional strategies of student discourse and collaborative structures for their ELL students?

RQ2: What challenges have teachers experienced when facilitating high school biology instruction using the required instructional strategies of student discourse and collaborative structures for their ELL students?

RQ3: What supports are still needed for teachers when facilitating high school biology instruction using the required instructional strategies of student discourse and collaborative structures for their ELL students?

**Rationale for Research Design**

The research approach for this study was qualitative. This approach was appropriate because qualitative research involves an understanding of how people interpret their own experiences to give them meaning (Merriam & Grenier, 2019) and relate these interpretations to the world (Denzin & Lincoln, 2018). According to Merriam and Grenier (2019), the meaning of perceptions is not discovered but is created from experiences. I selected the qualitative approach for this study because I focused on the experiences and perceptions that high school biology teachers attributed to how they support ELL students using student discourse and collaborative structures. The qualitative approach included open-ended interview questions to explore the teachers'

experiences in the natural setting of their classrooms (see Creswell & Guetterman, 2019). Qualitative researchers use interviews as the tool for data collection (Merriam & Grenier, 2019). Qualitative researchers also focus on the experiences of human beings, rather than calculations of collected data (Burkholder et al., 2019). The foundations of qualitative research are constructivist or interpretive. A constructivist believes there is no one truth as everyone subjectively constructs their own truth (Burkholder et al., 2019). Therefore, the qualitative approach was most suitable for my study, as it involved the experiences of the specified teachers using the instructional strategies, as opposed to a statistical calculations of standardized assessment results.

To address the RQs in this qualitative study, I conducted a basic qualitative inquiry of the experiences of high school biology teachers of ELL students in a local school district, using semistructured interviews. This study was best suited to a basic qualitative inquiry approach because it required an investigation into a real-world context and pertained to a specific situation that can inform other situations (Denzin & Lincoln, 2018). Interviews were the sole type of data collection. A basic qualitative inquiry approach can be used to answer the following questions: how can the experience of a circumstance be described or explored?, what is the meaning of a process to the target individual(s) of interest?, and what practical knowledge can be learned? (Kostere & Kostere, 2021). The purpose of this study was to explore high school teachers' experiences facilitating student discourse and collaborative structures for ELL students in biology. The study purpose aligned with the type of questions a basic qualitative inquiry

approach typically addresses. Additionally, a basic qualitative inquiry approach is appropriate when the participants' experiences are not intense ones. Intense experiences may require multiple interviews in a phenomenological frame (Kostere & Kostere, 2021). The basic qualitative inquiry approach was selected based on the conceptual framework of andragogy and PCK and the purpose of the study to explore teachers experiences and perceptions. Other approaches were considered but disregarded. I chose the basic qualitative inquiry approach because it provided a rich description and analysis of the participants' experiences.

**Consideration of Other Designs**

I considered but opted against using other qualitative approaches for this study. The case study method was disregarded because case studies require multiple data sources (typically at least three), data that are collected over a period of at least a few days, and participants who are selected via purposive sampling (Chowdhury & Shil, 2021). Phenomenology was disregarded as the researchers in these studies aimed to explain individuals' lived experiences of a phenomenon, which does not need to be bounded by time and space, like case studies or basic qualitative inquiries (Zahavi, 2018). Additionally, phenomenology requires multiple rounds of interviews and typically involves focus groups (Zahavi, 2018) which may negatively influence how the participants answer questions regarding their experiences and perceptions. The grounded theory method was disregarded as the researcher must collect copious amounts of data to confirm a new theory that is grounded in the field work (Chun Tie et al., 2019).

Furthermore, the ground theory approach was disregarded because the purpose of the study was not to identify a new theory, grounded in fieldwork, that emerged from systematic comparative analysis to explain the data (Chun Tie et al., 2019). The narrative inquiry approach is unique as it provides a description of individuals' storied lives are analyzed using a single-subject study (Gavidia & Adu, 2022). The approach was disregarded as it did not answer the RQs, was not align to the purpose of the study, nor provided enough data to inform social change.

Systems theory is a distinctive approach because the purpose is to identify the structure and patterns and relationships of a system that emerge from interactions among components, thus demonstrating each system is unique (McMahon & Patton, 2018). This approach was disregarded because the purpose of this study was not to explore or determine why the entire system functions as it does. Ethnography research is distinctive as the focus of the central RQ is to describe or interpret a group or culture to decipher cultural meaning (Mohajan, 2018). Therefore, ethnography was disregarded as the purpose of this study was not to describe or interpret a group or culture, but to explore a specific group of teachers' experiences and perspectives. Finally, the interactive participatory qualitative application approach is unique because it involves action research to develop post-positive research for the purpose of effecting immediate positive social change within a specific community (Vaughn & Jacquez, 2020). This approach was disregarded as it would develop a strategy to fix a problem and does not align with the purpose of exploration of why the problem exists.

## Role of the Researcher

A qualitative researcher collects useful data and interprets the data to build meaningful conclusions, both being fundamental as the knowledge gained is created, not identified (Merriam & Grenier, 2019). My role included interviewing the participants, developing the procedure for recruiting participants, and acting as the primary instrument for data analysis. I interviewed and recorded in verbatim the interviews conducted with the participants using my interview protocol. I interviewed 11 high school biology teachers from four different high schools in the Southeastern region of the United States. Most importantly, I followed Walden University Institutional Review Board (IRB) guidelines for qualitative research.

I have been a high school science teacher for 14 years in the Southeastern region of the United States, teaching biology for 6 of those years and have always been a teacher to ELL students. My current role is a science coach and curriculum specialist, but I have no supervisory role over any teachers, nor am I permitted to conduct any evaluations of the teachers. Although I have worked with many of the participants in the professional setting, I hold no power over their instructional decisions or practice.

As the sole researcher for this study, there were potential biases that may have affected the outcome of this study. From my own personal experiences, I have seen ELL students struggle both with the science content and the acquisition of a second language. I have also seen teachers struggle to facilitate instruction that support ELL students with learning the content and learning English. Teachers of ELL students have expressed these

concerns to me, their administrators, and to the Professional Learning Department faculty. I separated my role as a researcher and my role as a science coach to maintain the trustworthiness of my study. Additionally, these biases were identified and monitored.

Although I work with teachers at the schools where the interviews took place, I do not personally mentor or coach any of the participants. Participants were informed that their participation was completely voluntary and the decision to be interviewed would not affect their teaching position status or the supports they receive as a classroom teacher. Additionally, the participants were informed that none of their responses would be shared with any evaluating administrator or other teachers in the district. I informed the participants that their participation and identification would remain confidential. All participants were assigned a code, such as “Participant 1” and “Participant 2” to ensure confidentiality. At no point was their identity revealed, even after publication. I also maintained physical safeguards during the interview and secured private information from the interviews, including the audio recordings, from unauthorized personnel. These thorough strategies ensured protection of the participants and enhancement of the study.

## Methodology

In this section, a thorough description of the research study is provided. The methodology section includes the participation selection logic, instrumentation, procedures used for recruitment, participation, and data collection, and the data analysis plan. The methodology is described in sufficient depth for a researcher to replicate the study.

**Participant Selection Logic**

The participants for this study were selected from four comprehensive high schools in the Southeastern region of the United States. The four sites are considered comprehensive high schools because they provide education for $9^{th}$-$12^{th}$ grades, students attend each site based on their home address and zones established by the school district, and students graduate with a high school diploma. The four sites were selected because of their high population of ELL students enrolled in high school biology.

I identified potential participants using purposeful sampling. Purposeful sampling allows researchers to align the participant demographics or experiences to the purpose of the study, the RQs, and the type of collected data (Creswell & Guetterman, 2019). My sample size was 11 high school biology teachers from the four sites, approximately 3-4 teachers per site. This size allowed me to compare the teachers' perspectives and determine potential themes (Hennink & Kaiser, 2019). In qualitative research, it is the quality of the analysis of the collected data that matters more than the quantity (Hennink & Kaiser, 2019). Another reason for using purposeful sampling was to gain the most relevant and plentiful data (Creswell & Guetterman, 2019). Data saturation in qualitative research is controversial. Saunders et al., (2019) identified several institutions that require a specific number of data sources to attain saturation, but also stated that time, level of educational program, and the type of qualitative approach affect how many participants are required to achieve saturation. I interviewed 11 teachers to achieve saturation, until no new data became apparent and no new themes emerged (Hennink & Kaiser, 2019).

Inclusion criteria included the target population and the factors that were used to answer the RQ (Denzin & Lincoln, 2018). The inclusion criteria for my study was teachers in the local school district who teach high school biology, are certified in biology, and have taught for at least 2 years. Exclusion criteria are factors of the participants that meet the inclusion criteria but have additional characteristics that make the participant ineligible to participate in the study or would interfere with the success of the study (Denzin & Lincoln, 2018). The exclusion criterion for my study included high school biology teachers that did not have a high population of ELL students in their classroom. Participants were known to meet the criteria from a student demographics breakdown by school, provided on the district's public website. The district gave me consent to conduct my research study once it had been approved by my URR and the IRB.

Participants were identified using the school district's website to identify the schools with the highest population of ELL students. Then, the principal of each school was contacted by email to give consent for the study to be conducted on their campus and to determine which of the biology teachers met the criteria. These identified teachers were contacted via email to invite them to participate in my study. After receiving notice from these educators that they were willing to participate, I emailed them the IRB's Office of Research and Compliance's Informed Consent verbatim. Once I received the "I consent" response from the participants, I set up interview locations, dates, and times with the participants.

**Instrumentation**

I conducted semi-structured interviews to learn about the participants' beliefs and experiences and provided some structure with an interview protocol that still allowed for probing and follow-up questions (DeJonckheere & Vaughn, 2019). I used an interview protocol and two separate audio-tape recorders as my data collection instruments. The interview protocol was researcher-produced and aligned to the conceptual framework and the RQs. My interviews took place in person. One benefit to in-person interviews is there is no delay between question and answer so both the interviewer and the participant can react verbally or nonverbally to one another (Johnson et al., 2019). Another benefit is that the participants' responses are more natural and genuine, as they have less time to reflect on their responses (Johnson et al., 2019). This type of interview requires a well-planned interview guide or protocol as opposed to other interview formats because the interviewer may need to restructure or develop prompts on the spot if the questions were not clear in addition to taking notes during the interview (Johnson et al., 2019). Although this was the case, I recorded the interviews so I did not need to take diligent notes, and I practiced interviewing using my questions to correct any problems that may have arisen during the actual interviews.

Interview protocols are developed so interviewers remember to provide all the important information they want and need to share with their participants (Jimenez & Orozco, 2021). I chose to begin the interview questions with demographic questions that are easier to answer to warm up the participants and build trust (Jimenez & Orozco,

2021). I also decided to include some prompts or probes to allow for unexpected data to emerge (Jimenez & Orozco, 2021). I worded my questions as clearly and unambiguously as possible to ensure my participants understand the question, even at the risk of sounding slightly repetitive (Merriam & Grenier, 2019).

My interview protocol included an opening or introductory statement, the interview questions aligned to the RQs and conceptual framework, closing questions, and a closing statement. I began the interviews with an explanation of the purpose of the interview, how long the interview would approximately take to complete, a reminder that they could stop the interview at any time, and asked them if they have any questions before we began (Creswell & Guetterman, 2019). The interview questions I asked were open-ended to explore the teachers' experiences in the natural setting of their classrooms (Creswell & Guetterman, 2019). Some of the interview questions included probing questions to ensure I had a more complete sense of the teachers' experiences (Merriam & Grenier, 2019). The closing questions asked the participants if they had anything else they would have liked to add and the closing statement thanked them and informed them I would contact them to have them verify that I had captured their perspectives accurately. The Appendix contains the interview questions and potential probing questions I used to ensure my focus on teachers' experiences of facilitating student discourse and collaborative structures to their ELL students in high school biology.

**Procedures for Recruitment, Participation, and Data Collection**

The participants for this study were recruited from four high schools and were selected from the inclusion criteria that they are certified to teach biology, they have been teaching for at least 2 years, and they currently teach biology. The four high schools were selected because they all have a high population of ELL students enrolled in high school biology. Then, the principal of each school was contacted by email to give consent for the study to be conducted on their campus and to determine which of the biology teachers meet the criteria. I used the schools' public websites to obtain these identified teachers public email addresses and then emailed the teachers to invite them to participate in my study. This email included an invitation and the IRB's Office of Research and Compliance's Informed Consent, verbatim. Once I received the "I consent" response from the participants, I set up interview locations, dates, and times with the participants via email. When I collected consent from more than the 10-12 necessary participants, I emailed the extra participants that I had enough teachers to interview, but I would keep them in the participant pool in the case that someone dropped out or became ineligible to participate.

I gave my participants choice in where the interviews would take place, but all locations were in places with little distractions and free from administrative or student involvement (Meriam & Grenier, 2019). Once the locations of the interviews had been identified, I scheduled the interviews with the participants via email on a day and time that was amenable to both the participants' and my schedules. If the location required a

reservation, that was also incorporated in scheduling the day and time of each interview. The interviews required 45-60 minutes to complete, so I did not conduct more than one interview in a single day to ensure I, as the researcher, did not fatigue or overextend my observational abilities (Creswell & Guetterman, 2019). Each interview was audio recorded using a smart phone and a separate digital audio recorder as a backup.

After each interview, I thanked the participants for their time, asked how they preferred to be contacted by me for a debrief in the future, and if the need arose, would they be willing to answer any questions I had as a result of my data analysis. I debriefed with them by informing them I would contact them by their preferred method to have them verify that I had captured their perspectives accurately. I also informed them that once the study was completed, I would share the summary/abstract of the dissertation with them.

**Data Analysis Plan**

I was the sole researcher for this study and therefore collected and analyzed the data. As the interview protocol was the only data collection source, it addressed all three RQs. I used a five-phase cycle of organizing, coding, reassembling, interpreting, and concluding to perform a content analysis of the data (Creswell & Guetterman, 2019; Mayring, 2021). I compiled the data by using NVivo to transcribe the audio recording and to determine the codes. To ensure the transcriptions were accurate, I listened to the recordings again as I read along to the typed transcription. The next phase was to code the data, which was breaking down the complied data into smaller parts or codes

(Creswell & Guetterman, 2019). The codes are repeated patterns, phrases or terms that identify significance and alignment to the RQs. In this phase, I coded each interview using within-case analysis or open coding, meaning each interview was coded and analyzed separately (Mayring, 2021; Merriam & Grenier, 2019). As coding the data needed to be repeated in a trial-and-error method as discrepant cases arose until the best codes were identified (Creswell & Guetterman, 2019).

After developing codes, I created categories and themes in the reassembling phase. I used axial coding by rearranging the data to develop categories, or collections of similar data, and then used hierarchal arrays to develop themes (Mayring, 2021). This was followed by the interpreting phase, during which I created a new narrative from the reassembled data using a description strategy (Creswell & Guetterman, 2019). As a novice research and qualitative data analyzer, I ensured my interpretation was complete, fair, empirically accurate, value-added, and credible (Denzin & Lincoln, 2018). I accomplished this by obtaining continuous feedback from my peers and my committee. In the final phase of my data analysis, the conclusion phase, I drew the conclusions from my entire study using the results of all the previous phases (Mayring, 2021). A conclusion is a central statement or statements that bring the findings of a study to a higher conceptual plane and identifies the significance of the study (Creswell & Guetterman, 2019). The conclusion is framed in relation to the three RQs, the andragogy and PCK conceptual framework, and the literature review for my study.

## Issues of Trustworthiness

The trustworthiness of a research study concerns how confident the researcher is that the findings are unbiased and reflect a true representation of the results (McSweeney, 2021). Ensuring trustworthiness of a research study requires specific actions conducted by the researcher to overcome potential issues with translating the results into the findings of the study (Creswell & Guetterman, 2019; Merriam & Grenier, 2019). The issues of trustworthiness in a qualitative study include credibility, transferability, dependability, confirmability, and ethical procedures (Creswell & Guetterman, 2019; Denzin & Lincoln, 2018; Merriam & Grenier, 2019).

### Credibility

Creswell and Guetterman (2019) identified that a credible study's findings are plausible to the participants, and Merriam and Grenier (2019) added that the findings accurately describe the participants' perceptions and ideas. To ensure credibility in qualitative research, the researcher must spend an adequate amount of time and effort with the participants, conduct purposeful observations, triangulate the data collection, and practice peer debriefing and member checks (Creswell & Guetterman, 2019; Merriam & Grenier, 2019). To address credibility, I engaged in prolonged contact with my participants to build their trust and understand their reality. I asked my participants to review my findings to ensure I had accurately captured their perceptions and did not misinterpret their experiences. I also conducted purposeful observations to identify and assess the important themes, to separate the relevant data from the irrelevant data. I

practiced peer debriefing with secondary science educators that were not involved in the study and member checks to ensure the findings are representative of the participants' true perspectives.

**Transferability**

Transferability refers to the ability of a researcher's findings to be applied to other situations or contexts (Merriam & Grenier, 2019). To ensure transferability, the researcher must provide thick description, describing the participants and the context so others can apply the findings to their own situation with enough detail for others to replicate the findings. To address transferability, I collected data from biology teachers at four different high schools in the Southeastern region of the United States with a high percentage of ELL students. With the increasing population of ELL students in the United States and the requirement for students to learn biology, the findings of this study apply to educators and administrators across the country. Additionally, I described the context, the data collection method, and the data analysis in enough detail for others to replicate the study to conclude with similar findings.

**Dependability**

Dependability of a study accounts for changes within the context of the setting and participants, requiring extensive documentation (Merriam & Grenier, 2019). To ensure dependability of my research study, I developed an audit trail. This includes the raw data I collected, records of the process of condensing the data, and the process and results of the data analysis. I also followed my interview protocol during the interviews,

and I took journal notes following each interview. After the interviews were conducted and the data was analyzed, I also asked my participants to review my findings to ensure I had accurately captured their perceptions and did not misinterpret their experiences.

**Confirmability**

Confirmability is the ability to corroborate the interpretation and findings of a research study by addressing the issues of researcher's bias. Denzin and Lincoln (2018) stated that the researcher's background and experiences contribute to bias that can affect the data collection, data analysis, and findings. Additionally, Merriam and Grenier (2019) suggest identifying and explaining these biases to reduce the impact of negatively affecting the researcher's findings. Although I am a teacher in the school district where the study took place, I adhered to the interview protocol and built my audit trail to reduce or prevent bias in my findings. The audit trail guided me to identify potential outliers and continue my data collection until I had developed a normative portrayal.

**Ethical Procedures**

Creswell and Guetterman (2019) identified that ethical considerations and procedures are necessary to maintain research integrity. I conducted ethical procedures to ensure the trustworthiness of my study. These procedures included obtaining approval from the IRB to conduct my study within the proposed site, describing the treatment of the participants, describing the treatment of data, and addressing that I would conduct my research within my own work environment. I applied to the IRB at Walden University to

conduct the study and was given approval, dated July 29, 2022, approval number 07-29-22-0673458.

I did not collect any data until the IRB approved my application to conduct my research. The local school district had given me permission to conduct my study once the IRB approved my application. To address any ethical considerations related to recruitment, I clearly stated to all participants that their participation in my study was completely voluntary and any decision to participate or not to participate would not affect their teaching position status or the supports they may receive as a classroom teacher at their school or in the district. When I emailed the participants my invitation, it included the IRB's informed consent form, and no participant was contacted or interviewed until they consented to every statement in the form. Although I work with teachers at the schools where the interviews took place, I have not personally mentored or coached any of the participants. Additionally, the participants were informed that none of their responses would be shared with any evaluating administrator or other teachers in the district.

I informed the participants that their participation and identification would remain confidential. Although anonymous data offers more protection for participants, the need to interview prevents anonymity. At no point would their identity be revealed, even after publication. I also maintained physical safeguards during the interviews and secured private information from the interviews, including the audio recordings, from unauthorized personnel. These audio files and resulting documentation remain in a

password protected device to which only I have access and would not be stored in any virtual online space. The data will only be kept for 5 years after the publication of my study, at which point it will be completely deleted.

Participants were given a choice of where their interviews took place, but all choices were locations with little distractions and free from administrative or student involvement (Meriam & Grenier, 2019). My study involved minimal risk to the participants as there are no power differentials and participants were notified that they are under no obligation to remain in the study and may have dropped out at any time. There were no incentives given to the participants for their contribution to the study and I was transparent in my invitation that their voluntary participation would be free from any type of compensation.

## Summary

In Chapter 3, I described my proposed research method for my study. This method includes my research design and rationale and my role as the researcher. It also explained the methodology I utilized with my participant section logic, instrumentation, procedures for recruitment, participation, and data collection, and my data analysis plan. I also described the issues with trustworthiness and my plans to address these issues. Chapter 4 discusses my findings from this proposed basic qualitative inquiry study.

# Chapter 4: Results

The purpose of this qualitative study was to explore teachers' successes, challenges, and need for supports when facilitating high school biology instruction using the required strategies of student discourse and collaborative structures for their ELL students. To achieve this purpose, I interviewed 11 biology teachers at four different comprehensive high schools in the local school district. The goal of each interview was to determine participants' perspectives of using these strategies with their ELL students. I inquired about their experiences, including their successes, their perceived challenges, and what they feel they need to improve their practice. The RQs for this study were as follows:

RQ1: What are teachers' successful experiences facilitating high school biology instruction using the required instructional strategies of student discourse and collaborative structures for their ELL students?

RQ2: What challenges have teachers experienced when facilitating high school biology instruction using the required instructional strategies of student discourse and collaborative structures for their ELL students?

RQ3: What supports are still needed for teachers when facilitating high school biology instruction using the required instructional strategies of student discourse and collaborative structures for their ELL students?

In this chapter, I describe the research sites where the interviews took place, relevant participant demographics and characteristics, and the data collection procedures.

The chapter also includes an explanation of the data analysis procedures, including how codes were identified and then developed into categories and themes, and a review of the evidence of trustworthiness. The chapter concludes with the results of the study and a summary of the chapter.

## Setting

I conducted the study at four comprehensive high schools in a local public school district in the Southeastern region of the United States. These schools were selected because they have a high population of ELL students enrolled in biology classes. These schools were also selected because teachers are required to utilize student discourse and collaborative structures in biology classes.

I conducted all 11 of the interviews individually within the teachers' classrooms after students were dismissed for the day, at each teacher's request. No other individuals were present during the interviews to reduce participant anxiety. Interviews were conducted in August 2022 after the Covid-19 pandemic had subsided, and no mask or social distancing was required by the local school district. Although I offered to wear a mask and maintain a six-foot distance, all participants declined these accommodations. I identified no other personal or organizational conditions that may have influenced participants or my interpretation of the study results.

## Demographics

I selected participants from four comprehensive high schools because these schools have high populations of ELL students in their biology classes. Demographic

information about the participants is detailed in Table 1. Each participant was given a participant number to protect their privacy.

**Table 1**

*Participant Demographics*

| Participant no. | No. of years teaching | No. of years teaching ELL students | Level of biology taught | % of ELL students |
|---|---|---|---|---|
| 1 | 10 | 6 | Regular and honors | 55 |
| 2 | 9 | 9 | Honors | 30 |
| 3 | 21 | 4 | Regular and honors | 70 |
| 4 | 20 | 10 | Regular, honors, and sheltered | 90 |
| 5 | 17 | 11 | Honors, regular, AP, and sheltered | 60 |
| 6 | 10 | 10 | Honors and AP | 20 |
| 7 | 14 | 14 | Honors | 25 |
| 8 | 17 | 17 | Honors, regular, and sheltered | 60 |
| 9 | 5 | 5 | Regular, honors, and AP | 50 |
| 10 | 4 | 4 | Regular and sheltered | |
| 11 | 14 | 14 | Regular, honors, and sheltered | 60 |

*Note*. ELL = English Language Learner; AP = Advanced Placement.

I interviewed three biology teachers at three of the comprehensive high schools, and four biology teachers at the fourth high school. Eight of the participants were female, and three were male. Five of the participants were ELLs themselves as adults. Seven of the participants have taught ELL students every year they have been a teacher, but four of the participants have taught years without having any ELL students. The percentage of ELL students in the different teachers' classes ranged from 20% to 90%. Teachers of sheltered classes, those classes that have bilingual or multilingual paraprofessionals

supporting the ELL students' learning of the content, had higher percentages of ELL students, while teachers of honors and Advanced Placement classes had lower percentages.

## Data Collection

For this qualitative study, I interviewed 11 participants face-to-face. The participants had been teaching for at least 2 years, were certified to teach biology, and had a high percentage of ELL students in their classes, as compared to the state and local school district averages. After signing the consent form, each teacher was assigned a participant number to ensure confidentiality and privacy. Before each interview took place, I reviewed the informed consent with the participant and described the purpose of the study. I explained that I would be recording the audio of the interview on my privately owned and password-protected device and I would be the only person listening to the recording. I also reminded each participant that the questions were about their own experiences and there were no right or wrong answers to help ease any potential nervousness and build rapport between the interviewees and myself. Additionally, we agreed upon a hand signal for the interviewees to use in the case they wanted to stop the interview for any reason.

At the request of each participant, I conducted interviews inside each participant's classroom after students had been released for the school day, and no other persons were present during the interviews. Interviews were scheduled for 45 minutes each, and to ensure I did not fatigue as a researcher, only one interview was conducted in a single day.

The 11 interviews were conducted over a period of 3 weeks in August and September 2022.

I recorded each interview on my personal smartphone, which is password protected, and on a separate digital audio recording device as a backup. Before each interview, I tested the devices to ensure that they were operational, and the batteries were fully charged. On both devices, the audio recordings were only labeled with the participant number to maintain confidentiality and privacy.

During each interview, I followed my interview protocol, using my follow-up and probing questions, as needed. The probing questions in the interview protocol were sufficient to clarify responses and obtain more information from the participants. After each question, I gave the participants time to think about their experiences and answered any clarifying questions they had before they gave their responses. I maintained eye contact when asking the participants questions and consciously remained neutral while they responded. None of the participants were interrupted during their interview by outside distractions or disruptions.

There were no variations in interview protocol and data collection plan procedures described in Chapter 3, nor any unusual circumstances encountered during data collection. The participants expressed their happiness to contribute to my study. I thanked each participant for their time and their responses and reminded them that once the study was complete, I would share the abstract of the dissertation with them.

## Data Analysis

I used a five-phase cycle of organizing, coding, reassembling, interpreting, and concluding to perform a content analysis of the data (Creswell & Guetterman, 2019; Mayring, 2021). I organized the data by using NVivo to transcribe the audio recordings. To ensure the transcriptions were accurate, I listened to the recordings again as I read along to the typed transcription. Then, I coded each interview using within-case analysis or open coding, meaning each interview was coded and analyzed separately (Mayring, 2021; Merriam & Grenier, 2019). I read each interview several times to identify initial codes and manually identified these in NVivo using different colored highlighting. During the coding phase, I kept the RQs in view to ensure my codes were aligned to the study. I continued to identify codes in a trial and error method as discrepant cases arose until the best codes were identified.

Discrepant cases are responses that are incongruent with the majority or all the other responses. During the identification of codes, one participant held the belief that ELL students do not need instructional strategies such as student discourse or collaborative structures, but they "just need to figure it out." This idea was determined to have been an outlier, as no other participant held this belief, and it is not supported by the literature review. However, there were several codes that were identified in every interview, including "relationship building" and "positive learning environment."

After developing codes, I created categories and themes in the reassembling phase. I used axial coding by rearranging the data to develop categories, or collections of

similar data (Mayring, 2021). To develop the initial categories, I classified each code according to which RQ it addressed by highlighting the codes in different colors. For example, codes that related to RQ1, the success teachers had experienced when using student discourse and collaborative structures, were highlighted in green. The codes that related to RQ2, the challenges the teachers had experienced, were highlighted in red, and the codes relating to RQ3, the supports still needed, were highlighted in yellow. Then, I drew connections between the green codes separately from the red and yellow codes to create categories. The categories that emerged were "classroom environment," "necessary structures in place," "ongoing support and feedback," and "reflection time." Once the categories were developed, I used hierarchal arrays to develop themes.

This was followed by the interpreting phase, during which I created a new narrative from the reassembled data using a description strategy (Creswell & Guetterman, 2019). I used my conceptual framework and the purpose of my study to guide the development of this new narrative. In the final phase of my data analysis, the conclusion phase, I drew the conclusions from my entire study using the results of all the previous phases (Mayring, 2021). The conclusion was framed in relation to the three RQs, the conceptual framework, and the literature review.

## Evidence of Trustworthiness

The trustworthiness of a research study conveys how confident the researcher is that the findings are unbiased and reflect a true representation of the results (McSweeney, 2021). To substantiate evidence of trustworthiness, I implemented the strategies stated in

Chapter 3. The issues of trustworthiness in a qualitative study include credibility, transferability, dependability, confirmability, and ethical procedures (Creswell & Guetterman, 2019; Denzin & Lincoln, 2018; Merriam & Grenier, 2019).

**Credibility**

To ensure credibility in qualitative research, the researcher must spend an ample amount of time and effort with each participant, carry out purposeful observations, triangulate the data collection, and practice peer debriefing and member checks (Creswell & Guetterman, 2019; Merriam & Grenier, 2019). I implemented the strategies for credibility outlined in Chapter 3. I asked my participants to review my findings after the interviews were transcribed to ensure I had accurately captured their experiences and perceptions and had not misinterpreted their experiences. Additionally, I read and listened to the interviews and transcriptions several times to check for possible discrepancies or potential errors in transcription or interpretation.

**Transferability**

Transferability refers to the ability of a researcher's findings to be applied to other situations or contexts (Merriam & Grenier, 2019). To ensure transferability, I interviewed biology teachers at four different comprehensive high schools. Although each high school had a high percentage of ELL students as compared to the state and district averages, the schools had a wide range of different demographics of race, culture, socioeconomic status, and ethnicity. Additionally, I described the context, the data collection method,

and the data analysis in enough detail for others to replicate the study to conclude with similar findings.

**Dependability**

Dependability of a study accounts for changes within the context of the setting and participants, requiring extensive documentation (Merriam & Grenier, 2019). To ensure dependability, I strictly adhered to my interview protocol, and made notes immediately following each interview. I included participants with wide ranges in the number of years teaching, the types of biology classes taught, personal experiences of learning a second language, and differences in how many years they have taught ELL students. After the interviews were conducted and the data was analyzed, I also asked my participants to review my findings to ensure I had accurately captured their perceptions and experiences.

**Confirmability**

Confirmability is the ability to corroborate the interpretation and findings of a research study by addressing the issues of researcher's bias. Denzin and Lincoln (2018) stated that the researcher's background and experiences contribute to bias that can affect the data collection, data analysis, and findings. Merriam and Grenier (2019) suggested identifying and explaining these biases to reduce the impact of negatively affecting the researcher's findings. To ensure confirmability, I conducted my interviews where each participant requested, recorded each interview, and listened to the recordings several times to ensure transcriptions were accurate. I also adhered to my interview protocol

during interviews and associated the identification of codes to the purpose of the study, the conceptual framework, and the RQs.

## Results

After analyzing the data using a five-phase cycle, including a trial-and-error method to identify the best codes, I identified comprehensive themes within the data. Three comprehensive themes emerged for RQ1, and two comprehensive themes emerged from RQs 2 and 3. I have described the emergent themes and supporting data below by RQ. The RQs for this study were as follows:

RQ1: What are teachers' successful experiences facilitating high school biology instruction using the required instructional strategies of student discourse and collaborative structures for their ELL students?

RQ2: What challenges have teachers experienced when facilitating high school biology instruction using the required instructional strategies of student discourse and collaborative structures for their ELL students?

RQ3: What supports are still needed for teachers when facilitating high school biology instruction using the required instructional strategies of student discourse and collaborative structures for their ELL students?

### Research Question 1: Successes

In this section, I present my findings of the successful experiences of the teacher participants. My findings are based on the rich description of these experiences from the teachers, resulting in the comprehensive themes. The themes that emerged for this RQ

were building positive classroom environment and relationships, modeling with examples, and multiple structures put into place.

### *Building Positive Classroom Environments and Relationships*

All the participants discussed a major contributing factor of their positive experiences using student discourse and collaborative structures with their ELL students was attributed to having built a positive classroom environment and strong relationships with the students. Participant 3 described a positive classroom environment as "safe and welcoming" while Participant 6 described it as "a place where students felt it was okay to make mistakes." Several participants recalled their own experiences of being an ELL student and expressed their own memories of how a positive classroom environment made them feel comfortable. Participant 10 explained that teachers need to build a positive environment first because "if we don't have a good environment to teach, then the students don't feel good, and become unwilling to learn." This sentiment was shared by Participant 2 who described the benefit of having a positive classroom environment led to increased student participation and engagement.

The participants also discussed that another major contributing factor to successful experiences using the instructional strategies was since they had taken the time to build strong relationships with the students. Several participants described a strong relationship as one built on "trust" and "fairness." Many of the participants described the benefit of learning about their students' varied cultures, backgrounds, and experiences to build the trust. Participant 7 described how important it is for the students to believe that

their teacher not only understands their backgrounds and experiences, but that they are valued. While Participant 2 added that relationships between teachers and students are even expressed in lesson planning. He claimed,

> They can tell that the teacher of thought about how to make their lives better and how to make it more fun for them. And interesting. It's that's important to me. I really want them to know that I care. I want them to know that I'm working hard because when they know it, they participate for me and when they're participating for me, they learn.

He also noted that when the students felt that he cared about them and for them, they were willing to try harder, give up less, and began taking ownership in their own learning. Participant 9 described how she used time at the beginning of the school year to get to know her students and allowed them to get to know one another. Rather than having students engage in student discourse and collaborative structures about the content, she first had them use the structures to learn about one another. She expressed how this made the students feel better and more willing to participate because they knew the answers, as they were about their personal opinions or characteristics and not new biological concepts.

***Modeling with Examples***

Modeling the instructional strategies with examples using student volunteers emerged as another comprehensive theme as successful experiences from the participants. The participants also discussed a major contributing factor of their positive

experiences using student discourse and collaborative structures with their ELL students was attributed to providing students with explicit modeling of how the structures worked. Participant 6 asked, “how can we expect the students to truly know how to do something unless we show them what it looks like?” And participant 9 added “I am all about demonstration and the science classroom is perfect for that. So, I model, I demonstrate. I show them what the strategy looks like.” Participant 8 went so far as to say, “All educators should use modeling of these strategies to successfully integrate them in lesson delivery and best practices.”

Another reason to model the strategies for students the first few times you use them is to have the ability to use nonverbal movements and visual aids to help the ELL students who are not understanding the instructions. Participant 4 explained,

> Modeling, showing, demonstrating through visuals using nonverbals helps them understand how to use the structure. Tapping into their knowledge of the language and their understanding based on experiences under seeing things and or things that are relevant to them, and then showing them and giving them multiple opportunities to show that they understand whatever the concept is.

Participant 5 provided a similar response, noting that when the teacher models what the activity looks like with volunteer students, the visual learners immediately have a better understanding of the “rules and requirements.” And Participant 11 experienced that modeling the strategies with examples led to students asking clarifying questions,

improving their engagement, and learning when they began to practice using the strategies.

### *Multiple Structures in Place*

Putting multiple structures in place emerged as another comprehensive theme as successful experiences from the participants. Participants describe structures as “specific and explicit instructions,” “assigned student roles,” and “timing the interactions.” Several participants even described how successful using the strategies became when they used online and handheld timers.

Several participants did not realize the importance of the structures until their first experiences using them did not go as expected. Participant 6 described how badly her first experience using student discourse and collaborative structures went in her class,

> I did it wrong first, for quite a while, as it was more than just, you know, talk to somebody next to you. And they were quiet, they didn't understand the directions oftentimes. And so, I slowly build on the what the expectations are, talk to somebody next to you about this topic or ask this question, then answer and then build on that. Initially, when I would do it without structures, they were quiet because they just didn't know what to do or they would be talking about something off topic. Once I got that structure, more of a structure in place, and they understood my expectations, it took off, but I had to put little pieces in place for it to be successful.

Participant 5 had a similar experience when she first used these instructional strategies, but student participation and engagement "drastically increased when I gave them better instructions and assigned them individual speaking roles." Participant 1 also described his experience of the strategies not going "at all as planned until I gave them more rules and specific speaking and listening assignments."

The participants also described how learning improved because of putting these structures in place during student discourse and collaborative structures. They described how shy and timid ELL students can be when talking to a whole class but can feel safer in smaller groups. Participant 8 explained when she "assigned the students to small groups purposefully assigned them a different task for each to complete at a certain time limit, then they took turns in presenting their piece to the group and permitting constructive feedback from them" that the ELL students "had the opportunity to come up with their own answers and recognize their collective mistakes without being targeted. All groups were engaged in the activity and expressed that we do the rest of our assignments in this same format." Participant 1 believed adding structures to the strategies improved learning because "teenagers need rules, they need to know the boundaries and expectations." He explained that assigning roles and using timers provide his students with enough boundaries to learn what they needed to from the activity, but to still demonstrate their own creativeness.

Interview questions 10-14 directly related to RQ1. These interview questions are in the interview protocol (see Appendix). Table 2 includes a summary of the participants'

responses to the interview questions related to RQ1, which was, What are teachers' successful experiences facilitating high school biology instruction using the required instructional strategies of student discourse and collaborative structures for their ELL students?

**Table 2**

*Interview Summaries for Research Question 1*

| Participant | Interview questions | | | | |
|---|---|---|---|---|---|
| | IQ10: Increasing Student Engagement | IQ11: Increasing Student Achievement | IQ12: Improving Student Self-Efficacy | IQ13: Improving Student Self-Direction | IQ14: Other Benefits |
| 1 | Each student getting a turn to talk. | Structures increase learning because teenagers need rules. | With more rules, they felt they could do it. | They are more motivated. | Confidence in their ability to perform. |
| 2 | A positive environment makes them feel safe. | A positive environment leads to better engagement, which leads to better learning. | Once they see it done with examples, they feel they can do it too. | They get to be in charge. | Their feelings about the classroom and that I care about them. |
| 3 | After practice, they know the room is safe and I care about them, so they try harder. | Better engagement leads to better achievement. | When I model it, they know what to do. | Modeling it allows them to be more independent. | They feel safer working in smaller groups than speaking to the whole class at once. |
| 4 | Modeling the strategies leads to clarifying questions. | Modeling helps them relate the content to their culture. | Structures help them relate it to their experiences. | If they feel that I care about them, they are more directed. | Communicatio n skills help them build the new language. |
| 5 | It increases with more structures. | More guidelines lead them to better understanding. | Building relationships with them makes them comfortable. | The more guidelines, the better their self-direction. | They get ownership over their learning after modeling the strategies. |
| 6 | Building a safe environment made it okay to make mistakes. | More structures improved learning. | Talking in small groups builds confidence. | Showing examples of how to do it. | It gives them a network of people to feel safe around. |

(*table continues*)

| Participant | Interview questions | | | | |
|---|---|---|---|---|---|
| | IQ10: Increasing Student Engagement | IQ11: Increasing Student Achievement | IQ12: Improving Student Self-Efficacy | IQ13: Improving Student Self-Direction | IQ14: Other Benefits |
| 7 | Strong relationships showed I valued their background. | Every student has a role and a chance to participate. | After modeling it, they feel better about doing it. | Once the rules are clear, they can direct themselves. | They gain validation when they each get to share their ideas. |
| 8 | They more rules and structures I gave them, the more engagement. | The strategies promote higher-order thinking. | They gain self-awareness when it is a positive environment. | The more structures, the clearer the expectations. | All educators should use modeling to improve learning. |
| 9 | Building relationships improve engagement. | They have the opportunity to think on their own. | Modeling it with lots of rules helps them believe in themselves. | Modeling it empowers them to have self-direction. | They have to feel comfortable and safe in order to try. |
| 10 | Using it to build relationships first improves engagement. | They get to interact and share their understanding. | They get to express and share what they learned. | Showing them the rules first lets them get better to do it alone. | We have to give them a good environment or they won't learn. |
| 11 | After building a safe environment, they feel safe to try new things. | They get to practice without fear of getting it wrong or losing points. | The more rules I gave them, they better they felt about using the strategies. | Modeling the strategies leads to clarifying questions. | Smaller groups speaking is safer to them and they can share more. |

*Note*. IQ = interview question.

## Research Question 2: Challenges

In this section, I present my findings of the challenging experiences of the teacher participants. My findings are based on the rich and full descriptions of the participants' experiences, resulting in the comprehensive themes. The themes that emerged for this RQ were students' negative feelings, and students' lack of motivation.

### *Student Feelings*

The biggest challenge the participants experienced when using student discourse and collaborative structures with their ELL students, was the negative feelings of the ELL students. Participants described these negative feelings as "fear," "judgement," "frustration," and "dumb." The teachers explained that ELL students have fears about speaking in front of their classmates and their accents, mispronunciations, and using the "wrong words" will lead to their classmates judging or teasing them. Participant 4 described an experience when an ELL student spoke out to the class and several students laughed because the ELL student had mispronounced "natural selection,"

> My heart went out to my ELL student because he was excited, he knew the answer and decided to be brave and share his knowledge. After he pronounced the word wrong, he immediately knew it, and when the students started laughing, his shoulders dropped, and he slunk down into his chair. He put his head down and did not participate in the rest of the class. I had already scolded the children for laughing and reminded them that we all make mistakes and that is no reason to

> make someone fell badly, but it was too late. The ELL student was crushed and did not speak out in class again for quite a while.

Similarly, Participant 7 described an experience when one of her ELL students spoke in front of the whole class and when she mispronounced a word, "she immediately sat down and turned red. No one made fun of her or made her feel badly, but she felt dumb, believing her pronunciation of the word meant she wasn't smart."

High school students feel enough pressure about feeling judged or shamed without the added struggle of learning a second language and using it in front of their peers. Participant 10 described his ELL students as "smart, but shy and scared. They don't want to be different." Multiple participants shared experiences about using student discourse and collaborative structures with their ELL students as challenging because the students have experienced being judged and thought to be dumb in large group situations and are still hesitant to speak in smaller groups as well. Participant 3 explained it takes her "several weeks of encouragement and pushing her students to step out of their comfort zones and even say a few words to the smaller groups." This was also expressed by Participant 11 who said, "it takes a while for them to feel safe enough to speak in front of their peers, and even the students who aren't usually shy are still afraid of being teased."

***Student Motivation***

Another challenge the participants experienced when using student discourse and collaborative structures with their ELL students, was a lack of student motivation. The

participants described a lack of motivation as “lazy,” “disconnected,” and “no desire to even try.” Several participants felt that current students and their families do not hold education in high regard, but rather students go to school simply because they must go. Participant 4 stated,

> It depends on the culture. And the valued they have. I had one student, he came in from Guatemala and didn't speak a word of English at all. His parents were both working multiple jobs, and when he left school, he had to watch his little brothers and sisters and do housework. That was what his parents needed and valued, so that is what he valued. Not his education or learning about biology. Biology wasn’t going to help his parents pay the bills. So, it depends on the student’s internal motivation and what values have been given to them.

Similarly, Participant 11 explained a challenge she encountered with an ELL student who simply refused to participate. She attempted to be encouraging and patient, but the student would not speak to his classmates during student discourse or collaborative structure activities, even though she placed him in a bilingual group and allowed him to speak in his primary language. “He had no interest in biology, and the paraprofessional that was in the class to support him explained the student had expressed school is not important, work and money are important.”

Several participants also identified that until they built strong relationship with their ELL students, the students did not try to speak with their peers or would simply put

their heads down the entire class. Participant 3 recalled a student she had that refused to work with other students and speak to them. She explained,

> I encouraged him every day to try, I gave him sentence stems, I even paired him with the nicest or les shy students in my class. But nothing worked, he wouldn't participate. Every morning, I would welcome him into class and smile. I never got mad at him. It seemed that he just had no motivation to try. But I never gave up and when I gave him a birthday card, this was in February and I had him in my class all year, he finally smiled at me. I felt like I broke through and gave him a reason to want to participate in class. His motivation was because he finally saw that I cared about him.

Many of the participants described similar experiences of needing to find the student's internal motivation to get them to want to participate, learn, and speak to their peers.

Interview questions 15 and 16 directly related to RQ2. These interview questions are in the interview protocol (see Appendix). Table 3 shows a summary of the participants' responses to the interview questions related to RQ2, which was, What challenges have teachers experienced when facilitating high school biology instruction using the required instructional strategies of student discourse and collaborative structures for their ELL students?

**Table 3**

*Interview Summaries for Research Question 2*

| Participant | Interview questions | |
|---|---|---|
| | IQ15: Challenges experienced | IQ16: Overcoming the challenges |
| 1 | The students don't want to talk because they feel like they are going to look stupid. | Showing them the class is a safe space opens them up. |
| 2 | The students don't see the value in playing their part because their communication is always on their phones. | You have to make it fun, make them think they are not doing schoolwork but enjoying themselves. |
| 3 | It takes several weeks to make them comfortable enough to speak to their peers. | Building strong relationships helped improve their motivation. |
| 4 | An ELL student shared and was laughed at for her accent and she was humiliated. | It depends on the family values, if they family doesn't value education, the student won't care to participate. |
| 5 | The students are afraid of feeling judged, so they don't want to speak out loud. | Never give up, just keep trying to show them it is a safe space. |
| 6 | The students withdraw and are afraid about being judged. | High expectations and making them feel safe to be vulnerable. |
| 7 | A student mispronounced a word and felt dumb, then would not participate. | I made sure to build a classroom community to ensure all students felt comfortable talking and gave the student some scaffolds. |
| 8 | Many students were still not confident enough to trust their strengths. | Consistency throughout and differentiating the instruction to improve student engagement. |
| 9 | The ELL students are afraid of being judged so they don't want to speak in front of other students. | Having them share in pairs in the beginning and then working up to smaller groups helped. |
| 10 | ELL students don't want to be different; they don't want to stick out with accents or mispronunciations. | It's still about creating positive environment and building good relationships, so they feel safe. |
| 11 | It takes them a while to feel safe and that they won't be teased. | It's about finding the individual student's motivation for wanting to participate and communicate. |

*Note*. IQ = interview question.

## Research Question 3: Need for Supports

In this section, I present the findings pertaining to the need for supports for high school biology teachers to be successful when facilitating student discourse and collaborative structures with their ELL students. Although overall perceptions of the PD provided for teachers for using these instructional strategies were positives, participants shared that there was a lack of follow-up after the workshops. The themes that emerged from the data regarding this RQ were ongoing supports and teachers observing other teachers.

### *Ongoing Supports*

All participants identified that they do not feel they get enough, or any in some cases, ongoing support. They described their experiences as going to the PD and then being expected to "start using it immediately" without follow-up guidance. Participants described ongoing supports as "coaching" and "learning how to use accommodation in class."

Several participants indicated they need more coaching to be better at using the strategies with their ELL students. Even after attending the PD, they felt like they needed someone to show them specifically how to do it, in their classroom, with their students. Participant 8 claimed that "all educators should require extensions and modeling of these strategies to successfully integrate them with their own students." Participant 11 added "it is really specific, intentional examples of how I can use them in my classroom that I need so I can see it working and what makes it work for my students."

The participants also expressed a need for more PD on how to implement the use of accommodations that should be provided for their students. Participant 3 explained "I can use the accommodation like using a dictionary or cell phone in class to translate, I give them more time. But I never took a workshop or professional development for any others." Participant 1 explained that the accommodations he is required to give his students are often vague and he is not always sure how to apply them to biology class. He explained,

> I know what realia is, I can even think of examples like using microscopes to look at plant or animal cells or using salt and shampoo to pull visible DNA out of strawberries. But what about the other topics in biology, we cover so many, I need support from professionals to determine which specific realia would not only be classified as realia, but which are the best to use.

***Teachers Observing Other Teachers***

Several participants also explained that they feel they need to participate in teachers observing other teachers. They described this as the opportunity to have an educator "observe my class and provide me with feedback" and "observe other teachers and provide them with feedback." Additionally, many participants expressed they would like to see teachers who are effective with the strategies, and even those who have not perfected it yet, to identify common mistakes when using the strategies.

Several participants claimed they want teachers, instructional coaches, and ESOL specialists to observe their classroom instruction when using these strategies with their ELL students and provide them with feedback. Participant 7 went so far as to say,

> I have been given the opportunity to have other teachers observe my instruction and give me feedback before with other instructional strategies and that is one of the most successful models to support teachers on reflecting on their teaching practices. That is how I began to improve my instructional strategies. If you observe me and see what I'm doing and this is about some of the experienced teachers saying, 'Well, this is what I did, and it worked with me.' So, I'm going to look at you, I'm going to observe you and I'm going to tell you, well you did this, right. but try this part like that.

Similarly, Participant 9 felt there was an improvement on her practice of using new strategies when she received peer feedback on classroom observations as long as "the teacher will have my best interest in mind and they're not here to destroy my confidence, but to help me get better."

Participants also expressed the need to observe other teachers using the strategies with their ELL students. Participant 5 explained,

> I would love to see teachers who are great at using these strategies with their ELL students so I can not only learn, but see the strategies being effective. I want to see the small details that I have not even thought of, so I can make it better for my own students. But I also want to see teachers who aren't great at it yet. I want the

> nonexample too. I want to watch the students without having to be the teacher of the classroom, to see where things don't go perfectly, to identify the things I should make sure I do not so when using the strategies. Then, I can even share these with the teacher I observed to help them improve their practice as well. It goes both ways; we learn from each other.

Similarly, Participant 2 expressed the need to "see other teachers using them so I can learn how to do it and how not to do it." Additionally, Participant 3 saw a benefit in observing other teachers to "be able to debrief as a whole group in a safe space, to share what we saw that worked and what didn't work so we can all grow and learn together."

Interview Question 17 directly related to RQ3. This interview question is in the interview protocol (see Appendix). Table 4 shows a summary of the participants' responses to the interview question related to RQ3, which was, What challenges have teachers experienced when facilitating high school biology instruction using the required instructional strategies of student discourse and collaborative structures for their ELL students?

**Table 4**

*Interview Summaries for Research Question 3*

| Participant | Interview Question 17: What do you need to be more successful? |
|---|---|
| 1 | Accommodations are vague, I need support for using them in my classroom. |
| 2 | I need to see it in a classroom to know what to do and what not to do. |
| 3 | I want to observe other teachers and then debrief to grow and learn together. |
| 4 | Time to plan, process, and practice implementation . |
| 5 | I want to see them being effective in an actual classroom. |
| 6 | Feedback from my science coach after I use them in class. |
| 7 | After other teachers observed me, I improved with their feedback. |
| 8 | Modeling and extensions should be a requirement for all teachers, but I need support with using specific accommodations. |
| 9 | I want to see it in a classroom so I can decide what I will keep and what I will do differently for my students. |
| 10 | I want someone to give me feedback and ideas for improving my practice throughout the year. |
| 11 | I need specific examples for using it in my room with my students. |

## Discrepant Cases

In qualitative research, discrepant cases are those that present inconsistent data as compared to the other data (Creswell & Guetterman, 2019). No discrepant cases were identified in the findings of my study. Although there were more female participants than male participants, and nearly half of the participants were former ELL students themselves, there were no references made to gender or how being a former ELL student may have influenced the participants' teaching experiences when using the instructional strategies with their students. Five participants did mention that they were former ELL students and that enabled them to empathize with their own ELL students in their classes, however, findings did not show any variance in experiences comparing former ELL student participants to those who were not former ELL students.

## Summary

Chapter 4 included the setting and demographics of the participants in the study. It described the data collection and analysis procedures, including a description of the five-phase cycling approach I used to analyze the data to answer each of the RQs. It included evidence of trustworthiness for the study, relating to credibility, transferability, dependability, and confirmability. The results section was organized by RQ, and each question was answered based on the data analysis and were guided by the conceptual framework and literature review.

The successful experiences high school biology teachers have had using student discourse and collaborative structures for their ELL students are when they have built

positive classroom environments and string relationships with their students, when they model the strategies using examples, and when they implement explicit and specific structures. The challenging experiences the teachers have had using these strategies with their ELL students include negative student feelings and a lack of student motivation. Finally, high school biology teachers using these strategies need ongoing feedback and support. They also want opportunities to observe other teachers' instruction and have other teachers observe them and provide feedback.

Chapter 5 includes a description of how the findings extend knowledge in education and an interpretation of the findings. It also describes the limitations of the study and recommendations for further research. Finally, it presents the potential impact for positive social change.

# Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this study was to explore teachers' successes, challenges, and need for supports when facilitating high school biology instruction using the required strategies of student discourse and collaborative structures for their ELL students. To address the RQs in this qualitative study, I conducted a basic qualitative inquiry of high school biology teachers of ELL students in a local school district. To gather data, I conducted semistructured interviews. This study was best suited to using a basic inquiry approach as it required an investigation into a real-world context, and it pertained to a specific situation that can inform other situations (see Denzin & Lincoln, 2018).

Although there is an abundance of research that demonstrates that student discourse and collaborative structures improve ELL student learning (Casey et al., 2018; Estrella et al., 2018; Garza et al., 2018; Irby et al., 2018; Joseph-Orelus, 2019; Scalise & Clarke-Midura, 2018; Townsend et al., 2018; Von Esch & Kavanagh, 2018; Wu et al., 2019), there is little research supporting teachers' experiences using these strategies. This study may advance knowledge in the field of education by addressing a gap in the literature on teachers' experiences when applying instructional strategies that help ELL students learn in high school biology. In addition, the study may have implications for educators' professional practice as it provides insights on effective instructional strategies.

Findings indicate that when high school biology teachers built positive classroom environments and relationships, modeled the strategies for students with examples, and

put multiple structures into place, the teachers' experiences were positive and successful. Findings also indicated that the teachers' challenging experiences related to students' negative feelings and students' lack of motivation when using the strategies. Finally, findings indicate that the need for supports for teachers are ongoing support and opportunities to observe other teachers.

## Interpretation and Findings

In this section, I present the interpretation of the findings of the three RQs for this basic qualitative study. The themes identified from the collected data were building positive classroom environment and relationships, modeling with examples, putting multiple structures into place, addressing students' negative feelings, addressing students' lack of motivation, providing ongoing supports, and observing other teachers. These themes confirm and extend knowledge in the discipline when compared to the literature review and the conceptual framework. In this section, I describe how the themes for each RQ connect to current literature and the framework.

### Research Question 1: Successes

The three themes that emerged for RQ1 were building positive classroom environment and relationships, modeling with examples, and putting multiple structures into place. The importance of building positive classroom environments and relationships with students is confirmed by previous researchers. Many U.S. teachers do not implement student culture into lessons because they do not see the value culture can have in education for students with different ethnicities than their own (Byfield, 2019; Giles &

Yazan, 2020; Hong et al., 2019; Wood et al., 2018). According to the data collected, the participants had successful experiences with their students when the classroom environment was positive, and they felt they were valued for their differences. Byfield (2019) found that teachers who reflect on their teaching and their perceptions of students' culture improved ELL learning and overall classroom instruction. When teachers broaden their views and learn to incorporate content that students' value into their lessons, they are better able to assist students in improving their learning (Byfield, 2019; Giles & Yazan, 2020).

Findings from this study extend the knowledge about teachers' successes using student discourse and collaborative structures relating to modeling with examples. According to Garza et al. (2018) and Irby et al. (2018), these instructional strategies allow ELL students to process their learning by hearing their peers discuss the content and collaborating through their own experiences in a safe, small group setting. However, several participants noted that their successful experiences occurred only after they modeled how to do the strategies for the students and allowed students to practice them with relationship-building topics before using them with the content.

Findings from this study are consistent with those of Von Esch and Kavanagh (2018), who found that teachers who shifted their focus from utilizing different instructional strategies independently to integrating multiple strategies into a single lesson, by increasing the procedures and structures in place, improved ELL student science comprehension. Like Von Esch and Kavanagh, Wu et al. (2019) found that

increasing the procedures in place when utilizing these strategies improved ELL student learning. However, the findings from this study indicate that specific structures need to include assigning students with specific roles and using timers to keep the student on task and engaged.

Shulman (1987) identified in his theory of PCK that there are learning implications that may be associated with the specific content and the choice of instructional strategies. The findings from this study confirm Shulman's in that the successes the participants experienced related to how they presented the content, for example, in a safe space and with multiple structures in place. The themes that emerged from this RQ are both confirmed by current literature and connected to the conceptual framework.

**Research Question 2: Challenges**

The two themes that emerged from RQ2 were students' negative feelings and students' lack of motivation. Participants who described overcoming the students' negative feelings did so by building relationships with students. Garza et al. (2018) found ELL students performed better in classrooms using speaking and listening strategies in student-centered cooperative learning activities in small groups as opposed to ELL students speaking to the whole class in teacher-led classes. Irby et al. (2018) found that ELL students earned more learning gains on standardized assessments after experiencing frequent student-centered small-group collaborative structures. The findings from this study indicate that small-group instruction allowed teachers to build relationships within

their classrooms and smaller group settings lessened the student's negative feelings associated with speaking in front of their peers.

However, the study also allowed me to identify that finding a student's motivation for wanting to participate and learn helped teachers overcome their challenges with student motivation, thus extending the knowledge in current literature about what challenges teachers encounter. Several participants felt that current students and their families do not hold education in high regard, but rather students go to school simply because they must go. Many of the participants described experiences of needing to find the student's internal motivation to get them to want to participate, learn, and speak to their peers.

Knowles' theory of andragogy (1973) describes how adult learning improves when the emphasis is on the process of the learning, not simply the content of the learning. The participants' biggest challenges were not related to the content of the instructional strategies, or the content of their adult learning of what the strategies involved. The challenges were related to the process of how to get students motivated and confident enough to participate, putting the importance, or emphasis, on the process of the learning.

**Research Question 3: Need for Support**

The two themes that emerged from RQ3 were ongoing support and teachers observing other teachers. Recent researchers have shown that quality PD opportunities for teachers of ELL students include follow-up and on-site coaching, observation and

reflection, and teacher collaboration (Babinski et al., 2018; Li & Peters, 2020; Meskill & Oliveir, 2019; O'Hara et al., 2020; Ralston et al., 2019; Rutherford-Quach et al., 2018). The findings from this study confirm findings in current research as both emergent themes are included in the characteristics of quality PD.

Participants expressed their desire to receive feedback from their fellow teachers and instructional coaches. And recent researchers identified that PD that incorporates detailed times for teachers to reflect on their own learning and reflect on the observations of effective implementation led to consistent and effective practices that improve ELL student learning (Meskill & Oliveira, 2019; O'Hara et al., 2020; Ralston et al., 2019). Additionally, nearly every participant expressed the need for opportunities to observe other teachers using the strategies. Researchers have found that allowing teachers to observe effective implementation of new strategies learned from a PD improves the teachers' own implementation (Irby et al., 2018; O'Hara et al., 2020; Ralston et al., 2019).

Although researchers have identified findings that are confirmed by the findings in this study, this study also extends current researchers' findings. The findings from this study indicate that teachers also need support with including accommodations for students in their instructional strategies. Participants expressed their understanding of what accommodations are and the value of them, but they feel they need examples of them, specific to biology. Many participants want support for developing these

accommodations for more abstract topics in biology that do not have concrete realia associated with them.

Knowles (1973) claimed in his theory of Andragogy that learners become less dependent as they age, but this dependence is related to self-motivation and requiring less direct instruction (Hiatt & Fairbairn, 2018). Teachers still need to experience the application of the concepts of collaborative instruction and intentional student discourse to teaching for them to learn best practices and effective implementation. The data from this study supports this as one of the emergent themes was teachers observing other teachers.

## Limitations of the Study

The purpose of this qualitative study was to explore teachers' successes, challenges, and need for supports when facilitating high school biology instruction using the required strategies of student discourse and collaborative structures for their ELL students. This study was limited by small sample size, possible participant bias in answers, and subjectivity. Small sample sizes prevent generalizations in qualitative research (Creswell and Guetterman, 2019), but this study did not attempt to generalize findings, only to explore teachers' experiences for potential transferability to other school districts. The possibility of participant bias in their answers was managed by creating open-ended interview questions and by wording the questions differently to improve participant engagement (Creswell & Guetterman, 2019; McSweeney, 2021). Researchers can exhibit subjectivity through bias based on the researcher's previous experiences

(Merriam and Grenier, 2019). As a former biology teachers of ELL students, I had to overcome potential subjectivity through bias. To accomplish this, during the analysis of interview answers, I implemented procedures such as the audit trail and adhered to my interview protocol. These strategies were explained further in Chapter 3.

## Recommendations

Although this study identified new information regarding teachers' experiences using student discourse and collaborative structures, future research is recommended based on this study's results and the literature reviewed in Chapter 2. The first recommendation is to consider using a mixed-method approach to explore both the teachers' perceptions of the successes, challenges, and supports still needed and collect quantitative data to identify what implementation of the strategies was most effective for improving ELL students' biology scores on the state-required EOC. Combining qualitative and quantitative data allows the researcher to better understand the connections between the types of data (Burkholder, 2019). This could lead to a more encompassing understanding of the problem, improving the quality of the existing body of knowledge, and potentially lead to narrowing the gap between the academic achievement of ELL students and their non-ELL peers.

Another recommendation is to replicate this study in a different public-school district in the Southeastern region of the United States and compare the results and conclusions to this study. More insight into teachers' experiences would build the quantity of collected data, leading to a more accurate depiction of the successes,

challenges, and need for support among high school biology teachers of ELL students. More data could lead to a generalization of findings, which could positively impact more educators.

The final recommendation is to conduct a study like this but incorporate ELL student perceptions as well. The ELL students could provide insight into what works best for them, how they feel successful when using student discourse and collaborative structures and what they feel is the challenge to learn using the strategies. Including ELL students' perceptions could potentially recognize gaps this study did not identify.

## Implications

The purpose of this qualitative study was to explore teachers' successes, challenges, and need for supports when facilitating high school biology instruction using the required strategies of student discourse and collaborative structures for their ELL students. As the ELL student population is increasing in the United States, conducting this study in a school district with an ELL population higher than the national average allows the findings to apply to other districts with high populations of ELL students and the findings could identify the changes that need to take place to improve ELL student learning. On a more local scale, the process of interviewing the teachers could have the caused the participants to reflect on their own practice and pedagogy directing them to begin making positive changes to improve their instruction of their own ELL students when using student discourse and collaborative structures.

This study could also lead to positive social change as it identified central themes as to the types of support teachers still need to improve ELL student learning. By identifying what supports are still needed through the experiences and perspectives of teachers, the study has contributed to new understandings and insights for improving instruction and therefore student learning. Furthermore, these new insights and understandings could guide administrators and other key stakeholders what specific steps need to occur to improve teachers use of student discourse and collaborative structures. The school district already requires use of these strategies and therefore has identified that the strategies have been proven to improve ELL student learning. Understanding what could improve the use of the strategies could certainly lead to positive social change through an improvement of ELL student learning.

## Conclusion

The purpose of this qualitative study was to explore teachers' successes, challenges, and need for supports when facilitating high school biology instruction using the required strategies of student discourse and collaborative structures for their ELL students. The themes that emerged from a five-phase cycling data analysis were building positive classroom environment and relationships, modeling with examples, multiple structures put into place, students' negative feelings, students' lack of motivation, ongoing supports, and teachers observing other teachers. These themes were analyzed and interpreted in the content of the three RQs, recent research of current literature and the conceptual framework of the theory of andragogy and the PCK theory.

Current researchers have focused on teacher self-efficacy (Cho et al., 2020; Clark, 2020; Cruz et al., 2020; Glock et al., 2019; Malo-Jurera et al., 2018; Montoya, 2018; Thomas et al., 2020; Whitaker & Valtierra, 2018; Yough, 2019), teachers' perceptions of ELL students (Byfield, 2019; Garcia et al., 2019; Giles & Yazan, 2020; Guler, 2020; Guzman-Orth et al., 2019; Hong et al., 2019; Kim, 2020; Lachance et al., 2019; Santibanez & Gandara, 2018; Wood et al., 2018), second language acquisition (Aljumah, 2020; Fan, 2018; Franco et. al., 2020; Heineke et. al., 2019; Lachance, 2018; Lam, 2020; Lee et. al., 2019; Mickan et. al., 2019; Tedick & Young, 2018), instructional strategies that improve ELL student learning (Casey et al., 2018; Estrella et al., 2018; Garza et al., 2018; Irby et al., 2018; Joseph-Orelus, 2019; Scalise & Clarke-Midura, 2018; Townsend et al., 2018; Von Esch & Kavanagh, 2018; Wu et al., 2019), and PD (Babinski et al., 2018; Li & Peters, 2020; Meskill & Oliveir, 2019; O'Hara et al., 2020; Ralston et al., 2019; Rutherford-Quach et al., 2018). However, the findings of this study confirm the conditions necessary for ELL students to have an improved learning experience and a better understanding of the scientific concepts in a high school biology class and the next steps to be taken to better support teachers utilizing the required instructional strategies of student discourse and collaborative structures. Findings from this study have the potential to improve teachers' practice of these instructional strategies to improve ELL student learning and narrow the achievement gap between ELL students and their non-ELL peers.

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# Appendix: Interview Protocol

Hello, my name is Chrissy Brouwer. Thank you so much for your willingness to share your time, experiences, and thoughts with me today. As you know, the purpose of this interview is to better understand your experiences with successes, challenges, and supports still needed when facilitating high school biology instruction using the required strategies of student discourse and collaborative structures for their ELLs. Your privacy will be protected throughout the research process and no names will be used. Files will be stored on a private external drive which will be stored in a locked location and files will be password protected. This interview should last about 45 minutes. Do you have any questions? Are you ready to begin?

**Demographic Questions**

1. How many years have you been teaching?
2. How many years have you been teaching ELL students?
3. What levels of biology do you teach?
4. What percentage of your classes have been ELL students?
5. What types of ELL students are in your classes: NES, LY, LF, LZ?

**Interview Questions**

6. One a scale of 1-5, 5 being the highest, how important do you think it is to teach using student discourse and collaborative structures?
7. What is your understanding of the best practices for teaching English Language Learners?

8. How were you prepared to teach ELL students?
    a. Probes: what professional development workshops have you taken; what college courses did you complete related to ELL students
9. What is your understanding of student discourse strategies required in biology classes?
10. What is your understanding of the collaborative structures required in biology classes?
11. How were you prepared to facilitate instruction using student discourse and collaborative structures?
12. What prompted you to learn about student discourse and/or collaborative structures?
13. How comfortable are you with implementing student discourse and collaborative structures?
14. Think about a time when you used student discourse in your classroom. How did the students respond when participating in student discourse? (RQ1)
15. How do you think using these strategies increases student engagement? (RQ1)
16. How did you think using these strategies increases student achievement? (RQ1)
17. How do you think using these strategies improves student self-efficacy? (RQ1)
18. How do you think using these strategies improves student self-direction? (RQ1)
19. What might be some other benefits of student discourse and collaborative structures? (RQ1)

20. Think about a time when you used student discourse or collaborative structures in your classroom. Describe any challenges you may have encountered with any of the following: (RQ2)
    b. Student self-direction
    c. Student participation
    d. Students who do not follow the directions
21. How did you resolve those challenges if you were able to resolve them? (RQ2)
22. What do you feel you need to be more successful facilitating student discourse and collaborative structures? (RQ3)
    e. Additional types of professional development
    f. Observing other teachers' instruction
    g. Teachers observing your instruction
    h. PLCs support using student discourse and collaborative structures?

**Closing Questions**

23. What did I not ask about your experiences with student discourse and collaborative structures for ELL students in biology class that you would like to share?
24. Do you have any other experiences or information you want to share related to ELL students and student discourse and collaborative structures?

Thank you for your responses and your time today. I will contact you by your preferred method to have you verify that I have captured your perspectives accurately. Once the study is complete, I will share the summary/abstract of the dissertation with you.