7-2020

Curriculum Developers' Experiences Adopting Assistive Technology In An Educator Preparation Program

Keisha Tipton

CURRICULUM DEVELOPERS' EXPERIENCES ADOPTING ASSISTIVE TECHNOLOGY IN AN EDUCATOR PREPARATION PROGRAM

By

Keisha Tipton

A.A.S. Early Childhood Development, Kaplan University 2009
B.S. Child Development, Walden University 2011
M.A. Special Education, University of Texas of the Permian Basin, 2014

A DISSERTATION

Presented to the Affiliated Faculty of

The College of Graduate and Professional Studies at the University of New England

Submitted in Partial Fulfillment of Requirements

For the degree of Doctor of Education

Portland & Biddeford, Maine

July 2020

Keisha Tipton
July 2020
Educational Leadership

CURRICULUM DEVELOPERS' EXPERIENCES ADOPTING ASSISTIVE TECHNOLOGY IN AN EDUCATOR PREPARATION PROGRAM

ABSTRACT

Assistive technology competencies are not always included within the curriculum for teacher candidates. The lack of assistive technology content can result in teachers being unprepared to support the academic and social needs of students with significant disabilities in a general education classroom. Required courses in educator preparation programs for assistive technology have declined over the last decade. The problem addressed in this study was the absence of data about how teacher educators perceive their roles and responsibilities in learning about assistive technology and integrating the necessary competencies into the standard educator preparation curriculum. This interpretive phenomenological analysis study explored the experiences of higher education leaders when providing training to preservice teachers about assistive technology (AT). Two research questions guided this study. One of the questions asked curriculum developers about their lived experiences and beliefs of including assistive technology content into teacher preparation curriculum. The second research question pertained to curriculum developers' lived experiences and beliefs about preparing teachers with the knowledge, skills, and dispositions for collaboration within inclusive schools.

The participants for this study included higher education leaders charged with influence over curriculum development for an educator preparation program. Data were collected using a phenomenological interview protocol to gain an understanding of the meaning participants

attribute to experiences with curriculum development for teacher candidates. Five themes transpired from the data analysis, including: 1) lack of knowledge, 2) lack of AT adoption, 3) willingness to innovate, 4) need for collaboration, and 5) established norms/mental models. Several recommendations for the development and improvement of educator preparation curriculum emerged from the findings. Embedding assistive technology into the coursework for teacher candidates is warranted to ensure adequate preparation is acquired for supporting students with significant disabilities in a general education classroom.

Keywords: assistive technology, augmentative and alternative communication, educator preparation programs, inclusive education, educational technology.

University of New England

Doctor of Education
Educational Leadership

This dissertation was presented
by

Keisha Tipton

It was presented on

July 7th, 2020

and approved by:

Michelle Collay, Ph.D., Lead Advisor
University of New England

Catherine Stieg, Ed.D., Secondary Advisor
University of New England

Jazmine Brantley, DED., Affiliated Committee Member
University of the Southwest

DEDICATION

I dedicate this dissertation to my husband and daughter, who continually inspire me to challenge myself and push those boundaries. To Ryan and Rylee, your love and support were invaluable to this project. Thank you for always believing in my ability to earn a doctoral degree and reach my goals. I would not have completed it without your encouragement and reassurance. I love you both!

ACKNOWLEDGMENTS

I would personally like to acknowledge all my family, friends, colleagues, and professors who have provided advice and support throughout the culmination of this study. I would also like to extend a gracious thank you to Dr. Michelle Collay, Dr. Catherine Stieg, and Dr. Jazmine Brantley for the guidance, critique, and quality feedback during the development of this dissertation. Furthermore, I would like to especially thank each participant who courteously contributed their extensive lived experiences that brought this study to life.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE

INTRODUCTION

Approximately two million individuals in America cannot consistently rely on verbal speech and require *assistive technology* (AT) for expression (Chung & Stoner, 2016). Research about people who require AT for communication purposes fall under the broad category of disability studies (Erickson & Koppenhaver, 2020). Disability studies is an interdisciplinary domain that situates disability as a socially constructed reality (Pearson, 2016). For example, disabled individuals often encounter misunderstanding and oppression within society (Pearson, 2016). Individuals that cannot depend on verbal speech are also frequently misunderstood and oppressed because professionals and caregivers may lack a presumption of competence for AT users (Newton, 2019). Many individuals that need AT might not receive the necessary support from school personnel to become competent communicators as a result (Brady, Bruce, Goldman, Erickson, Mineo, Ogletree, & Wilkinson, 2016). Non-speaking individuals should be provided with technology and pedagogical practices to meet their communication needs and be taught how to use their AT devices for expressive purposes.

Teacher preparation programs need to incorporate innovative technologies into higher education curriculum (Martin, 2018). Educator preparation programs can prioritize technological knowledge and skills into coursework for preservice general and special education teachers. Integrating technology competencies in the curriculum of teacher preparation programs is a leading trend in the field of education (Foulger, Graziano, Schmidt-Crawford, & Slykhuis, 2017). Preservice teachers must be adequately prepared to use a variety of technology to meet the educational needs of students in the classroom (Raulston, & Alexiou-Ray, 2018).

To promote continual improvement of teacher candidate readiness, the state of New Mexico adopted the InTASC standards of practice for educator preparation programs (NM Public Education Department, 2017). The InTASC standards were developed to enact a vision for the teaching field by setting high expectations for teachers, enhancing teacher effectiveness, and improving practice (InTASC, 2013). Cross-disciplinary skills such as communication and technology are disseminated throughout the InTASC standards as important aptitudes for teachers to demonstrate in the classroom (InTASC, 2013). The potential for failure to meet these standards exists because, according to Francom (2019), a prominent barrier to the integration of technology in the classroom is the lack of training. Educator preparation programs have an obligation to provide adequate training in the integration of technology to support student learning (Martin, 2018).

Teachers need to be informed and well-versed in various educational technologies because some students require a type of assistive technology known as aided augmentative and alternative communication (AAC) to speak (Da Fonte & Boesch, 2019). AAC serves as a primary mode for receptive and expressive language development for individuals that cannot rely on verbal speech consistently (Da Fonte & Boesch, 2019). Innovative technologies can provide a means of communication for these students, but it is something they need to be taught how to use. Aided AAC includes high- and low-tech forms of assistive technologies for communication purposes, such as graphic symbols, pictures, and complex speech-generating devices (Erickson & Koppenhaver, 2020).

Teachers do not often receive the necessary training to aid their students' language development through alternative technology (Andzik, Chung, Doneski-Nicol, & Dollarhide, 2017). Educator preparation programs can address the lack of training by employing the InTASC

standards put forth to improve teacher training. The InTASC standards emphasize that teachers understand how to "incorporate tools of language development into planning and instruction, including strategies for making content and academic language accessible to linguistically diverse learners" (InTASC, 2013, p. 19). Therefore, if educator preparation programs employ the InTASC standards of practice, curriculum developers will have a framework so preservice teachers can be trained to integrate language development technologies for instructional purposes.

The development of innovative technologies has improved the field of AT for communication (Light, McNaughton, & Caron, 2019). These advancements lead to breakthroughs in educational pedagogy for students with *complex communication needs* (CCN). However, teacher educators have been slow to adopt assistive technology proficiencies within teacher preparation programs (Da Fonte & Boesch, 2016; Johnson & Prebor, 2019). Rogers' (2003) diffusion of innovation theory helps to explain the process of adopting technology within social systems such as institutions of higher learning. Exploring the lived experiences of higher education leaders' concerning the uptake of AT competencies in the curriculum may be viewed through the lens of Rogers' (2003) diffusion of innovation theory.

Statement of the Problem

The problem addressed in this study was the absence of data about how teacher educators perceive their roles and responsibilities in learning about assistive technology and integrating the necessary competencies into the standard educator preparation curriculum. Researchers developed AT competencies to align with the Council for Exceptional Children standards and AT training literature to strengthen preservice teacher preparation and to develop the knowledge

base needed by educators (Da Fonte & Boesch, 2016). The competencies can be used to integrate AT content in educator preparation programs.

Assistive technology content is deficient in teacher preparation programs in many post-secondary education settings (Johnson & Prebor, 2019). Higher education degree programs often fail to provide substantive coursework for the acquirement of AT knowledge and implementation for future educators (Biggs, Carter, & Gilson, 2018). It is common for teachers to educate AT users without ever receiving training on AT (McNaughton, Light, Beukelman, Klein, Nieder, & Nazareth, 2019). Insufficient training in AT is a significant barrier to the successful implementation of devices and services for students with CCN.

There are negative implications for future educators when AT-related subject matter is not included in their higher education curriculum. Communication is a fundamental human right for all living people, yet students with CCN are frequently not having their communication needs met by educational personnel (Brady et al., 2016). Students with complex communication needs are dependent upon knowledgeable communication partners regarding AT service delivery to become competent communicators (Light et al., 2019). Without a means of communication, students are not able to participate in the general education curriculum, engage in social activities, make autonomous decisions, or participate in employment opportunities later in life (Da Fonte & Boesch, 2019). Individuals with CCN remain oppressed and controlled by adults in their life without support to become competent communicators because communication is paramount for living a self-determined life (Brady et al., 2016; Da Fonte & Boesch, 2019).

Purpose of the Study

The purpose of this qualitative phenomenological study was to explore the lived experiences of higher education leaders regarding the incorporation of AT content and training into the educational curriculum for teacher preparation programs. The specific population was comprised of higher education leaders involved in the curriculum development of a teacher preparation program at a university in the state of New Mexico. Higher education leaders that serve as curriculum developers were asked to discuss their experiences with integrating new and emerging educational methodologies and technology into educator preparation curriculum. The methodology employed was a qualitative interpretive phenomenological analysis study. Identifying the perceptions of curriculum developers, such as program coordinators, department chairs, and higher education administrators about whether they are aware of the need to embed AT competencies in teacher preparation programs, was the aim of this study.

This research further advanced the current body of knowledge by exploring the lived experiences of higher education leaders responsible for incorporating AT content into teacher preparation programs. Higher education leaders, such as program coordinators, department chairs, and university administrators that develop curricula, were interviewed and asked specific open-ended questions that address curriculum development and professional development experiences. The purpose was to identify current lived experiences regarding the inclusion of AT competencies in the existing higher education curriculum and explore the experiences of remaining current on innovative technology implementation in teacher preparation. More specifically, studying the experiences of implementing change in educator preparation curriculum, as aligned with the diffusion of innovation theory, exposed additional details about the problem.

Research Questions

In qualitative studies, the research questions depict the central phenomenon to be explored (Creswell, 2015). The development of research questions is an interactive process and invites exploration and discovery (Agee, 2009). The questions for this study were broad to mandate additional explanations of the central topic (Creswell, 2018). Centralized research questions are best suited for a qualitative phenomenological study (Smith, Flowers, & Larkin, 2009). The reason behind the centralized research question was to discover the multifaceted set of factors surrounding the central phenomenon and present the diverse perspectives that participants hold (Creswell, 2018). Through the development of qualitative research questions, the researcher sought to clarify the purpose, make connections in the curriculum and professional development process, and reflect on the impact of the research (Agee, 2009). The central phenomenon for this study was teacher educators' lack of integrating AT content into postsecondary teacher preparation programs. In other words, curriculum developers for teacher preparation programs are not including AT competencies within the coursework.

Two primary research questions were used to adhere to the accepted guidelines of qualitative research studies (Creswell, 2018).

- How do higher education leaders, including program coordinators, department chairs, and university administrators, describe their experience and beliefs of including assistive technology content into the curriculum for preservice general and special education teachers?
- How do higher education leaders, including program coordinators, department chairs, and university administrators, describe their experience and beliefs about preparing preservice

general and special education teachers with the knowledge, skills, and dispositions for collaboration within inclusive schools?

These research questions remained dynamic and reflective of the purpose of the research (Smith et al., 2009). For example, the researcher revised the research questions throughout the process as the development of the study evolved to reflect the purpose and design of the research. The crafting of these questions was central to shape the overall study and topic that was researched.

Conceptual Framework

A foundation for the study was provided through the use of a conceptual framework, which enabled the researcher to describe the study's importance and rigor (Ravitch & Riggan, 2017). A conceptual framework poses an argument about why the study matters and how the research should be conducted (Ravitch & Riggan, 2017). Included within the conceptual framework were the personal interests of the researcher, topical research, and the theoretical framework driving the research. Equipping preservice teachers with the necessary knowledge and skills for implementing AT services to future students was important to the researcher as a university instructor.

Teachers often feel unprepared to support the communication needs of students requiring AT, which reveals an area of deficiency in educator preparation programs (Aldabas, 2017; Andzik et al., 2017). For example, the requirement to take courses in AT has declined in educator preparation programs over the last decade (Johnson & Prebor, 2019). Yet, there is a significant positive correlation between university training and the likelihood of AT users becoming competent communicators (Andzik et al., 2018). Exploring the experiences curriculum developers have with infusing AT competencies within educator preparation programs may provide a deeper understanding of the problem.

To better understand the adoption of coursework in AT, Rogers' (2003) diffusion of innovation theory was the theoretical framework applied in this study. Applying the diffusion of innovation theory as the theoretical framework for the study can facilitate the understanding of the adoption process of AT competencies in higher education courses (Rogers, 2003). Higher learning institutions are firmly positioned to advance social justice in the field of education for vulnerable student populations (Goodwin & Darity, 2019). The researcher explored curriculum developers' practices including AT competencies in educator preparation programs as an avenue to train teacher candidates to serve students with CCN. The pertinent themes from the lived experiences of higher education leaders regarding the inclusion of AT content in the curriculum for preservice general and special education teachers was explored in this study.

The leading belief of the diffusion of innovation framework is that an innovation's acceptance is reliant on the social context, which indicates why effective interventions are not used in practical applications, whereas ineffective interventions gain extensive reception (Dingfelder & Mandell, 2011; Niederhauser & Lindstrom, 2018). The innovation-decision process of the diffusion of innovation theory summarizes the process of accepting, adopting, and integrating technology (Rogers, 2003). For example, there are five stages in the innovation-decision process, which include gaining knowledge, forming an opinion, deciding to adopt, implementation, and confirming the decision for continued use of the innovation (Rogers, 2003). Various activities take place within each of the stages which propel the diffusion forward. The researcher studied the lived experiences of curriculum developers concerning the incorporation of AT content in educator preparation programs through the lens of the diffusion of innovation theory.

Assumptions, Limitations, and Scope

Assumptions are important beliefs about the topic that are held by researchers and are not confirmed prior to the research (Bloomberg & Volpe, 2015). There were assumptions undertaken in this study regarding the need for preservice teachers to gain knowledge of AT in the teacher preparation program, and that curriculum is developed based upon what preservice teachers need. One assumption included a level of consistency with AT knowledge for curriculum developers designing coursework for preservice teachers. A second assumption was that a systematic process exists for creating a curriculum driven by need rather than personal preference. The researcher assumed that the participants provided detailed descriptions of their experiences in a candid and truthful manner. The final assumption was that a qualitative phenomenological research design was the best-fit methodology to explore the lived experiences of teacher preparation curriculum developers.

Bloomberg and Volpe (2015) define limitations as external circumstances that can restrict the study's outcome and represent weaknesses due to the research design. A possible limitation for the study was the variability of detail in the responses from participants with the phenomenological methodology (Smith et al., 2009). The use of a semi-structured interview protocol with each participant separately was used to address the limitation and elicit further details as needed. Additionally, the small purposeful sample size from one designated research site used in this study could be another limitation affecting the level of transferability to all universities. Interested researchers might be able to draw parallels from the details provided from the design to enhance transferability to similar research studies in the future. The small isolated research site increases the likelihood for participants to know one another. However, the researcher ensured participants do not know who is participating in the study by recruiting

individually and ensuring the confidentiality of participants. The researcher did not share or notify others at the site who was participating in the study.

The scope of the study had specific parameters enacted by the researcher to increase the feasibility of the research (Bloomberg & Volpe, 2015). The use of a nonrandom, purposeful sampling ensured the designated participants had experience with the phenomenon (Creswell, 2018). Nine participants responsible for the development of curricula for the educator preparation program at the research site were asked open-ended questions about their experiences. Specific criteria for participation in the study included teaching in the preservice teacher program in addition to a supervisory role for curriculum development. The described parameters supported information-rich data to inquire about the lived experiences of higher education leaders regarding curriculum development (Merriam & Tisdell, 2016).

Rationale and Significance

Disability studies is a developing interdisciplinary field that explores disability as a social, cultural, and political phenomenon based upon the substantial oppression and exclusion people with disabilities have faced and continue to face every day (Pearson, 2016). Within the area of disability studies, there is a subgroup of people with complex communication needs (CCN) who cannot reliably depend on verbal speech and need quality AT services from educational organizations (Brady et al., 2016). Students with CCN are reliant upon the decisions of non-disabled adults to provide access to comprehensive vocabulary through AT systems. Despite the influx of knowledge about the benefits of AT for individuals with CCN, AT devices and services are not adequately provided to them (Light & McNaughton, 2015). The inadequacy of AT service delivery results in numerous consequences to the person with CCN. A few examples of those consequences include denied participation in the general education classroom,

lack of functional literacy skills, and nonexistent support for self-determination well into adulthood (Light & McNaughton, 2015). Withholding substantive communication supports leads to a perpetual cycle without any positive outcome for the individual with CCN.

The rationale for this study was to gain a better understanding of the irregularities of the application of AT content in educator preparation programs. Preservice teachers are not often taught how to employ AT devices and provide services for future students' communication needs in their preparation programs (Andzik et al., 2018; Johnson & Prebor, 2019). General and special educators need the knowledge and skills to integrate AT for the students that could benefit from alternative means of communication (Chung & Stoner, 2016). All teachers are likely to encounter students that require AT services at some time throughout their profession with the increased use of inclusive education. Therefore, understanding why teachers are not taught about AT in their preservice programs was imperative to get to the root cause of the problem.

This study served as a basis to improve AT competencies within educator preparation programs. The findings of this research can ensure that future educators are well-equipped to support a diverse, inclusive classroom. The outcome of this study holds the potential to launch a transformative process to initiate the incorporation of AT into future curriculum development efforts. By embedding aided AT competencies into the curriculum, institutions of higher learning will appropriately prepare teachers to support the educational needs of students with CCN in their classrooms.

Definition of Terms

Aided augmentative and alternative communication (AAC): technology that supplements or substitutes speech or written communication (Simacek, Pennington, Reichle, & Parker-McGowan, 2018).

Assistive Technology (AT): a purchased or created piece of equipment, item, or product that increases, maintains, or improves the functional capabilities of a student with disabilities (US Department of Education, 2004).

Complex Communication Needs (CCN): individuals that have "limited to no access to functional verbal speech and cannot rely on verbal speech to meet daily communication needs" (Biggs, Carter, & Gilson, 2018, p. 443).

Competent Communicator: one who has the ability to understand spoken language, follow social rules, and mend communication breakdowns during a conversation (Da Fonte & Boesch, 2019).

Diffusion of Innovation Theory: a framework for describing how, why, and at what rate new technologies spread through social systems (Rogers, 2003).

Disability Studies: a field that theorizes disability as a social, cultural, political, and discursive phenomenon and heavily stresses that disability is a socially constructed reality that continues to evolve (Pearson, 2016).

Educator Preparation Program: is an educational program that leads to teacher licensure after graduation (New Mexico Register, 2018).

Inclusive Education: comprises peers with and without disabilities in a general education classroom with opportunities to learn the general education curriculum with collaborative team members providing necessary supports (Zagona, Kurth, & MacFarland, 2017).

InTASC standards: a set of teaching principles and foundations that promote standard practices to empower every PK-12 student to achieve the goal of being college-ready or prepared to enter the workforce upon graduation (InTASC, 2013).

Preservice Teacher: a person that is enrolled in a department-approved educator preparation program and seeking a teaching license (New Mexico Register, 2018).

Teacher Candidate: a person that is enrolled in a department-approved educator preparation program and seeking a teaching license (New Mexico Register, 2018).

Conclusion

The lack of AT content within teacher preparation degree plans warranted an exploration into the underlying reasons it is not embedded in the curriculum. This study linked the current state regarding AT competencies with higher education curriculum, and professional development for curriculum developers. Connections were drawn between the rapid change of technology and current processes through the diffusion of innovation theory (Rogers, 2003). Utilizing the diffusion of innovation as the theoretical framework expanded the understanding of why teacher preparation programs are slow to adopt communication technologies for curriculum development.

A growing trend for universities is the incorporation of disability studies into programs of study (Pearson, 2016). Disability studies reformulate disability as natural to the human experience. Therefore, assistive technology for communication purposes can be viewed as a natural form of communication for some people. Disability studies enforce a reimagining of how students with complex communication needs are served by preparing teachers to employ flexible teaching practices and tools that meet all students' needs within inclusive classrooms (Valle & Conner, 2019).

Ultimately, future educators rely on current knowledge and best practice to be disseminated through their preservice programs. Teacher preparation programs can assist in equipping candidates with necessary competencies by employing professional standards of practice for educators (InTASC, 2013). The research led to findings that may facilitate adequately preparing candidates by exploring the lived experiences of higher education leaders

concerning the challenges and barriers that are faced when developing curricula and incorporating AT competencies into educator preparation programs.

CHAPTER TWO

LITERATURE REVIEW

The literature review provided evidence of previous studies that align with a research topic and addressed the gaps to advance the dialogue in the literature (Creswell, 2018). The key words used to prepare the literature review were augmentative and alternative communication (AAC), teacher preparation, inclusive education, educational technology, and assistive technology (AT). Collectively, the literature demonstrates teachers' lack of preparedness for practical application of employing inclusive education, providing assistive technology, and supporting students with complex communication needs (CCN) (Ajuwon et al., 2016; Markelz, Riden, & Scheeler, 2017; Schaaf, 2018). Inclusive education practices, assistive technology, and AAC knowledge and skills for teachers form the underpinnings of the literature review. Reviewing the literature provided a foundational basis of the academic research conducted on the topic to be studied (Bloomberg & Volpe, 2015). The themes that materialized from the literature review are examined in-depth. The research themes relate to the field of education with an emphasis on teacher preparation programs, inclusive education, educational technology, assistive technology, and aided AAC technology.

Nature of the Study

The purpose of this qualitative phenomenological study was to explore the lived experiences of leaders in higher education institutions concerning the integration of assistive technology content and training into the curriculum of teacher preparation programs. AT for communication purposes is known as *aided augmentative and alternative communication* (AAC), which refers to communication methods that require external tools, including technology-based speech-generating devices (SGD) (Beukelman et al., 2013). The research

reviewed for this study indicates there is a lack of AT content and training within teacher preparation programs (Costigan & Light, 2010; Johnson & Prebor, 2019). As a result, teacher candidates are ill-equipped to support the communication needs of their future students with technology. Roger's (2003) diffusion of innovation theory was used to evaluate the lack of technology adoption in teacher preparation curricula.

Policies Supporting Adoption of AT

The Council for Exceptional Children (CEC) has included the need for assistive technology (AT) and augmentative and alternative communication (AAC) training for special educator preparation programs, but this standard of practice has yet to be implemented consistently for preservice educators (Council for Exceptional Children, 2015; McNaughton et al., 2019). The Interstate Teacher Assessment and Support Consortium (InTASC) standards presented by the Council for Chief State School Officers (CCSSO) include teaching practices to improve student outcomes (CCSSO, 2013; Zagona, Kurth, & MacFarland, 2017). Additionally, the InTASC (2013) standards of practice stipulate that teachers need to understand how to integrate language development tools in the classroom for diverse students. These standards necessitate the incorporation of innovative communication technologies to be taught to preservice teachers as part of preparation programs. The Individuals with Disabilities Education Act of 2004 specifies assistive technology (AT) and augmentative and alternative communication (AAC) to be regarded and included for students with complex communication needs (CCN) (US Department of Education, 2004a). If preservice educators are graduating without the adequate training necessary to implement AT, some students with identified communication needs will not be successfully supported to make substantive academic progress.

Characteristics of Clients Requiring AAC Support

Students with complex communication needs (CCN) require a form of assistive technology known as aided AAC to communicate effectively and access educational opportunities (Ahmed, 2018; Erickson & Geist, 2016). Aided AAC refers to communication methods that require external tools, including technology-based speech-generating devices (SGD) (Beukelman et al., 2013). Not all students with CCN have access to qualified personnel who are familiar with the implementation of assistive technology and AAC (Andzik, Schaefer, Nichols, & Cannella-Malone, 2018).

Preparation of Teachers to Support AT Users

The research indicates there is a lack of aided AT content and training within teacher preparation programs (Costigan & Light, 2010; Johnson & Prebor, 2019; Koul & Lloyd, 1994). Consequently, teacher candidates are entering inclusive classrooms ill-equipped to support the future communication needs of their students with technology. The literature review explores the primary themes related to AT subject matter in university degree programs for future educators. Furthermore, the conceptual framework is included as a blueprint for the literature review.

This study examined technology instruction in teacher preparation programs. Educational technology, assistive technology, and aided AAC content were reviewed to emphasize the primary trends included for preservice teachers. Furthermore, the topic pertains to teacher readiness for supporting students with CCN requiring aided AAC. A knowledge base about aided AAC competencies within teacher preparation programs is presented in the literature review. For example, researchers found that teachers are graduating from their degree programs without the confidence to support students with complex communication needs (Andzik et al., 2018). One

possible reason for this is because AT competencies are not often included in the coursework for preservice teachers (Johnson & Prebor, 2019).

The advancements of AT have positively impacted educational opportunities for students with CCN (Light et al., 2019). The current research indicates technology infusion within teacher preparation programs is unsatisfactory (Ajuwon, Meeks, Griffin-Shirley, & Okungu, 2016; Aldabas, 2017; Andzik, Chung, Doneski-Nocol, & Dollarhide, 2017; Clark, Zhang, & Strudler, 2015; Costigan & Light, 2010; Coyne, Lane, Nickson, Hollas, & Potter, 2017). Students with complex communication needs rely on their teachers to have the knowledge and skills to meet their communication and educational needs. Therefore, students with CCN are often underserved because preservice teachers are not consistently educated on assistive technologies (Andzik et al., 2017). AT services and outcomes for students are negatively affected by the lack of expertise demonstrated by educational personnel.

AT devices and service delivery are not always adequately provided to students with CCN, despite the expanding body of knowledge about the benefits to the user (Light & McNaughton, 2015). Numerous consequences ensue for the person with CCN, such as denied participation in the general education classroom, lack of functional literacy skills, and nonexistent support for self-determination well into adulthood (Light & McNaughton, 2015). Students with CCN require quality services from educational organizations (Iacono, 2014). Inadequate communication supports and services result in a continuous cycle devoid of productive outcomes for individuals with CCN. It is therefore necessary to prepare teachers before they enter the classroom.

The problem addressed in this study was the lack of information regarding the perception of teacher educators' roles and responsibilities in learning about AT and integrating the

knowledge and skills needed into preservice teacher coursework (Andzik et al., 2018; Costigan & Light, 2010). Research indicates that higher education degree programs are not providing suitable curriculum outcomes for the attainment of AT knowledge and implementation for future educators (Aldabas, 2017; Andzik et al., 2017; Costigan & Light, 2010; Johnson & Prebor, 2019; McNaughton et al., 2019). The deficiency of AT training is a barrier to the effective application of services needed for students with CCN. Consequences can arise when AT-related subject matter is not embedded within higher education curriculum such as underprepared teacher candidates and students' unmet communication needs.

Conceptual Framework

A conceptual framework is a sequenced series of justifiable propositions that provide a foundation for a study and delineate the study's importance and rigor (Ravitch & Riggan, 2017). To further explain the notion, a conceptual framework is an argument based on research that solidifies the appropriateness and thoroughness of a study. Conceptual frameworks enable the researcher to be transparent about why and how to study a topic of interest (Ravitch & Riggan, 2017). The conceptual framework integrates a researcher's interests, topical research, and the theoretical framework (Ravitch & Riggan, 2017). Incorporating a conceptual framework into a study allows the researcher to be explicit and transparent about the questions asked, the methodology, and analysis of the research. Further, a theory is a critical component of one's conceptual framework and is included throughout the research process.

AT users are unlikely to become competent communicators without the adoption of AT competencies for preservice teachers (Light et al., 2019). General education teachers and special education teachers play an important part in teaching students with CCN how to communicate. However, preservice educators are not often taught how to incorporate AT into the classroom

(Andzik et al., 2018; Johnson & Prebor, 2019). School personnel can have minimal training on AT, which highlights a research to practice gap. Rogers' (2003) diffusion of innovation theory was employed as the theoretical framework for this study to portray higher education leaders' adoption practices of AT within preservice teacher programs of study.

Topical Research

The degree of AT content for communication in some university programs has been studied to a limited extent. An empirical study was conducted by Koul and Lloyd, which revealed only 24% of special education preservice programs offered a course in AT for communication (as cited in Costigan & Light, 2010). Johnson and Prebor (2019) studied preservice training for speech and language pathologists, and of the surveyed responses, six percent offered an AT course as an elective for special education majors. In the same study, the survey responses reported AT as a required course for special education majors at fourteen percent in 2008, and one decade later declined to zero percent (Johnson & Prebor, 2019). These percentages indicate a critical need for AT training to be better integrated within teacher preparation programs. If educators are underprepared to provide AT services to students, students with CCN are at risk of being non-proficient communicators (Andzik et al., 2018). Andzik et al. (2018) discovered a significant association between university training and proficient communication from AT users. The amount of training a teacher had strongly correlated with AT users' communicative competence (Andzik et al., 2018).

The slow rate of assistive technology adoption makes some students susceptible to poor progress in the general education curriculum and overall limitations for their future without a reliable means of communication. Practice can trail behind the research by 17 years or more (Light et al., 2019; Rogers, 2003). Light et al. (2019) argues that AT practices trail even further

behind the research in the field of AT because service providers lack AT competencies. Parents and caregivers of AT users can have a difficult time finding knowledgeable professionals to provide necessary communication supports (Light et al., 2019; McNaughton et al., 2019). However, proficient communication for AT users is dependent upon the uptake and implementation of technologies by knowledgeable service providers and family members (Light et al., 2019). The lack of service providers with training on AAC competencies has resulted in a considerable gap between research and practice (Light et al., 2019). Individuals requiring AT services exceed the quantity of educational personnel with the necessary knowledge to support them (Light et al., 2019). Increasing the rate of adoption of AT competencies in teacher preparation programs can minimize the research to practice gap.

Personal Interest

Research has repeatedly shown that assistive technologies are proven to be beneficial for individuals that cannot rely on speech to communicate (Biggs, Carter, & Gilson, 2019; Ganz, 2015; Light & McNaughton, 2015). AT interventions within the public-school system are provided by interdisciplinary teams that include special educators, general educators, and other communication partners (Chung & Stoner, 2016). Therefore, general education and special education teachers are integral to the service delivery of AT systems for students with complex communication needs. However, teachers often feel inadequately prepared to implement AT in the classroom, in part due to limited coursework in their university programs (Aldabas, 2017; Andzik et al., 2017; Andzik et al., 2018). The researcher explored the experiences of higher education leaders regarding the training of preservice teachers in AT competencies with this research. The research provided insight into whether AT content is included in university coursework for educators. Investigating the practices of incorporating AT content into teacher

preparation programs can facilitate an understanding of how AT innovations are diffused (Rogers, 2003).

Theoretical Framework

The theoretical framework applied within this study was the diffusion of innovation theory (Rogers, 2003). The diffusion of innovation theory can be used to explain the process through which new ideas, technologies, or innovations become adopted by specific communities of practice (Niederhauser & Lindstrom, 2018; Rogers, 2003; Sutton, & DeSantis, 2017). Rogers (2003) theorized five stages decision-makers proceed through when making a choice to adopt a new idea or not, termed the innovation-decision process, as shown in Figure 1:

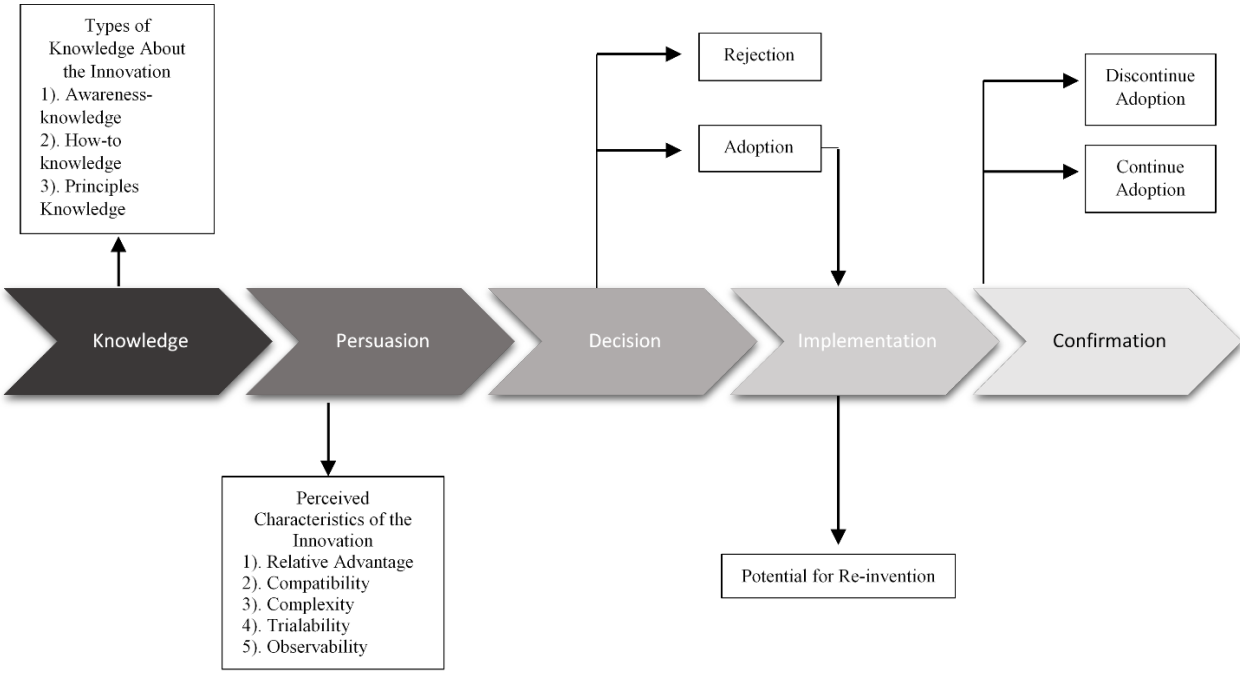

Figure 1. The Innovation-Decision Process. Adapted from *Diffusion of Innovation* (p. 170), by E. Rogers, 2003, New York, NY: Free Press.

The innovation-decision process, as depicted in the above figure, illustrates the progression through which an individual or decision-making group goes through over time and acts on at the following summarized stages:

- Knowledge: Initial communication and awareness about the idea occur.
- Persuasion: Knowledge is deepened about the innovation, and an attitude is formed.
- Decision: The technology is either adopted or rejected during this stage.
- Implementation: The innovation is put into practice and is where re-invention can take place.
- Confirmation: Reflection is conducted to determine whether to discontinue the innovation (Rogers, 2003).

The innovation-decision process is initiated by a decision-making unit once the exposure to the existence of an idea and learning about its functions occur. Three types of knowledge can transpire during the initial phase of the process, which include awareness-knowledge, how-to knowledge, and principles knowledge (Rogers, 2003). Awareness-knowledge involves the initial introduction about the existence of an idea or innovation. How-to knowledge is the learning process about how to use the innovation. Principles knowledge for innovation is the understanding of the inner workings of how the technology functions. The progression of understanding about innovation aids in the diffusion and uptake of new ideas. Once knowledge is obtained, an attitude of that innovation is formed. For technology to be adopted within a designated community, the innovation must be thought of as advantageous, compatible with current needs, easy to use, experimented with, and have positive results observed by others within the group (Rogers, 2003; Sutton & DeSantis, 2017). A decision is then made to either

adopt or reject the innovation. If adoption takes place, re-invention can transpire during the implementation phase. The decision-making unit reflects on the process, and the decision to either discontinue or adopt is solidified based on the experience.

The diffusion of innovation theory was employed in the research of uptake for many educational technologies. For example, Shaban and Egbert (2018) utilized the diffusion of innovation theory in conjunction with teacher technology literature to craft a professional development model in computer-assisted language learning. Porter and Graham (2016) applied Rogers' (2003) framework to determine the degree to which specific factors impede the adoption of blended learning among higher education professors. Some of the factors discovered to inhibit the adoption of blended learning included insufficient infrastructure, poor technical support, and inadequate pedagogy support (Porter & Graham, 2016). Chan, Borja, Welch, and Batiuk (2016) employed the diffusion of innovation theory to predict the likelihood of adoption for audience response system technology by faculty in higher education. The examples of the application of the diffusion of innovation theory as a conceptual framework for educational technology in university programs demonstrate relevance for this research study because AT is a form of educational technology.

Sutton and DeSantis (2017) advocate the use of the diffusion of innovation theory as one potential framework to facilitate higher education leaders' role in promoting educational technologies in university coursework. Additionally, Alper, Ellcessor, Ellis, and Goggin (2015) assert the diffusion of innovation theory is an applicable model to analyze the adoption of assistive technologies for communication. Therefore, interviewing higher education leaders about their experiences with incorporating AT content for preservice teachers can provide vital information about where curriculum developers are in Rogers' (2003) innovation-decision

process. The inclusion of AT subject matter within teacher preparation programs were examined through the lens of the diffusion of innovation theory.

Assistive Technology in Education

This literature review begins with an examination of the various themes that emerged in the research. The research on teacher preparation programs is explored to capture the practices employed by post-secondary educational settings. Preservice teachers' understanding of inclusive education is discussed because students with CCN are encouraged to be educated in the least restrictive environment (US Department of Education, 2004a). The format proceeds with a broad to narrow focus regarding technology. Educational technology is examined as a broad theme for the literature review. Then assistive technology and AAC are reviewed. Educational technology in teacher preparation programs is reviewed to understand general educational technology implementation. Assistive technology competencies and training are the next component in the review to examine the extent they are employed in preservice education programs. Lastly, research on the implementation, perception, and training of AAC is thoroughly discussed.

Teacher Preparation Programs

Teacher preparation programs and teacher educators are confronted with the challenge of priming pre-service teachers to meet the needs of diverse students (Lancaster & Bain, 2018; Zagona, Kurth, & MacFarland, 2017). The 2004 reauthorization of the Individuals with Disabilities Education Act (IDEA) accentuated student progress monitoring with the general education curriculum in the least restrictive environment (US Department of Education, 2004). Inclusive education has changed public education because teachers are encouraged to teach students with disabilities with typical peers in general education classrooms. General education

and special education teachers have a greater probability of encountering students that require AAC services at some point throughout their careers with inclusive education mandated by law. Educator preparation programs must ensure all teachers are equipped to support classrooms with diverse students.

Professional standards were created to delineate the necessary competencies teachers need for effective teaching. Institutions of higher education can align curriculum to the established standards to ensure preservice teachers complete preparation programs with the essential knowledge and skills required in today's classrooms. The Interstate Teacher Assessment and Support Consortium (InTASC) standards put forth by the Council for Chief State School Officers (CCSSO) incorporate teaching practices to enhance student outcomes (CCSSO, 2013; Zagona, Kurth, & MacFarland, 2017). Inclusive strategies are embedded throughout the InTASC standards and could enhance preparation programs' effectiveness. Students with CCN require teams to consider educational technology, assistive technology, and aided AAC to make substantive progress with the general education curriculum (Ahmed, 2018). However, students with CCN are often deprived of access to the general education curriculum and educated in segregated classrooms despite research that demonstrates the efficacy of access to grade-level standards-aligned content for this population (Taub, McCord, & Ryndak, 2017). Examining current practices being taught to preservice teachers may highlight where the breakdown is occurring. Teacher preparation programs encounter multiple obstacles with integrating technology competencies into the curricula, including lack of technology, lack of time, lack of technical support, and lack of knowledge (Kalonde & Mousa, 2016). Applying the diffusion of innovation theory may facilitate an understanding of the adoption of educational

technology, assistive technology, and aided AAC competencies within teacher candidate preparation (Rogers, 2003).

Inclusive Education

The ambiguous language of the IDEA mandate has resulted in many misconceptions about how to provide access to the general education curriculum for students with disabilities (Olson & Roberts, 2018). For example, IDEA states that all students should have access to the general education curriculum with opportunities to learn, but it does not specify where or who should provide access for students (Olson & Roberts, 2018). Olson and Roberts (2018) investigated teacher educators' definitions of access to the general education curriculum to understand how those definitions impacted teacher preparation practices. The purposive sampling for the study included special education teacher educators. The practices of the participants were determined to be shaping dispositions and equipping preservice teachers with the knowledge and skills to provide access to their future students. The special education teachers in this study noted a lack of inclusive placements for their preservice teachers to witness or apply learning in their fieldwork (Olson & Roberts, 2018). Similarly, participants in Miller's (2015) study noted there were no field experiences for preservice teachers to work with students with disabilities during their university training. The shortage of quality inclusive placements preservice teachers had at their disposal for observation indicates a lack of real-world application of inclusive education taught in teacher preparation programs. Teacher candidates may have additional barriers to overcome in their future classrooms if they cannot observe quality AAC services being applied during inclusive educational field experiences in their preservice programs.

Inclusive education can be improved by priming preservice teachers to be able to support the diverse needs of future students (Lancaster & Bain, 2018; Zagona et al., 2017). Zagona et al. (2017) discovered a positive relationship between educators who had taken inclusive education courses during their preservice preparation and their ability to implement inclusive education. Further, Miller (2015) exposed a lack of adequate preparation for inclusive practices for over half of the study's participants. The connection between university coursework about inclusive education and the abilities of education service delivery demonstrate the need for further incorporation within teacher preparation programs to advance the application of theory to practice.

Preservice teachers also need practice with generalizing the content learned from preparation programs. The application of theory to practice is imperative, given that practices can diverge from the research. Markelz, Riden, and Scheeler (2017) studied the extent to which special education teacher preparation programs were educating preservice teachers to generalize content learned and integrate the knowledge and skills into the classroom. Student teaching supervisors were the targeted participants, which included surveys and extant data analysis from course syllabi (Markelz et al., 2017). Results signify that participants understood generalization as a term, but not specific generalization techniques. The extant data analysis from the syllabi did not demonstrate generalization from the teacher preparation program to a K-12 setting (Markelz et al., 2017). Field experiences throughout a preservice program can provide avenues to apply learned curriculum content to the general education classroom. For example, Kent and Giles (2016) discovered that intense field experiences were beneficial to teacher candidates being prepared to implement inclusive practices and support diverse students in a classroom.

Educational Technology

Rapid advancements of educational technologies create challenges for teacher educators to adequately prepare preservice teachers to integrate technology in the classroom (Cheek et al., 2019). The lack of training and support is identified as a first-order barrier to technology infusion for teachers (Francom, 2020). Therefore, educational technology training within educator preparation is examined.

Preservice Teachers

The literature draws attention to preservice teachers being prepared to integrate technology in their future classrooms to support all students. Preservice teachers have been reported to value the importance of technology in their practice (Coyne, Lane, Nickson, Hollas, & Potter, 2017). Student teachers participated in a study to assess their beliefs, preparation, and observation of technology for instruction (Coyne et al., 2017). The participants did not observe technology being used by in-service teachers to a great extent in the K-12 setting nor from their professors in their teacher preparation program (Coyne et al., 2017). According to the diffusion of innovation theory, the degree to which technology is observed can positively impact the rate of adoption (Rogers, 2003). Field experiences throughout a preservice program offer teacher candidates opportunities to witness how technology is used in the classroom. If preservice teachers don't observe technology being used by seasoned teachers, it could limit their own future use of technology because the learning curve could be viewed as unattainable or unimportant.

Applying learned technological knowledge and skills in the classroom is an ideal outcome of teacher candidate education. The transference of instructional technology of 14 preservice teachers was analyzed in a mixed-methods study (Clark, Zhang, & Strudler, 2015).

The participants were enrolled in a course in which 124 hours are spent in a mentor's classroom, and five lessons are taught by the preservice teacher (Clark et al., 2015). The results revealed the inability to transfer the technology content from the teacher preparation program to the classroom setting for student-centered technology use (Clark et al., 2015). Both the Clark (2015) and Coyne (2017) study participants did not observe technology implemented to a great extent by their mentor teachers. The lack of observation of technology highlights a significant divergence in the transference of knowledge from teacher preparation programs and in-service professional development.

Preservice teachers were evaluated on their intent to use technology in their future practice. Li, K., Li, Y., and Franklin (2016) determined factors contributing to preservice teachers' technology intentions included self-efficacy, attitudes, and perceived ease of use. Similarly, Sadaf, Newby, and Ertmer (2016) found that attitudes, self-efficacy, supportive mentors, and perceived usefulness were major contributing factors for participants' intentions to use Web 2.0 tools in the classroom. Understanding the factors that influence intentions does not equate to the actual adoption of technology by the participants, but it is an initial measure to understand the potential likelihood of technology usage in the classroom. Han, Shin, and Ko (2017) discovered the importance of student teaching experiences that incorporated technology with the intention to use other innovations with future students. Providing practical experiences to observe and utilize technology can influence teacher candidates' plans to integrate technology for teaching and learning.

The technology literacy of preservice teachers could be a better predictive measure for technology adoption within future classrooms. In one study conducted by Dincer (2018), participants perceived themselves as technology literate, but the results exposed low levels of

technology literacy. Another study had comparable findings in which preservice teachers inaccurately self-assessed and overestimated their digital competence, which countered their actual objective scores on digital competence (Maderick, Zhang, Hartley, & Marchand, 2016). The research indicates intentions and perceptions of technology are not enough to predict the implementation of technology in the classroom prompting the need for further investigation. However, practical experiences and observations of technology use in the classroom can positively impact the uptake of such tools for teaching and learning. Preservice teachers' mentors can model the use of technological tools in the classroom, increasing the likelihood of future use by the teacher candidate.

Teacher Educators

It is important to evaluate the technological knowledge of preservice teachers and seek understanding from technology embedded into teacher preparation programs from those educating the preservice teachers before they enter a classroom. Taimalu and Piret (2019) found that knowledge of the integration of technology directly influenced technology being applied in education. Additionally, Kalonde and Mousa (2016) sought to explore the basis of teacher educators' decisions regarding technology modeled to preservice teachers. The results indicated teacher educators' decisions were based on multiple factors, including availability, content, ease of use, cost, training, and experience. Barriers to technology integration within teaching included a lack of technology, lack of time, lack of technical support, and lack of knowledge (Kalonde & Mousa, 2016). Advancing this research into the realm of instructional and assistive technology in teacher preparation programs could benefit preservice teachers' ability to provide access to the general education curriculum within inclusive settings.

Teacher educators and preservice teachers require support, experience, and collaboration regarding technology (Nelson, Voithofer, & Cheng, 2019). Teacher educators often serve as mentors and model the use of technology for preservice teachers to see the practical application prior to entering a classroom for the first time. If preservice teachers witness how technology can be utilized for instruction, they may be more apt to incorporate technology within their practice. Understanding the experiences of teacher educators and their approach to training teacher candidates to utilize technology was explored in the research. There were several factors that were found to affect their technology training practices, such as technical knowledge and institutional support (Nelson et al., 2019). Teacher educators with more technical knowledge and institutional support were more apt to align with the International Society for Technology in Education (ISTE) standards. A focus on increasing technology knowledge was warranted for teacher educators, which has the potential to trickle-down to preservice teachers.

Teacher educators' level of competency with technology has been a recurring element in the research. Uerz, Volman, and Kral (2018) conducted a review of the literature on teacher educators' technology practices, and competencies noted to attain the incorporation of technology in teacher preparation programs. The review uncovered four categories of competence, which include technology competence, instructional technology competence, teaching and learning philosophies, and innovation and professional learning competence (Uerz et al., 2018). Tondeur et al. (2019) revealed that some teacher educators are not confident in their ability to prepare and motivate preservice teachers to integrate technology in the classroom, indicating a need for in-service professional development. Teacher educators can focus on development within the categories of competence to increase technology use for preservice

teachers. It is equally important for preservice teachers to observe technology integration from university instructors in addition to field experiences embedded throughout the curriculum.

The research concerning teacher educators' use of technology adds to the understanding of components necessary to facilitate the integration of technology into teacher preparation programs. However, a gap in the literature exists regarding the experiences of curriculum developers' decisions to integrate technology competencies for preservice teachers. The gap indicates a need to explore the factors that influence curriculum developers' decisions for incorporating technology practices in the curricula of teacher preparation programs.

Assistive Technology

As defined by the Individuals with Disabilities Education Act of 2004, assistive technology (AT) is "any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of a child with a disability" (US Department of Education, 2004b, para. 1). IDEA also includes assistive technology services, which include "any service that directly assists a child with a disability in the selection, acquisition, or use of an assistive technology device" (US Department of Education, 2004c, para. 1). To meet the AT needs of students, educators must have the knowledge and skills to choose and implement the technology appropriately for the student's benefit. Therefore, it is important to understand what educators are taught in their teacher preparation programs, because numerous educators are unprepared to establish appropriate assistive technologies for students with disabilities (Koch, 2017; Marino, Sameshima, & Beecher, 2009; Schaaf, 2018).

Researching AT barriers is a starting point to understand how it is being taught and used in the classroom setting. Bouck (2016) discovered inconsistencies with AT access and use for

secondary students with high-incidence disabilities compared to low-incidence disabilities. The amount of AT provided to secondary students with disabilities needs to be improved. Karlsson, Johnston, and Barker (2017) interviewed teachers, parents, and their children to gain a deeper understanding of their experiences regarding assistive technology. The participants' experiences indicated a need for knowledgeable professionals to provide support and guidance because untrained personnel typically determine the educational needs of students (Karlsson, Johnston, & Baker, 2017). Additionally, Ahmed (2018) surveyed faculty, staff, and students within the College of Education at Midwestern University to understand the general public's awareness of AT in the classroom. Eighty-seven percent of the participants did not believe teachers were aware of the benefits of AT. The respondents of the study perceived cost as a critical barrier preventing students from obtaining access to AT (Ahmed, 2018). According to Rogers (2003), technology costs can impact whether it is widely adopted. As noted in the Ahmed (2018) study, cost as a barrier to access aligns with a review of the literature which found a lack of funding and cost of AT, poor awareness about AT, and inefficient assessment of AT as hindrances to implementation (Ahmed, 2018; Boot, Owuor, Dinsmore, & MacLachlan, 2018). Knowledge and awareness about assistive technology were noted as potential catalysts to improve access (Boot et al., 2018).

AT competencies. One challenge for educator preparation programs is to prepare preservice teachers for current technological trends in AT, but the rapid pace of technological advancements poses a risk of those trends being outdated once preservice teachers graduate (Peterson-Karlan, 2015). Koch (2017) proposes a sustainable avenue through embedded accessibility features of existing technologies used in many educational institutions. Microsoft and Apple operating systems offer accessible components to their devices that can benefit

students, such as enlarging texts, text-to-speech options, visual alerts, and virtual assistants (Koch, 2017). These universal features eliminate the need to learn how to use several dedicated devices used for just one purpose.

Assistive technology service providers were surveyed about their perspectives of education/training received and interdisciplinary standards of practice (Arthanat, Elsaesser, & Bauer, 2017). Most of the respondents professed there was a deficiency of a standard of practice in the field of assistive technology (Arthanat et al., 2017). Participants also acknowledged inadequate education and training to fulfill their roles as assistive technology service providers (Arthanat et al., 2017). Burgos (2015) also reported about the lack of standard competencies for the delivery of assistive technology services. The absence of clear standards of practice creates a significant barrier for adequate training of service providers.

AT training. Special educators must have a thorough understanding of AT, but with the rise in inclusive education, general educators also need applicable understanding to properly support their students (King & Allen, 2018). Most of the literature focuses on special educators rather than general educators due to the notion that assistive technology is a specialized area implemented by specifically trained people (Connor & Beard, 2015). Therefore, a gap in the literature exists regarding the lack of exploration of general educators' AT awareness, training, and competencies. Teacher preparation programs need to provide AT competencies to both special and general preservice teachers. Understanding curriculum developers' experiences with incorporating AT content for preservice teachers is warranted.

There is a need to understand how universities incorporate AT within teacher preparation programs. Atanga, Jones, Krueger, and Lu (2019) found that completing a university course on AT was linked to increased AT knowledge. Some universities are integrating assistive

technology-focused training for preservice teachers to address the lack of knowledge and skills (Connor & Beard, 2015; Jones, Williams, & Rudinger, 2018; King & Allen, 2018). East Carolina University's AT center launched a professional development model to deliver modules on AT awareness, knowledge, and skills for preservice teachers (King & Allen, 2018). The modules were developed for distance education as well as on-campus students (King & Allen, 2018). All special education preservice teachers complete the modules, and designated modules are completed by other preservice teachers (King & Allen, 2018). It is suggested that other universities adopt similar approaches to educate teacher candidates on AT proficiencies to ensure adequate preparedness to serve the diverse needs of all students. Texas A&M University-Commerce (TAMUC) has also recognized the necessity for knowledgeable preservice teachers on AT given prior research on the topic (Jones et al., 2018). Previous research on AT training discovered that teachers lacking AT knowledge and skills posed a risk of limiting the success of students requiring AT devices and services (Jones et al., 2018). TAMUC launched an AT lab for preservice teachers and students with disabilities to trial various devices (Jones et al., 2018). These labs provide practical experience and exposure to preservice teachers to promote necessary technology for their students, but they are not standard practice for most universities with limited resources (Jones et al., 2018; King & Allen, 2018).

Augmentative and Alternative Communication

Students with complex communication needs (CCN) rely on a form of assistive technology known as aided augmentative and alternative communication (AAC) to connect with others and be an active participant in daily life (Erickson & Geist, 2016). It has been reported that 37% of students with significant cognitive disabilities are incapable of using speech to communicate (Erickson & Geist, 2016). Approximately two to four million people in the United

States cannot rely on speech for communication needs (Beukelman et al., 2013; Chung & Stoner, 2016). Aided AAC is a communication method that requires tools such as paper-based communication books and technology-driven speech-generating devices (Andzik et al., 2017; Beukelman et al., 2013). Aided AAC modeling is a prominent intervention to promote language acquisition for students with CCN in the research literature (Kent-Walsh, Murza, Malani, & Binger, 2015; Sennott, Light, & McNaughton, 2016).

AAC implementation. It is imperative to understand how students with CCN are supported to meet their communication needs. Andzik et al. (2018) studied special educators regarding the students with CCN they taught. Special education teachers were surveyed across all 50 US states in which they gave descriptions of the training they have obtained, and instructional approaches used (Andzik et al., 2018). The special education teachers supported almost four students with communication needs on average, and most students requiring an AAC device did not communicate proficiently (Andzik et al., 2018). About 42% of students that had speech served by the study participants communicated non-proficiently. AAC training for the participants varied, but most commonly, training was provided by a speech-language pathologist (SLP), teacher preparation program, and professional development (Andzik et al., 2018). Most instructional practices derived from collaboration with SLPs, which might also highlight a reason for the lack of proficient communicators since research shows SLPs receive limited training on AAC best practices (Andzik et al., 2018; Kent-Walsh et al., 2015; Costigan & Light, 2010). Some teachers did not receive any training from SLPs or AAC specialists within their districts (Andzik et al., 2018). Andzik's et al. (2018) research study demonstrates a significant area of need for preparing educators to support their students with CCN to be active participants in the classroom and engage with the general education curriculum. Accessing the general education

curriculum, being an active participant, and making connections are not possible without a means of communication.

Researchers strive to understand the benefits of providing AAC users with access to the general education curriculum and how that can be accomplished. Kleinert, Towles-Reeves, Quenemoen, Thurlow, and Fluegge's (2015) study examined 15 states regarding access to general education settings for AAC users who take the state's alternate assessment and the correlation with expressive language, AAC usage, reading skills, and math skills. In-service teachers completed the survey, and on average, students taking the state alternative assessments were in a self-contained setting with some level of inclusive activities (Kleinert et al., 2015. Furthermore, an overall positive correlation was found for inclusive settings and expressive communication, reading, and math, but a negative correlation for inclusive settings and AAC usage. The reduction of AAC use within inclusive settings, but an increase in expressive communication is a significant finding that warrants further study. Examining factors as to why AAC use diminishes within inclusive placements could point to a lack of adequate knowledge to support students with CCN. The lack of AAC use in inclusive settings is also explored in a study on the effectiveness of peer interventions to boost AAC use (Biggs, Carter, & Gustafson, 2017). If educators are unfamiliar with best practices in AAC, they will not be able to incorporate peer support in AAC effectively.

Perceptions of experience with AAC. Special education teacher candidates can have varying levels of understanding and awareness to support AAC users. Aldabas (2017) claimed the literature did not explore pre-service special education teachers' perceptions about AAC knowledge and skills. Twenty-seven participants were surveyed in a descriptive study to understand their level of awareness and understanding (Aldabas, 2017). Aldabas (2017) found

that most pre-service special educators in the study noted a lack of AAC training to implement AAC in a classroom and an inability to select an AAC device for students' needs. The participants did not feel they were adequately prepared to evaluate the effectiveness of AAC for students (Aldabas, 2017). The study has important connotations and points to the need for teacher preparation programs to incorporate AAC competencies in the coursework. An important finding from the Aldabas (2017) study indicates the lack of training in teacher preparation programs is an on-going problem of practice. A gap in the literature was revealed as the research does not include curriculum developers' approaches to incorporating AAC content into teacher preparation programs for special and general preservice teachers.

The perceptions of practicing special educators on AAC implementation have been explored in the literature as well. Andzik et al. (2017) conducted a study utilizing individual interviews with fourteen special educators on their personal experiences supplying AAC services to students with CCN (Andzik et al., 2017). Low levels of access to AAC training were reported as well as variations in team collaboration and limited preparation time (Andzik et al., 2017). Insufficient support from Speech-Language Pathologists (SLPs) and general education teachers was conveyed by study participants (Andzik et al., 2017). Andzik's et al. (2017) study advances the literature forward on current barriers special educators face while supporting students with CCN. A lack of awareness and knowledge across disciplines indicates a need to explore the decision-making process of curriculum developers for teacher preparation programs.

AAC users have a range of team members that provide support and education in the public education setting. Two researchers conducted a meta-synthesis of team members' experiences and recommendations for supporting AAC users through the lens of the logic model (Chung & Stoner, 2016). The logic model is often used to evaluate programs and includes inputs,

activities, and outcomes (Chung & Stoner, 2016). Team members were notably in need of support, such as time, training, and financial resources (Chung & Stoner, 2016). Inadequate preparation time, poor training, and a lack of financial resources were factors found by Andzik, Chung, Doneski, and Dollarhide (2017) that negatively impact educators' ability to support AAC users. Families' and professionals' expectations, attitudes, and knowledge were also key indicators of the effectiveness of AAC implementation (Chung & Stoner, 2016). AAC device characteristics posed several barriers to team members such as programming, device features, and need for repairs (Chung & Stoner, 2016). The review discovered that, when team collaboration was poor, student outcomes were jeopardized (Chung & Stoner, 2016). Overall, teams are often ineffective at collaborating and working together, which could be a result of poor training in AAC competencies and best practice. The inconsistencies in implementation can be attributed to the lack of knowledge and skills possessed by team members. The research to practice gap is uncovered in this meta-synthesis and warrants further investigation into what team members are taught concerning AAC implementation.

AAC training. If educators are underprepared to provide AAC services to students, students with CCN are at risk of being non-proficient communicators, as noted in the Andzik et al. (2017) study. Teachers should not have to rely on professional development or in-service training for initial AAC competencies. Costigan and Light (2010) conducted a review of the literature on preservice training for SLPs, special education teachers, and occupational therapists. Preservice programs for the three groups of providers had a low amount of AAC content (Costigan & Light, 2010). In the universities that did offer an AAC course, most of the classes were electives (Costigan & Light, 2010). The reviewed studies revealed a small increase in preservice AAC training from earlier studies on the subject, but overall, preservice programs

offer minimal AAC training for SLPs, special education teachers, and occupational therapists. Costigan and Light's (2010) review displayed an absence of AAC training in any undergraduate program in the United States. Additionally, the programs that did offer training were taught by non-experts in AAC, which jeopardizes the quality of content and competencies covered (Light & Costigan, 2010). The SLP programs studied in the literature found found less than 43% of SLP graduates competent in providing AAC services (Light & Costigan, 2010). SLPs are often the ones charged with making AAC decisions in a school setting (Johnson & Prebor, 2019). If SLPs, special education teachers, and occupational therapists are not adequately prepared nor have the necessary competencies to implement AAC with fidelity, the identified knowledge gap indicates students with CCN will not receive a substantive education. The review did not include AAC competencies within general teacher preparation programs. Therefore, exploring the experiences of higher education leaders' decision-making process to incorporate AAC competencies in special and general teacher preparation programs is needed.

Johnson and Prebor (2019) have since updated the research on AAC training for speech-language pathologists. The researchers found improvements in speech-language pathology graduate programs that offer AAC content with at least one faculty member with AAC expertise (Johnson & Prebor, 2019). However, many students graduate without the preparation necessary to provide AAC services to future students, which can be attributed to a lack of clinical experiences in AAC (Johnson & Prebor, 2019). Teachers often rely on speech-language pathologists to facilitate decisions and provisions regarding communication support for students. The previously conducted research demonstrates that educators and speech therapists are deprived of essential preparation to implement AAC (Costigan & Light, 2010; Johnson &

Prebor, 2019). Students in need of AAC services are put at risk without qualified team members to provide the necessary support.

Educators who are inadequately trained in their teacher preparation programs are left with finding professional development in AAC implementation for their students. Hanline, Dennis, and Warren's (2018) study explored the perceptions of AAC use in the preschool setting after training in Multimodal Early Language Development (MELD), a professional development program to train preschool teachers on how to meet the needs of preschoolers with communication needs. There were many perceived benefits to the MELD professional developments, including confidence in AAC implementation and positive behavior changes in the children (Hanline et al., 2018). The coaching element to the program after the training was perceived as helpful (Hanline et al., 2018).

The need for AAC training for team members dominates the literature (Andzik, Chung, Donesky, & Dollarhide, 2017; Costigan & Light, 2010; Johnson & Prebor, 2019). Senner and Baud (2016) have studied an eight-step instructional model to train school staff in partner-augmented input. Partner-augmented input is an evidence-based strategy for AAC users learning the symbolic language of the device (Senner & Baud, 2016). Participants included two instructional assistants, one teacher, and one SLP in the pre-post-test research (Senner & Baud, 2016). The participants completed a five-week training program in partner-augmented input. The researchers wanted to know if training school staff in partner-augmented input would increase AAC modeling in the natural context of the classroom (Senner & Baud, 2016). The study resulted in all staff increasing the percentage of utterances modeled throughout the 5-week period (Senner & Baud, 2016). Staff described the coaching element as they implemented the practice in the classroom, which is in alignment with the perceptions from the MELD study

(Hanline et al., 2018; Senner & Baud, 2016). The training model with real-time coaching emphasis promotes positive outcomes in the literature, which has implications for teacher preparation programs and student practicums.

AAC users rely on knowledgeable communication partners to facilitate the acquisition of their systems and communication interactions. Communication partners require training to support individuals with CCN to communicate proficiently. A meta-analysis was completed to understand the communication partner intervention effects (Kent-Walsh, Murza, Malani, & Binger, 2015). The researchers concluded that communication partner instruction has positive effects for AAC users' performance and proficiency (Kent-Walsh et al., 2015). The review poses an essential need for well-informed team members to ensure efficient interventions are applied for students with CCN.

Systematic reviews are headed by various researchers seeking to understand the effectiveness of partner-augmented input (Allen, Schlosser, Brock, & Shane, 2017; O'Neill, Light, Pope, 2018; Sennott, Light, & McNaughton, 2016). There are multiple names for augmented input that all refer to modeling an AAC system paired with spoken words as an intervention (Sennott, Light, & McNaughton, 2016). Some of those include AAC modeling, aided language input, aided language stimulation, natural aided language, augmented input, and aided language modeling. AAC users that observe models of their symbolic language make evident gains in receptive and expressive language, pointing to similarities of typical language acquisition (Sennott et al., 2016; Allen, Schlosser, Brock, & Shane, 2017; Biggs, Carter, & Gilson, 2018). An examination of the extent AAC competencies are included in teacher preparation programs would be advantageous to advance the research to practice gap further.

Conclusion

The literature analyzed within this review contributes to framing the problem of practice regarding the lack of AAC competencies embedded in teacher preparation programs for preservice special educators and general education teachers. Professional development of AAC implementation has proven to be effective in strengthening teachers' abilities to employ AAC services to students (Hanline et al., 2018). The shortage of AAC content in teacher preparation programs leads to underprepared teachers (Costigan & Light, 2010). The literature review also uncovered a deficiency of educational technology and assistive technology competencies in teacher preparation programs leading to ill-equipped preservice teachers.

Teacher preparation programs are at risk of providing a disservice to preservice teachers by failing to incorporate the knowledge and skills necessary to meet the diverse needs of all students in a classroom setting (Costigan & Light, 2010). The research to practice gap emphasizes the relatively slow nature of the technology adoption in many domains. Technology is a necessity for many students to make substantive progress in the general education curriculum and be an active contributor to their classroom communities. According to Roger's (2003) diffusion of innovation theory, knowledge as an initial step in the innovation-decision process, which signified a need to explore the AT competencies provided to teacher candidates in their postsecondary education settings.

A study that reviews AT content in teacher preparation programs was warranted. Interviewing educational leaders about their experiences with incorporating AT content into teacher prep programs could be a logical next step to understand the problem of practice. Students with complex communication needs depend upon knowledgeable teachers to support their educational needs. Teachers that are deprived of opportunities to develop necessary

proficiencies in AT implementation can inhibit students' social and academic abilities. Therefore, this study interviewed higher education leaders about their lived experiences regarding the incorporation of AT content and training into the educational curriculum for teacher preparation programs.

CHAPTER THREE

METHODOLOGY

A problem of practice exists in the preparation of preservice teachers to support future students with complex communication needs (CCN). The current literature demonstrates assistive technology (AT) competencies are not consistently embedded into educator preparation courses, which has implications for the education of students with CCN (Andzik et al., 2018; Johnson & Prebor, 2019). The researcher reviewed the literature about preservice educator programs to better understand the problem but has not identified studies that explore the lived experiences of curriculum developers who design teacher education programs.

Chapter 3 provides the essential features of the methodological considerations of the study of inquiry. This interpretive phenomenological analysis study aimed to explore the lived experiences of higher education leaders regarding the inclusion of AT content in educator preparation programs. This chapter provides vital information about the research design and methodological processes conducted. Additionally, the guidelines for this study are delineated to ensure credibility and validity.

Purpose of the Study

The purpose of this interpretive phenomenological analysis study was to explore the experiences of higher education leaders when providing training to preservice teachers concerning assistive technology (AT) competencies in the curriculum. There is an increasing need for teachers to have adequate preparation to provide AT services to students (Da Fonte & Boesch, 2016). For students to become competent communicators with AT, in-service teachers should receive basic competencies in university coursework to be prepared to support future students. Preservice AT training can facilitate the implementation of proper supports for

students. Researchers have discovered a significant correlation between teacher training in university coursework and the extent of support teachers utilized to foster communication for non-speaking students (Andzik et al., 2018). However, the existing research establishes a lack of training for preservice teachers in preparation programs (Andzik et al., 2018; Da Fonte & Boesch, 2016; Johnson & Prebor, 2019). Targeting the experiences of those who develop an educator preparation program curriculum might reveal challenges and barriers to incorporating AT content for preservice teachers and provide a better understanding of the problem.

The research contributes to the body of knowledge of the development of teacher preparation curriculum by exploring the lived experiences of higher education leaders regarding the incorporation of AT content for preservice teachers. The researcher initially investigated the literature about the necessity of assistive technologies provided to students with CCN and how teachers often feel ill-equipped to support the communication needs of students. The lack of AT content in the preservice teacher curriculum was also examined. However, the literature found has yet to inspect higher education leaders' experiences with incorporating AT content into the educator preparation coursework to determine potential challenges and barriers. Therefore, this study expanded the understanding of this phenomenon and the impact of social change for the improvement of the delivery of AT devices and services.

Research Design and Questions

A qualitative interpretive phenomenological analysis research design was used to describe the lived experiences of curriculum developers relating to AT content in preservice teacher programs. Different philosophical underpinnings apply to qualitative research, such as constructivism, which theorizes that realities are socially constructed void of only one reality (Merriam & Tisdell, 2016). Phenomenology is another philosophical structure of all qualitative

inquiry (Creswell & Poth, 2018). Furthermore, phenomenology can also be a methodology applied to some qualitative studies (Creswell & Poth, 2018). van Manen (2016) stipulates that understanding the essence of one's lived experience is the purpose of phenomenology. The notion was furthered by explaining that the researcher has an opportunity to learn from others' experiences to better comprehend the phenomenon being studied (van Manen, 2016). Siedman (2013) posits, "The primary way a researcher can investigate an educational organization, institution, or process is through the experience of the individual people, the "others" who make up the organization or carry out the process" (p. 9). Furthermore, Sloan and Bowe (2014) employed hermeneutical phenomenology as a best-fit methodology for their study to better understand the lived experiences of lecturers as curriculum designers. Exploring curriculum developers' experiences could potentially highlight barriers to including innovative communication technologies for teacher candidates. Identifying barriers can facilitate addressing the underlying causes of the problem of practice in preservice training for AT competencies. Therefore, to grasp an understanding of higher education leaders' experience with integrating AT content into the curriculum for preservice teachers, an interpretive phenomenological analysis research design was employed for this study.

Phenomenological research typically utilizes an interview protocol that includes in-depth, semi-structured interviews with open-ended questions (Siedman, 2013; Smith, Flowers, & Larkin, 2009). In-depth interviews are fitting to understand the lived experience and sense-making of the experience for participants through reflection (Siedman, 2013). Furthermore, in-depth interviews enable the researcher to explore participants' experiences in context, extract details of the experience, and reflect on the meaning (Siedman, 2013). The researcher strived to act as an unbiased investigator by utilizing open-ended questions to elicit genuine responses

from the lived experiences of participants. The interview protocol entailed an in-depth interview, which incorporated background information, provided opportunities for participants to share their experiences and reflect on the meaning of those experiences.

Qualitative studies require research questions to direct the research process and are centered on the central phenomenon to be explored (Creswell, 2015). The central phenomenon explored in this research is the lack of assistive technology competencies in educator preparation curriculum for preservice teachers. Two targeted research questions guided this study:

- How do higher education leaders, including program coordinators, department chairs, and university administrators, describe their experience and beliefs of including assistive technology content into the curriculum for preservice general and special education teachers?
- How do higher education leaders, including program coordinators, department chairs, and university administrators, describe their experience and beliefs about preparing preservice general and special education teachers with the knowledge, skills, and dispositions for collaboration within inclusive schools.

Site Information

Typically, a single site is selected for a phenomenological study (Creswell & Poth, 2018). Therefore, the site for the study is a small private, faith-based university accredited by the Higher Learning Commission (Higher Learning Commission, 2019). The College of Education at the university offers undergraduate educator preparation programs of study. Thirteen specializations are available for teacher candidates to choose from within the program. Preservice teachers can choose between early childhood education, elementary education, secondary education, and special education. Moreover, teacher candidates decide specific teaching fields for their chosen

program, which includes science, math, social studies, or English language arts. There are six programs of study at the graduate level for the College of Education as well. All programs lead to state licensure and therefore adhere to state guidelines.

Creswell, J.W., and Creswell J. D. (2018) emphasize the importance of securing necessary permissions through the gatekeepers of any research site. Therefore, the researcher obtained approval for the project from the institution's administration and adhered to all institutional review board requirements. Respect for daily operations was also maintained throughout the study, with interviews organized around the participants' convenience.

Sampling Method

The intent of qualitative research is to understand the constructed meanings people give to experiences (Merriam & Tisdell, 2016). Purposeful sampling is a strategy used in qualitative phenomenological research that allows a researcher to inquire about an in-depth understanding of the phenomenon being studied by focusing on specific characteristics of contributors (Patton, 2015). Smith et al. (2009) also specify that purposeful homogenous sampling is used with phenomenological research. A non-random, purposeful sampling method involves pinpointing and selecting participants that have experience with the phenomenon of study (Creswell & Creswell, 2018).

Furthermore, criterion-based sampling extends the participant selection procedure by identifying eligibility conditions to be met (Merriam & Tisdell, 2016). The specific criteria to be considered for eligibility to be a participant in the project were isolated to leaders at an institution of higher learning and responsible for curriculum development for the study site's educator preparation program. Participants had a supervisory role with curriculum development and taught courses in the preservice teacher programs. A sample of nine participants was interviewed

and data saturation was encountered (Seidman, 2019). Because qualitative phenomenological research is concerned with understanding the meanings of lived experiences, a non-random, purposeful, criterion-based sampling method was appropriate to understand the experiences of curriculum development for educator preparation programs.

Participants for this study were chosen using a purposeful, criterion-based sample for the isolated study site. Creswell and Poth (2018) explain that phenomenological studies require participants to have experienced the phenomenon to uphold quality assurance. The participant requirements for this doctoral study included higher education leaders charged to influence curriculum development for the College of Education's educator preparation program. Criteria for participation in the study include:

- Must be an employee at the site of study.
- Must actively participate in the development of the curriculum.
- Must have input into the approval of any new curriculum.
- Must have an instructional capacity in the educator preparation programs.

Because the research is a single-site study, confidentiality for all participants was secured throughout the project by using unidentifiable information for the study site and participants. Utilizing a nonrandom, purposeful sample based on the described criteria contributed to information-rich data for the inquiry of experiences with educator preparation curriculum development (Merriam & Tisdell, 2016). Participants were recruited within the department network based on the purposeful criteria within the study site.

Instrumentation and Data Collection

This phenomenological study aimed to explore the lived experiences of higher education leaders concerning the incorporation of AAC competencies in educator preparation programs.

The use of a qualitative, phenomenological design was employed for research into the lived experiences of lecturers as curriculum developers (Sloan & Bowe, 2014). van Manen (2016) advises that the phenomenological interview is a conversation between the researcher and participant in which reflection takes place about the phenomenon of study. The retelling of personal stories and anecdotes have been used throughout humankind as an avenue to make sense of experiences (Siedman, 2019).

Therefore, a phenomenological interview protocol was employed to gain an understanding of the meaning participants attribute to previous experiences with curriculum development for preservice teachers. The phenomenological interview protocol included background information of the participants' experiences pertaining to the phenomena of study, offered distinctive details about the lived experience that were unearthed through the in-depth interview process, and an opportunity to reflect on the meaning of the experience. The interview questions were crafted to further explore the overarching research questions that guided this study.

The interview included demographic information and experiences from the participant's life history that inform their practice. Additionally, there were fifteen overarching questions that composed the second half of the interview questionnaire. For example, participants were asked to describe their experiences with curriculum development and any experiences with integrating assistive technology content and collaborative skills into the coursework for preservice teachers. The last part of the interview provided an opportunity for the participant to reflect on the meaning of their experiences relating to AAC in teacher preparation. Appendix A displayed the foundational questions that were asked during the interview.

Phenomenological interviewing typically involves in-depth, open-ended questions to enable participants to reconstruct experiences on the study topic (Siedman, 2019). In-depth, semi-structured interviews on a one-to-one basis were the data collection method for this study (Smith et al., 2009). The semi-structured interview with open-ended questions served as a way for the researcher to explore the answers to the questions asked, and the ascribed meaning participants make from their experiences (Seidman, 2019). Each interview was 30-60 minutes each. To ensure credibility and rigor was maintained throughout the study, a member checking process was embedded in the protocol (Birt et al., 2016). Participants had the opportunity to review the synthesized, analyzed data to ensure their experiences were accurately captured (Birt et al., 2016).

Interview Protocol

Participants who met the specified criteria were recruited through an email within the department network. The interview protocol included questions about the participants' history, experiences with curriculum development for preservice teachers, and meaning from experiences (Siedman, 2019). The length of interviews was between 30-60 minutes to allow for participant flexibility. Informed consent was explained to the interviewee and obtained prior to being enrolled as a participant. Appendix B includes the form that was used in this research study to request informed consent from the participants. The interviews were conducted through teleconferencing, which allowed the option for recording, or by telephone. No in-person interviewing took place for this study.

The researcher developed a semi-structured interview instrument to reflect the research questions, as noted with Appendix A. The interview protocol included questions about the participants' demographic information and life history, experiences with curriculum

development for preservice teachers, and reflection on the meaning made from those experiences (Siedman, 2019). All in-depth, semi-structured interviews were recorded with participant permission, transcribed, and stored in a secure location at the researcher's home. Transcription was performed by the researcher to gain a deeper familiarization with the material. Any personally identifiable information was removed to ensure the confidentiality of the participants and the study site. Only the researcher knew the identities and responses of the participants to ensure privacy. Generic classification labels such as Contributor 1, Contributor 2, and so on were used to replace participant names in the reporting process. Creswell, J.W., and Creswell, J.D. (2018) explain that validity is enhanced when participants are followed-up with throughout the analysis phase of the research. Member checking was used to offer an opportunity for the participants to review and revise the final report to ensure the accuracy of the findings. Additionally, participants were afforded the opportunity to review the transcribed interview to ensure a textual description of their experiences were accurately portrayed. Participants were provided an opportunity to review the synthesized and analyzed data to ensure participants' experiences are correctly interpreted (Birt et al., 2016).

Precautions were employed to safeguard the study site and population. Ethical considerations for the site included maintaining participant and institutional confidentiality. The researcher ensured that no interview questions compromised the integrity of the institution. All transcripts of interviews were stored in a secure location with only researcher access. No organizationally identifiable information was made publicly available to uphold confidentiality for the site and participants. Data were coded to remove identifying information, and pseudonyms were used.

Pre-study Protocol

The interview protocol was piloted prior to the study to improve the instrument. According to Merriam and Tisdell (2016), piloting the interview provided an opportunity to practice interviewing and revise any questions that could be unclear to the interviewee. An iterative process to the interview can facilitate data collection and analysis. Piloting the interview instrument can support the development of the semi-structured interview questions for the study. Smith et al. (2009) suggest conferring with someone else about the interview questions to ensure the questions capture the participants' lifeworld experiences. The interview questions were piloted with an individual that is not affiliated with the study. Conducting a preliminary interview can reveal any potential issues and strengthen the validity of the study.

One-on-one interviews utilizing a phenomenological interview protocol with open-ended questions were used as the data collection technique for this study. According to Smith et al., (2009), in-depth interviews provide an optimal avenue to elicit rich personal narratives of lived experiences. Phenomenological research is concerned with turning the essence of participants' lived experiences into a textual description (van Manen, 2016). Therefore, in-depth, semi-structured interviews utilizing a nonrandom, purposeful sampling of participants was recorded and transcribed with permission from the interviewees.

Data Analysis

As a qualitative phenomenological study, heavy reliance is placed on data collection and interpretive analysis (Smith et al., 2009). van Manen (2016) summarizes six activities for phenomenological studies, which include:

1. Determining a topic in which the researcher is interested,
2. Exploring experiences as they are lived rather than how it is conceptualized,

3. Contemplating principal themes about the phenomenon,
4. Utilizing rich written language to describe the phenomenon,
5. Upholding a strong connection to the phenomenon,
6. Equalizing the research by ensuring the parts reflect the posed questions.

Conducting a thematic analysis can be done by reflecting on key themes that emerge from the collected data (van Manen, 2016). Each recorded in-depth interview was transcribed for analysis. The data was organized and analyzed through CAQDAS software known as NVivo (Siedman, 2019). Data were reduced inductively by searching for key elements that were revealed and winnowing the transcripts (Siedman, 2019).

Once the transcription was complete, a thorough reading of the transcripts was performed, and interesting details were highlighted. Exploratory notations were used to provide a rationale for the highlighted text (Smith et al., 2009). In-vivo coding and descriptive coding was used to ensure the analysis was oriented on each participants' experiences (Saldana, 2016). Emerging themes were developed based on transcribed interviews and exploratory comments by coding the interesting descriptions. The themes were examined for connections, and then the process was repeated with each transcript. Smith et al. (2009) recommend treating each transcript individually to capture the uniqueness of each participant's experiences and allow new themes to emerge. Once all transcripts were coded and reflected upon, the researcher looked for patterns within the themes. Identifying recurrent themes were determined if themes were present in over half of the participants' transcribed interviews to adhere to Smith, Flowers, and Larkins' (2009) suggestions and increase the validity of the study. The data were analyzed and saturation was reported in the themes.

Limitations of the Research Design

Limitations exist in all research projects and acknowledging the constraints that can affect the interpretation of the findings is critical to safeguarding the study (Bloomberg & Volpe, 2015). Phenomenology is concerned with eliciting rich descriptions from participants' experiences about the phenomenon. Consequently, the data collected are required to include significant details from participants' experiences. Each participant varied in the level of details shared during the interview, which is one limitation to the study design (Smith et al., 2009). The researcher utilized semi-structured, in-depth interviews on a one-to-one basis to account for this potential limitation. Another possible limitation of this project was the use of a single study-site with a small purposeful sample, and the results may not be broadly applied to all institutions of higher learning. Any future research using a similar design may be able to draw parallels from the curriculum designers in this study even though the results will not be identical.

Credibility

Qualitative research requires an emphasis on the credibility or reliability of the research findings to ensure the participants' experiences are accurately interpreted (Korstjens & Moser, 2018). Four principles have been established to assess the credibility of phenomenological research studies (Smith et al., 2009). The four principles include:

1. Demonstrating sensitivity to context through the relational aspect of conducting interviews and textualizing the participants' lived experiences,
2. Displaying commitment and rigor throughout the data collection process by being attentive to the participants and thoroughly analyzing the transcribed interviews,
3. Maintaining transparency and coherence by clearly articulating the research process and adhering to phenomenological principles,

4. Aspiring for the research to make an impact and be important to the field (Smith et al., 2009.

The researcher ensured credibility was upheld in this project through prolonged engagement with the participants (Korstjens & Moser, 2018). Multiple cycles of analysis were conducted to capture representative themes for participants' experiences. A member checking procedure also solidified the credibility of this research project. Engaging in these activities produced a reliable and sound study as the researcher strived to make an impact on teacher preparation curricula.

Member checking procedures. A member checking process was employed in this study to enhance reliability and validity. Member checking can be applied in the data analysis phase to ensure the credibility of the findings and interpretations is achieved (Bloomberg & Volpe, 2015). Participants could review the transcribed interview as the first step in the member checking process. Then the participants were invited to assess the findings to certify their lived experiences are accurately represented in a textual format.

Additional member checking measures included a hypothetical independent audit to enhance validity (Smith et al., 2009). Yin (as cited in Smith et al., 2009) proposes that validity can be checked by storing the data to allow others a way to "follow the chain of evidence that leads from initial documentation through to the final report" (p. 183). Therefore, data were filed to provide a paper trail of the raw data and written findings to ensure validity and confirmability are maintained throughout, and the research remains transparent. For example, any memos from the development of the research, the proposal, interview questionnaires, and coded de-identified transcripts were kept on the researcher's password-protected computer, which served as an independent audit trail.

Transferability

Qualitative research is not necessarily concerned with generalizing findings of a study as in quantitative research but instead focuses on transferability in which findings might be applied in similar organizational scenarios (Bloomberg & Volpe, 2015). To promote transferability to other settings, the researcher provided rich, thick descriptions to vividly portray the described experiences of participants. Doing this can permit others to draw parallels between the findings in the study and applicability to their context or setting. Descriptions of the context, sample, sample size, selection criteria, interview questions, and findings were provided to address transferability for this project (Korstjens & Moser, 2018).

Validity

Quality and validity are vital components for strong interpretive phenomenological analysis studies (Smith et al., 2009). van Manen (2016) posits four conditions of substantial validity within phenomenological research, which include descriptions that are oriented, strong, rich, and deep. The researcher remained oriented to the data in a reflexive manner to describe the participants' experiences in-depth. Interpretations of the experiences of curriculum development were strengthened by engaging in the hermeneutic circle, or the dynamic interplay between parts of the data and the whole in multiple layers (Smith et al., 2009). The hermeneutic circle ensured the textual descriptions were depicted both richly and deeply. Additionally, the member checking procedures in addition to the in-depth interviews enhanced the validity and quality of the study.

Confirmability

A study's confirmability ensures the researcher's viewpoints do not influence the interpretations but are based on the data collected (Korstjens & Moser, 2018). The use of an audit trail, as previously mentioned, increased the project's confirmability. Creswell and Poth

(2018) explain that confirmability establishes the value of data and is implemented through the auditing of the research process. Therefore, the researcher addressed confirmability by filing the data so another researcher could retrace the steps taken throughout the research process. The researcher remained transparent throughout the study's development until completion of the project.

Ethical Issues in the Study

Merriam and Tisdell (2016) explain the importance for researchers to engage in ethical practices and attempt to predict any potential ethical issues before conducting research. To uphold ethical practices, the researcher adhered to all ethical requirements outlined in Title 45, Part 46 of the U.S. Code of Federal Regulations (e-CFR, 2019). Prior to collecting data, the researcher obtained IRB approval from the university and maintained ethical requisites throughout the research process. All recruited participants received a form regarding informed consent stipulations and offered voluntary acceptance to contribute described experiences for the study. Siedman (2019) affirms that informed consent can facilitate an understanding of any potential risks before participation to help guard against any vulnerabilities and certify the right for protection. The purpose and potential benefits of the study were delineated in the informed consent document. An assertion of confidentiality for participants was also included in the consent form.

Participants were offered an explanation of the right to terminate involvement in the study at any time throughout the study. Any personally identifiable information regarding the participants were safeguarded by utilizing pseudonyms for records, recordings, and transcripts, such as Contributor 1, Contributor 2, etc. The researcher had access to the decoded data regarding participant information. Additionally, interview recordings and transcriptions were

stored on a secure, password-protected computer. Any digitally collected data were erased from the device, and any printed material will be shredded after five years.

Conclusion and Summary

The purpose of the research and the strategy for implementing the research project was delineated in this chapter. This interpretive phenomenological analysis study focused on two primary research questions about the lived experiences of curriculum developers when designing assistive technology coursework and incorporating collaborative skills for preservice teachers. The strategy for conducting the study involved an educator preparation program at one university with a purposeful, criterion-based sampling method for participant selection. Nine higher education leaders responsible for the curriculum development of an educator preparation program were recruited for this study. A phenomenological interview protocol utilizing semi-structured interviews on a one-to-one basis was the data collection procedure. The data was analyzed using in-vivo and descriptive coding to depict key themes from participants' experiences.

Furthermore, this chapter provided details about the approach in this study to ensure reliability and validity throughout the process. Other inclusions involving the ethical considerations and strategy were described. The study aimed to document the lived experiences of higher education leaders regarding educator preparation curriculum development to understand any barriers when implementing innovative communication technology competencies and collaborative dispositions for general and special education preservice teachers.

CHAPTER FOUR

DATA ANALYSIS

The first three chapters presented an introduction to the problem of practice, a review of the literature, and a description of the methodology applied in this study. The problem of practice introduced in the first chapter highlights the absence of data about how teacher educators perceive their roles and responsibilities in learning about assistive technology (AT) and including AT competencies into educator preparation curriculum. Teachers are often required to educate students that need AT devices and services without ever receiving any AT training (McNaughton, Light, Beukelman, Klein, Nieder, & Nazareth, 2019). The lack of training is a prominent barrier to the successful implementation of AT for students with disabilities that could receive benefits for communication purposes and an enhanced quality of life. Additionally, the review of the literature presented evidence of previous research on the topic of assistive technology and teacher preparation on inclusive practices for students with disabilities. The second chapter also provided information regarding the conceptual and theoretical framework applied in the study. This study is viewed through the lens of Roger's (2003) diffusion of innovation theory as the theoretical framework. Lastly, the third chapter included details about the research design and scope of the study, which includes details of the interpretive phenomenological analysis methodology.

Chapter four presents a summary of the findings from the phenomenological interviews with higher education leaders. The results of the study are structured in a way that is associated with the two primary research questions guiding this inquiry project about experiences with assistive technology adoption within the educator preparation curriculum. The fourth chapter

provides a review of the methodology, an overview of the research questions, the data analysis, and a presentation of the findings.

Review of the Methodology

The purpose of this qualitative interpretive phenomenological analysis study was to explore the lived experiences of higher education leaders about equipping teacher candidates with AT knowledge and skills within the educator preparation curriculum. A qualitative interpretive phenomenological analysis was chosen to capture the essence of the participants' lived experiences with curriculum development that includes AT training for preservice teachers. In-depth, semi-structured interviews with open-ended questions using a non-random, purposeful sampling method was employed in this study. The interview protocol included background information, and opportunities for participants to share their experiences and reflect on the meaning of their experiences. More specifically, the participants were invited to describe their experiences with curriculum development and any experiences with integrating assistive technology content and collaborative skill-building into the curriculum for preservice teachers. The data collection instrument is exhibited in Appendix A.

The recorded interviews were transcribed by the researcher and analyzed using in-vivo and descriptive coding to uphold the orientation of the participants' experiences. Additionally, a criterion-based sampling was used to ensure the participants had influence over curriculum development for preservice teachers. The specific criteria for participants included:

- Must be an employee at the site of study.
- Must actively participate in the development of the curriculum.
- Must have input into the approval of any new curriculum.
- Must have an instructional capacity in the educator preparation programs.

Participants

Potential employees of the research site that met the criteria were invited to participate via email correspondence once the researcher gained IRB approval. Additionally, interviews were scheduled and recorded with consent through teleconferencing technology. There was a total of nine participants interviewed in this study that met the specified criteria noted previously. Each participant was labeled as Contributor 1, Contributor 2, Contributor 3, etc. to maintain confidentiality. For this study, 2 (22%) of the participants were male and 7 (78%) female. The years of higher education leadership experience ranged from 1 year to 23 years. Furthermore, the roles that participants served included administrators, department chairs, and program chairs as demonstrated in Figure 2.

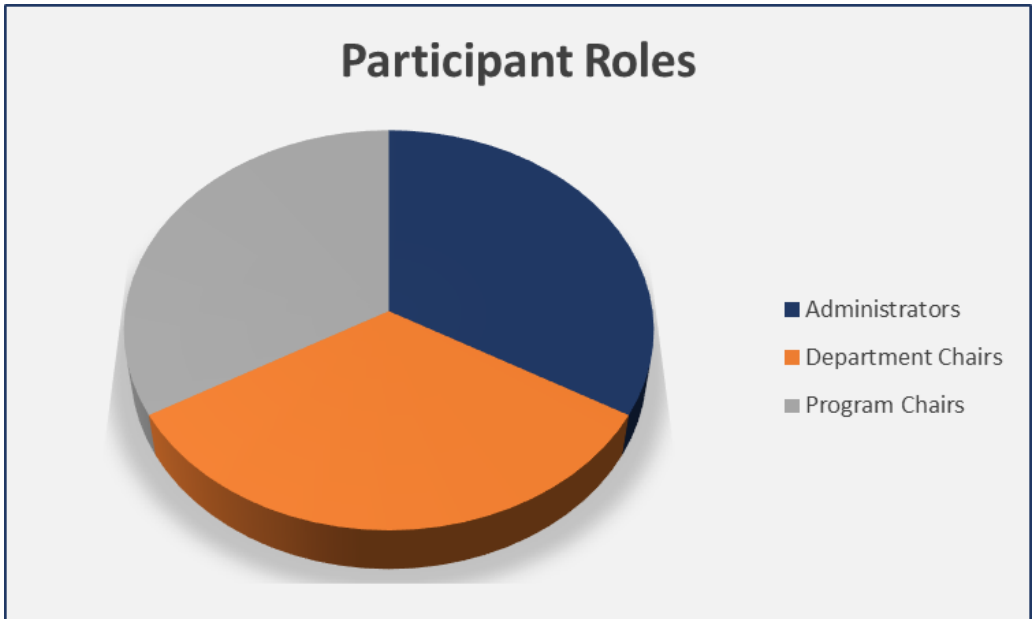

Figure 2. Participant Roles

Note. This figure illustrates the roles participants serve at the institution.

Research Questions

The central phenomenon explored in this study was the experiences of higher education leaders regarding the integration of assistive technology competencies in an educator preparation program. The researcher sought to discover the complex set of factors relating to the central phenomenon to present the various perspectives that participants exhibit (Creswell, 2018). Two overarching research questions guided this study.

- How do higher education leaders, including program coordinators, department chairs, and university administrators, describe their experience and beliefs of including assistive technology content into the curriculum for preservice general and special education teachers?
- How do higher education leaders, including program coordinators, department chairs, and university administrators, describe their experience and beliefs about preparing preservice general and special education teachers with the knowledge, skills, and dispositions for collaboration within inclusive schools.

Data Analysis

The recorded interviews were transcribed and delegated a number to remove personally identifiable information and uphold the confidentiality of the participants. The de-identified transcripts were housed on the researcher's password-protected computer and will be erased after five years from the publication date of the dissertation. In-vivo coding was used initially, which involves using the participant's language. Then descriptive coding was used for winnowing the data by summarizing the excerpt in the transcript. The coding process helped to reveal five primary themes represented in the data, which are as follows and are described in detail in subsequent sections of this chapter:

1. Lack of knowledge
2. Lack of AT adoption
3. Willingness to innovate
4. Need for collaboration
5. Established Norms/Mental models

Qualitative coding procedures were utilized to identify thematic commonalities amongst participant responses. Table 1.1 provides a visual summary of the categories found in the coded data. Key research points resulting from the analysis were vetted against the primary research questions discussed in further detail later in this chapter.

Table 1

Coded Data Categories

Minimal experience	Resource allocation	Comfort with technology	Social barriers/economics	Training
Lack of training	Bureaucratic	Universal design	Cost of adoption	Faculty development
Lack of knowledge	Mental Model/Paradigm Shift	Knowledge management	Social constraints	Reactive vs. proactive culture
Lack of awareness	Early Adoption	Shared knowledge	Technical skills gap	Resistance to change
Lack of exposure	Currency in field	Collaboration	Organizational culture of adoption & creativity	Subject matter expert

The coded data categories were aggregated into functional themes corresponding to the research questions and the theoretical framework applied in this study. Table 2 provides a visual summary of the primary themes in the data and the related categories. Five themes were determined from the coded data categories and visually represented below.

Table 2

Five identified themes from data

Themes	Subthemes
Lack of Knowledge	Lack of experience, Lack of training, Lack of awareness, Lack of exposure, Currency in the field, Lack of expertise
Lack of AT Adoption	Universal design, Comfort with technology, Resistance to change, Cost of adoption, Social barriers, Resource scarcity
Willingness to Innovate	Bureaucratic, Reactive vs. Proactive culture, Culture of creativity, Practical application
Need for Collaboration	Shared knowledge, Knowledge management, Subject matter expert, Modeling
Established Norms/Mental Models	Habits, Routines, Agents of change

Data Saturation

Saldaña (2016) describes data saturation as the part of the process when no new information is discovered during the coding process. Creswell, J.W. and Creswell J. D. (2018) further this notion by explaining that saturation helps the researcher know that the sample is adequate. In this study, data saturation was achieved after six interviews. However, three additional interviews were conducted to enhance credibility of the study, ensure saturation was achieved, and that the sample was satisfactory. Table 3 and Figure 3 provide a visual presentation of the number of participants who discussed the themes during the interviews. The visual diagrams illustrate the level of data saturation achieved in this study.

Table 3

Number of participants who discussed themes

Themes	Number of participants who discussed themes
Lack of Knowledge	9
Lack of AT Adoption	7
Willingness to Innovate	9
Need for Collaboration	9
Established Norms/Mental Models	7

Each theme was discussed by most of the participants during the interviews as represented in Table 3 and Figure 3. Three of the themes were experienced by all the participants in this study, which included a lack of knowledge, a willingness to innovate, and a recognized need for collaboration. Two of the themes were experienced by 7 out of 9 of the participants, which were a lack of AT adoption and established norms.

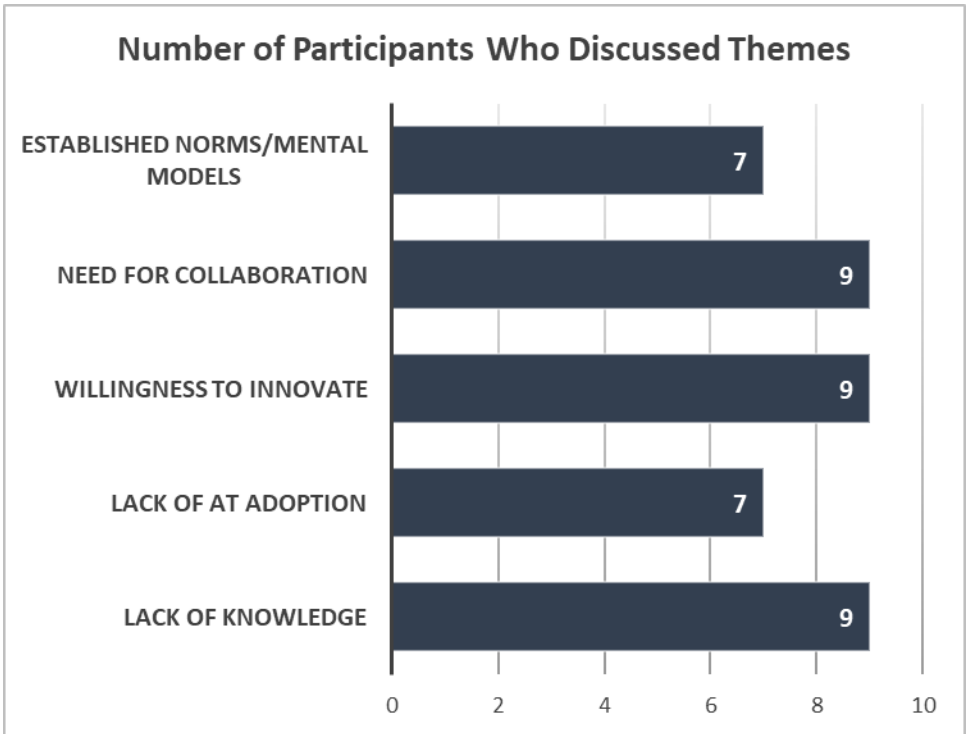

Figure 3. Number of Participants Who Discussed Themes

Note. This figure illustrates the number of participants who discussed the themes.

Presentation of the Findings

The presentation of the findings section describes in further detail the common themes identified in the data. The primary themes relate to the experiences and beliefs with assistive technology adoption and building collaborative skills in an educator preparation program. Subthemes connected to each theme are discussed in this section as well to further highlight the participants' experiences and beliefs.

Background information was explored to gain an understanding of how participants' life history informed their thinking about inclusive education and assistive technologies. Several of the participants had family members that were educators and other mentors, which influenced their decision to pursue the field of education. Additionally, many of the participants described

always having an interest in the helping professions such as teaching, nursing, or counseling. For example, one participant noted:

> First of all, both of my parents were teachers. My Dad was a high school teacher and my Mom was a grade school teacher. So, I think that had an influence. I also had three really good English teachers in high school. I think all three of them were role models for me and they made a huge impression on me as far as being creative with assignments and putting forth a lot of effort. Ever since I was younger, I enjoyed the process of learning and I've always read a lot.

Participants generally described being interested in helping people. Their varied experiences and interests directed them towards education. Many participants discussed opportunities that altered the trajectory of their original plans. To illustrate this one participant discussed interest in the nursing field that ultimately led to the education field.

> I never really thought of being a teacher growing up because I always wanted to be a nurse. I came from a family of nurses. In fact, I canceled a trip the night before I was supposed to attend Charity Hospital in New Orleans on a full ride nurses' training scholarship because of pressure from my mother. That really changed the course of my life and I just wanted to help people.

The participants had very minimal experiences with inclusive education growing up and did not have any exposure to students with significant disabilities that required assistive technology. One participant had a peer with disabilities in shop class during the early 1990s and recalled all students helping when the need arose. Other participants described instances of supporting students with disabilities during their teaching careers in the public school system. However, none of the participants expressed experience teaching students with significant disabilities in a

general education classroom or who used assistive technology. The following primary themes were discovered in the data analysis.

Theme 1: Lack of Knowledge

The principal theme linked directly to the first research question and related to the general absence of specific knowledge about assistive technology and how to prepare teacher candidates to employ it in their classrooms. Despite many years working in the field of education, 8 of 9 (89%) of the higher education leaders interviewed, indicated a deficiency of awareness, knowledge, exposure, and training on assistive technology for communication purposes. There were several similar phrases mentioned by participants that expressed minimal experience, if at all with assistive technology in general. One participant described the following:

> I agree that teachers are unprepared for assistive technology because if I hypothetically had a student with disabilities and all of a sudden, I have to learn how to deal with a student with disabilities, I would have to learn how to help that student right away. I think teachers need the opportunity to warm up to it and not have to do it all of a sudden.

This comment highlights a common theme amongst participants' lack of knowledge about assistive technology.

Lack of experience, awareness, exposure, and expertise. The elements highlighted as subthemes are associated with an overall lack of knowledge of AT. A general deficiency of awareness and expertise can affect whether AT is adopted for preservice teachers. If curriculum developers are not aware of the need for AT or have no expertise of various technologies, teacher candidates are at risk of being unprepared to implement AT for future students with disabilities. However, one participant did have knowledge and training on assistive technology. The proceeding comment emphasizes expertise on AT.

> I live in region or hub of where technology evaluators are out of, so I am able to go down and pick their brain or try out their new tech or even just do research for it. They are a great resource. They usually go to special education directors' meetings every other month and give updates and how to get contacts. They bring their toys with them and we get to try them out during meetings and stuff. I have learned a lot about assistive technology from them and they even have a lending library.

It is interesting that this participant lives near the state's assistive technology evaluation headquarters and has regular communication with the evaluators. The increased level of access and recurrent training from experts in the AT field is a stark contrast from other participants in this study. This interviewee has historically served as a point of contact to request AT evaluations for students and trained paraprofessionals how to use the devices. The participant also has a keen interest in technology and a special education background. The other participants did not have that degree of access, exposure, or training on assistive technology.

Knowledge, awareness, and exposure are required as an initial step in the adoption process. This is consistent with Rogers' (2003) diffusion of innovation theory. The innovation-decision process of Rogers' theory includes five stages. The first stage is about gaining knowledge of technology (Rogers, 2003). Therefore, adopting assistive technology into the curriculum for preservice teachers requires curriculum developers to be knowledgeable about AT as a beginning step in the process. The lack of knowledge for the participants in this study can impact the uptake of AT into educator preparation curriculum.

Theme 2: Lack of Assistive Technology Adoption

A second theme was revealed as a result of the lack of knowledge and expertise from participants. An overall deficiency of assistive technology adoption into educator preparation

curriculum was the second theme. This theme also directly linked to the first research question about exploring experiences of higher education leaders about embedding assistive technology coursework for preservice teachers.

To embed AT into the educator preparation curriculum, knowledge, expertise, and ongoing training is a necessity for preservice teachers to become proficient with AT. Lacking knowledge and expertise profoundly impacts the adoption of AT for teacher candidates. Therefore, a deficiency of AT adoption was represented in the participants' experiences. In this study, 8 of 9 (89%) of the participants did not express experiences with integrating AT content in the curriculum. One participant stated:

> I feel like we are lacking a little bit on that area. We might need to add some of that information in. Not necessarily that it's not there but it might be such a small section that it is just glossed over that maybe that isn't an area that we are strongly preparing our students. We are telling them that they are going to have these students and it is a possibility that they will be in their classroom but that is pretty much it. You know it is like a one-day discussion that there isn't really any preparation and more of like an introduction.

While this participant noted that it might be covered as a one-day discussion to introduce the concept of AT, an absence of specific content on AT may not adequately prepare teacher candidates to educate students with disabilities. However, this participant went on to describe ways teacher candidates are prepared to utilize inclusive practices for students with significant disabilities through an Intro to Special Education course as well as during a classroom management course. In these courses, teacher candidates learn about IEPs and how to prepare IEPs and other basic skills for dealing with different disabilities in the classroom. The participant

noted that teacher candidates also take a technology-based course and are introduced to Zoom and Blackboard. These are important skills for all teachers to learn, but they might not be detailed enough for new teachers to be fully prepared to enact those competencies with practical application. Another barrier was described by a participant that mentioned a lack of access to all of the different technology programs teacher candidates use during their student teaching courses. School districts utilize many different platforms and the university supervisor does not have access to the same platforms to train the student teachers during their coursework. Therefore, school districts are the ones that train the student teachers and those experiences vary widely. Another interviewee provided personal experiences about preparing teachers to integrate technology, which are as follows:

> Students share with me their experiences with technology becoming more and more prevalent. I wish I could say I had more of an impact on teachers and integrating technology into the classroom, but I just lived during this time that was in a real transitional place.

This sentiment sheds light on the overlap between a lack of knowledge, exposure, and awareness with the lack of AT adoption. If higher education leaders are unaware or lack knowledge about AT, it will not be embedded into the curriculum for teacher candidates.

Universal Design, Comfort with Technology, and Resource Scarcity. The subthemes associated with the lack of AT adoption provided additional insight into the experiences and beliefs of curriculum developers for educator preparation programs. Experiences using general technology to benefit all students was discussed by 7 of 9 (78%) of the participants. One interviewee provided insight into an experience supporting a student who was hard of hearing through curriculum development.

> As an administrator, we've had students with unique learning needs. For example, a student who was hard of hearing. Modifying curriculum and adjusting a class so the content is delivered in a way so that if a student who is deaf or hard of hearing can either have lectures recorded with closed captioning or in text format so that it is able to be read. I think more than anything we have tried to focus on creating courses and curriculum that if you take that class and whatever your preferred learning method is, or time whether that is synchronous or asynchronous, or how you engage and interact with the material, that we meet as many needs as possible.

The description from this participant highlights experiences with designing curriculum to coincide with one aspect of Universal Design for Learning (UDL), which is multiple means of representation (Bracken & Novak, 2019). UDL is an inclusive framework that offers variability in three critical areas, multiple means of engagement, multiple means of representation, and multiple means of action and expression. Multiple means of representation, as described by this participant, is one area of the UDL framework in which teachers offer content in a variety of formats to meet learners' needs. The UDL framework is complementary to the integration of assistive technology to improve the education of students with disabilities. However, an understanding of the various assistive technologies is needed to amplify the success of all students. Other participants mentioned that technologies such as Zoom, PowerPoint, and Grammarly can be beneficial to all students. As stated by one participant:

> When I think of assistive technology, what comes to mind is Grammarly because that is a way to help students that have trouble with English and writing fluently and it helps students where English is their second language. But Grammarly is assistive technology that helps everyone whether they have a disability or not.

Additional factors were noted in the experiences and beliefs of participants relating to the lack of AT adoption. Comfort with technology, cost of adoption, and resource scarcity were discussed by participants. For instance, one interviewee mentioned "If a teacher is not comfortable with an assistive technology device, that can definitely influence access and decision-making." Also, when discussing professional development on AT, one participant stated the following:

> One of the challenges of working at a private institution is the lack of funding to go out and do professional development because when you work in the public sector, there is so much funding to do some really cool things like that. I think I learned the most from my colleagues that have similar passions.

The lack of funding for professional development can be a contributing factor for the absence of currency in the field, which impacts AT adoption in educator preparation curriculum. Professional development on AT was also rarely experienced by participants and can influence the uptake of AT for teacher candidates. As stated by one participant:

> One of my weak areas is professional development on assistive technology. I was a go-to person for curriculum development, but not so much for training on assistive technology. I have researched it, but I'm not trained on it other than using an iPad, laptop, whiteboard, or smartboard, but not specific to assistive technology. I would do professional development in schools to show them how to use apps on iPads.

Curriculum development for preservice teachers in the 21st century requires knowledge of how to support diverse classrooms. Classrooms in the 21st century can include students with significant disabilities that need assistive technology devices and services. A lack of knowledge

and expertise for curriculum developers in AT can impact the preparation of teacher candidates to serve students with diverse needs in the classroom.

Theme 3: Willingness to Innovate

After analyzing the data, another theme emerged about participants' willingness to innovate, which is a core tenet of the research site. In this study, all 9 (100%) of the participants were keenly interested in the topic of assistive technology. Overall, interviewees expressed the need to prepare teachers with AT competencies, but not all of them were embedding AT content in the curriculum when interviewed. Multiple subthemes emerged relating to the willingness to innovate, which include bureaucratic factors, a reactive vs. proactive culture, a culture of creativity, and practical application.

Primarily, participants agreed that preparing teachers with AT knowledge and skills was a viable strategy to consider for future curriculum development efforts. Respondents mentioned the necessity for teachers to have knowledge about AT and supporting students with significant disabilities in a general education classroom. As stated by one participant, "Teachers need background knowledge to be ready for those one or two students with significant disabilities they will have." A need for teachers to have background knowledge on AT was mentioned by other participants as well. Another participant stated, "There is a huge opportunity and need for educator preparation programs to train teachers how to use these technologies." While a different interviewee specifically stated, "AT training is important for preservice teachers, but I don't know how to do that." How-to knowledge directly links to Rogers' (2003) diffusion of innovation theory. According to Rogers (2003), how-to knowledge is part of the learning process when first introduced to new innovations and technologies.

Bureaucratic factors and Reactive vs. Proactive culture. The emerging interest in assistive technology and recognizing the importance of implementing it for teacher candidates is promising for future program review initiatives. However, there were multiple facets that seemed to impact participants' willingness to innovate. One of those involved bureaucratic factors. Educator preparation programs are facilitated by state requirements, which was discussed by 3 of 9 (34%) of participants. One participant illustrated the following statement.

> The initial threshold is what the state requires. Then use national standards such to strive for such as CAEP accreditation. That is going to be higher. We know we are in the second poorest state. We know our education system is minimal in New Mexico so let's not make that the stopping point.

Other respondents mimicked the same opinion about state requirements not being a high enough bar to set for educator preparation programs. One interviewee discussed a need to be innovative, but that the bureaucracy makes it difficult to do because the state might not adopt new changes, which demands educator preparation programs to supplement the curriculum in addition to state requirements. There is a constant need to maintain compliance with state statutes for educator preparation programs as well. Another participant cited that it is "easy for curriculum developers to get caught up in how convoluted everything can be and all the requirements that some may lose sight of the real picture of what we are doing as educators." It is evident from the interviews that mandates from the state influence higher education leaders' ability to be innovative when developing curriculum for teacher candidates.

Another subtheme that emerged from the transcribed interviews was a reactive vs. proactive culture. Analyzing the data, 5 of 9 (56%) of participants described experiences in which they waited until the need arose to learn how to support students with disabilities. For

example, one respondent noted, “When a need arises, that’s really when I start researching what that student needs.” A more proactive approach would ensure that one has background knowledge on a variety of assistive technologies that could benefit students with disabilities. One participant described a tendency to be reactionary and put a Band-Aid on when a need arises, but then change it back, which is counterproductive to being innovative. Shifting to a proactive culture may facilitate AT adoption for teacher candidates.

An overall willingness to innovate amongst participants was prevalent. Most respondents described themselves as lifelong learners and interested to learn more about AT in the future. Addressing state mandates strategically and shifting to a proactive culture may benefit the uptake of AT into program review initiatives.

Theme 4: Need for Collaboration

To address the second research question, specific questions were asked to the interviewees about their experiences and beliefs about preparing teacher candidates with the competencies required for collaboration with a student’s team members. Each person interviewed within this study valued collaboration as a necessary skill to teach undergraduate preservice teachers. Several subthemes were discovered relating to the need for collaboration as well, which included shared knowledge, knowledge management, subject matter experts, and modeling.

Knowledge management, subject matter experts, and modeling. Participants described various strategies to encourage the acquirement of collaborative skills for teacher candidates. One respondent suggested the use of a book titled *Crucial Conversations: Tools for Talking When the Stakes are High* by Patterson, Grenny, McMillan, and Switzler (2002), because it describes how to have difficult conversations. Another participant conferred the

importance of a strong administrator to provide the time and space for people to collaborate, discuss, share, and build with each other. This participant had experiences with a partnering program that included a special education teacher co-teaching together to address all students' needs in the classroom. However, the leadership changed and eliminated the program after a successful three years despite being presented with positive assessment data and parental input. The description from this participant illustrates the importance of administrative support that values inclusive best-practices.

Other participants explained their approach to fostering the attainment of collaborative skills through classroom activities. Group work and modeling collaborative skills was mentioned by 4 of 9 (44%) of the participants. As described by one respondent:

> Collaboration is a skill that takes a lifetime to develop and with undergraduates we have to be sure to do small group projects where they learn to collaborate with small groups every time you have a class period. Education is getting much better at having students learn that but learning to collaborate in small groups is the best way to learn it for the future. Practical experience helps build those skills. Weekly discussions impact collaborative skills. Practice with being clear with writing is important.

It was very evident that all participants valued collaboration and preparing teacher candidates to refine those skills through practical application. One interviewee expressed that teaching by example and sharing passions and beliefs with preservice teachers influence collaborative skill-building and being willing to learn from others.

Several of the administrators interviewed suggested the use of subject matter experts to improve curriculum development endeavors and prepare teacher candidates to support students with significant disabilities. When describing a desire to learn more about inclusive education,

one participant verified reliance on experts on the educator preparation team to utilize best practices and engage in applicable faculty development. Another respondent noted the breadth of experience with instructors in the educator preparation program that is key to preparing teacher candidates. The interviewee went on to state, “The fact that we have faculty with that knowledge and experience brings something to the table that they might not get from the classroom.” The use of subject matter experts can facilitate curriculum development for preservice teachers.

All participants in this study portrayed the importance of collaborative skills being taught within the educator preparation program. Various strategies were described to facilitate the refinement of collaborative skills to be used with inclusive teams. Reflecting on these strategies might help to expand and leverage dispositions to build collaborative skills for preservice teachers.

Theme 5: Established Norms/Mental Models

The findings from this study revealed established norms and mental models as a theme. Mindsets was represented in the data as a factor contributing to curriculum development and preparing teacher candidates for the profession. In this study, 7 of 9 (78%) of participants discussed experiences relating to established norms. Habits, routines, and agents of change were subthemes relating to mental models of individuals.

Concerning mindsets, one participant said it best, “People get stuck in, ‘Oh, this is how we’ve always done it, and this is how we need to do it.” This statement summarizes this theme as a common factor in the field that hinders innovations from being adopted. Another respondent stated, “Everybody has a gift and our education system is not structured to funnel people to their gifts.” These examples of established norms make it challenging for curriculum developers to integrate new and emerging ideas to adequately prepare teacher candidates.

Habits, routines, and agents of change. The additional subthemes relating to established norms and mental models provides deeper insights into the two research questions guiding this study. The participants shed light on soft factors that influence the preparation of preservice teachers. For example, one respondent mentioned, "I think inclusion, awareness, and appreciation for differences is an ongoing process, just like trying to get rid of racism is an ongoing process." Facilitating preservice teachers' development of dispositions is necessary to address shifting mindsets and encouraging agents of change within the education field. Shifting mindsets was also discussed by another participant. The administrator mentioned that diversity is a core value of the institution and having faculty adopt that mentality and model it for preservice teachers helps to shift mindsets.

Inclusive education and supporting students with significant disabilities in a general education classroom is not widely accepted by everyone. For example, one participant provided the following description:

> Regular ed teachers do not have the training that is necessary to fully address all students' special education needs. I have been a regular ed teacher in very large classes and it is impossible to accommodate and do everything that is required for a regular ed teacher to instruct all students in a large classroom and meet all their needs. It's a little bit unfair to do that to a teacher, especially in our core areas like math, English, and science. I did not have time. I felt like the high-achievers were ignored because I was so busy trying to address the students that had high needs. It was hard to make it even.

Teachers need knowledge of best practices for inclusive education and administrative support to help all students succeed in the classroom. Supporting students with significant disabilities in a general education classroom cannot be just one teacher's responsibility. Adequate preparation

within undergraduate programs is paramount to shifting the habits, routines, and creating agents of change to propel inclusive education forward.

Summary and Transition

The aim of this study was to explore the lived experiences of higher education leaders regarding the integration of assistive technology into the educator preparation curriculum for preservice teachers. Learning from the experiences of these curriculum developers provided an opportunity to understand and make sense of the problem of practice of a lack of AT adoption for teacher candidates. Participants signified a deep passion for life-long learning and being willing to implement new and emerging innovations into the educator preparation curriculum and preparing preservice teachers to learn collaborative skills. The current lack of experience, awareness, and knowledge of AT has influenced the lack of adoption into the curriculum for preservice teachers.

The fourth chapter presented the findings of the study about curriculum developers' experiences with incorporating AT in the preservice teacher curriculum. A review of the methodology, an overview of the research questions, data analysis, and a presentation of the findings were provided in this chapter. Multiple visual diagrams were offered to present the participant roles, themes and subthemes, and coverage of the themes. The researcher articulated a descriptive analysis of the themes consistent with interpretive phenomenological analysis. The final chapter of this dissertation offers conclusions and recommendations for further study and application.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

The goal of this interpretive phenomenological analysis (IPA) research study was to explore the experiences of higher education leaders regarding the integration of assistive technology (AT) content into the educator preparation curriculum. Teachers often feel unprepared to meet the AT needs of students with significant disabilities in a general education classroom (Aldabas, 2017; Andzik et al., 2017). Educator preparation programs are positioned to adequately train teacher candidates to incorporate AT devices and services in the classroom. There is an area of deficiency in the curriculum for teacher candidates if teachers feel unprepared to employ AT for students who need them. This study investigated curriculum developers' experiences about training preservice teachers on assistive technology competencies.

The preceding chapter discussed the data analysis and findings resulting in five overarching themes from higher education leaders' experiences. The primary themes discovered in the data were: 1) lack of knowledge, 2) lack of AT adoption, 3) willingness to innovate, 4) need for collaboration, and 5) established norms/mental models. Tables and figures were included to visualize the data analysis process as well. The fifth and final chapter provides information on the conclusions and recommendations for this study.

Review of Research Questions and Summary of Responses

According to Smith, Flowers, and Larkin (2009), qualitative phenomenological studies necessitate centralized research questions. Centralized research questions enable the researcher to discover the related set of elements surrounding the central phenomenon and present the diverse perspectives that participants hold (Creswell, J. W., & Creswell, J. D., 2018). The following two research questions directed this study.

- How do higher education leaders, including program coordinators, department chairs, and university administrators, describe their experience and beliefs of including assistive technology content into the curriculum for preservice general and special education teachers?
- How do higher education leaders, including program coordinators, department chairs, and university administrators, describe their experience and beliefs about preparing preservice general and special education teachers with the knowledge, skills, and dispositions for collaboration within inclusive schools.

Summary of Responses

Program chairs, department chairs, and university administrators that serve a key role in the development and approval of curriculum for the educator preparation program were the participants in this study. A one-on-one interview was conducted with each participant about experiences with integrating AT content and collaborative skill-building into the educator preparation curriculum. The researcher transcribed each recorded interview and coded the data using in-vivo and descriptive coding.

Five predominant themes were revealed through the analysis phase, which include: 1) lack of knowledge, 2) lack of AT adoption, 3) willingness to innovate, 4) need for collaboration, and 5) established norms/mental models. Data saturation appeared after six interviews, but three additional interviews were completed to ensure the sample was satisfactory. Figure 4 illustrates participants' descriptions of the themes. Three themes emerged from participant responses that related to the first research question about experiences and beliefs of including AT competencies into the curriculum for teacher candidates. A lack of knowledge, lack of AT adoption, and willingness to innovate were the primary themes linked to the first

research question. Two themes were attributed to the second research question about higher education leaders' experiences and beliefs about preparing teacher candidates to be able to collaborate within inclusive schools. The need for collaboration and established norms were the two overarching themes attributed to the second research question. A summary of the participants' discussion involving the five themes are subsequently presented.

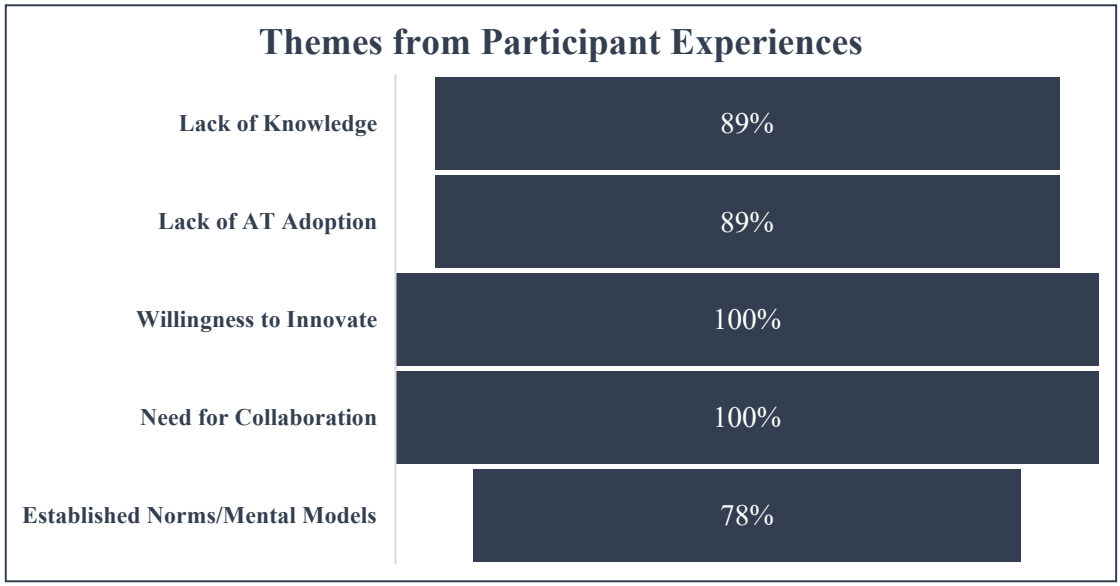

Figure 4. Themes from Participant Experiences

Lack of knowledge. The majority of respondents did not have specific knowledge about AT, which impacted the preparation for preservice teachers about supporting students with significant disabilities. Overall, nearly all of the participants did not have any experiences, awareness, or exposure with AT. All of the participants felt AT knowledge was important to teach candidates, but 8 of 9 (89%) lacked the knowledge to implement the competencies into the curriculum. As stated by one interviewee:

> Everyone should know about it, not just teachers, but administrators, janitors, and secretaries so they know what students are doing or what it is they are carrying around

> with them. The classroom teacher that has an opportunity to work with students, they need to know what the device can do for their student but putting that all on a regular education teacher that is teaching 20 students is a lot to put on one person.

Only 1 of 9 (11%) of the participants had knowledge, training, and exposure with AT and included it in the curriculum. This study provided strong confirmation that most of the interviewees do not have basic awareness, knowledge, or experience with assistive technologies.

Lack of Assistive Technology Adoption. Similar to the lack of knowledge, there was a deficiency noted from the majority of participants about including AT competencies into the curriculum for teacher candidates. In this study, 8 of 9 (89%) of the respondents did not integrate AT content to help prepare preservice teachers to educate students with significant disabilities in a general education classroom. For example, one interviewee expressed that including AT into the curriculum was a weak area for the institution and that it might need to be incorporated more thoroughly. To include AT competencies into the curriculum for preservice teachers, knowledge is required. Therefore, if the majority of participants do not have a basic understanding, regular training, or experience with AT, then it is unlikely to be covered in the educator preparation program as noted from the data in this study.

Willingness to Innovate. Participants in this study were overwhelmingly interested in the concept of assistive technology. Throughout the data, all (100%) of the respondents believed that teachers should be prepared to implement AT devices and services for students with significant disabilities. However, as stated previously, AT content is currently not included in the curriculum for teacher candidates. Participants provided similar insights about the necessity to include AT competencies and were clearly interested to learn more about it through future faculty development opportunities.

In this study, 3 of 9 (34%) of the participants described bureaucratic factors that impact their ability to be innovative. It was believed that the state requirements make it difficult to modernize the curriculum regularly because the bar is not high enough. Therefore, curriculum developers have to supplement or include content in addition to what the state requires. Additionally, there was a reactive vs. proactive culture that emerged from the data. Participants described a tendency to wait until the need arose to address any issues. However, interviewees haven't ever experienced the need to learn about AT, which contributes to the lack of knowledge within the data.

Need for Collaboration. The second research question explored higher education leaders' experiences and beliefs about equipping teacher candidates with the knowledge, skills, and dispositions to be able to collaborate within inclusive settings. An exploration of participants' beliefs in the interviews led to a prominent theme regarding an expressed need for collaboration. One participant described instances as a parent in which collaboration was not always experienced when implementing a loved one's Individualized Education Plan (IEP) and expressed a need to teach these skills to future teachers. In this study, all 9 of the participants valued the necessity to prepare undergraduate preservice teachers with the knowledge, skills, and dispositions to be able to collaborate.

Each interviewee discussed various ways to facilitate the development of collaborative skills for teacher candidates. Knowledge management, subject matter experts, and modeling were strategies commonly used by participants to encourage the ability to collaborate with preservice teachers. Some of the administrators interviewed for this study relied on subject matter experts to make adjustments to curriculum and prepare candidates to support students with significant disabilities. Other participants described using group work and modeling

collaborative skills in the courses they taught. It was evident from the data that the need for collaboration was valued from all contributors in this study.

Established Norms/Mental Models. Experiences relating to established norms and mental models was the final theme discussed by participants. Preparing future teachers to educate students in the 21st century require challenging the status quo and being an agent of change. In this study, 7 of 9 (78%) of the contributors described experiences with fixed mindsets, habits, and routines. Established norms can make it difficult for higher education leaders to incorporate new and emerging ideas to continually push the boundaries and improve teacher education.

Encouraging the development of teacher candidates' knowledge, skills, and dispositions for collaboration within inclusive schools can promote agents of change that challenge the status quo. One participant provided insight on this topic by explaining that diversity is a core value of the university. Therefore, a domino effect takes place to aid in shifting mindsets. For example, administrators disseminate to faculty the core tenets of the institution, which faculty implement and model teaching to diverse students for preservice teachers. This in turn advances mindset shifts and challenges established norms. Strategies were discussed by participants to challenge established norms and mental models.

Interpretation and Alignment of Findings with Literature

The primary themes produced in this section portray the experiences of participants as well as how the findings are aligned to the literature. Smith, Flowers, and Larkin (2009) propose scrutinizing the results in a broader context with the existing literature. The resulting themes are presented in this portion of the chapter by examining the findings to align with or counter prior research, as suggested by Smith et al. (2009).

Theme 1: Lack of Knowledge

A lack of knowledge of assistive technology was portrayed through most of the participants experiences. Only one participant had extensive knowledge, training, and exposure with AT. The other respondents discussed never having opportunities to learn about or use AT prior to being interviewed. A lack of expertise is also representative in the literature among in-service and preservice teachers (Aldabas, 2017; Andzik et al., 2017; Costigan & Light, 2010; Johnson & Prebor, 2019). Additionally, parents and caregivers report the challenge of finding knowledgeable team members to provide AT devices and services for their loved ones with significant disabilities (Light et al., 2019; McNaughton et al., 2019). Costigan and Light (2010) discovered minimal preservice programs offer training, and oftentimes courses were taught by individuals that lack expertise in the field. As a result of the findings in the current literature, it is not surprising that higher education leaders interviewed in this study also lack the knowledge of AT.

The lack of knowledge can also be linked to the theoretical framework in this study. The diffusion of an idea takes place through the innovation-decision process, as illustrated with Figure 1 in Chapter 2 of this study (Rogers, 2003). The first phase of the innovation-decision process is knowledge, in which an individual first learns about the existence of an innovation and its basic functions (Rogers, 2003). Many of the participants in this study did not have prior knowledge about assistive technology. Therefore, in order for the uptake of AT into the coursework for preservice teachers, curriculum developers must first be introduced to AT.

Theme 2: Lack of AT Adoption

The lack of AT adoption discovered from the participants' experiences in this study is similar to findings from other studies as well and is connected to the general lack of knowledge

of AT. In a study conducted by Johnson and Prebor (2019), AT was a required course for special education majors in 2008 but was not found to be a required course a decade later. Similarly, Costigan and Light (2010) researched augmentative and alternative communication (AAC), a subset of assistive technology. The two researchers discovered an absence of AAC competencies taught to undergraduate students (Costigan & Light, 2010). Additionally, Aldabas (2017) discovered that most special education teacher candidates explained there was an overall lack of preservice training to employ AT in a classroom. Given that higher education leaders lack knowledge of AT, as the findings in this study and others report, it is not surprising that AT has yet to be widely adopted for preservice training.

Adoption of AT competencies, or lack thereof, in the educator preparation program can be better understood through the theoretical framework applied in this study. Identifying needs and problems can increase the likelihood of the uptake of new innovations within an organization (Rogers, 2003). The findings from this action research project can provide the foundation of an identified need within the curriculum for the teacher education program at the study site.

Theme 3: Willingness to Innovate

The respondents in this study had a willingness and an affirmation that preservice teachers should be prepared to use AT in the classroom, but AT content has yet to be widely adopted in the curriculum at the research site. In a study led by Ahmed (2018), the majority of participants believe AT is beneficial to students who need it, and that schools are responsible for providing AT devices and services to students. Additionally, participants in a different study also had a willingness to innovate and an affirmation of necessity for technology to be included in education courses (Martin, 2018). Attitudes have been found to be contributing factors for intentions to use technology as well (Li, K., Li, Y, & Franklin, 2016; Sadaf, Newby, & Ertmer,

2016). Therefore, being willing to innovate and believing AT is important for teacher candidates to learn about is promising for future program review initiatives.

Participants indicated being willing to innovate and include AT into the curriculum, but didn't know how, which can be linked to Rogers' (2003) diffusion of innovation theory. For example, how-to knowledge involves how an innovation works and increases the likelihood of adoption (Rogers, 2003). Additionally, many of the participants in this study discussed a reactionary approach when embracing new technologies. For example, respondents expressed waiting until a need arose to learn more about technology solutions. Rogers (2003) explains that some individuals seek information that pertain to their interests, needs, and existing attitudes. A willingness to innovate provides a foundation to build upon. Advancing through the innovation-decision process to adopt AT into the educator preparation curriculum requires expanding upon awareness-knowledge, how-to knowledge, and principles knowledge for curriculum developers (Rogers, 2003).

Theme 4: Need for Collaboration

Preservice teachers need opportunities to develop the knowledge, skills, and dispositions to collaborate in future inclusive settings. Chung and Stoner (2016) revealed through their review that positive student outcomes were endangered when team collaboration was inadequate. Participants in this study valued collaboration as a vital skill to teach undergraduate candidates. Professional standards have been created to encourage educator preparation programs to provide opportunities for teacher candidates to develop collaborative skills (Bavonese, Connor, Wheat, Beard, & Owens, 2017; InTASC, 2013). Curriculum developers can continually align the educator preparation program with the national and professional standards to facilitate a variety of opportunities to enhance collaboration for preservice teachers.

The need for collaboration is also related to Roger's (2003) diffusion of innovation model. Roger's (2003) describes diffusion as a type of social change requiring communication about new ideas. Higher education leaders can take this into account when implementing collaborative skill-building into the educator preparation curriculum for preservice teachers. Knowledge management requires an educated individual to spread ideas to others, which is how innovations spread throughout a social system (Rogers, 2003).

Theme 5: Established Norms/Mental Models

Respondents in this study described experiences with established norms and mental models of individuals. Successful inclusive education requires collaboration, positive attitudes, and teacher self-efficacy (Weber & Greiner, 2019). Interviewees experienced having to challenge colleagues' fixed mindsets. Therefore, the participants in this study described needing to challenge established norms and mental models of others. Some participants recommended that modeling or leading by example can foster mindset shifts to allow opportunities for others to walk in someone else's shoes. One participant expressed concerns about including students with significant disabilities because it is too much to put on one person. This sentiment highlights the importance of collaboration and infrastructural supports for effective inclusive practices. School leadership is an imperative component to building inclusive settings that enable all students to thrive academically, socially, and emotionally (DeMathews, Kotok, Serafini, 2019).

Established norms and mental models can be linked to the diffusion of innovation theory (Rogers, 2003). Rogers (2003) states that norms, which are ingrained behavior patterns for individuals within a social system, can create barriers to change. Change agents and opinion leaders can communicate to other members about specific ideas that meet the needs of the organization (Rogers, 2003). First, there has to be an awareness of a need for change and then the

change agent and other members of the organization establish a relationship, build rapport, and exchange information about the idea (Rogers, 2003). Challenging established norms in this way can minimize barriers to change.

Implications

Higher education leaders contributed extensive insights into the development of curriculum for the College of Education at one institution. The findings provided descriptive information about curriculum developer's experiences regarding the integration of assistive technology (AT) content and opportunities for preservice teachers to develop collaborative skills. Prior research showed that AT content was deficient in university educator preparation programs (Andzik et al., 2018; Costigan & Light, 2010; Johnson & Prebor, 2019). The findings from this research study were similar to previous studies and lacked AT adoption in the educator preparation curriculum. The evidence provided can contribute to positive social change by disseminating information within the institution about the deficiency of AT content for teacher candidates. Future curriculum changes could incorporate AT competencies to enhance the preparation of preservice teachers to be able to support students with significant disabilities in a general education classroom. Additionally, the findings can extend beyond the field of education with the potential for the private sector to explore business leaders and entrepreneurs' experiences regarding the employment opportunities for individuals that utilize assistive technologies. There are far-reaching implications from this research that may positively impact learning organizations.

The results from this study facilitate a broader understanding of the problem of practice with a lack of AT adoption within educator preparation programs. While the findings in this study are limited to one university, there are important implications for other educator

preparation programs as well. The information can serve as a model for other institutions of higher learning to examine the preparation practices for preservice teachers regarding AT content in the curriculum. The findings from this present study have significant implications for curriculum development efforts for educator preparation programs and provides additional knowledge in the literature.

Recommendations for Action

The aim of this interpretive phenomenological analysis study was to explore the lived experiences of higher education leaders regarding the incorporation of assistive technology (AT) competencies into the educator preparation curriculum. This research was integral to the area as the research site provides teachers in the state of New Mexico. Multiple considerations for the development and improvement of educator preparation curriculum can be suggested from the findings of this study. Such recommendations can serve to enhance the training of teacher candidates.

Recommendations provided in this section may benefit the research site, other higher education leaders, education preparation policymakers, and researchers seeking to improve curriculum for teacher candidates. The recommendations for action linked to the evidence in this study are as follows: 1) awareness campaign, 2) faculty development, 3) program review, 4) early adoption of technology, 5) culture of innovation, 6) creativity as core competency, 7) knowledge sharing opportunities, 8) team building, and 9) paradigm shift. Table 4 illustrated below, and subsequent explanations will expand upon these recommendations for the designated themes in this study. Recommendations for themes 1-3 are addressed for the first research question, while recommendations for themes 4 and 5 are representative for the second research question guiding this study.

Table 4

Recommendations for Action

Themes	Recommendations
Lack of Knowledge	1) Awareness Campaign to include: a) Communication Plan b) Stakeholder Input Opportunities 2) Faculty Development to include: a) Internal & External AT Training b) Specialized Credentialing
Lack of AT Adoption	1) Program Review to include: a) Current Curriculum Audit b) GAP Analysis c) Action Plan to Incorporate AT d) Continuous Improvement Processes 2) Demonstrate Early Adoption of Technology
Willingness to Innovate	1) Reinforce Culture of Innovation 2) Develop Creativity as Core Competency
Need for Collaboration	1) Expand Knowledge Sharing Opportunities 2) Encourage Interdisciplinary and Cross-Functional Team Building
Established Norms/ Mental Models	1) Facilitate Paradigm Shift by: a) Increased Exposure to Best Practices b) Make Case for Change Through Future Vision/Planning

Recommendations for Theme 1: Lack of Knowledge

To address the overall lack of knowledge of assistive technology, an awareness campaign could expand an understanding of the need to include AT competencies in the teacher education curriculum. The development of a communication plan and providing stakeholder input opportunities as part of the campaign might widely disseminate awareness for adequately preparing teacher candidates to support students with significant disabilities in the classroom. Awareness campaigns are often used when awareness and knowledge about various issues are insufficient (Bonne, Suber, Anderson, & Livingston, 2018; Weinmann, Radon, Sukalla, Gerlich,

Barth, Nowak, & Karnowski, 2018). Therefore, a comprehensive awareness campaign could be a viable option to spread knowledge about the lack of AT adoption in educator preparation curriculum.

Faculty development opportunities might also alleviate the lack of knowledge on the topic of AT for preservice teachers. Internal and external training on AT for faculty could enhance knowledge to be able to incorporate it in the curriculum. As reported in the literature, AT courses are often taught by faculty who lack expertise on the subject and students with significant disabilities are frequently educated by untrained teachers (Andzik et al., 2017; Costigan & Light, 2010; Johnson & Prebor, 2019). While the participants did not provide details about faculty development options, there are several avenues the university could pursue. For example, the use of a subject matter expert could provide internal training opportunities for the faculty to deepen their knowledge on assistive technology. Furthermore, there are many conferences available for external training, such as the annual options put on by The Assistive Technology Industry Association (2020) and Closing the Gap (2020). In addition to internal and external training, specialized credentialing could deepen curriculum developers' level of knowledge on AT. Many universities offer graduate-level certificates in assistive technology, which might be an avenue for some faculty to explore. These faculty development options might address the lack of knowledge of AT for the instructors in the College of Education.

Recommendations for Theme 2: Lack of AT Adoption

Comparable to other institutions of higher learning, the research site has not consistently embedded AT into the educator preparation curriculum. Future program review efforts may facilitate the incorporation of AT training for teacher candidates. First, a curriculum audit would provide vital information on the current state of technology competencies included in the

curriculum. Second, conducting a gap analysis would help to assess the deficiencies in the curriculum. Third, creating an action plan could help mitigate deficiencies and facilitate integrating AT competencies in the coursework for teacher candidates. Lastly, routine program review processes could enable continuous improvement and currency in the curriculum.

The research site is firmly positioned to demonstrate early adoption of AT for preservice teacher training. Rogers' (2003) diffusion of innovation theory describes specific innovativeness categories for members of a social system which include innovators, early adopters, early majority, late majority, and laggards. Early adopters function as role models for other potential adopters and accelerate the diffusion process (Rogers, 2003). Including AT content in the educator preparation curriculum would brand the university as an early adopter because few programs include AT training for preservice teachers (Andzik et al., 2017; Costigan & Light, 2010; Johnson & Prebor, 2019).

Recommendation for Theme 3: Willingness to Innovate

While the evidence presented in this study indicates a lack of knowledge about AT and a lack of AT adoption in the curriculum, the findings also suggest that all the participants are willing to innovate and learn more for improvement purposes. The researcher proposes leveraging the willingness to innovate to enact the prior recommendations offered such as the awareness campaign, faculty development, and program review. Reinforcing the culture of innovation within the organization can further these endeavors to improve curriculum for preservice teachers. Additionally, developing creativity as a core competency in the College of Education may help curriculum developers' problem-solve any barriers encountered in the process.

Recommendations for Theme 4: Need for Collaboration

Teacher candidates require preparation to develop collaborative skills to serve students with significant disabilities within inclusive settings. Zagona, Kurth, and MacFarland (2017) discovered that general education teachers feel less prepared to collaborate with colleagues than special education teachers from their preservice programs. Inclusive education for students with significant disabilities requires team members to collaborate for the purpose of shared responsibilities with planning and implementing instruction (Zagona et al., 2017). The findings from this study reveal that participants value preparing teachers to cultivate the knowledge, skills, and dispositions required for collaboration.

Expanding knowledge sharing opportunities between faculty, general and special education teacher candidates could foster collaborative skill-building. Additionally, encouraging interdisciplinary and cross-functional team building is another recommendation. For example, allowing practice of collaborative skills with all preservice teachers and candidates from the principal licensure program at the university might be beneficial. There are multiple stakeholders that could be involved in team-building exercises. One innovative option could be to employ virtual reality opportunities to provide structured practice in a risk-free platform. Enhancing opportunities for preservice teachers to practice collaborative skills will help prepare them to educate students with significant disabilities in an inclusive setting.

Recommendations for Theme 5: Established Norms/Mental Models

Despite the research about effective instructional strategies for students with significant disabilities, established norms and outdated mental models persist regarding inclusive education (Dukes & Berlingo, 2020). Established norms risk inadequately preparing teacher candidates with collaborative skills. The findings in this study indicate many participants have experienced

established norms within the profession. For example, one interviewee stated, “People get stuck in, ‘Oh, this is how we’ve always done it, and this is how we need to do it.” Advancing inclusive education forward with this type of mindset is complex and challenging. One recommendation to combat established norms would be to facilitate a paradigm shift by increasing exposure to best practices to curriculum developers, faculty, and teacher candidates. Additionally, a case can be made for change through future vision and planning initiatives. Knowledge management and collaboration can assist a paradigm shift and challenge the status quo.

Recommendations for Further Study

This study provides additional research concerning assistive technology adoption within educator preparation programs and preparing teacher candidates to develop collaborative skills. Potential recommendations for further study are presented in this section. The first recommendation would be to expand the research to include other institutions of higher learning. The second recommendation would be to examine AT content in graduate education programs. A final recommendation for further study would be to investigate curriculum developers’ adoption of assistive technology after faculty development on AT.

Recommendation for Further Study #1

Exploring the lived experiences of curriculum developers for educator preparation programs at multiple universities might provide further insight regarding the uptake of AT training for teacher candidates. This study was an action research project focused on the experiences of higher education leaders at one research site. Therefore, broadening the research to include curriculum developers from other universities might provide deeper insight into the lack of AT adoption in educator preparation programs.

Recommendation for Further Study #2

Another option for future research could include examining AT content for graduate education students. Many graduate students are working professionals and serve as teachers of record in a classroom. The experiences of in-service teachers working on an advanced degree might also provide a deeper understanding of any gaps in curriculum concerning AT training. Replicating this study at the master's level could highlight the level of training in-service teachers gain from their programs. Investigating the curriculum for AT competencies for graduate students might advance the research.

Recommendation for Further Study #3

Assistive technology training was recommended as an actionable step for the uptake of AT into the curriculum for teacher candidates. A supplemental study could examine the impact on curriculum after higher education leaders receive training on AT. For example, if curriculum developers had AT training, would AT then be integrated into the curriculum? Also, understanding the perceived level of preparedness of preservice teachers to support students with significant disabilities could be explored in a study of this nature once AT was included in the curriculum.

Summary

This qualitative interpretive phenomenological analysis study explored the lived experiences of higher education leaders about assistive technology (AT) adoption in an educator preparation program. A gap was filled in the literature regarding the experiences of curriculum developers' decisions to integrate assistive technology competencies for preservice teachers. Two research questions directed the study and further explored the central phenomenon. Data were collected through semi-structured interviews using a criterion-based sampling at one

research site as noted in Chapter 3. The analysis of the transcribed interviews revealed five primary themes, which include: lack of knowledge, lack of AT adoption, willingness to innovate, need for collaboration, and established norms/mental models.

Pursuing this research study provided an instrumental learning experience for the researcher. A deeper understanding of the complex nature of curriculum development was gained throughout the research process. Furthermore, the researcher discovered an unexpected interest for interviewing others and capturing their life experiences. This was a rewarding process for the researcher which promoted personal and professional growth through the iterative development of this study.

The findings from this study contribute to the existing literature on AT and teacher preparation. The results were interpreted and aligned with the current research from the field. Additionally, detailed descriptions of the researcher's recommendations for action were presented in this chapter. Suggestions for future research endeavors were also included to advance the body of knowledge. Extending the level of AT awareness and knowledge could serve as a vital factor in adoption within educator preparation curriculum.

References

Agee, J. (2009). Developing qualitative research questions: A reflective process. *International Journal of Qualitative Studies in Education, 22*(4), 431-447.

Ahmed, A. (2018). Perceptions of using assistive technology for students with disabilities in the classroom. *International Journal of Special Education, 33*(1), 129-139.

Ajuwon, P. M., Meeks, M. K., Griffin-Shirley, N., & Okungu, P. A. (2016). Reflections of teachers of visually impaired students on their assistive technology competencies. *Journal of Visual Impairment & Blindness, 110*(2), 128-134.

Aldabas, R. A. (2017). Preparing for using augmentative and alternative communication in classrooms: Pre-service special education teachers' perceptions. *Journal of Studies in Education, 7*(4), 105.

Allen, A. A., Schlosser, R. W., Brock, K. L., & Shane, H. C. (2017). The effectiveness of aided augmented input techniques for persons with developmental disabilities: A systematic review. *Augmentative and Alternative Communication, 33*(3), 149-159.

Alper, M., Ellcessor, E., Ellis, K., & Goggin, G. (2015). Reimagining the good life with disability: Communication, new technology, and humane connections. In H. Wang (Ed.), *Communication and "the good life"* (pp. 197-212). New York, NY: Peter Lang Publishing, Inc.

Andzik, N. R., Chung, Y., Doneski-Nicol, J., & Dollarhide, C. T. (2017). AAC services in schools: A special educator's perspective. *International Journal of Developmental Disabilities,* 1-9.

Andzik, N. R., Schaefer, J. M., Nichols, R. T., & Cannella-Malone, H. I. (2018). Exploring relationships between teacher training and support strategies for students utilizing

augmentative and alternate communication. *Journal of International Special Needs Education, 21*(1) 25–34.

Assitive Technology Industry Association. (2020). Introducing ATIA 2021: The first virtual event. https://www.atia.org/atia-2021/

Atanga, C., Jones, B. A., Krueger, L. E., & Lu, S. (2019). Teachers of students with learning disabilities: Assistive technology knowledge, perceptions, interests, and barriers. *Journal of Special Education Technology*.

Arthanat, S., Elsaesser, L., & Bauer, S. (2017). A survey of assistive technology service providers in the USA. *Disability and Rehabilitation: Assistive Technology, 12*(8), 789-800.

Beukelman, D., Mirenda, P., Ball, L., Fager, S., Garrett, K., Hanson, E., & McNaughton, D. (2013). *Augmentative and alternative communication: Supporting children and adults with complex communication needs* (4th ed). Baltimore: Brookes Publishing.

Biggs, E. E., Carter, E. W., & Gilson, C. B. (2018). Systematic review of interventions involving aided AAC modeling for children with complex communication needs. *American Journal on Intellectual and Developmental Disabilities, 123*(5), 443-473, 496, 498.

Biggs, E. E., Carter, E. W., & Gilson, C. B. (2019). A scoping review of the involvement of children's communication partners in aided augmentative and alternative communication modeling interventions. *American Journal of Speech-Language Pathology, 28*(2), 743-758.

Biggs, E. E., Carter, E. W., & Gustafson, J. (2017). Efficacy of peer support arrangements to increase peer interaction and AAC use. *American Journal on Intellectual and Developmental Disabilities, 122*(1), 25-48.

Birt, L., Scott, S., Cavers, D., Campbell, C., & Walter, F. (2016). Member checking: A tool to enhance trustworthiness or merely a nod to validation? *Qualitative Health Research, 26*(13), 1802-1811.

Bloomberg, L.D. & Volpe, M. (2015). *Completing your qualitative dissertation: A road map from beginning to end,* (3rd Ed.) Thousand Oaks, CA: Sage Publications.

Bonne, S., Suber, I., Anderson, A., & Livingston, D. H. (2018). Implementation is not enough: Graduated drivers licensing benefits from a comprehensive enforcement, education, and awareness campaigns. *The Journal of Trauma and Acute Care Surgery, 85*(4), 704-710.

Boot, F. H., Owuor, J., Dinsmore, J., & MacLachlan, M. (2018). Access to assistive technology for people with intellectual disabilities: A systematic review to identify barriers and facilitators: Access to assistive technology. *Journal of Intellectual Disability Research, 62*(10), 900-921.

Bouck, E. C. (2016). A national snapshot of assistive technology for students with disabilities. *Journal of Special Education Technology*, *31*(1), 4–13.

Bracken, S., & Novak, K. (2019). *Transforming higher education through universal design for learning: An international perspective* (1st ed.). Milton: Routledge Ltd.

Brady, N. C., Bruce, S., Goldman, A., Erickson, K., Mineo, B., Ogletree, B. T., & Wilkinson, K. (2016). Communication services and supports for individuals with severe disabilities: Guidance for assessment and intervention. *American Journal on Intellectual and Developmental Disabilities, 121*(2), 121-138,165-168.

Burgos, B. B. (2015). *A study of assistive technology competencies of specialists in public schools* (Doctoral dissertation). Retrieved from ProQuest One Academic. (Order No. 3717315).

Chan, T. F. I., Borja, M., Welch, B., & Batiuk, M. E. (2016). Predicting the probability for faculty adopting an audience response system in higher education. *Journal of Information Technology Education: Research, 15*, 395-407.

Cheek, A. E., Idol, W. A., Jones, J. L., & Holden, K. B. (2019). Infusing technology throughout teacher preparation programs to support preservice teacher development. *Journal of Special Education Apprenticeship, 8*(2), 1-14.

Chung, Y. C., & Stoner, J. B. (2016). A meta-synthesis of team members' voices: What we need and what we do to support students who use AAC. *AAC: Augmentative & Alternative Communication*, *32*(3), 175–186.

Clark, C., Zhang, S., & Strudler, N. (2015). Teacher candidate technology integration: For student learning or instruction? *Journal of Digital Learning in Teacher Education, 31*(3), 93-106.

Closing the Gap. (2020). Closing the gap virtual conference. https://www.closingthegap.com/conference/

Connor, C., & Beard, L. A. (2015). Increasing meaningful assistive technology use in the classrooms. *Universal Journal of Educational Research, 3*(9), 640-642.

Costigan, A., & Light, J. (2010). A review of preservice training in augmentative and alternative communication for speech-language pathologists, special education teachers, and occupational therapists. *Assistive Technology*, *22*(4), 200-212.

Council of Chief State School Officers. (2013). Interstate Teacher Assessment and Support Consortium. InTASC *Model Core Teaching Standards and Learning Progressions for Teachers 1.0: A Resource for Ongoing Teacher Development*. Washington, DC.

Council for Exceptional Children. (2015). What every special educator must know: Professional ethics and standards. CEC.

Coyne, J., Lane, M., Nickson, L., Hollas, T., & Potter, J. P. (2017). Assessing pre-service teachers' attitudes and self-efficacy in using technology in the classroom. *Teacher Education and Practice, 30*(4), 637.

Creswell, J. W. (2015). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research (5*th ed.). Upper Saddle River, NJ: Pearson.

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

Da Fonte, M. A., & Boesch, M. C. (2016). Recommended augmentative and alternative communication competencies for special education teachers. *Journal of International Special Needs Education, 19*(2), 47–58.

Da Fonte, M. A., & Boesch, M. C. (2019). *Effective augmentative and alternative communication practices: A handbook for school-based practitioners*. New York, NY: Routledge.

DeMatthews, D. E., Kotok, S., & Serafini, A. (2019). Leadership preparation for special education and inclusive schools: Beliefs and recommendations from successful principals. *Journal of Research on Leadership Education, 00*(0), 1-27.

Dingfelder, H. E., & Mandell, D. S. (2011). Bridging the research-to-practice gap in autism intervention: An application of diffusion of innovation theory. *Journal of Autism and Developmental Disorders, 41*(5), 597-609.

Dinçer, S. (2018). Are preservice teachers really literate enough to integrate technology in their classroom practice? Determining the technology literacy level of preservice teachers. *Education and Information Technologies, 23*(6), 2699-2718.

Dukes, C., & Berlingo, L. (2020). Fissuring barriers to inclusive education for students with severe disabilities. *Research and Practice for Persons with Severe Disabilities, 45*(1), 14-17.

e-CFR. (2019). Electronic code of federal regulations. Retrieved from https://www.ecfr.gov/cgi-bin/text-idx?SID=a1b3f08bed62ab04596b6b26ca946f24&mc=true&node=pt45.1.46&rgn=div5

Erickson, K. A., & Geist, L. A. (2016). The profiles of students with significant cognitive disabilities and complex communication needs. *Augmentative and Alternative Communication 32*(3), 187-197.

Erickson, K. A., & Koppenhaver, D. A. (2020). *Comprehensive literacy for all: Teaching students with significant disabilities to read and write*. Baltimore, MD: Brookes Publishing.

Foulger, T. S., Graziano, K. J., Schmidt-Crawford, D., & Slykhuis, D. A. (2017). Teacher educator technology competencies. *Journal of Technology and Teacher Education*, *25*(4), 413–448.

Francom, G. M. (2019). Barriers to technology integration: A time-series survey study. *Journal of Research on Technology in Education, 52*(1), 1-16.

Ganz, J. B. (2015). AAC interventions for individuals with autism spectrum disorders: State of the science and future research directions. *Augmentative and Alternative Communication, 31*(3), 203-214.

Goodwin, A. L., & Darity, K. (2019). Social justice teacher educators: What kind of knowing is needed? *Journal of Education for Teaching, 45*(1), 63-81.

Han, I., Shin, W. S., & Ko, Y. (2017). The effect of student teaching experience and teacher beliefs on pre-service teachers' self-efficacy and intention to use technology in teaching. *Teachers and Teaching, 23*(7), 829-842.

Hanline, M. F., Dennis, L. R., & Warren, A. W. (2018). The outcomes of professional development on AAC use in preschool classrooms: A qualitative investigation. *Infants & Young Children, 31*(3), 231-245.

Higher Learning Commission. (2019). About the higher learning commission. Retrieved from https://www.hlcommission.org/About-HLC/about-hlc.html

Iacono, T. (2014). What it means to have complex communication needs. *Research and Practice in Intellectual and Developmental Disabilities, 1*(1), 82-85.

InTASC. (2013). *Model core teaching standards and learning progressions for teachers*. Washington, DC: Council of Chief State School Officers.

Johnson, R., & Prebor, J. (2019). Update on preservice training in augmentative and alternative communication for speech-language pathologists. *American Journal of Speech-Language Pathology*, *28*(2) 536-549.

Jones, B., Williams, N., & Rudinger, B. (2018). Designing and implementing an assistive technology lab for postsecondary education. *Education Sciences, 8*(1), 11.

Kalonde, G., & Mousa, R. (2016). Technology familiarization to preservice teachers: Factors that influence teacher educators' technology decisions. *Journal of Educational Technology Systems*, *45*(2), 236–255.

Kent, A. M., & Giles, R. M. (2016). Dual certification in general and special education: What is the role of field experience in preservice teacher preparation? *The Professional Educator, 40*(2), 1.

Kent-Walsh, J., Murza, K. A., Malani, M. D., & Binger, C. (2015). Effects of Communication Partner Instruction on the Communication of Individuals using AAC: A Meta-Analysis. *AAC: Augmentative & Alternative Communication*, *31*(4), 271–284.

King, L. H., & Allen, A. E. (2018). Beyond preservice special educators: Embedding assistive technology content throughout a teacher education program of study. *Rural Special Education Quarterly, 37*(4), 228–234.

Kleinert, H., Towles-Reeves, E., Quenemoen, R., Thurlow, M., Fluegge, L., Weseman, L., & Kerbel, A. (2015). Where students with the most significant cognitive disabilities are taught: Implications for general curriculum access. *Exceptional Children, 81*(3), 312-328.

Koch, K. (2017). Stay in the box! embedded assistive technology improves access for students with disabilities. *Education Sciences, 7*(4), 82.

Korstjens, I., & Moser, A. (2018). Series: Practical guidance to qualitative research. Part 4: Trustworthiness and publishing. *European Journal of General Practice, 24*(1), 120-124.

Koul, R., & Lloyd, L. (1994). Survey of professional preparation in augmentative and alternative communication (AAC) in speech-language pathology and special education programs. *American Journal of Speech-Language Pathology, 3*(3), 13–22.

Lancaster, J., & Bain, A. (2018). Teacher preparation and the inclusive practice of pre-service teachers: A comparative follow-up study. *International Journal of Inclusive Education,* 1-15.

Light, J., & McNaughton, D. (2015). Designing AAC research and intervention to improve outcomes for individuals with complex communication needs. *Augmentative and Alternative Communication, 31*(2), 85-96.

Light, J., McNaughton, D., Beukelman, D., Fager, S., Fried-Oken, M., Jakobs, T., & Jakobs, E. (2019). Challenges and opportunities in augmentative and alternative communication: Research and technology development to enhance communication and participation for individuals with complex communication needs. Augmentative and Alternative Communication.

Light, J., & McNaughton, D. & Caron, J. (2019). New and emerging AAC technology supports for children with complex communication needs and their communication partners: State of the science and future research directions. *Augmentative and Alternative Communication*, *35*(1), 26-41.

Li, K., Li, Y., & Franklin, T. (2016). Preservice teachers' intention to adopt technology in their future classrooms. *Journal of Educational Computing Research, 54*(7), 946-966.

Maderick, J. A., Zhang, S., Hartley, K., & Marchand, G. (2016). Preservice teachers and self-assessing digital competence. *Journal of Educational Computing Research, 54*(3), 326-351.

Marino, M. T., Sameshima, P., & Beecher, C. C. (2009). Enhancing tpack with assistive technology: Promoting inclusive practices in preservice teacher education. *Contemporary Issues in Technology and Teacher Education*, 9(2), 186-207.

Markelz, A., Riden, B., & Scheeler, M. C. (2017). Generalization training in special education teacher preparation: Does it exist? *Teacher Education and Special Education, 40*(3), 179–193.

Martin, B. (2018). Faculty technology beliefs and practices in teacher preparation through a TPaCK lens. *Education and Information Technologies, 23*(5), 1775-1788.

McNaughton, D., Light, J., Beukelman, D. R., Klein, C. Nieder, D. & Nazareth, G. (2019). Building capacity in AAC: A person-centred approach to supporting participation by people with complex communication needs. *Augmentative and Alternative Communication, 35*(1), 56-68.

Merriam, S. B., & Tisdell, E. J. (2016). *Qualitative research: A guide to design and implementation* (4th ed.). San Francisco, CA: John Wiley & Sons, Incorporated.

Miller, M. S. (2015). *Beginning elementary education teachers' perceptions concerning teaching in inclusive classrooms: Beliefs and attitudes toward preparation* (Doctoral dissertation). Retrieved from ProQuest One Academic. (Order No. 3722537).

Nelson, M. J., Voithofer, R., & Cheng, S. (2019). Mediating factors that influence the technology integration practices of teacher educators. *Computers & Education, 128*, 330-344.

New Mexico Public Education Department. (2017). NM register XXVIII, issue 18. Retrieved from https://webnew.ped.state.nm.us/bureaus/policy-innovation-measurement/recently-adopted-rule/nm-register-xxviii-issue-18/

New Mexico Register (2018). Primary and secondary education. http://164.64.110.134/nmac/nmregister/xxix/6.65.3.html

Newton, E. D. (2019). "*You don't know what you don't know until you know it": Perceptions, practice, and implementation of augmentative and alternative communication (AAC) for students with complex communication needs* (1128865735). [Doctoral dissertation, University of Delaware]. Proquest One Academic.

Niederhauser, D. S., & Lindstrom, D. L. (2018). Instructional technology integration models and frameworks: Diffusion, competencies, attitudes, and dispositions. *Handbook of Information Technology in Primary and Secondary Education*, 1-21.

Olson, A. J., & Roberts, C. A. (2018). Teacher educators' perspectives: Preparing preservice teachers to provide access to the general curriculum. *Remedial and Special Education, 39*(6), 365–376.

O'Neill, T., Light, J., & Pope, L. (2018). Effects of interventions that include aided augmentative and alternative communication input on the communication of individuals with complex communication needs: A meta-analysis. *Journal of Speech, Language and Hearing Research 61*(7), 1743-1765.

Patterson, K. (2002). *Crucial conversations: Tools for talking when stakes are high*. McGraw-Hill.

Patton, M. Q. (2015). *Qualitative research & evaluation methods* (4th ed.). Thousand Oaks, CA: Sage Publications.

Pearson, H. (2016). The impact of disability studies curriculum on education professionals' perspectives and practice: Implications for education, social justice, and social change. *Disability Studies Quarterly, 36*(2).

Peterson-Karlan, G. (2015). Assistive technology instruction within a continuously evolving technology environment. *Quarterly Review of Distance Education, 16*(2), 61-76,149.

Porter, W. W., & Graham, C. R. (2016). Institutional drivers and barriers to faculty adoption of blended learning in higher education: Drivers and barriers to blended learning adoption. *British Journal of Educational Technology, 47*(4), 748-762.

Raulston, C. G., & Alexiou-Ray, J. (2018). Preparing more technology-literate preservice teachers: A changing paradigm in higher education. *Delta Kappa Gamma Bulletin, 84*(5), 9-13.

Ravitch, S.M., & Riggan, M. (2016). *Reason & rigor: How conceptual frameworks guide research*. 2nd edition. Thousand Oaks, CA. SAGE Publications.

Rogers, E. (2003). *Diffusion of innovation*. (5th ed.). New York, NY: Free Press.

Roose, I., Vantieghem, W., Vanderlinde, R., & Van Avermaet, P. (2019). Beliefs as filters for comparing inclusive classroom situations. Connecting teachers' beliefs about teaching diverse learners to their noticing of inclusive classroom characteristics in videoclips. *Contemporary Educational Psychology, 56*, 140-151.

Sadaf, A., Newby, T. J., & Ertmer, P. A. (2016). An investigation of the factors that influence preservice teachers' intentions and integration of web 2.0 tools. *Educational Technology Research and Development, 64*(1), 37-64.

Saldaña, J. (2016). *The coding manual for qualitative researchers* (3rd ed.). Thousand Oaks, CA: Sage Publications.

Schaaf, D. N. (2018). Assistive technology instruction in teacher professional development. *Journal of Special Education Technology, 33*(3), 171-181.

Seidman, I. (2019). *Interviewing as qualitative research: A guide for researchers in education and the social sciences* (4th ed.). New York, NY: Teachers College Press.

Senner, J. E., & Baud, M. R. (2017). The use of an eight-step instructional model to train school staff in partner-augmented input. *Communication Disorders Quarterly, 38*(2), 89-95.

Sennott, S. C., Light, J. C., & McNaughton, D. (2016). AAC modeling intervention research review. *Research and Practice for Persons with Severe Disabilities*, *41*(2), 101–115.

Shaban, A., & Egbert, J. (2018). Diffusing education technology: A model for language teacher professional development in CALL. *System, 78*, 234-244.

Simacek, J., Pennington, B., Reichle, J., & Parker-McGowan, Q. (2018). Aided AAC for people with severe to profound and multiple disabilities: A systematic review of interventions and treatment intensity. *Advances in Neurodevelopmental Disorders, 2*(1), 100-115.

Sloan, A., & Bowe, B. (2014). Phenomenology and hermeneutic phenomenology: The philosophy, the methodologies, and using hermeneutic phenomenology to investigate lecturers' experiences of curriculum design. *Quality & Quantity, 48*(3), 1291-1303.

Smith, J.A., Flowers, P., & Larkin, M. (2009). *Interpretative phenomenological analysis: Theory, method and research*. Thousand Oaks, CA: Sage Publications.

Sutton, K. K., & DeSantis, J. (2017). Beyond change blindness: Embracing the technology revolution in higher education. *Innovations in Education and Teaching International, 54*(3), 223-228.

Taimalu, M., & Luik, P. (2019). The impact of beliefs and knowledge on the integration of technology among teacher educators: A path analysis. *Teaching and Teacher Education, 79*, 101-110. doi:10.1016/j.tate.2018.12.012

Taub, D. A., McCord, J. A., & Ryndak, D. L. (2017). Opportunities to learn for students with extensive support needs: A context of research-supported practices for all in general education classes. *The Journal of Special Education, 51*(3), 127-137.

Uerz, D., Volman, M., & Kral, M. (2018). Teacher educators' competences in fostering student teachers' proficiency in teaching and learning with technology: An overview of relevant research literature. *Teaching and Teacher Education, 70*, 12-23.

US Department of Education (2004a). Individuals with disabilities education improvement act of 2004, Pub. L. No. 108-446, 118 Stat. 2647.

US Department of Education. (2004b). Sec. 300.5 Assistive technology device. Retrieved from https://sites.ed.gov/idea/regs/b/a/300.5

US Department of Education. (2004c) Sec. 300.6 Assistive technology service. Retrieved from https://sites.ed.gov/idea/regs/b/a/300.6

Valle, J. W., & Connor, J. D. (2019). *Rethinking disability: A disability studies approach to inclusive practices* (2nd ed.). Milton: Routledge Ltd.

Van Manen, M. (2016). *Researching lived experience: Human science for an action sensitive pedagogy* (2nd ed). New York, NY: Routledge.

Weber, K. E., & Greiner, F. (2019). Development of pre-service teachers' self-efficacy beliefs and attitudes towards inclusive education through first teaching experiences. *Journal of Research in Special Educational Needs, 19*(S1), 73-84.

Weinmann, T., Radon, K., Sukalla, F., Gerlich, J., Barth, S., Nowak, D., & Karnowski, V. (2018). Developing an awareness campaign to reduce secondhand smoke among disadvantaged families-A participatory M-health approach. *International Journal of Environmental Research and Public Health, 15*(9), 1945.

Zagona, A. L., Kurth, J. A., & MacFarland, S. Z. C. (2017). Teachers' views of their preparation for inclusive education and collaboration. *Teacher Education and Special Education, 40*(3), 163-178.

Appendix A: Data Collection Instrument for Semi-Structured Interviews

Demographic Information and Life History

How many years have you taught students of any age?

How many years have you taught preservice teachers?

How many years have you taught at your current university?

Will you describe your experiences growing up that led you into the field of education?

What were your educational experiences like inside and outside of the classroom as a child leading up to teaching?

What experiences have you had as a student that relate to inclusive education?

What experiences have you had that relate to augmentative and alternative communication?

Detailed Lived Experiences

RQ 1- How do higher education leaders, including program coordinators, department chairs, and university administrators, describe their experience and beliefs of including assistive technology content into the curriculum for preservice general and special education teachers?

1. What experiences led you to become a teacher educator?

2. What roles have you served at this institution?

3. Will you describe your experience with curriculum development for preservice teachers?

4. What are the various factors, policies, and legislation that influence your decision-making when developing curriculum for preservice teachers?

5. What has been your approach with preparing teachers for inclusive education?

6. Tell me about your experiences with preparing preservice general education and special education teachers to support students with significant disabilities.

7. What has been your approach with including technology competencies in the curriculum for preservice teachers (general and special education)?

8. How do you explain your experience with professional development to remain current on innovative assistive technologies for communication purposes?

9. It is perfectly okay to not have extensive knowledge of AT because it is still in the emerging phases of integration. What might be your approach regarding professional development in AT content for preservice teachers?

10. What about your experience with including augmentative and alternative communication content in the curriculum?

11. It is evident that you are aware of the importance of AAC content for preservice teachers, how might you bring it into the curriculum in the future?

RQ 2- How do higher education leaders, including program coordinators, department chairs, and university administrators, describe their experience and beliefs about preparing preservice general and special education teachers with the knowledge, skills, and dispositions for collaboration within inclusive schools.

1. Will you tell me about your beliefs regarding inclusive education?

2. What are your beliefs about preparing preservice teachers to integrate assistive technology within inclusive classrooms?

3. What beliefs do you hold concerning collaborative skills and dispositions being taught to preservice teachers?

4. What does it mean to you to be a curriculum developer for preservice teachers in the 21st century?

Reflection on the Meaning of the Lived Experience

Reflecting on the previous questions, what does it mean to you to teach preservice teachers?

Based on your previous experiences, what does it mean to you to prepare future educators with the knowledge and skills to employ AT services?

What does it mean to you to engage in professional development opportunities related to AT?

Is there anything else you would like to share?

Appendix B

UNIVERSITY OF NEW ENGLAND
CONSENT FOR PARTICIPATION IN RESEARCH

Project Title: AAC Technology Adoption in an Educator Preparation Program: A Phenomenological Study of Curriculum Developer Experiences

Principal Investigator(s): Keisha Tipton, Graduate Student, University of New England
Email: ktipton1@une.edu Phone: (817) 771-7024

Introduction:

- Please read this form. You may also request that the form is read to you. The purpose of this form is to give you information about this research study, and if you choose to participate, document that choice.

- You are encouraged to ask any questions that you may have about this study, now, during, or after the project is complete. You can take as much time as you need to decide whether or not you want to participate. Your participation is voluntary.

Why is this research study being done?
This research study is being done to explore the lived experiences of curriculum developers regarding the integration of assistive technology (AT) competencies into the coursework for preservice teachers.

Who will be in this study?
Higher education leaders that actively participate in the development of educator preparation curriculum will be in this study.

What will I be asked to do?
You will be asked to participate in an interview that will last approximately 30-60 minutes and give permission for the interview to be recorded for transcription and analysis by me. You will also be invited to review the transcribed interview and findings to ensure your lived experiences are accurately represented.

What are the possible risks of taking part in this study?
Participation in this study will involve an interview that will take approximately 30-60 minutes to complete and will consist of questions related to your experience with incorporating assistive technology competencies into the education curriculum. The personal risks associated with participating in this study are minimal and are not expected to exceed the level of risk or discomfort associated with everyday life. Participation is entirely voluntary, and you may withdraw from the study at any time if you so choose.

What are the possible benefits of taking part in this study?

There are no direct benefits for participating in this study; however, you might obtain a deeper understanding of the positive impact of integrating AT competencies in the curriculum for preservice teachers. Your participation in this research study might also facilitate positive social change by integrating innovative communication technologies within educator preparation programs.

What will it cost me?

There are no monetary costs related to participating in this study. Interviews will be completed at your convenience, by teleconference or telephone.

How will my privacy be protected?

No personally identifiable information will be used in this research study for participants to protect privacy. Generic classification labels such as Contributor 1, Contributor 2, and so on will be used to replace your name.

How will my data be kept confidential?

All documents and interview recordings associated with this research study will be securely stored on my password-protected computer and destroyed after five years from the completion of the study. All data will be kept confidential to the extent permitted by law.

What are my rights as a research participant?

- Your participation is voluntary. Your decision to participate will have no impact on your current or future relations with the University.
- Your decision to participate will not affect your relationship with the University or me.
- You may skip or refuse to answer any question for any reason.
- If you choose not to participate, there is no penalty to you, and you will not lose any benefits that you are otherwise entitled to receive.
- You are free to withdraw from this research study at any time, for any reason.
    - If you choose to withdraw from the research, there will be no penalty to you, and you will not lose any benefits that you are otherwise entitled to receive.
- You will be informed of any significant findings developed during the course of the research that may affect your willingness to participate in the research.
- If you sustain an injury while participating in this study, your participation may be ended.

What other options do I have?

- You may choose not to participate.

Whom may I contact with questions?

- The researcher conducting this study is Keisha Tipton.
    - For more information regarding this study, please contact me at ktipton1@une.edu or via phone at (817) 771-7024.
- If you choose to participate in this research study and believe you may have suffered a research-related injury, please contact the faculty advisor, Dr. Michelle Collay Ph.D. at mcollay@une.edu.
- If you have any questions or concerns about your rights as a research subject, you may call Mary Bachman DeSilva, Sc.D., Chair of the UNE Institutional Review Board at (207) 221-4567 or irb@une.edu.

Will I receive a copy of this consent form?

- You will be given a copy of this consent form.

Participant's Statement

I understand the above description of this research and the risks and benefits associated with my participation as a research subject. I agree to take part in the research and do so voluntarily.

_____ _____

Participant's signature or Legally authorized representative — Date

_____

Printed name

Researcher's Statement

The participant named above had sufficient time to consider the information, had an opportunity to ask questions, and voluntarily agreed to be in this study.

_____ _____

Researcher's signature — Date

_____

Printed name