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Perceptions of Tenured Science Faculty Regarding the Provision of Reasonable  
Accommodations for Students with Disabilities

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A dissertation  
presented to  
the faculty of the Department of Educational Leadership and Policy Analysis  
East Tennessee State University

In partial fulfillment  
of the requirements for the degree  
Doctor of Education in Educational Leadership,  
concentration in Higher Educational Leadership

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by  
Rebecca Joan Riggs  
August 2022

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Dr. Jill Channing, Chair  
Dr. James Lampley  
Dr. Jean Swindle

Keywords: disability, accommodations, STEM, science faculty, postsecondary education

## ABSTRACT

### Perceptions of Tenured Science Faculty Regarding the Provision of Reasonable Accommodations for Students with Disabilities

by

Rebecca Joan Riggs

This phenomenological study used qualitative research methods to explore the perceptions of tenured science faculty regarding the provision of reasonable accommodations for students with disabilities. Thirteen tenured science faculty at postsecondary institutions throughout the United States participated in one-on-one interviews. The participants provided their perceptions and experiences regarding the provision of academic accommodations for students with disabilities in a laboratory science. In these interviews key themes emerged, such as the importance of providing reasonable accommodations for successful academic outcomes for students with disabilities, the perception that providing reasonable accommodations to students with disabilities is fair, the concern that providing reasonable accommodations may not prepare students with disabilities for future endeavors, the perception that the processes and procedures regarding student accommodations are vague, the recognition that faculty members are legally obligated to provide reasonable accommodations to students with disabilities, and the challenges faced with providing reasonable accommodations to students with disabilities in the laboratory portion of science courses are discipline specific. The findings from my study can be used to provide support and mentorship for students with disabilities who are enrolled in science courses, provide science faculty with training regarding appropriate and inclusive teaching strategies for students with disabilities in science courses, and provide insights into ways to support science

faculty with the challenges they encounter while providing reasonable accommodations to students with disabilities in the laboratory portion of their courses that are discipline specific.

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## DEDICATION

This dissertation is dedicated to the four people who mean the world to me: my husband, Eric, and my children, Isabella, Luke, and Matthew.

## ACKNOWLEDGEMENTS

Earning this degree would not be possible without the support of others. Foremost, I acknowledge that I am nothing without the Lord and it is through Him that all good things come. Thank you, Lord, for affording me the ability, courage, and opportunity to earn my degree.

My family is a blessing and my inspiration. To my husband, Eric, who has been a source of encouragement and support during the challenges of earning this degree. Thank you for believing in me and encouraging me. To my children, Isabella, Luke, and Matthew, who gave up precious time together so that I could earn this degree. Your support and selflessness throughout this process was amazing. Thank you!

This work is truly a labor of love and could not be completed without the guidance and knowledge of the faculty at East Tennessee State University. First, to my dissertation chair, Dr. Jill Channing, who encouraged and mentored me throughout this arduous journey. I benefited immensely from your knowledge, experience, and support. It is with deep gratitude that I thank you. Second, to Dr. James Lampley, whose willingness to guide me throughout this process and provide feedback was beneficial. It is with gratitude that I thank you. Finally, to Dr. Jean Swindle, who served as a member of my dissertation committee, I thank you for your support, feedback, and guidance.

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## **Chapter 1. Introduction**

Implementing Section 504 of the Rehabilitation Act of 1973, the Americans with Disabilities Act (1990), and the Higher Education Opportunity Act (2008) has been integral in enabling students with disabilities to enroll in postsecondary education (Lyman et al., 2016). The legislation protects students with disabilities as they apply to, are admitted into, and attend institutions of higher education (U.S. Department of Education, 2020a). The result is a steady increase in the percentage of students with disabilities enrolling in higher education (Alliston, 2010; The Postsecondary National Policy Institute, 2021), which is generating interest in accessibility and educational equity in higher education (West et al., 2016).

### **Students with Disabilities in Postsecondary Education**

There has been a significant increase in the percentage of students with disabilities enrolling in higher education (West et al., 2016). In the 2015-2016 academic year, 19.4% of undergraduate students in the United States reported having a disability (Institute of Education Sciences, 2019; The Postsecondary National Policy Institute, 2021). Although there is a continual increase of students with disabilities in higher education and faculty are receiving an increased number of requests for accommodations from students with disabilities (Dyer, 2018; Lombardi & Murray, 2011), faculty lack a fundamental understanding and knowledge of disability legislation, appropriate teaching strategies for students with disabilities, and the availability of disability services offered by their institution (West et al., 2016). Research by the National Center for Education Statistics (2011) identified that only 64% of postsecondary institutions provide their faculty with information about working with students who have disabilities.

## **Accommodations and Support for Students with Disabilities**

Research has shown that the most important indicator of success for students with disabilities in postsecondary education is being provided appropriate accommodations (Khouri et al., 2019; Kim & Lee, 2016; McGinty, 2016). Disability services at higher education institutions play an integral role in aiding students with disabilities in receiving reasonable accommodations as the purpose of disabilities services is to facilitate the process (Chiu et al., 2019). Students with disabilities must disclose their disability and provide documentation to the institution to receive accommodations (Freedman et al., 2020; Newman & Madaus, 2015; U.S. Department of Education, 2020b). The disclosure rate and the rate of accommodation receipt are lower in higher education than it is at the secondary level for students with disabilities (Newman & Madaus, 2015).

Students with disabilities require support from faculty to be successful and the retention of students with disabilities is dependent on that support (West et al., 2016). An integral aspect of faculty support is providing accommodations; however, students with disabilities encounter various barriers to receiving accommodations in higher education (Bellman et al., 2018; Booksh & Madsen, 2018; Diez et al., 2015; Fanger, 2019; Hong, 2015; Kim & Lee, 2016; Lyman et al., 2016; Martin et al., 2011; Toutain, 2019). Common barriers that students with disabilities encounter include institutional procedures, general knowledge about accommodations, limited resources, and a lack of training for faculty and staff (Bellman et al., 2018; Diez et al., 2015; Fanger, 2019). Because of these barriers, students with disabilities have to self-advocate to receive their accommodations (West et al., 2016), which can be difficult for these students as they lack the knowledge of how to appropriately self-advocate (Newman & Madaus, 2014).

## **Students with Disabilities in STEM Disciplines**

The need for professionals in the science, technology, engineering, and mathematics (STEM) fields is increasing (Davis, 2014). One way to fulfill the need and overcome the shortage is to increase the participation of students with disabilities in STEM (Davis, 2014). Recent research has shown that students with disabilities are a significant portion of those who enroll in STEM disciplines (Booksh & Madsen, 2018; Friedensen et al., 2021) and desire to major in STEM disciplines “at approximately the same rate as students without disabilities at the time of high school/college transition (21.7% versus 23.1%)” (Booksh & Madsen, 2018, p. 626). Although students with disabilities pursue STEM disciplines in postsecondary education, the attrition rate for students with disabilities in STEM disciplines is high (Davis, 2014).

Students with disabilities require support in postsecondary education and even more so in the STEM disciplines (Davis, 2014). Students in non-STEM disciplines typically receive higher grades than students in STEM disciplines (Chiu et al., 2019). The disparity in grades is even more pronounced when the student majoring in a STEM discipline has a disability (Chiu et al., 2019). Part of the reason for this is that STEM disciplines require higher levels of executive functioning than non-STEM disciplines (Chiu et al., 2019). The other aspect of the significant disparity in grades for students with disabilities in the STEM disciplines is because of the negative perceptions that STEM faculty have concerning students with disabilities and STEM faculty’s resistance to providing reasonable accommodations to students with disabilities (Martin et al., 2011; Monagle, 2015; Rao, 2002).

Faculty perceptions are an integral aspect of providing accommodations to students with disabilities (Alliston, 2010; Baker et al., 2012; Basilice, 2015; Bettencourt et al., 2018; Diez et al., 2015; Dyer, 2018; Hoffman, 2013; Lombardi & Murray, 2011; McCarron, 2017; Sayle,

2016). Faculty perceptions of student accommodations impact students' accommodations as those perceptions impact whether the faculty member is willing to provide accommodations (McCarron, 2017). Additionally, students with disabilities must be capable of working through various barriers to "be afforded equal opportunity" (Martin et al., 2011, p. 295) in the STEM disciplines. Overcoming these barriers allows students with disabilities to use their accommodations and have better academic outcomes (Lyman et al., 2016). Therefore, support for students with disabilities in STEM disciplines is necessary (James et al., 2020; Schneiderwind & Johnson, 2020).

Because students with disabilities are enrolling in the STEM disciplines and there is a high attrition rate for students with disabilities in STEM disciplines, it is crucial to study how science faculty perceive reasonable accommodations for students with disabilities. My study uses in-depth interviews to explore how tenured science faculty perceive students with disabilities and their perceptions about providing academic accommodations. I used phenomenology as a lens to explore the perceptions of tenure science faculty regarding the provision of accommodations to students with disabilities.

### **Statement of the Problem**

All students are typically required to complete science courses as a general education requirement to earn their degree in postsecondary education (Dennon, 2021). Students with disabilities regularly face challenges in using accommodations when taking a science course in higher education (Bettencourt et al., 2018). These challenges are linked to the perceptions held by science faculty (Bettencourt et al., 2018). Additionally, science courses require laboratory exercises and traditional coursework in which content builds on previous work (Bettencourt et al., 2018; Friedensen et al., 2021). The laboratory exercises coupled with content that builds on



previous work and the negative perceptions of faculty means that students with disabilities face greater challenges in the sciences (Bettencourt et al., 2018).

Understanding the challenges faced by students with disabilities will help address how to overcome those challenges (Fanger, 2019). To overcome the challenges that students with disabilities face and aid students with disabilities in receiving the necessary accommodations, the stigma associated with using accommodations needs to be addressed (Bolt et al., 2021; Dukes & Roberts-Dahm, 2018; James et al., 2020). One way to begin the process of addressing the stigma associated with using accommodations is to explore faculty perceptions surrounding student accommodations. Understanding the perceptions that faculty have will enable insight into what training concerning student accommodations would be beneficial to science faculty to alleviate negative perceptions and remove barriers that impede the use of accommodations in the sciences (Bettencourt et al., 2018; Kim & Lee, 2016; Lyman et al., 2016).

The purpose of this phenomenological study is to explore the perceptions of tenured science faculty about providing reasonable accommodations for students with disabilities at institutions of higher education in the United States. Perceptions of tenured science faculty will be generally defined as any beliefs about student accommodations of a tenured science faculty member. The focus of the study is on the perceptions that tenured faculty in biology, chemistry, and physics have about providing reasonable accommodations to students with disabilities. This study includes participants from across the United States.

### **Research Questions**

This qualitative study focuses on the perceptions of tenured science faculty about providing reasonable accommodations to students with disabilities. Research has shown that faculty in STEM disciplines have negative perceptions about providing student accommodations

(Bettencourt et al., 2018; Friedensen et al., 2021). My intent was to understand the perceptions that tenured biology, chemistry, and physics faculty have concerning the provision of reasonable accommodations to students with disabilities. The research questions were determined with that in mind. My study was guided by the following research questions.

1. What do tenured science faculty report as their perceptions about providing reasonable accommodations to students with disabilities?
2. What experiences do tenured science faculty link to their perceptions of accommodations?
3. What do tenured science faculty perceive as the greatest challenge with providing reasonable accommodations to students with disabilities in a laboratory science?
4. How do tenured science faculty characterize their willingness to provide accommodations?

### **Significance of the Study**

My study has several implications on both regional and national levels. First, there is a growth in students with disabilities enrolling in higher education (Alliston, 2010; The Postsecondary National Policy Institute, 2021) and students with disabilities are a significant portion of the students who enroll in or desire to major in the STEM disciplines (Booksh & Madsen, 2018; Friedensen et al., 2021; West et al., 2016). It is worth learning more about students with disabilities and the challenges that impede their academic success in STEM.

Second, the literature regarding the perceptions of science faculty concerning students with disabilities is scarce (Friedensen et al., 2021). My study has implications for filling the dearth in the literature regarding the perceptions that science faculty have concerning students with disabilities (James et al., 2020; Schneiderwind & Johnson, 2020). This study can provide

information to aid in developing the body of literature concerning the perceptions of science faculty regarding student accommodations.

Finally, my study can potentially provide faculty and administrators in postsecondary education with a greater understanding of how to support students with disabilities in the sciences. Analyzing the results of this study can help educators learn more about supporting and mentoring students with disabilities who enroll in science courses to improve their academic outcomes.

### **Definitions of Terms**

The following terms are used throughout this study. Most of the terms listed are generally understood; however, some terms may be unclear. The terms will be defined as outlined below to clarify the use of the terms in relation to the study.

- *Disabled person* – A person who is considered to have a physical or mental impairment that significantly limits one or more activity needed for life. This includes a person who has a recorded impairment or a person who is regarded as having an impairment that significantly limits one or more activity needed for life ("What is the definition of disability under the ADA?", n.d.).
- *Disability stigma* – The negative beliefs, attitudes, and behavior that are held regarding disabled people (Nieweglowski & Sheehan, 2017).<sup>1</sup>
- *Reasonable accommodations* – An adjustment or a modification for a person with disabilities that affords a disabled person equal opportunity in either academic programs or in employment (American Psychological Association, n.d.).

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<sup>1</sup> These are the operational definitions according to these sources; however, I will use person-first language when addressing a “disabled” person throughout my study.

- *Stereotype threat* – A situation where individuals perceive that their actions will confirm stereotypes about their group (Booksh & Madsen, 2018, pp. 627-628).
- *Students with disabilities* – Students who have a physical or mental impairment that significantly limits one or more major activity needed for life, has a recorded impairment, or who is regarded as having an impairment (U.S. Legal, n.d.).

### **Limitations and Delimitations**

This dissertation is limited to the participants. The responses of the participants are their expressed perceptions based on their individualized perspectives. Therefore, the perspectives of the participants in this study may not be indicative of the perspectives of all tenured science faculty. Consequently, the results from this study are a limitation. The data collected cannot be generalized to all tenured science faculty since a qualitative research lens was used to conduct the study; however, this data may be transferable to readers who recognize similarities between their experiences and the experiences of the participants (Nowell et al., 2017a).

Only tenured faculty in postsecondary education who live in the United States participated in this study. The study was further delimited to tenured faculty who teach biology, chemistry, or physics in postsecondary education. Nontenured science faculty were excluded to decrease the possibility of social desirability bias due to the legal ramifications associated with disability and academic accommodations.

### **Statement of Researcher Perspective**

Qualitative research is personal, and interpretation of the data is dependent on the researcher (McMillan & Schumacher, 2010). Thus, acknowledging the researcher perspective is an important aspect of qualitative research (Creswell & Creswell, 2018). As such, my bachelor's and master's degrees are in chemistry and my work experience includes 11 years in academia.

Consequently, I am a tenured science faculty member at an institution of higher education in the United States; therefore, any preconceptions and bias because of my background and experiences needed to be addressed throughout the data collection and analysis processes. There is a possibility that my background in chemistry and experience as a tenured science faculty member at an institution of higher education in the United States influenced the willingness of participants to share their experiences and provide their perceptions regarding academic accommodations for students with disabilities. I delineate any preconceptions and bias so that the reader may consider the findings of my study taking into consideration my background and experiences.

### **Overview of the Study**

There are five chapters included in this phenomenological study. Chapter 1 introduces the topics of focus, provides a statement of the problem being examined, highlights the purpose statement, describes the significance of the study, addresses the research questions which guided the study, includes the definitions of key terms, and provides the limitations and delimitations to the study. Chapter 2 presents a collection of literature relevant to the study, including pertinent information about the issues and barriers that students with disabilities encounter in postsecondary education; faculty perceptions concerning student accommodations; student perceptions concerning academic accommodations; issues encountered by students with disabilities in the science, technology, engineering, and math disciplines; and the legalities of student accommodations. Chapter 3 contains the design of the study, including an overview of research questions, the data collection method, ethical considerations, population sampling, and trustworthiness. Chapter 4 presents research results. Finally, Chapter 5 contains a discussion of

the research results, implications for higher education practice, and suggestions for future research.

## **Chapter 2. Review of Literature**

Students with disabilities are a significant portion of the student body at postsecondary institutions in the United States (Alliston, 2010; The Postsecondary National Policy Institute, 2021; Toutain, 2019). Although the percentage of students with disabilities who enroll in postsecondary education is increasing, students with disabilities often face negative environments in postsecondary education (Bettencourt et al., 2018). Some of these negative environments are a result of postsecondary faculty believing that providing a student with accommodations gives that student an advantage over other students (McCarron, 2020). The reality is that students with disabilities are at a disadvantage (Freedman et al., 2020; Toutain, 2019).

Accommodations do not lower academic standards or compromise the fundamental elements of the course or the program (American Psychological Association, n.d.; Lovett, 2021). Providing students with academic accommodations “adjust the manner in which students with disabilities learn or are evaluated so that they can access and demonstrate knowledge at a level equal to that of their peers” (Khouri et al., 2019, p. 1). Although there are several laws that were enacted to protect students with disabilities and aid students with disabilities to obtain appropriate accommodations, students with disabilities still face barriers in obtaining reasonable accommodations in postsecondary education, especially since most faculty do not have a good understanding of the legislation concerning disability discrimination and their legal obligations (Zhang et al., 2010).

### **Disability Legislation and Postsecondary Education**

People with disabilities have been marginalized and stigmatized throughout history (Anti-Defamation League, n.d.). It was not until the civil rights movement in the 1960s that disability

advocates began demanding equal rights for those with disabilities (Anti-Defamation League, n.d.). The result being the inclusion of those with disabilities in the Rehabilitation Act of 1973 (Anti-Defamation League, n.d.). The Rehabilitation Act of 1973 laid the foundation for other disability related legislation such as the Americans with Disabilities Act (1990), the Higher Education Opportunity Act (2008), and the Individuals with Disabilities Education Act (1975).

### ***The Rehabilitation Act of 1973***

The Rehabilitation Act of 1973 is a federal mandate that provides protection from discrimination for those with disabilities (U.S. Department of Justice, 2020). This act applies to all programs that receive federal financial aid, including most postsecondary institutions, or are controlled by federal agencies (Leuchovius, n.d.). Section 504 of the Rehabilitation Act of 1973 pertains to education (U.S. Department of Justice, 2020). Postsecondary institutions are required to provide academic accommodations or adjustments to ensure they do not discriminate against those with disabilities (U.S. Department of Education, 2020b). The student is required to self-identify as having a disability and request accommodations (U.S. Department of Education, 2020b). The Rehabilitation Act is a general act written for people with disabilities, but it is not written specifically for students (Baker, 2021).

### ***Americans with Disabilities Act (ADA)***

The ADA is an extension of Section 504 of the Rehabilitation Act (Madaus et al., 2018). It is a federal mandate that “prohibits discrimination against people with disabilities” (U.S. Department of Labor, n.d., para. 1). The protection of the ADA extends to diverse areas, including postsecondary education as outlined in Titles II and III of the ADA (Leuchovius, n.d.; U.S. Department of Labor, n.d.). The protection of the ADA extends to students in postsecondary education as “both public and private colleges and universities must provide equal access to



postsecondary education for students with disabilities” (“Postsecondary institutions and students with disabilities,” n.d.b, para. 1).

Postsecondary institutions are required to provide reasonable accommodations and auxiliary aids to students with disabilities so that equal access is ensured as outlined by the ADA (Madaus et al., 2018). Reasonable accommodations are determined by the institution’s disability office. Common examples of reasonable accommodations include “extra time on exams, screen readers, note takers, audio lecture recordings, and reduced course load” (Madaus et al., 2018, p. 3). Accommodations that would “fundamentally alter essential academic requirements, impose an undue burden, or impose a direct threat to the health or safety of the student or others” (Madaus et al., 2018, p. 3) are not deemed to be reasonable accommodations under the ADA (Madaus et al., 2018). Moreover, any accommodation can be denied if the accommodation causes undue hardship on the institution; however, the institution will have to prove that a true undue hardship exists (Madaus et al., 2018). According to Leuchovius (n.d.), the modifications for providing students with disabilities accommodations are seldom expensive or substantial; therefore, true undue hardships are rare.

### ***Individuals with Disabilities Education Act (IDEA)***

IDEA is the keystone of special education legislation in the United States. IDEA streamlined the process for students with disabilities in the K-12 environment; however, IDEA did not help students with disabilities as they transitioned to postsecondary education (Baker, 2021). Students with disabilities experienced a seamless transition of their accommodations as they progressed from grade to grade in the K-12 environment, especially with the use of an Individualized Educational Plan (IEP) (Baker, 2021). The IEP did not transition with the student into postsecondary education, so neither did the accommodations that the student received

(Baker, 2021). The impact of this is that students must request accommodations each semester in postsecondary education. Consequently, students do not receive the same level of accommodations, or even the same accommodations, that they received in high school (Koerner, 2016), which impacts their success in postsecondary education.

### ***Higher Education Opportunity Act (HEOA)***

The HEOA is federal legislation that was enacted in 2008 and was a reauthorization of the Higher Education Act of 1965 (Powers & Schloss, 2017). The HEOA was enacted to address access, affordability, quality, and accountability in postsecondary education (Kurtz, 2011). The HEOA included language that directly affected students with disabilities (Ingram, 2017). One of the intended goals of HEOA was to increase access to postsecondary education to a diverse population, which included people with disabilities (Dukes & Roberts-Dahm, 2018; Kurtz, 2011). Moreover, the HEOA expanded previous versions of the law by adding provisions that affected access to postsecondary education, including expanding the definition of postsecondary education (Madaus et al., 2012).

Expanding the definition of postsecondary education allowed for more programs, including certifications and apprenticeships, to be included for students with disabilities (Madaus et al., 2012). This is important as students with disabilities prefer programs other than four-year programs (Madaus et al., 2012). Furthermore, the implementation of HEOA made postsecondary education more affordable for people with disabilities, increasing opportunities for students with disabilities to attend postsecondary institutions (Madaus et al., 2012).

### ***Faculty Knowledge of Disability Legislation***

It is important that the faculty understand how the ADA and Section 504 of the Rehabilitation Act apply to students in postsecondary education. It is the responsibility of the

institution to educate their faculty about disability legislation, the purpose of providing accommodations, and their legal obligations under the ADA and Section 504 of the Rehabilitation Act (Leuchovius, n.d.). Although the ADA and Section 504 of the Rehabilitation Act mandate that students with disabilities are appropriately accommodated, “it is not unusual to encounter instructors who feel classroom or testing accommodations give students with disabilities an unfair advantage over other students” (Leuchovius, n.d., p. 4). This leads to faculty noncompliance.

Noncompliance with the ADA and Section 504 of the Rehabilitation Act is the basis for lawsuits (Blanck, 1997). There have been several lawsuits filed because of violations of the ADA or Section 504 of the Rehabilitation Act as well as complaints filed with the Office of Civil Rights. These lawsuits are not only occurring at small universities and community colleges but also at large, well-known universities (Blanck, 1997). For example, there were lawsuits brought against Massachusetts Institute of Technology, the University of Michigan, Harvard University, and Boston University for violating the ADA or Section 504 of the Rehabilitation Act (Taylor & Weisberg, 2021). Although required to provide accommodations by law, it is commonly accepted that students with disabilities will encounter faculty who refuse to implement accommodations (Toutain, 2019). This indicates an overall lack of knowledge concerning the ADA and Section 504 of the Rehabilitation Act by faculty.

The lack of faculty knowledge concerning the ADA and Section 504 of the Rehabilitation Act is part of several studies (Baker, 2021; Basilice, 2015; Bolt et al., 2011; Diez et al., 2015; Price, 2018; Zhang et al., 2010). Baker (2021) identified that faculty lacked training, and consequently understanding, in disability laws and policies. Baker found that faculty distrust and are skeptical of the overall system regarding student accommodations and the processes (Baker,

2021). One of the fourteen faculty members in the Baker study was adamant that student accommodations are solely recommendations and were not mandatory (Baker, 2021). Another faculty member in the Baker study argued against approved accommodations for a student in their class (Baker, 2021). This further supports the conclusion that some faculty members do not understand disability law. The findings from Baker's (2021) study are consistent with Basilice (2015) who identified that part of the problem with faculty perceptions of student accommodations was a lack of understanding and knowledge of disability law. Most of the eight faculty members in this study reported that they had minimal or no knowledge concerning protective legislation for students with disabilities (Basilice, 2015).

Byrd (2018) linked knowledge about the legal issues involved with student accommodations to the attitudes of the faculty. The findings from this study indicated that faculty who had a positive perception concerning student accommodations were more likely to understand disability legislation and regulations whereas faculty who had a negative perception concerning student accommodation were less likely to understand disability legislation and regulations (Byrd, 2018). Byrd did not specify whether the connection is because those with more positive attitudes concerning student accommodations sought out additional information compared to the faculty who had more negative attitudes (Byrd, 2018).

The findings from Baker (2021), Basilice (2015), and Byrd (2018) regarding faculty knowledge of disability legislation are consistent with the findings of Zhang et al. (2010). Zhang et al. (2010) posited that there are four factors involved with faculty willingness to accommodate students with disabilities. One of these four factors was faculty knowledge of legal obligations and responsibilities (Zhang et al., 2010). Zhang et al. determined that overall, faculty lack legal knowledge concerning disability legislation. The implication being that faculty are not

supporting students with disabilities in accordance with disability legislation; therefore, students are not receiving the necessary accommodations to be successful (Zhang et al., 2010). Bolt et al. (2011) also posited that poor legal knowledge of disability law by faculty is a barrier for students who have disabilities and need accommodations.

Hammel (2010) investigated whether there is a relationship between faculty attitude, faculty education, and faculty experience with knowledge of disability law. Hammel used scores on an attitude scale and compared that with the gender of the faculty member, the number of years that the faculty member had been teaching, the number of students with disabilities that each faculty member had taught, whether the faculty member considered themselves to have a disability, the faculty member's perceived knowledge level concerning disability law, the type of disability education that each faculty member received, and whether the faculty member has or had a relationship with someone who has a disability. The significant predictor for faculty knowledge of disability law was the faculty member's experience teaching someone with a disability (Hammel, 2010). Additionally, the site where the study was performed had grievances filed with the Office for Civil Rights or the U.S. Department of Justice; however, Hammel found no link between faculty knowledge and the grievances filed.

Price (2018) denoted a difference in familiarity with disability law between STEM and non-STEM faculty. The results indicated that non-STEM faculty were significantly more familiar with disability law than the STEM faculty (Price, 2018). For students with disabilities in STEM, this lack of faculty knowledge creates issues for them to receive their appropriate accommodations in a discipline area where faculty are already less flexible when it comes to providing student accommodations (Bettencourt et al., 2018).

## **The Stigma of Disability**

The prevalence of disability in society is significant; however, society still views disability as a stigma (Wang & Ashburn-Nardo, 2019). According to Gershon (2020), disability stigma is so deeply ingrained in our society that it “can be hard to imagine what a society that fully included disable people would look like” (para. 1). People with disabilities feel stigmatized because they live in a society where accessibility and disability are inconveniences to others (Castillo, 2016). Our society is built for the able bodied (Castillo, 2016).

Part of the issue with disability stigma is that society uses terms that are derogatory and perpetuate discrimination adding to the stigma (Dukes & Roberts-Dahm, 2018). For example, phrases like “mentally retarded” or “suffers from” are derogatory, outdated, and should be avoided (Dukes & Roberts-Dahm, 2018). Dukes and Roberts-Dahm (2018) suggested that society use language that is demonstrative of sensitivity when speaking about people with impairments by using person-first language. Using terminology that is sensitive and respectful will aid in disabling the stereotypes surrounding people with disabilities, which will reflect the legislative mandates and the efforts of advocates to better integrate people with disabilities into society (Dukes & Roberts-Dahm, 2018). Doing so will help to remove outdated terminology (Clark, 2017), which tends to carry with it an emotional message (Dukes & Roberts-Dahm, 2018).

Possessing any distinct characteristic that causes someone to be set apart from another can lead to the person being looked upon disapprovingly, which causes a stigma (Akin & Huang, 2019). Students with visible disabilities experience less negative stigma associated with their disabilities than students with nonvisible disabilities (Akin & Huang, 2019). Furthermore, there is a perception that those with a nonvisible disability may be falsifying their disability or that a

person with a disability is able to control that disability (Akin & Huang, 2019). Consequently, those with a nonvisible disability often feel embarrassed by their disability (Akin & Huang, 2019). The stigma associated with disability is traumatic and not only affects an individual's experience in academia but also in their future life (Akin & Huang, 2019).

Society has negative perceptions about those with disabilities (Akin & Huang, 2019). Those negative perceptions are the basis for stereotypes commonly associated with disability (Akin & Huang, 2019; Baker et al., 2012). Common disability stereotypes about people with disabilities include, but are not limited to, being “more dependent, incompetent, unstable, vulnerable, emotionally unstable, and less outgoing and intelligent than non-disabled individuals” (Akin & Huang, 2019, p. 28). The perception of disability “is an important construct affecting not only the well-being of individuals with disabilities, but also the moral compass of the society. Negative attitudes toward disability disempower individuals with disabilities and lead to their social exclusion and isolation” (Babik & Gardner, 2021, para. 1). Stereotype threats can hinder academic achievement for students with disabilities as well as cause underperformance (Booksh & Madsen, 2018). Disability stereotypes impact interactions with faculty, which can have detrimental academic repercussions (Akin & Huang, 2019; Castillo, 2016). Additionally, Castillo (2016) noted students’ largest concern involved the stigma of identifying oneself as needing accommodations and how they would be perceived by the faculty.

Mullins (2019) links stigma concerns to the two dominant models of how society views disability: the medical model and the social model. In education, the prevalent model used is the medical model (Mullins, 2019). The medical model views disability as a disease that requires treatment, which, in turn, provides the impression the person with the disability needs to adapt to be successful in society (Mullins, 2019). The social model states that society creates barriers;

therefore, society should change to minimize those barriers (Castillo, 2016; Meyer, 2008; Mullins, 2019).

Research has shown that the stigma of disability has become a barrier that prevents students with disabilities from using their accommodations and students with disabilities often mention the stigma associated with having a disability (Bolt et al., 2021; Diez et al., 2015; Dukes & Roberts-Dahm, 2019; Elcock, 2014; James et al., 2020). Barriers for students with disabilities are erected because of societal factors. Society assigns distrust and shame to those with disabilities, which conveys the message that something is intrinsically incorrect about a person with disabilities (Gershon, 2020).

In higher education, a student with a disability is required to provide documentation attesting to the disability to receive an accommodation (Freedman et al., 2020; U.S. Department of Education, 2020b). Even though a student with disabilities provides the appropriate medical documentation, they are often met with skepticism as to whether they truly have a disability (Booksh & Madsen, 2018). This is especially true for individuals with invisible disabilities (Booksh & Madsen, 2018). The skepticism causes social isolation for the student with disabilities instead of an inclusive environment (Booksh & Madsen, 2018). This environment makes students with disabilities hesitant to admit to a disability and request accommodations for concern that their actions will substantiate stereotypes associated with the disabled (Booksh & Madsen, 2018). Additionally, students with disabilities perceive that others negatively view their disability and need for accommodations; therefore, students are less likely to identify as disabled (Bolt et al., 2011).

To illustrate, Koerner's (2016) study supports the conclusions from the Booksh and Madsen (2018) study as Koerner's findings indicated that students with disabilities would rather



risk floundering academically than confront the stigma and the status loss that our society places on those with disabilities. Consequently, students with disabilities are less likely than their peers without disabilities to complete their degree. Furthermore, Diez et al. (2015) noted that faculty tend to display inappropriate attitudes towards students who have disabilities compared to their non-disabled peers. Faculty members make “a choice, either examined and intentional or unexamined and unintentional, about where they situate disability: as a deficit within the individual ... or as an interaction between an individual and social structures” (James et al., 2020, p. 17). The stigma associated with disability and the use of accommodations by students with disabilities needs to be addressed to overcome the barriers that students with disabilities face, and to aid students in receiving the necessary accommodations.

### **Common Barriers Students with Disabilities Encounter**

Students with disabilities often face barriers to receiving their accommodations in postsecondary education (Bellman et al., 2018; Booksh & Madsen, 2018; Diez et al., 2015; Fanger, 2019; Hong, 2015; Kim & Lee, 2016; Lyman et al., 2016; Martin et al., 2011; Toutain, 2019). Barriers faced by students with disabilities impede the use of their accommodations, which affects their academic achievement (Kim & Lee, 2016). Understanding the barriers faced by students with disabilities will help address how to overcome them. Common general barriers include issues with institutional procedures, general knowledge about accommodations, limited resources, and a lack of training for faculty and staff (Bellman et al., 2018; Diez et al., 2015; Fanger, 2019). However, there is variation regarding what constitutes a barrier. There are three generally accepted constructs for barriers: (1) knowledge, (2) attitude, and (3) function (Toutain, 2019).

Hong (2015) identified four major themes concerning the barriers and frustrations that students with disabilities had concerning accommodations. These themes emerged from the barriers and frustrations that students encountered daily. Hong classifies the themes as (1) faculty perceptions, (2) the ability of advisors, (3) common stressors experienced at college, and (4) the quality of the disability services that students received. Students felt that they were being given lower class expectations and that their past experiences taught them to believe that faculty would demean them because of their need for accommodations (Hong, 2015). They felt that their advisor had an overall lack of knowledge about disabilities, were unresponsive to students, and felt that the advisors did not see them as individuals (Hong, 2015). The students felt that there was social stigmatization and struggles both mentally and emotionally, which is consistent with how students felt in other studies (Diez et al., 2015; Dukes & Roberts-Dahm, 2019; Elcock, 2014; Hong, 2015; James et al., 2020). Additionally, students felt intimidated by those in disability services (Hong, 2015). Students feeling intimidated means they will be less likely to return to or seek additional assistance from disability services. Of further detriment to students with disabilities are the experiences that occurred either privately with faculty or in front of their peers in class that left them feeling humiliated, judged, or embarrassed by faculty (Hong, 2015). Overall, students with disabilities felt like they were treated differently because of having a disability (Hong, 2015).

Lyman et al. (2016) contended that there are six themes related to the barriers for students with disabilities: (1) a desire for being self-sufficient, (2) a desire to avoid the negative reactions from others, (3) lack of knowledge, (4) the quality of accommodations and disability support services, (5) negative experiences with instructors, and (6) a fear that accommodations may be damaging to them in the future. These themes are consistent with the findings of similar

studies except for a fear that accommodations may be damaging in the future. Participants conveyed their concern that their accommodations would be removed if they demonstrated good academic performance, that their transcripts would reflect that they had a disability, that professors would not write a positive reference, or that the accommodations will inhibit learning a needed skill (Lyman et al., 2016). These themes can be linked in part to the negative connotation that society places on people with disabilities.

Toutain (2019) concluded that there are three main barriers for students with disabilities in postsecondary education: (1) the lack of knowledge by students with disabilities concerning accommodations, (2) the inability of students with disabilities to provide the required documentation to receive accommodations, and (3) the negative responses of their peers and faculty when they either disclosed their disability or requested implementation of accommodations. These findings align with the findings from the Freedman et al. (2020) study; however, Freedman et al. narrowed the classifications into two broad categories after performing student simulations.

Freedman et al. (2020) identified two main barriers for students with disabilities regarding the use of accommodations in postsecondary education: the professors and the disability services office. This study is unique in that the situations in the study were simulated for students to practice speaking with their professors concerning their accommodations and disabilities; however, the students reported that the interactions they had with their professors in these simulations were indicative of the interactions they previously had with their professors (Freedman et al., 2020). From these simulations, Freedman et al. noted that postsecondary institutions require students to register their accommodations using the appropriate accommodation documentation. The amount of documentation required can be a barrier to some

students in receiving their accommodations (Freedman et al., 2020). Freedman et al. also reported that encounters with the faculty can be barriers. Students perceived some innocuous statements made by professors as derogatory, which made the students feel like there was something wrong with them for having the disability, that there would be appreciable ramifications from using the accommodation they were requesting, or they felt the professor was being oppositional (Freedman et al., 2020).

Finally, students with disabilities identify that having access to course materials prior to lecture enhances their ability to learn (Diez et al., 2015). Having the course materials for lectures in advance helps students with disabilities to better understand the explanations provided during lecture and assimilate information (Diez et al., 2015). Unfortunately, faculty tend to delay providing said material to the students (Diez et al., 2015). Barriers such as this can be rectified by faculty and improve outcomes for students with disabilities; however, faculty's negative perceptions result in inappropriate attitudes by faculty towards students with disabilities (Diez et al., 2015). The barriers that students with disabilities who require accommodations face can be alleviated through knowledge and understanding about students with disabilities (Diez et al., 2015). Mullins (2019) noted that "approaching students with the mindset that they have the potential to be contributing citizens" (p. 14) would help remove the negative stigma associated with disability.

### **Common Student Accommodations**

Research has shown that the most important indicator of success for a student with disabilities in postsecondary education is being provided appropriate accommodations (Khoury et al., 2019; Kim & Lee, 2016; McGinty, 2016). Accommodations enable students with disabilities to experience educational activities without decreasing academic standards or rigor (Khoury et

al., 2019). When students with disabilities use accommodations in postsecondary education, they have higher achievement academically and improved graduation rates (Kim & Lee, 2016). As stated previously, providing students with accommodations “adjust the manner in which students with disabilities learn or are evaluated so that they can access and demonstrate knowledge at a level equal to that of their peers” (Khouri et al., 2019, p. 1). Providing students with accommodations neither lowers academic standards nor compromises the fundamental elements of the course or the program (American Psychological Association, n.d.; Lovett, 2021).

It is generally accepted that accommodations fall into two broad categories: instructional accommodations and examinational accommodations (Khouri et al., 2019). Instructional accommodations help students with disabilities succeed by altering how they learn whereas examinational accommodations alter how students demonstrate what they have learned (Khouri et al., 2019). Although accommodations are individually tailored (U.S. Department of Education, 2020b), there are common reasonable accommodations that are used in postsecondary education. Common accommodations include, but are not limited to, preferential seating during lecture, being provided a note taker, extra time on assignments and assessments, a quiet or separate assessment location, copies of the professor’s notes, and assistive technology (Baker, 2021; George, 2020). Providing common accommodations to students with disabilities is an essential aspect of success for students with disabilities (Dyer, 2018).

### **Non-disabled Students’ Perceptions Concerning Student Accommodations**

Several studies (Bahraini, 2018; Baker et al., 2012; Bettencourt et al., 2018; Diez et al., 2015; Khouri et al., 2019) examined the perceptions that students with disabilities have concerning faculty providing reasonable accommodations and perceptions that faculty have concerning reasonable accommodations, but studies investigating the perceptions that non-

disabled students have regarding student accommodations are sparse. There are two main studies that address the perceptions that non-disabled students have about their disabled peers receiving academic accommodations. These two studies are the Meyer (2008) study and the Akin and Huang (2019) study.

Meyer (2008) showed that approximately 46% of non-disabled students viewed student accommodations in a positive way and only approximately 8% of non-disabled students viewed accommodations in a negative way; however, the non-disabled students who had positive views of student accommodations limited those views depending on whether they perceived the accommodation would benefit them, too. Additionally, non-disabled students believed accommodations were inequitable if they perceived that the accommodation(s) lowered the effort required to pass an assignment or the course (Meyer, 2008). The perception was that the accommodation(s) enabled a student to take advantage of the system (Meyer, 2008).

Some non-disabled students perceived academic accommodations as overly beneficial to students with disabilities and were detrimental to those students without disabilities (Meyer, 2008). Moreover, students without disabilities reported that accommodations altered the degree of the person with disabilities (Meyer, 2008). Furthermore, non-disabled students felt that not providing the accommodations to everyone was unfair and would impede the success of those with disabilities in the real world (Meyer, 2008). These perceptions are like the perceptions that faculty have concerning the fairness and use of accommodations (Bahraini, 2018; Bettencourt et al., 2018; Clark, 2017; Foss, 2002; Leuchovius, n.d.; Lombardi & Murray, 2011; Zhang et al., 2010). The perceptions reported in this study support the research that the medical model view of disability is prevalent in postsecondary education (Meyer, 2008). Meyer (2008) posits that these perceptions are the basis for why students with invisible disabilities hesitate to use their

accommodations, especially since non-disabled students' knowledge concerning accommodations was low.

Akin and Huang (2019) determined that the perceptions of a disabled person's peers concerning disability impact a disabled person's self-perceptions, which impacts the selection of their college major, their performance academically, and their willingness to seek help. The perceptions held by the peers of a disabled person can lead to acrimony and resentment towards those with disabilities (Akin & Huang, 2019). Acrimony and resentment were especially prevalent when the non-disabled peers had the perception that a disability can be controlled (Akin & Huang, 2019).

### **Students' Perceptions of Faculty Concerning Student Accommodations**

Part of the issue with providing academic accommodation stems from a difference in perceptions between faculty and students concerning the accommodations. Bolt et al. (2011) identified that there are several perceptions that students have concerning accommodations that keep students from using those accommodations in a postsecondary setting. Perceptions that students have that hinder their use of accommodations include the perception that the system they need to navigate to obtain accommodations is difficult, the perception that they cannot effectively communicate their accommodation needs to faculty and disability services, and the perception that the amount of documentation required to obtain their accommodations is overwhelming (Bolt et al., 2011). Bolt et al. also noted that students feel that using their accommodations can be stigmatizing; however, Bolt et al. stated that student perceptions can be mitigated. Mitigating factors included faculty members who were flexible, faculty members who were willing to use the requested accommodations, and faculty members who attempted to be helpful (Bolt et al., 2011).

Baker et al. (2012) evaluated whether the perceptions of the faculty members were similar to the perceptions of students regarding the accommodations and the classroom environment. The results indicated that both faculty and students agree that students with disabilities can achieve success (Baker et al., 2012). Although these results are encouraging, the results also indicated that faculty required ongoing training concerning best practices for students with accommodations as their knowledge in this area was lacking (Baker et al., 2012).

Wright and Meyer (2017) examined how communication between faculty and students with disabilities impacted the perceptions of faculty in meeting the student accommodations. The study utilized both high and low disclosure of student accommodation information to measure the self-efficacy of the faculty in making the accommodations (Wright & Meyer, 2017). Independently, the high disclosure of information about the accommodation resulted in higher self-efficacy; however, when the high disclosure and low disclosure information were looked at collectively, the overall results indicated lower self-efficacy on the part of the faculty (Wright & Meyer, 2017). This indicated that faculty self-efficacy was lacking overall.

The results obtained by Wright and Meyer (2017) are consistent with the results from George's study. George (2020) explored faculty perceptions and student perceptions concerning student accommodations utilizing a mixed methods approach. The results of this study indicated that there is a dichotomy between the perceptions of faculty members versus the perceptions of students (George, 2020). Although faculty and students shared environments, faculty and students experienced the shared environments differently (George, 2020). Additionally, there was a dichotomy between how the students perceived the implementation of their accommodations and how the faculty perceived the implementation of the accommodations (George, 2020). This would indicate a lack of communication between the students and the



faculty. Like the Baker et al. (2012) study, George noted that faculty perceived a more receptive institutional climate and implementation process than students perceived.

Fanger (2019) explored the perceptions of faculty, students, and administration concerning accommodations. The purpose of this study was two-fold in that the investigator was looking to understand the knowledge of the participants regarding the ADA requirements and to explore perceptions of the participants regarding their roles in fulfilling the ADA requirements (Fanger, 2019). The goal of the investigator was to improve professional development regarding best practices for meeting ADA requirements as the retention of students with disabilities is less than the retention of students without disabilities (Fanger, 2019). Fanger asserted that part of the issue with students receiving their accommodations is their lack of knowledge in requesting accommodations along with lack of awareness of specific institutional procedures. Students thought that the faculty knew more about disabilities and accommodation than the faculty knew; however, Fanger noted a general lack of knowledge from the faculty. Both students and faculty lacked the proper knowledge and training required for students with disabilities to receive the accommodations required to be successful (Fanger, 2019). Fanger concluded that the lack of knowledge on the part of the students and the faculty could be alleviated with proper training and preparation programs.

Finally, Corbran (2021) examined the perceptions that students with disabilities have regarding faculty support. Corbran identified four categories of student perceptions: (1) microaggressive behavior from the faculty, (2) the negative impacts on students from unsupportive faculty, (3) the positive impacts on students from supportive faculty, and (4) the resiliency of the students. Students were reluctant to disclose their disability or need for accommodations because they feared that faculty would have a negative perception of their

ability because of the disability (Corbran, 2021). Students in the study reported microaggressive behaviors towards them from faculty (Corbran, 2021). Examples of the microaggressive behaviors from the faculty included questioning the capability of the student to perform in the class, questioning the capability of the student in their selected career path, lowering course expectations, and having grading concerns (Corbran, 2021). Overall, the students felt that they were treated differently than their peers (Corbran, 2021). Additionally, ignorance of accommodation processes led to faculty members disclosing the students' accommodations to others, including to classmates, without the permission of the student, faculty members misunderstanding the disability that the student has, and faculty members denying the accommodations to the students (Corbran, 2021).

### **Faculty Perceptions and Attitudes Concerning Student Accommodations**

Faculty perceptions are an important aspect of providing accommodations for students with disabilities (Alliston, 2010; Baker et al., 2012; Basile, 2015; Bettencourt et al., 2018; Diez et al., 2015; Dyer, 2018; Hoffman, 2013; Lombardi & Murray, 2011; McCarron, 2017; Sayle, 2016). Faculty perceptions of student accommodations impact the accommodations that students receive as those perceptions impact whether the faculty member is willing to provide accommodations regardless of the legal issues (McCarron, 2017). Academic outcomes for students with disabilities correspond to the experiences they have with faculty members (McGinty, 2016).

Faculty willingness to provide student accommodations is linked to personal beliefs and the perceived difficulty of the accommodation request (McCarron, 2017). The negative beliefs and responses to student accommodations by a faculty member present a barrier for the student making the request (Bettencourt et al., 2018; Sayle, 2016; Diez et al., 2015). Murray et al. (2008)

found that in general faculty were more willing to provide minor accommodations than major accommodations, especially if they viewed the accommodations as compromising the integrity of the program. Typically, faculty are amenable to implementing student accommodations that require little effort on their part, sustain the nature of the curriculum, or are not perceived as giving advantage to students with disabilities over their peers (Bahraini, 2018; Clark, 2017; Dyer, 2018; Foss, 2002; Khouri et al., 2019; McGinty, 2016; Zhang et al., 2010).

Studies involving the perceptions and attitude of faculty towards students with disabilities typically focus on seven areas. These studies typically focus on the following:

- (1) faculty perceptions and knowledge of disability, (2) faculty willingness to invest time supporting students with disabilities, (3) fairness and sensitivity among faculty, (4) performance expectations of students with disabilities, (5) faculty knowledge of disability law, (6) faculty willingness to provide teaching, exam, and accessibility accommodations, and (7) knowledge of campus support services. (Lombardi & Murray, 2011, p. 45)

Lombardi and Murray (2011) argued that although these areas are of importance, there is also a need to determine whether faculty's views regarding inclusive teaching result in more positive outcomes for students with disabilities, which means there is also a need for faculty to integrate inclusive pedagogy. An additional obstacle in postsecondary education is that the faculty are subject matter experts, but not experts in pedagogical methods (Lombardi & Murray, 2011).

Lombardi and Murray affirmed that they could measure actions that were associated with universal design. These results are significant because using the developed instrument to measure faculty perceptions of students with disabilities while integrating aspects of universal design can be used to encourage postsecondary faculty to use universal design (Lombardi &

Murray, 2011). Doing so will not only improve educational outcomes for students with disabilities, but also for students without disabilities (Lombardi & Murray, 2011).

Research has shown that students who have a support system established with their peers are more successful (Dyer, 2018). A strong support system for a student with a disability is essential for them to feel more comfortable about their disability and for them to receive encouragement to complete their studies (Dyer, 2018). Faculty relationships with students with disabilities are equally important (Baker et al., 2012; Dyer 2018). Faculty can lack sensitivity towards and have preconceived notions about students with disabilities that impede the student with a disability to be successful (Corbran, 2020; Koerner, 2016). Furthermore, negative interactions with faculty are discouraging for students (Dyer, 2018). Consequently, students with disabilities may not advocate for themselves (Dyer, 2018).

Positive attitudes for faculty concerning accommodations are imperative as faculty attitudes have been linked to the willingness to provide accommodations for students with disabilities (Alliston, 2010; Baker et al., 2012; Basilice, 2015; Bettencourt et al., 2018; Diez et al., 2015; Dyer, 2018; Hoffman, 2013; Lombardi & Murray, 2011; McCarron, 2017; Sayle, 2016). An increase on the part of the faculty to willingly provide accommodations means one less obstacle that students with disabilities must face in postsecondary education (Lombardi & Murray, 2011). Generally, faculty are willing to provide accommodations to students with disabilities (Lombardi & Murray, 2011); however, faculty are disinclined to adapt their teaching methods for students with disabilities. Furthermore, faculty are less willing to provide accommodations if those accommodations require additional time or effort for them (Foss, 2002; Khouri et al., 2019). Moreover, faculty are concerned that providing accommodations to students with disabilities will give them an unfair advantage over their non-disabled peers, will lower the

standards for their course, will prove to be ineffective, or will result in students requesting accommodations that they do not truly require. (Bahraini, 2018; Bettencourt et al., 2018; Clark, 2017; Foss, 2002; Zhang et al., 2010). Researchers surmised that these negative perceptions that faculty have concerning accommodations are grounded in a lack of knowledge on the part of the faculty as to the importance of accommodations and the role of accommodations in student success and is not out of maleficence (Khouri et al., 2019).

Zhang et al. (2010) contended that there are several factors that influence faculty's willingness to provide accommodations and that faculty attitudes about student accommodations could either hinder or help the implementation of accommodations. Faculty willingness to provide accommodations hinged on whether the faculty member felt that the accommodations were unfair, whether the faculty member had concerns about lowering academic integrity, and whether the faculty member believed accommodations were efficacious (Zhang et al., 2010). Zhang et al. summarized their findings as four overall factors that affect the willingness of faculty to provide accommodations: (1) knowledge of legal responsibilities, (2) personal attitudes of faculty regarding students with disabilities, (3) the perceived support from the institution, and (4) comfort level of the faculty with interacting with students who have disabilities. Additionally, faculty members were more accepting to providing students with accommodations if the disability was noticeable or if the disability was a learning disability whereas faculty were less accepting to providing accommodations if the disability was emotional in nature (Zhang et al., 2010). Finally, Zhang et al.'s study supports other studies in that there is a difference in the perceptions of students with disabilities being dependent on the faculty member's field of discipline. The faculty with the most negative perceptions about student accommodations belonged to faculty in science, engineering, and industry (Zhang et al., 2010).

The link between the perceptions of faculty members to the quality or perception of the accommodation was established in several studies (Alliston, 2010; Baker, 2021; Basilice, 2015; Dyer, 2018; Hoffman, 2013; Sayle, 2016). Dyer (2018) concluded that faculty have a variety of negative perceptions concerning student accommodations that are manifested as faculty feeling burdened by accommodations. These results are comparable to the results from Hoffman (2013) who concluded that the overall negative experience of students stems from a combination of the lack of faculty knowledge, the lack of faculty awareness, and the negative perceptions of faculty concerning accommodations.

Hoffman's (2013) study focused on assessing faculty knowledge, awareness, and perceptions. Faculty with more knowledge had more positive perceptions and faculty with less knowledge had more negative perceptions (Hoffman, 2013). Hoffman determined that there was no direct link between the years of teaching with knowledge, awareness, and perceptions as well as no direct link between the faculty having a disability and knowledge, awareness, and perceptions. The only demographic variable that Hoffman directly linked to faculty perception, knowledge, and awareness is gender. Hoffman concluded that the gender of the faculty member and faculty who identified as having a disability were two variables that predicted faculty knowledge, awareness, and perceptions. This is consistent with the findings from a study by Alliston (2010) in which there was a link between the gender of the faculty members and their attitudes towards working with students who required accommodations. Alliston also concluded that male faculty disregard disability etiquette and find it of no importance whereas female faculty have more positive attitudes concerning working with and interacting with students with disabilities.

Sayle (2016) also established a direct link of faculty perceptions concerning accommodations with implementation of the accommodation. Positive faculty perceptions resulted in supportive implementation of accommodations whereas negative faculty perceptions resulted in effective implementation of student accommodations being inhibited (Sayle, 2016). Similarly, Basilice (2015) noted a link in faculty perceptions, knowledge, and attitudes concerning student accommodations with the willingness and abilities of faculty to support accommodations.

Another issue that arises is that some faculty believe that they have positive perceptions of student accommodations and are meeting the accommodations satisfactorily; however, this is not necessarily true (McCarron, 2017). McCarron (2017) explored whether faculty who reported willingness to meet accommodations were truly accommodating the students. The investigator categorized faculty as “committed, well-intentioned, reluctantly compliant, and skeptically resistant” (McCarron, 2017, p. 1). The results indicated that the only group that was truly meeting student accommodations were the faculty in the committed group (McCarron, 2017). There is an apparent disconnect between how the faculty members perceive their willingness to accommodate students and their actions for accommodating students.

Likewise, Baker (2021) studied how student accommodations and awareness differed between faculty in postsecondary education. Baker found that the faculty did not have adequate training in institutional disability policy and in disability laws. Additionally, Baker concluded that faculty need training in disability in general as well as using adaptive pedagogy. This is consistent with the findings of Lombardi and Murray (2011) who concluded that faculty need training about inclusive pedagogy and universal design. Lombardi and Murray (2011) also determined that a general lack of training provided to the faculty negatively impacted students

with disabilities. Faculty generally had a distrust of and were skeptical about the overall disability system (Baker 2021).

Koerner (2016) also studied the lived experiences of students with disabilities in a postsecondary setting. Forty-five percent of the students who participated in the study received negative responses from faculty when they disclosed their disabilities (Koerner, 2016). Additionally, students with disabilities revealed that the experiences that they had with faculty left them preferring to risk struggling and possibly failing rather than confronting the stigma and stereotyping those disabilities bring (Koerner, 2016). These results are consistent with other studies (Akin & Huang, 2019; Baker et al., 2012; Castillo, 2016). The faculty in Koerner's study felt the academic integrity of their courses and programs would be at risk if they provided students with accommodations (Koerner, 2016). This is also consistent with the results from other studies (Baker et al., 2012; Elcock, 2014). The negative perceptions of disabilities, faculty preconceptions, and the faculty's belief of the destruction of academic integrity are partly why students selected not to reveal their disabilities and risk being unsuccessful in postsecondary education (Baker et al., 2012; Elcock, 2014; Koerner, 2016).

A 2018 study by Byrd was based on faculty perceptions of student accommodations for graduate students. This study was based on earlier studies that revealed the startling perception that faculty believe students who request accommodations due to a disability are just lazy and unmotivated (Byrd, 2018). Byrd reported that faculty with negative perceptions concerning student accommodations were less likely to make accommodations or even attempt to understand student accommodations (Byrd, 2018). The results from this study stress the significance of the relationship between faculty perceptions of student accommodation and their willingness to implement student accommodations.



The focus of other studies centered on recommendations for faculty development concerning student accommodations. Shelley's (2018) study was based on the perceptions of faculty and linked those perceptions to the responsiveness of faculty to students with disabilities. The intent of this study was to identify what organizational support faculty required for students with disabilities as well as to examine the impact of this support provided to faculty as professional development (Shelly, 2018). Humphrey et al. (2011) based their study on the creation of a faculty mentoring program to aid faculty with understanding student accommodations. The mentoring program was part of a pilot faculty development program to improve the university environment concerning disabilities and student accommodation (Humphrey et al., 2011). The results were promising as the climate surrounding disabilities and student accommodations became more positive through the implementation of the mentoring program (Humphrey et al., 2011). This study supported the idea that providing faculty support and training positively affects perceptions concerning student accommodations.

There are a few studies (Clark, 2017; Nizar, 2018) that focused on community colleges. Nizar (2018) explored faculty perceptions of the challenges of student accommodations at community colleges. The premise of this study was that the challenges associated with student accommodations at community colleges are different than the challenges encountered at large universities (Nizar, 2018). Nizar concluded that more research is required to determine the challenges associated with student accommodations at community colleges.

Clark (2017) also investigated the attitudes and experiences of faculty at a community college. Clark noted five key findings: (1) faculty generally have positive attitudes concerning accommodations for students with a visible disability, (2) faculty have concerns about the success of students who have invisible disabilities, (3) if a faculty member perceives that an

accommodation is unfair or does not prepare the student for the demands of secondary education, then they are less willing to provide the accommodation, (4) faculty want training to better understand the impact that disabilities have on students, and (5) faculty used outdated language when speaking about students with disabilities. The results indicated that the faculty need training concerning student accommodations (Clark, 2017). This result is comparable to the results of Lombardi and Murray (2011) who concluded that to successfully meet the needs of students with accommodations, postsecondary faculty need training in how to accomplish this as research shows appropriate training is linked to more positive attitudes of faculty towards accommodations.

Alalyani (2021) performed a study in a four-year public institution in Saudi Arabia and determined that 72% of the faculty who participated in the study have a positive attitude towards college students who have learning disabilities. Alalyani found a weak correlation between the attitudes of faculty towards students with disabilities and the faculty's willingness to provide student accommodations. These results are not consistent with the results of the studies performed by Alliston (2010), Baker et al. (2012), Basilice (2015); Bettencourt et al. (2018), Diez et al. (2015), Dyer (2018), Hoffman (2013), Lombardi and Murray (2011), McCarron (2017), and Sayle (2016). The major difference in the studies is that the Alalyani study was performed at an institution outside of the United States. There was no statistical significance of willingness of faculty to provide student accommodations based on gender, teaching experience, and academic rank; however, there was a statistical difference among faculty based on their departmental affiliation (Alalyani, 2021). The design of the test only allowed for the conclusion that there is a statistical difference between departmental affiliation and willingness to provide accommodations as a nonparametric test was used. The results only indicated a difference in the

distribution of scores among the departments, meaning the department affiliation may influence the attitude of faculty members concerning student accommodations (Alalyani, 2021).

Alghazo (2008) used the Scale of Attitudes towards Disabled Persons and the General Attitudes toward College Educational Accommodations to investigate the attitudes of postsecondary faculty members concerning disability and educational accommodations. The study compared the faculty at Southern Illinois University Carbondale to the faculty at the University of Mu'tah in Jordan (Alghazo, 2008). Although the faculty at Southern Illinois University Carbondale had more positive attitudes toward people with disabilities than the faculty at the University of Mu'tah, an overall comparison of the faculty saw no significant difference towards educational accommodations based on gender and on discipline (Alghazo, 2008). These findings are inconsistent with previous findings. However, when considering only the University of Illinois Carbondale, Alghazo determined that faculty rank, prior contact with students with disabilities, and discipline of the faculty member were all significant predictors concerning faculty attitudes toward people with disabilities (Alghazo, 2008). Alghazo also determined that gender and discipline are significant predictors concerning their evaluation of the 10 types of accommodations outlined in the General Attitudes toward College Educational Accommodation. These results are consistent with Murray et al.'s (2008) study in that Murray et al. revealed that lower ranking faculty members were more likely to provide teaching accommodations and that female faculty were more likely to provide accommodations for exams, had greater knowledge about disabilities, and greater sensitivity concerning the provision of academic accommodations. Unfortunately, Alghazo did not report what disciplines had less positive or more positive faculty attitudes towards providing educational accommodations.

## **Discipline Specific Studies**

There are a few studies (Foss, 2002; Harrison, 2013; Karakashian, 2020; May 2013) that focused on specific disciplines instead of utilizing an institutional approach. Harrison (2013) investigated faculty perceptions for a teacher preparation program. The focus of the study was whether a student with accommodations should enter the teacher preparation program. The findings from this study indicated that faculty held different perceptions of students with disabilities entering their program based on whether the disability was intellectual in nature or physical in nature (Harrison, 2013). The findings are significant if you consider the fact that the investigation focused on the perceptions from faculty in a teacher preparation program, which means the perceptions held by the faculty could be passed along to future educators (Harrison, 2013).

Foss (2002) examined the accommodation practices and the attitudes of faculty in the health professions. Although faculty provided accommodations, faculty did not have a strong belief that accommodations were effective (Foss, 2002). Foss linked the willingness of faculty to provide student accommodations with the accommodation type. Faculty were more willing to provide student accommodations if the accommodation involved additional time on assessments, alternate location for assessments, providing lecture notes, and recording the class (Foss, 2002). Faculty were less willing to provide students with accommodations if the accommodations involved an alternate format for assessments, an alternate format for assignments, or a provision of individual assistance for writing assignments (Foss, 2002).

Similar to the Foss (2002) study is a study by May (2013) involving nursing faculty. May's study utilized standardized assessments to understand faculty attitudes, beliefs, and knowledge. The sample size of the study was 231 participants; however, the results revealed that

only 21% of the participants achieved a passing score on the assessments (May, 2013). The nursing faculty lacked fundamental knowledge about disability law; however, they were able to recognize that an essential change to the content in their courses is not considered to be a reasonable accommodation (May, 2013). Additionally, the nursing faculty understood that they could not deny student accommodations citing academic freedom (May, 2013). Even with those insights, the nursing faculty failed to realize that they can be held personally liable for failing to provide student accommodations (May, 2013). Overall, the results from May's study indicated that more faculty training concerning student accommodations is necessary.

Finally, a study performed by Karakashian (2020) was specific to 11 English faculty at a community college. The results from this study are interesting in that all 11 faculty members reported positive perceptions of student accommodations even though the study reported that faculty training concerning student accommodations was inconsistent (Karakashian, 2020). The results from this study also indicated that the negative perceptions that faculty held were directed at the college's office of disability services and not the students or the actual accommodations being requested (Karakashian, 2020). Karakashian reported the reason for this was that faculty members felt that the disability support services staff were unapproachable and unhelpful.

### **STEM Studies**

There is a shortage of professionals in engineering and the sciences (Bellman et al., 2018). Part of the shortage is due to underrepresentation of certain groups, including women, racial minorities, ethnic minorities, and people with disabilities (Bellman et al., 2018). In the United States, it is recognized that there is a need for diversity in STEM fields; however, the common action is to "weed out" minority students, including students with disabilities (Bellman et al., 2018; Schneiderwind & Johnson, 2020). "Research shows the impact of social upbringing, the

media, and self-reinforcement on students who are statistically not ‘supposed’ to do well – they tend not to, and this is referred to as the expectancy effect” (Schneiderwind & Johnson, 2020, p. 102). Studies concerning the expectancy effect in STEM focus on women and minorities; however, the consequences from the expectancy effect can be extrapolated to students with disabilities.

Research has shown that students require support beginning at a young age to successfully pursue careers in STEM, which is especially true for students with disabilities (Griffiths et al., 2019). According to Hwang and Taylor (2016), students in the United States have negative views concerning STEM, which develop because of problems they experience in mathematics and science courses during primary education. Consequently, one-half of high school graduates are unable to meet the required proficiency upon entrance into postsecondary institutions in both math and science (Hwang & Taylor, 2016).

Griffiths et al. (2019) recommend that higher education implements what they refer to as FACES – facilitation, awareness, connection, exposure, and support – to facilitate transitions. To facilitate transitions, postsecondary institutions need to share the skills required with K-12 schools to ensure students enter with the necessary skillsets (Griffiths et al., 2019). To increase awareness, postsecondary institutions should form partnerships with organizations, sponsor events, and make a targeted and purposeful campaign (Griffiths et al., 2019). Students also need to be exposed to mentors and professors and gain support through accommodations and Universal Design for Learning (Bellman et al., 2018; Griffiths et al., 2019).

Students with disabilities are drawn to STEM fields (Bettencourt et al., 2018); however, there is a high attrition rate among students with disabilities enrolled in STEM fields (Booksh & Madsen, 2018; Friedensen et al., 2021). This is in part related to how society views disability.

The societal descriptor for disability is intrinsically negative viewing disability as synonymous to inability instead of understanding that disability is merely a descriptive characteristic (Bellman et al., 2018; Booksh & Madsen, 2018). The other aspect of high attrition rates for students with disabilities is the climate in STEM towards students with disabilities (Friedensen et al., 2021).

The STEM climate towards students with disability is negative in postsecondary education (Bellman et al., 2018; Bettencourt et al., 2018; Booksh & Madsen, 2018; Dishauzi, 2016; Dunn et al., 2012; Friedensen et al., 2021). “In order to be afforded equal opportunity, especially in STEM fields, people with disabilities must be able to work their way through multiple barriers” (Martin et al., 2011, p. 295). Additionally, there is a lack of support for students with disabilities in STEM (Bettencourt et al., 2018; Dishauzi, 2016; Friedensen et al., 2021). Moreover, students with disabilities are not encouraged to major in STEM and they have no role models (Dishauzi, 2016; Dunn et al., 2012; Friedensen et al., 2021). Further complications for students with disabilities occur as there is a lack of understanding by STEM instructors, STEM instructors’ use of non-inclusive and rigid curricula, and resistance in the STEM faculty to provide reasonable accommodations (Bettencourt et al., 2018; Friedensen et al., 2021).

Research has shown that there is a distinct difference in attitudes of faculty concerning student accommodations from faculty in STEM disciplines compared to faculty in non-STEM disciplines (Bettencourt et al., 2018; Friedensen et al., 2021; Martin et al., 2011; Monagle, 2015; Rao, 2002). The faculty with the most negative perceptions about student accommodations belonged to faculty in science, engineering, and industry (Zhang et al., 2010). According to Bettencourt et al. (2018), the faculty in STEM have shown themselves to be inflexible, which requires STEM-specific interventions on behalf of students in need of accommodation

(Bettencourt et al., 2018). Students with disabilities who do major in STEM disciplines receive less accommodations compared to students whose majors were outside of STEM disciplines (Monagle, 2015).

STEM faculty perceive student accommodations as a barrier to students being successful in their future careers as the STEM faculty believe that accommodations prevent students from learning the skills that are required in their field (Bettencourt et al., 2018). Additionally, STEM faculty have difficulty understanding students with disabilities (Bettencourt et al., 2018). The difficulty understanding students with disabilities appears to be based on the experiences that STEM faculty had when they were students (Bettencourt et al., 2018). One STEM faculty member illustrates this point when asked why STEM faculty have difficulty understanding students with disabilities. The reply was that “they just imagine themselves. They went to class ...you just make yourself do it. If it is important to you, you just do it” (Bettencourt et al., 2018, p. 389). This is a difficult mindset to overcome and one that is prevalent in STEM. To further complicate student accommodation in STEM is the fact that sequential nature of the curricula in STEM poses a challenge as the course material is cumulative both within the course and within the course sequences (Bettencourt et al., 2018).

Bellman et al. (2018) suggested focusing on five broad categories to increase students with disabilities in STEM fields: (1) recruitment and engagement, (2) through communication, (3) through technology and product accessibility, (4) by encouraging inclusion, and (5) by developing appropriate strategies to collect and evaluate data. Although these methods were used to include students with disabilities in an engineering research center, the methods can be applied to postsecondary education (Bellman et al., 2018). All implementation strategies can aid with



increasing enrollment and retention of students with disabilities in STEM; however, these practices are not commonplace in postsecondary STEM programs (Bellman et al., 2018).

Bahraini (2018) investigated a humanities discipline and a STEM discipline simultaneously. Bahraini's study focused on the perceptions of 10 faculty members in mathematics and English. The study provided insights into how the faculty interviewed responded to student accommodations. The purpose of Bahraini's study was to use the findings to develop training for faculty to improve accommodations for students based on the perceptions reported (Bahraini, 2018). Bahraini (2018) reported two major themes concerning faculty perceptions. The first theme was that there are multiple factors that influenced the willingness of faculty to provide students with accommodations (Bahraini, 2018). The factors that influenced the willingness of faculty to provide accommodations included concerns about fairness to other students who were not receiving accommodations, doubts about the accuracy of disability determination, the number of students requesting accommodations in a single class, and consideration for whether the accommodations are time-consuming (Bahraini, 2018). The second theme was that there are both positive and negative insights present regarding the provision of accommodations to students with disabilities (Bahraini, 2018). Some of these insights included faculty feeling inadequate when providing accommodations, faculty feeling discomfort regarding some accommodations, and faculty having feelings of empathy towards students who required accommodations (Bahraini, 2018). Although the results of Bahraini's study are consistent with previous studies performed, the results are not discipline specific. The results are not separated by discipline to be able to compare faculty in STEM to non-STEM faculty.

The focus of the Love et al. (2015) study was STEM faculty at one land grant university. Love et al. determined that the STEM faculty were cognizant of their obligations to provide

reasonable accommodations as outlined in the ADA and Section 504 of the Rehabilitation Act. Although faculty in this study were cognizant about their obligations, the faculty were underprepared to work with students with disabilities (Love et al., 2015). The varied terminology used for students with disabilities caused ambiguity for the faculty, especially if the student had an emotional, social, or attention disabilities (Love et al., 2015). Further complications noted the lack of classroom experience that the STEM faculty had as they obtained progressive degrees in their field (Love et al., 2015). As is consistent with other studies concerning the provision of student accommodations, the faculty lacked general knowledge of accommodations (Baker, 2021; Basilice, 2015; Bolt et al., 2011; Byrd, 2018; Murray, 2008; Zhang et al., 2010).

Schneiderwind and Johnson (2020) indicated that part of the issue involved the little amount of research performed concerning students with disabilities in the STEM fields. If the research is scant, then educators in the STEM field are ill-prepared to meet the need of students with disabilities, the students become invisible, and barriers that are faced cannot be removed (Schneiderwind & Johnson, 2020). Furthermore, faculty did not recognize their own bias pertaining to students with disabilities (James et al., 2020); therefore, students with disabilities did not receive the necessary support to be successful (Baker et al., 2012; James et al., 2020; Schneiderwind & Johnson, 2020).

### **The Sciences**

All students in postsecondary education are typically required to complete science courses as a general education requirement to earn their degree (Dennon, 2021). Students with disabilities regularly face challenges in utilizing their accommodations when taking a science course in higher education (Bettencourt et al., 2018). These challenges are linked to the

perceptions held by science faculty and diminish the possibility that students receive appropriate accommodations (Bettencourt et al., 2018).

Science courses require laboratory exercises, which typically utilize teamwork, as well as traditional coursework in which content builds on previous work. The laboratory exercises coupled with the negative perceptions of faculty means students with disabilities face greater challenges in the sciences (Bettencourt et al., 2018). An additional challenge in the sciences is that the material is often cumulative within a course as well as within the course sequence (Bettencourt et al., 2018; Friedensen et al., 2021). This poses a unique problem for the science faculty as they attempt to meet student accommodations. An issue arises when student accommodations involve removing attendance requirements and students miss multiple lectures or laboratory experiments that build on previously learned concepts (Bettencourt et al., 2018). Missing multiple laboratory experiments places the student at a disadvantage since science labs provide the hands-on experiences that augment concepts covered in lecture and help students to better grasp concepts. This is an issue that non-STEM faculty do not encounter.

There were no studies found in the literature that delineate between tenured and non-tenured faculty specifically. Additionally, there were no studies found in the literature that are specific solely to the sciences in postsecondary education. Bettencourt et al.'s (2018) study focused on the perceptions of STEM faculty and investigated 17 of the over 30 STEM majors across three colleges at one university; however, STEM encompasses more disciplines than just biology, chemistry, and physics. The participants of Bettencourt et al.'s (2018) study included tenure-track faculty, tenured faculty, non-tenure track faculty, and administrators. Similar studies by Price (2018) and Bahraini (2018) provided a comparison of STEM faculty to non-STEM faculty but did not delineate between the various disciplines of STEM. There are no studies

found in the literature that focus on biology, chemistry, and physics while eliciting responses solely from tenured faculty in postsecondary education; therefore, there is a dearth in research concerning the perceptions of tenured science faculty in these fields regarding the provision of accommodations to students with disabilities in a postsecondary environment.

### **Chapter Summary**

The review of the pertinent literature demonstrates that there are variety of issues faced by students with disabilities in postsecondary education (Bellman et al., 2018; Booksh & Madsen, 2018; Diez et al., 2015; Fanger, 2019; Hong, 2015; Kim & Lee, 2016; Lyman et al., 2016; Martin et al., 2011; Toutain, 2019), especially for students with disabilities in STEM (Bellman et al., 2018; Bettencourt et al., 2018; Booksh & Madsen, 2018; Dishauzi, 2016; Dunn et al., 2012; Friedensen et al., 2021). The faculty in STEM are inflexible with rigid curricula and a disdain for implementing inclusive or adaptive pedagogy (Baker, 2021; Bettencourt et al., 2018; Friedensen et al., 2021; Lombardi & Murray, 2011). Students with disabilities in STEM do not receive the necessary support to be successful (Baker et al., 2012; James et al., 2020; Schneiderwind & Johnson, 2020). Additionally, faculty lack recognition of their own biases concerning students with disabilities (James et al., 2020). Furthermore, the faculty in STEM display more negative attitudes towards the provision of student accommodations compared to faculty in non-STEM disciplines (Bettencourt et al., 2018; Friedensen et al., 2021; Martin et al., 2011; Monagle, 2015; Rao, 2002).

### **Chapter 3. Research Method**

This chapter presents the research methodology employed to explore the perceptions of tenured science faculty about providing reasonable accommodations to students with disabilities. The chapter includes a summary of the qualitative research method used; a review of the research questions; a description of my role as the researcher; a description of the methods used to select participants; an explanation of how data was collected and analyzed; a narrative concerning trustworthiness; and the ethical considerations for my study. The chapter concludes with a summary of the information.

#### **Qualitative Research Method**

Qualitative research situates the researcher in the world allowing the researcher to study phenomena in natural settings (Given, 2008). The emphasis of qualitative research is to explore and understand “the meaning individuals or groups ascribe to a social or human problem” (Creswell & Creswell, 2018, p. 4). Qualitative research uses the perspectives of insiders (Lapan et al., 2012, p. 3) to study the problem or phenomenon. This is different from quantitative research in which the emphasis is to evaluate objective theories by examining the relationship between variables (Creswell & Creswell, 2018).

A qualitative research approach is appropriate when the goal of the researcher is to provide explanations and understanding of a phenomenon by using the perceptions of those who have lived experiences about the phenomenon (Creswell & Creswell, 2018). A qualitative research approach to this study was appropriate since the purpose of this study was to examine the perceptions of tenured science faculty concerning the provision of academic accommodations for students with disabilities.

Creswell and Poth (2018) delineated five approaches to qualitative inquiry, including narrative research, phenomenology, case study, ethnography, and grounded theory. The researcher determines which qualitative research design to use by examining their research focus and their research problem (Creswell & Poth, 2018). Of the five approaches delineated by Creswell and Poth (2018), I selected a phenomenological research design for my study as I am interested in exploring the essence of the lived experiences of tenured science faculty.

### ***Phenomenology***

Phenomenology is “a *rigorous science* with an autonomous philosophical method” (Eberle, 2013, p. 184). Phenomenology examines a phenomenon pre-reflectively instead of theorizing or conceptualizing the phenomenon being studied (Adams & van Manen, 2012). The focus is on consciousness, such as emotions and perceptions (Connelly, 2010). Phenomenology also focuses on “humans as embodied beings” (Connelly, 2010, p. 127), that is, the experiences are through a physical body. Consequently, phenomenologists have a desire to explore the experiences of living the phenomenon (Connelly, 2010).

There are several types of phenomenology, including transcendental phenomenology, existential phenomenology, hermeneutic phenomenology, linguistic phenomenology, and ethical phenomenology (Adams & van Manen, 2012); however, phenomenology can be broadly categorized as either descriptive phenomenology or interpretive phenomenology (Connelly, 2010; Lopez & Willis, 2004). Descriptive phenomenology is based on the idea that the motivation and actions of humans are influenced by their perceptions and their lived experiences (Lopez & Willis, 2004). Descriptive phenomenologists believe that there are “features of any lived experience that are common to all persons who have the experience” (Lopez & Willis, 2004, p. 728). Additionally, descriptive phenomenology requires the researcher to rid themselves

of prior knowledge and personal bias; therefore, descriptive phenomenologists must practice bracketing to improve rigor (Connelly, 2010; Lopez & Willis, 2004). This is different than interpretive phenomenology in that interpretative phenomenology is based on the belief that “humans are embedded in their world to such an extent that subjective experiences are inextricably linked with social, cultural, and political contexts” (Lopez & Willis, 2004, p. 729). Interpretive phenomenologists believe that it is the “interpretation of the narratives provided by participants in relation to various context that is foundational” (Lopez & Willis, 2004, p. 729). This belief allows for the use of a theoretical framework to focus the research and aid in decision-making concerning the sample, the participants, and the research questions (Lopez & Willis, 2004). Each researcher must reflect upon which type of philosophy they prescribe to determine their approach. I prescribed to an interpretive phenomenological approach, which is the approach I used to explore the perceptions of tenured science faculty.

### ***Phenomenological Research***

Phenomenological research is the study of “lived or experiential meaning and attempts to describe and interpret these meaning in the ways that they emerge and are shaped by our consciousness, language, our cognitive and noncognitive sensibilities, and by our preunderstandings and presuppositions” (Adams & van Manen, 2012, p. 615). In general, phenomenological studies involve individuals who have lived through a specific phenomenon and the researcher catalogues the experiences of those individuals (Neubauer et al., 2019). The researcher in a phenomenological study is not only interested in what the participants experienced, but also how the participants experienced the phenomenon (Creswell & Poth, 2018). The researcher attempts to describe and interpret the lived experiences of the participants (Adams & van Manen, 2012). In this study, I examined the perceptions of tenured science

faculty through their lived experiences, which is the rationale for using a phenomenological research approach.

Phenomenological research requires the researcher to interact with the participants (Adams & van Manen, 2012); therefore, phenomenological research primarily relies on collecting data using interviews, observations, stories, surveys, or a combination of these techniques (Creswell & Poth, 2018). The use of interviews to collect data in phenomenology is quite common (Given, 2008) and “is linked to the expectation that the interviewed subjects’ viewpoints are more likely to be expressed in an openly designed interview situation” (Flick, 2009, p. 150). To explore and understand the perceptions that tenured science faculty have concerning the provision of student accommodations, I established an open dialogue between the participants and me (Flick, 2009; Flick, 2018). In-depth interviews provided the opportunity to establish a dialogue with the participants to understand and explore their experiences, which is the rationale for the use of in-depth interviews in this study.

### ***Social Desirability***

Social desirability can be “conceptualized as an individual’s constant need for social approval and impression management in social interactions” (Frey, 2018, p. 2). Social desirability can cause research subjects to provide answers that are socially desirable as a mechanism for self-preservation and self-presentation (Frey, 2018). Responses prompted by social desirability introduce bias into the research (Frey, 2018). Social desirability bias is a concern when the interview questions relate to behaviors associated with legal ramifications or if the interview questions are perceived by the participants to be sensitive (Gaia, 2020).

To determine whether a question is characterized as sensitive, three aspects are considered: “the social (un)desirability of the answer, invasion of privacy, and risk of disclosure



of the answer to third parties” (Gaia, 2020, p. 2). In these instances, participants can provide responses that are inaccurate because they fear that their responses are socially undesirable, they fear that their responses could be disclosed to a third party, or they feel the questions asked were an invasion of their privacy (Gaia, 2020). Social desirability bias can be mitigated by protecting data and maintaining confidentiality (Frey, 2018).

Although the identities of the participants in this study were kept confidential, and the data were protected and de-identified, participants may have had unexpressed concerns about the disclosure of their responses to third parties. Disclosure of sensitive answers to third parties could have a negative impact on employment because of the legal ramifications involved with disability and accommodations. To decrease the effect of social desirability bias and the concern of adverse employment action brought about by their responses to sensitive questions, only tenured faculty members were interviewed.

### ***Tenure in Postsecondary Education***

Tenure in postsecondary education was established to secure protection for the professoriate (Manjounes, 2016). According to the American Association of University Professors (n.d.), “freedom and economic security, hence, tenure, are indispensable to the success of an institution in fulfilling its obligations to its students and society” (para. 8). Manjounes (2016) asserted that the goal of tenure “is to protect those who have the courage to speak their mind ... and voice dissent or displeasure. ... Protection of tenure essentially equates to job security, hence disagreement with authority figures is condoned within the tenure concept” (p. 26).

Tenure guarantees continuous employment in the professoriate regardless of whether faculty vocalize opposition, concerns, or negative viewpoints. The employment security

associated with tenure ensures that the dismissal of a tenured faculty member must be based on just cause and that the faculty member is afforded due process (American Association of University Professors, n.d.; Olivas & Gajda, 2016). It is difficult to terminate the employment of a tenured faculty member as tenure provides “strong protection for faculty” (Olivas & Gajda, 2016, p. 278); therefore, only tenured faculty members were interviewed.

### **Research Questions**

The focus of this research was to explore the perceptions of tenured science faculty at institutions of higher education located in the United States about providing reasonable accommodations for students with disabilities. My intent was to understand the perceptions that tenured biology, chemistry, and physics faculty have concerning the provision of reasonable accommodations to students with disabilities. The research questions were determined with that in mind. The following research questions were investigated:

1. What do tenured science faculty report as their perceptions about providing reasonable accommodations to students with disabilities?
2. What experiences do tenured science faculty link to their perceptions of accommodations?
3. What do tenured science faculty perceive as the greatest challenge with providing reasonable accommodations to students with disabilities in a laboratory science?
4. How do tenured science faculty characterize their willingness to provide accommodations?

### **Researcher’s Role**

Qualitative research is personal (Creswell & Creswell, 2018), and the interpretation of the data is dependent on the researcher (McMillan & Schumacher, 2010). According to Flick (2018),

researchers are an integral aspect of the “research process, either in terms of their own personal presence as researchers, or in terms of their experiences in the field and with the reflexivity they bring to the role – as are members of the field under study” (pp. 5-6). Thus, acknowledging the researcher perspective is an important aspect of qualitative research (Creswell & Creswell, 2018). Additionally, reflexivity in qualitative research establishes credibility (McMillan & Schumacher, 2010). Reflexivity is an extensive self-reflection performed by the researcher throughout the research process (McMillan & Schumacher, 2010). McMillan and Schumacher (2010) stated that the researcher’s “very act of posing difficult questions to himself or herself assumes that he or she cannot be neutral, objective, or detached” (p. 332). Furthermore, reflexivity can be affected by whether the researcher shares the experiences of the participants (Berger, 2015).

I possess a Bachelor of Science in chemistry and a Master of Science in analytical chemistry. My work experience includes 11 years in academia. Consequently, I am a tenured science faculty member at an institution of higher education in the United States. None of the participants interviewed had a direct relationship with me; however, within the context of the study, it was important that I considered my role as tenured science faculty and how my experience may have influenced the participants’ answers or how I approached the conversation. An important aspect of this was the consideration that my background could impact the willingness of the participants to speak openly about the subject and share their experiences. This is a consideration when analyzing the results of the study, especially since my experiences in higher education involved colleagues whose perceptions of student accommodations were negative. I addressed the potential bias by authoring memos to position myself in the process. Memo writing helps to minimize bias through reflexivity (McMillan & Schumacher, 2010).

Additionally, some participants inquired about my area of expertise, specifically my educational background. I was honest with participants and informed them that I am a degreed chemist. This may have been the reason that participants spoke openly about their experiences with academic accommodations for students with disabilities. I was honest with participants as deceiving participants is unethical and was not employed (U.S. Department of Health and Human Services, 2018).

### **Study Participants**

The participants for this study were tenured science faculty at institutions of higher education throughout the United States. All participants reside in the United States and are over the age of 18 years. Participants were recruited from the science departments at institutions of higher education in the United States using purposeful sampling and snowball sampling, which are acceptable qualitative research recruitment methods (Creswell & Poth, 2018). I recruited participants by sending email messages to science faculty using the public directory on the institutions' websites as well as posting information concerning the study on Facebook.

Interested participants were sent an informed consent to review and were asked to verify that they are tenured. Because of the legal ramifications and sensitivity of the phenomenon being studied, only tenured faculty members were recruited to lessen social desirability bias (Latkin et al., 2017). Participants provided oral consent to participate in the research. Thirteen tenured science faculty members participated in the study. Five participants are biology faculty, two participants are physics faculty, and six participants are chemistry faculty. Eight participants are employed at community colleges and five participants are employed at a four-year college or university.

## **Data Collection Method**

I received approval from the Institutional Review Board at East Tennessee State University prior to recruiting participants and collecting data. The method for collecting data was in-depth, semi-structured, interviews using open-ended questions (Edwards & Holland, 2013). An interval protocol (Appendix) was used for the interviews; however, the interviews were allowed to progress in a conversational style encompassing information relating to the research questions but remained in the bounds of minimal risk.

Prior to the start of the interview, the participants were given an opportunity to ask any questions or express any concerns they had concerning the research. Participants were reminded of their ability to withdraw from the study at any time without consequence. Participants then provided verbal consent. I conducted interviews after receiving verbal consent from the participants. The interviews were performed virtually using Zoom at a date and time convenient for the participants and were recorded.

The participants selected the date, time, and location of their interviews to ensure their privacy as the interviews were recorded using the Zoom platform. The participants also had the option of changing their name in Zoom so that an alias was recorded. I ensured confidentiality for the participants during the interviews by performing the interviews at home behind closed doors. Additionally, all data was stored on my personal password-protected laptop that was kept secured in my home office. Finally, a Virtual Private Network was used during the interviews and during data review and analysis.

The initial transcript of each interview was an automated transcript produced by Zoom. I reviewed each initial transcript for accuracy by comparing the video to the generated script. I corrected any discrepancies. Participants were contacted a second time for clarification of their

answers and to expand on their answers for accuracy purposes. The exception to this was one participant who stated that there was no need for further clarification as I had a recording of the interview and they said everything in the way they intended.

I authored field notes during each interview. After each interview, I authored memos to position myself in the process and to increase transparency in the process (McMillan & Schumacher, 2010). Memos help to minimize bias through reflexivity (McMillan & Schumacher, 2010). Additionally, memos create an audit trail (Anfara et al., 2002). Memos and field notes from this study include my thoughts and concerns from the interviews, reflections on the process, and my thoughts about emerging codes and themes as well as the reasoning behind changing the name of a code.

### **Data Analysis Methods**

The data were analyzed using thematic analysis. Saldaña (2016) stated that “themeing the data is appropriate for virtually all qualitative studies and especially for phenomenology” (p. 200). Thematic analysis is a method for “identifying, analyzing, organizing, describing, and reporting themes found within a data set” (Nowell et al., 2017b, p. 2). The themes emerge from coding the data (Saldaña, 2016). The interviews were coded in the same order as the interviews occurred. I coded the data manually using Excel to make coding more consistent and transparent.

Initially, I entered the data from each transcript into an Excel spreadsheet. Each transcript was broken down into small phrases containing no more than 10-12 words so that data were coded in manageable portions that were meaningful. Initial codes were generated based on the research questions and were coded using open coding with a line-by-line approach (Saldaña, 2016). The codes consisted of one to four words that described the essence of the narrative of the participant, that is, in vivo codes were used (Saldaña, 2016). The initial codes were expanded

based on the emergence of themes in the data (Saldaña, 2016). A codebook was generated to ensure consistency in applying the codes. Additional initial codes were generated as more data was analyzed, codes were renamed to better reflect the essence of the narrative, and the data recoded (Saldaña, 2016).

I performed a second cycle of coding. The goal of second cycle coding is to develop a “sense of categorical, thematic, conceptual, and/or theoretical organization” (Saldaña, 2016, p. 234) from the first cycle of codes. The codes were narrowed to develop a more refined list of codes during the second cycle of coding. The codes from the second cycle of coding were narrowed into categories by interconnecting the codes based on broad themes.

Lastly, the categories were combined into distinct themes. Saldaña (2016) refers to this as creating “categories of categories” (p. 278). I used a category map (Saldaña, 2016) to create my “categories of categories” (p. 278). The relationship between the categories was emergent and recognizable as the category map aids in illustrating those relationships (Saldaña, 2016).

### **Credibility and Trustworthiness**

Rigor in qualitative research is often questioned because it is evaluated against the criteria of validity, reliability, and objectivity, which are aspects of quantitative research and positivism (Anfara et al., 2002). These criteria are inappropriate for qualitative research (Shenton, 2004). Instead, qualitative researchers strive to instill trustworthiness in their research to demonstrate rigor. Trustworthiness in qualitative research can be established by integrating means to ensure credibility, transferability, dependability, and confirmability in the research (Anfara et al., 2002). I addressed credibility, transferability, dependability, and confirmability to ensure trustworthiness in my research.

### ***Credibility***

One of the most important aspects for establishing trustworthiness in qualitative research is to demonstrate credibility (Shenton, 2004). Demonstrating credibility involves promoting confidence that the researcher recorded the phenomenon accurately (Shenton, 2004). Credibility can be established using various methods (Anfara et al., 2002; Creswell & Creswell, 2018; Creswell & Poth, 2018; Shenton, 2004).

I established credibility in several ways. First, I employed triangulation. Triangulation was achieved by using various research sites located throughout the United States, participants from three different science disciplines, and institutions of varying sizes, that is, community colleges, four-year colleges, and four-year universities. Second, I employed member checking to ensure accuracy of the data. Third, I adopted the use of established research methods. Finally, all participants in the study are tenured faculty members so that there is no pressure for the faculty members to provide answers that do not necessarily reflect their true perceptions and to minimize social desirability bias.

### ***Transferability***

Trustworthiness can be established through transferability (Anfara et al., 2002). Transferability is established by providing thick, rich descriptions of the data and employing purposive sampling (Anfara et al., 2002; Creswell & Creswell, 2018). I established transferability by both methods. First, I provided rich and thick descriptions of the data I collected. Second, I employed purposive sampling by ensuring all participants are tenured faculty who teach biology, chemistry, or physics.



### ***Dependability***

Trustworthiness can also be established through dependability (Anfara et al., 2002). Dependability can be established through triangulation, using a code-recode method for the data, creating an audit trail, or using peer debriefing or examination (Anfara et al., 2002; Creswell & Creswell, 2018). Additionally, a code book can be developed and used (Creswell & Poth, 2018). I integrated dependability into my study in several ways. First, as mentioned previously, I employed triangulation by collecting data from different institutions and from participants in three different science disciplines. Second, I created an audit trail. The audit trail consists of the transcribed interviews, coded transcriptions, participant clarified transcripts, memos, and an interview protocol. Lastly, I used a code-recode method and a codebook to accurately assign codes to the data.

### ***Confirmability***

Finally, trustworthiness can be established through confirmability. Anfara et al. (2002) recommend the use of triangulation in the research and for the researcher to practice reflexivity, which addresses research bias and assumptions, to establish confirmability. As mentioned previously, I achieved triangulation by using various research sites and participants from three different science disciplines. I practiced reflexivity by writing memos.

I wrote textual and reflexive memos during data collection and data analysis. I wrote textual memos to record themes that I saw emerging as the research progressed and to establish the reasoning behind selecting codes for the data, which enabled me to reason through code designation and consistency in applying the codes. Second, I wrote reflexive memos to determine what role I played in collecting data and to position myself in relation to the data. Reflexive memos helped me to identify any impact that I may have on the research and enabled

me to determine what, if any, errors were made during interviews. Both types of memos improved the data collection and analysis for the research study as I was able to reflect on how my background could impact the study.

### **Ethical Considerations**

This study involved humans, so ethical considerations were of utmost importance (U.S. Department of Health and Human Services, 2018). Foremost, my study received the required approval of the Institutional Review Board at East Tennessee State University, which included approval of the informed consent, the participant recruitment letters, and the interview protocol. Each participant was given an informed consent outlining the intent of the research project prior to the interview, the risks involved in the research, and information concerning who will have access to the data. Participants were also given the opportunity to ask questions prior to the start of the interview and were informed of their ability to withdraw from the research study at any time without consequence. Participants gave oral consent prior to the start of the interview. All interviews were conducted online via Zoom, so I was able to conduct the interviews in an isolated area, which increased confidentiality. The data were kept confidential and no personal information is included in the results. The data has been de-identified and pseudonyms and vague identifiers used to protect the privacy of the participants. Finally, the risks for this study were minimal and the research did not place participants in danger to be harmed physically.

### **Chapter Summary**

This study was conducted using a qualitative research method to explore the perceptions of tenured science faculty about providing accommodations for students with disabilities. Specifically, a phenomenological research method was used. In this chapter, I included information about the method used, the participants of the study, how data was collected and

analyzed, the ethical considerations for the study, the trustworthiness of the study results, and my role as the researcher. The results of this study will be provided in detail in Chapter 4.

## **Chapter 4. Findings**

### **Introduction**

The purpose of this phenomenological study was to explore the perceptions of tenured science faculty regarding the provision of academic accommodations to students with disabilities. The study was guided by four research questions. Data were gathered through interviews with the participants. I transcribed each interview and then used member checking to ensure accuracy. The responses from the participants informed the following analysis. This analysis identifies emergent themes from the data that addressed the research questions.

### **Data Collection**

Data were collected using in-depth, one-on-one interviews. Thirteen tenured science faculty members were interviewed, and each interview took place using the virtual meeting platform Zoom. Interviews occurred over a four-month period. Participants were asked questions from a predetermined interview protocol (Appendix). Follow-up questions or questions for further elaboration were possible and were dependent on each participant's responses to the questions. Zoom created an initial transcription of each interview, which I then edited for accuracy. Participants reviewed, clarified, and approved their responses. After participant approval was granted, I searched each transcript for key themes.

### **Participant Profiles**

Data were collected from interviews with 13 tenured science faculty. Six participants are tenured chemistry faculty, five participants are tenured biology faculty, and two participants are tenured physics faculty. Eight of the participants are employed at community colleges and five participants are employed at four-year colleges or universities. I assigned each participant a pseudonym, which is used throughout the study to protect the identity of the participants. The

participants are referred to by their pseudonym in the reporting of findings: Elena, Tabitha, Gabe, Jeff, Janet, Aaron, Michael, Derek, Daniel, Sam, Alicia, Jack, and Melissa.

### ***Biology Faculty Members***

Elena is a tenured biology faculty member at a large community college in the South. Elena teaches Anatomy and Physiology I, Anatomy and Physiology II, and an undergraduate research course. Elena began her career in industry as a lead scientist and project leader. Elena hoped to work for the Centers for Disease Control (CDC) as a virus chaser when she relocated from the North to the South; however, the CDC was not hiring at that time. Elena stated that she had to reinvent herself, so she selected a career in academia. Elena disclosed that she has a nephew with a learning disability. Elena has 14 years of teaching experience.

Derek is a tenured biology faculty member at a medium-sized community college located in the South but teaches solely at one of the institution's smaller satellite campuses. Derek teaches General Biology I, General Biology II, Anatomy and Physiology I, Anatomy and Physiology II, and Introduction to Biology. Derek has 18 years of teaching experience.

Daniel is a tenured biology faculty member at a large community college located in the South. Daniel teaches General Biology I, General Biology II, Microbiology, and an undergraduate research course that focuses on genetics research. Daniel began his professional career in industry, but after accepting an adjunct instructor position he realized that teaching is his passion. He has 22 years of teaching experience.

Alicia is a tenured biology faculty member at a medium-sized community college located in the South. Alicia teaches General Biology I, General Biology II, Anatomy and Physiology I, Anatomy and Physiology II, and Microbiology. Alicia began her career at a private research laboratory in a post-doctoral research position but transitioned to teaching after she realized that

the position at the research laboratory was too stressful for her. Alicia has 12 years of teaching experience.

Melissa is a tenured biology faculty member at a medium-sized community college located in the South but teaches solely at one of the institution's smaller satellite campuses. Although a veterinarian by degree, Melissa teaches Anatomy and Physiology I and Anatomy and Physiology II. Melissa is also qualified to teach an introductory chemistry course, but refrains from doing so because of her disdain for chemistry. Melissa began her professional career as a veterinarian but transitioned to academia after the birth of her son. Additionally, Melissa disclosed that her son has autism, that her mother has obsessive-compulsive disorder, and that she has obsessive-compulsive disorder. Melissa has 21 years of teaching experience.

### ***Chemistry Faculty Members***

Gabe is a tenured chemistry faculty member at a small four-year university located in the Northeast. Gabe teaches General Chemistry I, General Chemistry II, and an upper-level inorganic chemistry course. Gabe disclosed that one of his sons has learning disabilities. Gabe mentioned that he and Aaron, another participant in this study, are friends. Aaron and Gabe are not employed at the same institution. Gabe has 21 years of teaching experience.

Jeff is a tenured chemistry faculty member at a large university located in the Midwest. Jeff teaches General Chemistry I, General Chemistry II, upper-level chemistry laboratory courses, and an ethics course. Jeff teaches both undergraduate and graduate students. Jeff worked in industry for a year prior to attending graduate school. After earning his doctorate in chemistry, Jeff worked in industry for three years but left industry to join the faculty at his current institution. Jeff has 27 years of teaching experience.

Janet is a tenured chemistry faculty member at a small college located in the West. Janet teaches General Chemistry I, General Chemistry II, Organic Chemistry, Physical Chemistry, and co-teaches an upper-level university studies course that focuses on chemistry and religion. Janet is also the laboratory coordinator for the general chemistry laboratories at the institution. Janet has 16 years of teaching experience.

Aaron is a tenured chemistry faculty member at a small university located in the Northeast. Aaron teaches General Chemistry I, General Chemistry II, and Advanced Inorganic Chemistry. Aaron accepted a three-year post-doctoral position before beginning his career in academia. Aaron disclosed that he published an article detailing one of his experiences teaching a student with disabilities in an upper-level chemistry course. Additionally, Aaron is a friend of Gabe, another participant in the study; however, Aaron is not employed at the same institution as Gabe. Aaron has 16 years of teaching experience.

Michael is a tenured chemistry faculty member at a medium-sized university located in the South. Michael worked for two years as an industrial chemist prior to joining the faculty at his current institution. Michael teaches General Chemistry I, General Chemistry II, Organic Chemistry, Advanced Inorganic Chemistry, and co-teaches courses in chemical literature and chemistry seminar. Michael has 11 years of teaching experience.

Jack is a tenured chemistry faculty member at a large community college located in the South. Jack teaches General Chemistry I, General Chemistry II, and a high school chemistry cooperative course for homeschooled students. Jack has 27 years of teaching experience.

### ***Physics Faculty Members***

Tabitha is a tenured physics faculty member at a large community college in the South. Tabitha teaches Calculus-based Physics and non-Calculus based Physics using an active learning

and inquiry-based curriculum. Prior to teaching at the large community college in the South, Tabitha taught at one of the U.S.' military academies. Tabitha disclosed that she has a nephew with a learning disability. Tabitha has 27 years of teaching experience.

Sam is a tenured physics faculty member at a medium-sized community college located in the South. Sam teaches both Calculus-based Physics and non-Calculus based Physics. He taught at three institutions prior to joining the faculty at his current institution. Sam self-identified as having a physical disability and spoke of how his disability is a result of the inordinate amount of stress he experienced while employed at a previous institution. Sam has 11 years of teaching experience.

### **Interview Results**

The data were coded and categorized into themes. The following section includes direct quotes and rich descriptions from the participants as supporting evidence for the prominent themes that emerged for each of the four research questions. The research questions focused on the perceptions of tenured science faculty members regarding the provision of academic accommodations for students with disabilities, the experiences underlining the perceptions that tenured science faculty had regarding the provision of accommodations, the perceived challenges faced by tenured science faculty members in a laboratory science, and how tenured science faculty members characterized their willingness to provide reasonable accommodations to students with disabilities.

#### ***Research Question 1***

What do tenured science faculty report as their perceptions about providing reasonable accommodations to students with disabilities?



The first research question is centered on how tenured science faculty perceived the provision of reasonable accommodations for students with disabilities. The participants' perceptions about providing reasonable accommodations to students with disabilities are delineated by theme below. Four themes were identified: important for student success, accommodations are fair, not indicative of the real world, and vague expectations and processes.

**Important for Student Success.** The provision of academic accommodations to students with disabilities is essential for positive academic outcomes for students with disabilities (Khouri et al., 2019; Kim & Lee, 2016; McGinty, 2016). The perceptions of faculty members are an integral aspect of providing those accommodations as faculty perceptions are linked to the willingness to provide accommodations (McCarron, 2017). Twelve participants perceived accommodations as important for the success of the students with disabilities.

Gabe perceived providing accommodations as appropriate for him to do and explained why he perceived providing accommodations as appropriate.

I totally feel that it is appropriate for me to do [provide accommodations]. It is something that I want to do because in the end ... I want all of them [his students] to be successful. ... Not everyone starts at the same place, not everyone comes with the same background, not everyone has the same resources at their disposal, and so there's a lot of variety in the student body. And there are students who need these interventions in these accommodations to be successful and that's sort of part of what I do as an educator to provide them.

Jeff, like Gabe, perceived academic accommodations as an important aspect of success for a student with disabilities. Jeff perceived the provision of student accommodations as:

Absolutely worthwhile. ... A lot of it has to do with time and access to materials, and the rate at which people learn or are able to acquire material is not the same. And it's not the same from discipline to discipline, so you know it's perfectly reasonable [to provide accommodations]. People do not choose to have physical disabilities, they do not choose to have, you know, mental or other kinds of, other kinds of disabilities that might require an accommodation.

Derek, who echoed Jeff's and Gabe's sentiments about providing academic accommodations to students with disabilities, related his perceptions to his belief that as a faculty member he should help all students to succeed.

Accommodations are a good thing. ... I have always done whatever I had to do, you know, to help a student. ... I want to make sure that our students, that my students at least, are going to get everything they need to succeed.

Overall, the tenured science faculty in this study perceived accommodations positively. Positive perceptions about providing academic accommodations are important as positive perceptions can indicate a greater willingness on the part of the participants to provide academic accommodations to students with disabilities (Bettencourt et al., 2018; Diez et al., 2015; Lombardi & Murray, 2011).

**Accommodations Are Fair.** Academic accommodations for students with disabilities adjust the learning environment or provide alternate evaluation strategies for students with disabilities so that students with disabilities can learn concepts and demonstrate their knowledge equitably to students without disabilities (Khouri et al., 2019). However, research has shown that faculty can perceive the provision of academic accommodations to students with disabilities as giving students with disabilities an unfair advantage over students who do not receive academic

accommodations (Leuchovius, n.d.; McCarron, 2020). This was not the case with the participants in this study. Twelve participants perceived academic accommodations as fair and necessary to level the playing field between students with disabilities and students without disabilities. The 12 participants were adamant that providing accommodations to a student with disabilities does not give those students an advantage over other students.

Elena argued that an unfair advantage occurs if a student with a disability does not request accommodation(s). Elena explained:

This [providing accommodations] is not an unfair advantage. The unfair advantage is if you need it [accommodations] and don't take it. ... I think that that's giving them [students with disabilities] an equal playing field ... and that's why I'm fine with it. ... I've heard that [accommodations give students with disabilities and advantage over other students]. ... I know a lot of faculty aren't always willing to make the accommodations that are requested. I will make the accommodations that are requested. It's just that is the right thing to do for that student. ... Now, they need to pass on their own. And at least now they have a level playing field to be able to do that.

Jeff also did not perceive the provision of academic accommodation as unjust towards students without disabilities. Jeff stated that accommodations are provided to students with disabilities because they are the students who have a difficulty to overcome which other students do not have.

So, I've heard people say that [accommodations give a student with disabilities an advantage over students without disabilities]. I don't think it is true because the accommodation is given because there's a difficulty to overcome, right? ... It's a good

way to get, to not have a stupid hurdle that doesn't have anything to do with the actual learning.

Derek's perceptions also aligned with this sentiment. Derek stated that "I don't think that a student with an accommodation has any more advantage over another student."

Daniel provided an example of someone who has dyslexia to illustrate his perception regarding student with disabilities having an advantage over other students because of the accommodations granted to them. Daniel posited:

Let's say that someone's like dyslexic or something. They literally can't read the exam as quickly, as effectively as the other person. So, even at an hour and a half [of extended time on an exam], maybe they're [the student with a disability] still at a disadvantage.

Janet and Gabe addressed their perceptions about academic accommodations providing students with disabilities an advantage over students without disabilities by relaying previous encounters they had with faculty who perceive accommodations as providing a student with disabilities an unfair advantage. Janet spoke about how she approached a situation where one of her colleagues mentioned that providing a student with accommodations gives that student an advantage over students without accommodations.

I usually jump in and say studies show that extra time for students that don't need accommodations does not actually given them an advantage, so it is not an advantage for those students [who do require extra time]. ... Then I point out, you know, we've all seen it where students that spend extra time [on exams] and they don't need it, you know, if you just let that extra time go, they end up with the same score regardless. It doesn't matter. ... That extra time for students really does help the students that need it. ... We've [Janet and her colleagues] seen so many students come through [take chemistry

courses] where they repeat a class, and they do get the accommodations, and they do fine, that most of us are very proactive. Like, come on, don't you want the accommodations? You need to get them. That kind of thing.

Gabe works with faculty who perceive that providing accommodations to students with disabilities provides them with an unfair advantage. Gabe believes the focus in academia should be on helping students learn the necessary concepts. Gabe spoke of how he addressed this with one of his coworkers.

I've had plenty of colleagues who said that to me over my 21 years. ... I had one colleague who was always reticent to provide students accommodations. His rationale was well, they [students with disabilities] have to get a job out in the world, and no one's going to give them accommodations out in the world. And I would argue with him, and I said 'well, [colleague's name]' I said, 'I don't agree with that, because again it's all about learning the concepts. ... So, let's use an example that if I went and assigned a homework set, right, that I said this is due in a week. And let's pretend that, that there were no accommodations just for a moment. ... If I had a student who could complete that assignment in an hour and get 100, or, then I had a second student who maybe it took her three hours to complete the assignment and she could still get 100, and I had a ... third student who took three days to complete the assignment and got 100, would we view any of those kids as being different or more than or less than? ... They all mastered the concepts.' ... If I have a student who has some sort of a learning challenge that would sort of impact the way they approach and learn something, again, my goal is mastery of the material. And if my student takes an hour versus three hours versus six hours versus an extra day or they need time and a half or double time, to me, that's not really relevant

because it's about the content. ... If I have a student who has trouble reading, that shouldn't impact their ability to take an exam. ... I had a student who had trouble with his fine motor skills. ... It took him longer to literally write out the answers. So, does that mean that, that if I give that student the quote unquote normal time that I gave everyone else ... that would, therefore, impact his ability to show me what he learned whereas if I gave him an accommodation, which would take into account that it took him longer to answer. ... I don't see why that's inappropriate... that's giving that student, in essence, an equal opportunity to a student who did not have that learning challenge. ... I think that's a whole load of crap that I hear from my colleagues when they say that.

Overall, these results indicated a positive perception of providing reasonable accommodations to students with disabilities and that providing accommodations to students with disabilities is fair; however, there was one participant in the study who perceived accommodations as providing an unfair advantage to students with disabilities. Alicia perceived that providing accommodations to students with disabilities does provide an unfair advantage to the student with disabilities. Alicia mentioned leveling the playing field for the student who does not have a disability or require an accommodation.

If I am describing it [a kidney] to this student [a student who has a vision impairment], then I also need to describe it [the kidney] to my student that has normal vision to make it a level playing field.

Alicia was the only faculty member interviewed who perceived accommodations in this way.

**Not Indicative of the Real World.** Several studies (Bahraini, 2018; Clark, 2017; Foss, 2002; Zhang et al., 2010) found that faculty generally perceive student accommodations as not realistic or indicative of the real world. Eight participants in this study perceived that providing

accommodations to students with disabilities was not realistic or indicative of the real world. Additionally, the participants perceived the fact that accommodations were not realistic or indicative of the real world as unfair to students with disabilities. Alicia addressed this several times during her interview.

I think that even though a student might desire to go into a specific area that they also need to be able to recognize their limitations. ... If I'm in an anatomy course and a student cannot take an exam amongst other students, if they have to be in isolation, or have extended time, what are they going to do when that patient is on their table and the doctor hasn't arrived yet and they have to make that life changing decision? They can't Google it. They can't find a friend. They can't, you know, have extra time to make that decision because that time is someone else's time on earth, like literally. They can't do that. So, I feel like it's, it [accommodations] doesn't make it realistic. I understand that it is, it is with the best of intentions to give that student the opportunity to be most successful. And that's what I have to tell myself, because you know I'm not encountering that student in clinical. Like, let's say that student makes it into the nursing program. You can feel certain that their clinical instructor doesn't give them extra time because their clinical instructor understands the importance of quickness of response. I hope that is true. I don't know that to be certain, but I hope that it's true. That the students do not continue to be allowed accommodations that are not appropriate for their major.

Later in the interview, Alicia revisited the topic of student accommodations not being realistic or indicative of life after academia. Alicia stated:

A lot of times the accommodation, while it might, you know, meet the student's learning abilities that they believe, you know, disabilities or impairments that they have, I don't think it is realistic to what they're going to experience after that [outside of academia].

Elena echoed Alicia's sentiment regarding the provision of academic accommodations to students with disabilities as potentially having a negative impact on the student using accommodations. Elena, like Alicia, referenced the nursing students when asked to confirm that this was her perception. Elena stated:

At some point ... they [students with disabilities] aren't going to be able to do this job where they have to make instant decisions if they're getting triple the amount of time to answer. They're not going to be able to be successful, and no one has that conversation. Because here's the way it's been explained to me, when they're in the pipeline of trying to get into the [nursing] program, ... we have to do the accommodations. But once they're in the program itself, and if they're supposed to be able to do old fashioned blood pressure, but they are visually impaired and can't see the numbers, there's no special accommodation for that. So, you let them in [to the nursing program] knowing that they're going to fail. I have a problem with that, because ... once they're in the program, you don't have to do any special accommodations. They have to do what they're supposed to do in that program. And if it's they have to be able to read the numbers on a blood pressure cuff and take blood pressure using the stethoscope, they have to be able to do that. They don't get any accommodation for that. But if it's a test, then they get the accommodations. If you need to enlarge it, they get the accommodations. But once they're in the program, they don't necessarily. So, someone who's getting triple the time is not going to be able to do that profession as a nurse because you aren't going to get triple



the time to make a decision when that decision is life or death. Somebody's blood pressure's crashing, you need to do something and not take three times as long to do it. That's one of the things that nobody wants to say because I don't want to ever say you can't do it, but you also have to be realistic.

Michael also has this perception and relayed that “it almost feels like, are we, are we giving a little bit too much accommodations, and setting the student possibly up for failure?”

Michael, Elena, and Alicia were not alone in perceiving that providing accommodations could potentially be detrimental to the students and could cause issues in future endeavors.

Tabitha also expressed concern about the future endeavors of some students with disabilities and explained by referencing a student she taught who had difficulty with communication.

This girl I had this past year, and I keep mentioning her because that's been the most difficult student I've had recently, in the last 10 years or so. ... I just wondered if her mother was getting professional help on what kind of career would be appropriate for her daughter. That's the only thing I worried, because she wanted to be an astronomer, she thought, and she can't communicate with other people very much. I mean, she can barely communicate with other people. ... I never said anything because it's not for me to say, I just wonder that she needed to get professional help to guide her on what career would be best for her.

Not all participants agreed that accommodations are unrealistic and that accommodations are not indicative of life in the real world. Jeff perceived academic accommodations as realistic. Jeff argued that it is academia that is not indicative of the real world.

I have heard that [in the real-world students will not receive accommodations] and it's simply not true. ... If you got a skill or talent, employers will make accommodations for,

you know, your vision impaired. ... We need to be able to be able to assist you. ... A lot of the things, like time and a half and so forth on exams, are a lot of that's built up with testing performance anxiety. ... That's a real thing that doesn't appear in the 'real' world. In some ways ... the academic exercise is just that. It's an exercise. ... It's got goal achievement built into it, but it's a very weird exercise and it's not reflective at all of the ... actual, mostly of the actual, working world. You'll have projects you'll be working on. ... They have a series of tasks ... in that way, homework acts like that. And then you may have a series of things that will have deadlines that you got to have, you know, specific production for. So that acts like exams but, but instead, in the working world, instead of trying to cram something in that you don't know ... you're busy pulling out what you do know and the skills that you do have to apply them. And that's a different process. So, that's kind of when it comes up, because sometimes it kind of does come up, those are the sort of comments that I would respond with: yeah, it's just not it's not the same [academia and the work environment].

**Vague Expectations and Processes.** Understanding the processes and expectations involved in providing accommodations to students with disabilities is important to successfully implementing the accommodations (Bettencourt et al., 2018; Kim & Lee, 2016; Lyman et al., 2016). All participants perceived the expectations and processes involved for providing student accommodations at their respective institutions as vague. Because of the vagueness in the processes, participants made unnecessary errors that impacted students. For example, Elena relayed how confusing the forms that she received from her institution's disability support services can be for her. Elena recalled:

I'm trying to read this generic standard form that says you have to do this, or you have to find a note taker. Okay, well, what does that mean? For example, a reader means on the front end that the instructor needs to have that test done in advance. That would be good to know.

Gabe also spoke of a difficulty he had when presented with a form stating the accommodation that he was to implement for one of his students. He perceived the instructions as vague stating, "I have a student who needs a screen reader. How functionally do I make this happen? What are the things I need to be aware of if I provide materials to be used by the screen reader?" Gabe only received a generic letter stating the required accommodation but no other explanation as to the logistical aspects of the accommodation.

Some participants perceived the process of determining student accommodations as not only vague but also as mysterious. Demystifying and clarifying student accommodations could improve the perceptions and attitudes that faculty have concerning academic accommodations for students with disabilities. Because faculty perceptions and attitudes are linked to the willingness to provide accommodations and impact the quality of accommodations, it is imperative that that faculty perceive accommodations favorably (Alliston, 2010; Baker et al., 2012; Basilice, 2015; Bettencourt et al., 2018).

Alicia reported curiosity concerning how disability support services at her institution determined what accommodation(s) a student required. Alicia perceived the process at her institution as magical.

I never really get the conversation of what has shown you [disability services' staff] that they [students] need this [a specific accommodation]. ... I just feel like it's like a magical

equation that just ‘boop’ there's the accommodation because I'm not in the know about how they do what they do.

Alicia's curiosity was echoed by Michael, who alluded to the process being unclear to him. Michael stated:

How does this process actually work? ... Is the student interviewed? Are their medical records involved in it? ... To be honest, it almost feels like the student just kind of showed up, and says, so I've got these things going on, and they [disability support services] says, okay, well, we'll fix it.

The unclear expectations and processes surrounding student accommodations could be alleviated by providing the participants with appropriate training (Fanger, 2019). The participants suggested what a good training regarding the provision of student accommodations would look like to them. For example, when Michael was asked about what a good training would look like to him, Michael stated, “An overview of what the requirements are on the student end. And then, an overview of what our true limitations are on our end. Are our hands 100% tied or is there a little bit of give?”

Gabe also stated that having training to alleviate the mystery surrounding student accommodations would be beneficial. Furthermore, Gabe expressed that he would welcome training concerning student accommodations even after 21 years of teaching.

I think I would love training even now in accommodations. But I would have loved it ... when I was first starting out because we do so many things by the seat of our pants. ... I try to read the plan that gets sent to me by our, the center that we have on campus has changed names a number of times, but basically, we have a few people who coordinate all of the accommodation plans on campus, and so I would love to have had ... any

understanding as to what so many of the terms and the common learning challenges that tend to come up a lot. I would love to have had a little bit of background in these. ... I would have loved to have had anything at all, yes.

Tabitha also desired training to alleviate the vague expectations and processes associated with the disability services at her institution, which aligns with Gabe's and Michael's statements. Tabitha wanted training that focused on situations that could possibly arise and how to handle those situations.

So, I think having some training in things like, not just here are the procedures you should go through, you need to meet all these recommendations for each student, but also, here are some things that could happen and here's how you would deal with it if it did [happen]. I think that would be helpful.

Previous research suggested that faculty need training about providing accommodations to students with disabilities (Baker, 2021; Fanger, 2019) and the participants in this study echoed that sentiment. The participants stated that training that addressed the following topics would be beneficial: (a) common accommodations they would encounter, (b) how to successfully implement accommodations, (c) the process involved in determining who receives accommodations, (d) the process involved in determining what accommodations are given, and (e) the options available to them in providing accommodations. Removing the ambiguity concerning student accommodations, the processes involved in determining student accommodations, and the corresponding expectations for faculty would aid in demystifying student accommodations and the process surrounding the provision of accommodations for students with disabilities.

## ***Research Question 2***

What experiences do tenured science faculty link to their perceptions of accommodations?

This research question linked the perceptions that tenured science faculty reported about providing academic accommodations to students with disabilities to their experiences with providing accommodations to students with disabilities. The experiences reported by the participants are delineated below by the key themes that emerged in the data for research question one.

**Important for Student Success.** Twelve participants perceived academic accommodations for students with disabilities as important for success, which is a significant finding as research has shown that accommodations are the greatest indicator of success for students with disabilities (Khouri et al., 2019; Kim & Lee, 2016; McGinty, 2016). Faculty members who perceive accommodations positively are more willing to provide accommodations (McCarron, 2017). The participants provided several examples that linked their experiences with students who have disabilities to the perception that academic accommodations are important for student success.

Tabitha recalled an experience in which a student with disabilities worked hard in Tabitha's physics class to earn a good grade. The reasonable accommodation for this student was extended time on tests. Tabitha recognized that the student was able to succeed because of the accommodation.

She [the student] knew she needed extra time on a test. She really did. She worked really hard and like I said, she pulled out a low B, but she got a B in the end. She needed that [accommodation].

Elena shared an experience in which she thought outside of the proverbial box to provide a student with a disability a way to be successful in her anatomy and physiology course, which requires students to identify and label using the correct spelling of various bones, muscles, and so forth as part of the assessments. Elena's willingness to think outside of the box and provide accommodations for this student removed a challenge for the student so that the student could be more successful in her class. Elena recalled:

Another student who had issues ... I don't know what the disability was, but they [the student] had issues with spelling. So, we [Elena and her coworkers] said all right, we will cap the spelling at 10%. If you miss more than that, I'm not going to count anymore off. And that student would hit the 10% mark on spelling. ... I can always tell if they're spelling it phonetically, so, ... the DSS [disability support services] gave me a recorder so he [the student] would record his answers as he went around [the room]. And then I could see what he wrote because he may not have spelled it right, but he was saying it right. There was just some disconnect between what he said and what he wrote. That was brilliant, and I let him keep it [the recorder] the whole time. He was spelling it [the word] ... atrociously but he was saying the word right. I just didn't understand it looking at the answers that he was writing. That worked out great!

This experience demonstrated to Elena that once properly accommodated the student excelled. The student understood the concepts and could correctly identify the various parts of the anatomy being assessed but was unable to spell the answers correctly, which was negatively impacting his grade. Elena removed that barrier for the student, which enabled the student to succeed (Lyman et al., 2016).

Aaron provided an experience that he had teaching a legally blind student in an upper-level chemistry lecture and laboratory course. Aaron had several months to prepare for the student and worked over the summer months to ensure that the student would have a positive experience in his course. The fact that Aaron willingly worked over the summer months to prepare so that one of his students could succeed is encouraging and indicative of positive perceptions regarding the use of student accommodations. Aaron recalled:

When I worked with a blind, legally blind, student, it was a very positive experience. ... The student told me what worked and what didn't work, so I was able to plan accordingly. He [the student] didn't leave me in the dark. He told me this is how this works best for me. Please try do it this way. ... By working closely, hand-in-hand, with the student and the disability director, it worked out very well.

The experiences provided by the participants help form the basis of their perceptions concerning student accommodations. The participants' experiences with students with disabilities and with academic accommodations were positive, which benefited their students and will benefit future students who require academic accommodations in their courses because faculty perceptions are linked to the willingness to provide accommodations (McCarron, 2017).

**Accommodations Are Fair.** Previous research generally supports that faculty members at postsecondary institutions perceive that student accommodations could potentially be an unfair advantage for the student who receives those accommodations (Leuchovius, n.d.; McCarron, 2020); however, most of the tenured science faculty in this study perceived accommodations as both fair and necessary to level the playing field between students with disabilities and students without disabilities. Participants provided examples of positive experiences or interactions that were memorable to them.



Elena's example of a student who had a disability in which spelling was an issue and required a recorder to demonstrate his level of expertise with the subject clearly demonstrated that once accommodated the student was capable of succeeding. Elena stated that "He was spelling it [the word], you know, atrociously but he was saying the word right. I just didn't understand it looking at the answers that he was writing. That [the student recording himself saying the word] worked out great!" Elena recognized that the student required an adjustment to demonstrate mastery of the concepts and to be successful in her class (Khouri et al., 2019).

Tabitha's example of the student who needed extra time for exams also illustrated the importance and fairness of providing accommodations to students with disabilities. Tabitha recognized that the student worked hard in the class, and the extra time on exams enabled the student to demonstrate her mastery of concepts. Regarding this student, Tabitha's perception about providing extra time on the exams was that "She [the student with disabilities] needed that [accommodation]. ... I don't really feel that it gives anyone an advantage."

Michael stated that he does not see accommodations as giving a student with disabilities an advantage. He came to this conclusion based on the experiences in his courses by comparing grades between students who received accommodations to students who did not receive accommodations. Michael stated that "based solely on my singular grades, I don't see it [giving an advantage to students with disabilities]. They [students with disabilities] usually fall right in the middle [the C range] along with everyone else."

Elena's, Tabitha's, and Michael's experiences demonstrate that accommodations are not an unfair advantage given to students with disabilities, but rather illustrates that students with disabilities require accommodations to be afforded equal opportunity, especially in the sciences (Martin et al., 2011). Elena, Tabitha, and Michael understood the importance of implementing

accommodations and providing support for the students with disabilities so the students could be successful in their science courses (Martin et al., 2011).

Other participants provided examples of experiences that they felt were positive and enhanced learning for students with disabilities. Gabe reported one of his experiences working with a student who required accommodations and not meeting the accommodation to the standard found to be satisfactory by the student. The institution where Gabe teaches provides students with iPads to use, which Gabe has incorporated into his teaching. Gabe recounted how the use of the iPad for one of his students with disabilities was not fulfilling the student's need. The student relayed that to Gabe, who changed tactics to fulfill the student's accommodation needs.

The student was open enough to say to me 'hey like this isn't working the way we thought it would'. ... I was very pleased that the student felt comfortable to advocate for themselves and that I was able to provide an accommodation that was helpful to her. And the bonus was it wasn't overly onerous on me either. ... So that's like two wins right there, right?

Derek described how working with a student who required an accommodation gave him an opportunity to build rapport with the student. Derek was eager to share this experience as he felt it was a good example of how faculty can make a difference for students with disabilities.

One student that was very, a very good lip reader would always fuss at me when I turned my head and I talked to the board. ... It became quite a running joke between the two of us in class that you know I said, 'I'm going to turn my head now, so you can hear what I'm saying.' ... We had a good relationship. ... It was a good experience I had.

When you can reach that kind of rapport with your students ... that's ideal. ... I still remember her picking on me.

**Not Indicative of the Real World.** Several participants expressed concerns that providing accommodations for students with disabilities could be setting these students up for failure in their future endeavors (Clark, 2017). Although these participants expressed this concern, they still provided the accommodations to the students. The examples provided by Alicia and Elena previously for research question one addressed their concerns regarding students with disabilities that required accommodations in their anatomy and physiology courses and who majored in nursing. Alicia further relayed her perceptions about success for students with disabilities in the future from the experiences she had concerning students with disabilities and the provision of accommodations. Alicia recalled:

Students will say 'I studied so much for this exam, and I just get there, and I go blank. So, you know, having extra time helps me think about it more.' But when I do a little bit more investigation about how's the student's studying for this course ... asking them how they're study, looking at their course progress in D2L - how often are they accessing course content? How often are they doing this? ... I find that the students a lot of times are not doing the work. They're not putting in the work. And being accommodated to help with their lack of performance, lack of engagement ... that is just further hindering them. So, if they're already slackers, if they're already, you know, just trying to get anything they can to improve their grade without actually doing the work to improve their grade, that's not really setting them up for success.

Alicia recounted a second experience she had with a pre-med student who required accommodations. The student's mother attended exams with her son to lessen her son's test anxiety. Alicia found this situation to be unrealistic.

I had a student that would pass out. He felt anxiety while taking an exam. And sometimes when he passed out, he would have seizures. And this was a student in one of my majors' courses [general biology courses] who wanted to, his major was pre-med. He required his mother to be present while taking exams. I'm sorry, but that is not realistic.

Aaron taught a legally blind student in an upper-level chemistry course. Aaron relayed how a student with disabilities was given accommodations to aid in his success as an undergraduate student pursuing a degree in chemistry. This example is demonstrative of an unintended consequence that developed from providing accommodations. The issue, according to Aaron, occurred when the student attended graduate school. The graduate school had a difficult conversation with the student concerning the issues that arose with the student's disability and requested accommodations. Aaron described the situation in terms of a "gentle coercion" and stated:

The blind student wanted to get his PhD in synthetic organic chemistry, but it was explained to him that he's not always going to have a surrogate to help him measure things out, do experiments for him when he's in graduate school because he would have to do all the manipulations himself. So, he was gently coerced into ... pursuing a more computational aspect for his PhD. And he did get his PhD at [name of university] in the computational chemistry and he's a postdoctoral fellow now. That works out well because he's doing a lot of computer simulations and calculations. And, you know, he

can do that on the computer and there's necessary software for him to do that being legally blind.

Aaron perceived this situation as an example of a student receiving accommodations in an undergraduate situation that later impacted the student when following their desired career path in graduate school resulting in the student being coerced to change his major.

Derek voiced his concerns about adequately preparing students with disabilities to be successful outside of academia. Derek's response indicated a more philosophical approach in that students with disabilities may need to rethink how they approach their desired field of study to be successful outside of academia. Derek surmised:

I think prepping them [students with disabilities] to succeed is the best thing we can do for them. ... Perhaps they [a student with disabilities] need to focus on this particular area, you know as their emphasis. It doesn't mean they can't be a nurse. It doesn't mean they can't be a radiologist; they can't be a surg tech; they can't do physical therapy, you know? Just depends on how they, you know, they are aware of that, they're aware ... of their disabilities and how they work around them.

**Vague Expectations and Processes.** All participants reported that the processes for providing an accommodation or what was expected of them when providing accommodations was unclear. Because of this vagueness in the process, participants made unnecessary errors that impacted students. Some errors stemmed from the lack of communication and training on the part of the disability office at the college or university where the participants are employed, and some errors stemmed from not understanding how to accommodate a specific request. Other issues related to understanding the accommodation process itself. Errors such as these are a result of a lack of knowledge on the part of the faculty members and are not out of maleficence

(Khouri et al., 2019). Additionally, it is the responsibility of the institution to train their faculty members about processes, expectations, and responsibilities regarding students with disabilities and academic accommodations (Leuchovius, n.d.). The implication being that the institutions did not adequately prepare their faculty. The participants provided their experiences concerning these issues.

Elena did not understand that a student who needed to take an exam at the disability support services' office required her to have the exam available to the disability support services office well in advance of when the student was planning to take the exam. Because of not understanding the process, Elena missed the deadline to submit the exam to the disability support services office.

I didn't understand [the process for a student to take an exam at disability support services]. And so, the very first one [exam], I didn't have it ready. So that student had to test later because I didn't get the test to them [disability services] in time.

Tabitha revisited the experience that she recounted previously regarding a student who Tabitha deemed the most difficult student she had to accommodate in the past 10 years. The student exceeded the predetermined time on an exam, which was determined by the disability office at the institution. Tabitha was unsure of the process to address this situation.

I didn't know what I should do because they [disability support services] had told me exactly what accommodation she was supposed to have and they [the student and her mother] exceeded it. And, so, I just let it go. I didn't know what to do about it.

Sam thought some of the issues that faculty have about providing academic accommodations to students with disabilities could be alleviated with training. Sam reported that

appropriate training for faculty would encourage faculty members to be empathetic towards students with disabilities. Sam reasoned:

Just you know, trying to help people just be more aware of those sorts of things [what it is like to have a disability]. You know, what it is like to be dyslexic, and you need more time on a test because it's hard to see the frickin letters! ... I think that kind of training could be helpful. ... Case studies would probably be a good way to go and especially since I've been here advocating about empathy and understanding. ... I think that's probably a good way to do that. You know, here's Joni and Joni always had trouble paying attention in class and here's what life is like for Joni.

### ***Research Question 3***

What do tenured science faculty perceive as the greatest challenge with providing reasonable accommodations to students with disabilities in a laboratory science?

This question focused on the challenges that are present in a laboratory science that are not present in courses that do not have a laboratory component. Generally, chemistry, physics, and biology laboratory courses in academia are allowed a maximum of 24 students per section (American Chemical Society, n.d.). Science laboratory courses are typically three hours long but can range from two to four hours in length depending on the course and institutional requirements. There is a possibility that laboratory sections can be taught one after another for 12 hours on one or more days per week. For example, laboratory sections can be scheduled from 9:00 a.m. – 11:50 a.m., 12:00 p.m. – 2:50 p.m., 3:00 p.m. – 5:50 p.m., and 6:00 p.m. – 8:50 p.m. on one or more day each week. Back-to-back scheduling of laboratory sessions is common and can be a challenge when accommodating students who require extra time or who have excused

absences. This type of scheduling impacted the biology faculty significantly but did not impact the chemistry or physics faculty.

Eleven of the 13 participants reported the perception that there are difficulties in providing accommodations in the laboratory portions of their courses. The participants had different perceptions about the greatest challenge providing reasonable accommodations to students with disabilities in a laboratory science based on the subject taught. Because the concerns expressed were specific to the discipline taught, the perceptions are delineated by discipline below. The exception to this delineation by discipline was the theme of providing comparable laboratory experiences as this theme was evident in all three disciplines and is addressed separately.

**Chemistry.** Four of the six participants who are tenured chemistry faculty members perceived the greatest challenge to providing reasonable accommodations to students with disabilities in the laboratory was ensuring that safety remained a priority. The use of chemicals require specific safety practices and safety violations can have serious consequences (American Chemical Society, 2017). Moreover, faculty members are held personally and legally responsible for a student's safety in a chemistry laboratory (American Chemical Society, 2017).

Jack perceived a situation to be unsafe while accommodating a student with impaired vision. Jack explained that his concern was for the safety of the student with impaired vision and not out of resistance to providing the accommodation. The student was placing her face too close to a flame and too close to chemicals, which was alarming to Jack.

A student in chemistry lab whose vision is poor enough that they have to have their face within about six inches of something to see it, and ... they're wanting to stick their face within six inches of a Bunsen burner, to a heated crucible, or something like that ... to



me, as the person responsible for safety, that's a scary situation. ... I mean that's a potential accident. That's a potential safety issue right there. ... I don't like the accommodation saying 'do this' when I know that's a potentially unsafe situation, like the girl who had to stick her face so close to the flame. That was scary and so I don't like that feeling. ... How do you balance that [the accommodation and safety]? ... To me, the safety has to come first. ... The accommodation is great and I'm all for it, but sometimes ... you gotta put safety first.

Safety in the chemistry laboratory not only applies to the students, but also any visitors, support people, and support animals (American Chemical Society, 2017). Safety can be problematic in a chemistry laboratory when a companion animal or service animal accompanies a student. When asked about accommodations in the laboratory regarding accommodations for students with disabilities, Jeff stated:

A companion person ... it's not too hard. ... That's pretty easy. You can train the monkey to stand in the corner. But a companion animal is, has proven, problematic. ... So, yeah, booties, and got doggy goggles, and bed, and so. But I don't know if we have, if there were ... an assistance animal, you know, that pick stuff up and so forth. I don't know how we would do that.

Safety concerns for students and animals because of the possibility of fire, chemical exposure, spills, and glassware breakage are specific to chemistry laboratories (American Chemical Society, 2017). The chemicals contained in chemistry laboratories can pose physical hazards, health hazards, and environmental hazards (National Library of Medicine, 2011). Physical hazards and health hazards are of more concern when dealing with students and animals in teaching laboratories as the harm would be done to them and not the environment per se.

**Physics.** Two physics faculty members, Sam and Tabitha, participated in the study. The small number of physics faculty members makes it difficult to discern any significant themes concerning perceived challenges in a physics laboratory. Because there were only two physics faculty members who participated in my study, below are each of the participants' perceptions about challenges each faced in the laboratory portion of their respective courses. It is of note that Sam teaches at a smaller institution than Tabitha teaches.

Sam perceived the greatest challenge for him in the laboratory regarding student accommodations is a logistical issue because of the size of the physics laboratory at his institution. He demonstrated this by relaying his experience with a student who used a wheelchair. Sam recalled:

I did have a student in a wheelchair, a power chair. ... The room was completely unaccommodating to him. ... The room was built in the 90s; still the spacing of the tables is not very good. And it's not generous enough. ... There wasn't really a table at a height that was convenient for him. ... He always just sort of kept things in his lap. ... He was just kind of used to doing that, so he never complained about it, though he probably had cause to complain but luckily didn't. ... I don't know what we would have done if he would have been insistent on things.

Tabitha did not perceive any logistical issues in the laboratory portion of her courses but perceived that there was an inordinate amount of time involved to accommodate the students in her laboratory sections. Tabitha spoke about two students who utilized accommodations in the laboratory in Tabitha's physics courses. Tabitha stated about the first student that she "ended up having to do all the labs with him [the student] outside of lab [instead of with the other students

in his class]. So that did take a lot of extra work on my part.” Regarding a second student who utilized accommodations in the laboratory, Tabitha stated:

I had to videotape the labs. ... And then I'd have her [the student] take the video and slowly step through it and explain the concepts to the student. ... I'd say 'what happened in this video' and I'd say, 'did the force of the hand on the car cause the speed of the car to change?' and she go 'now, I don't know' and then I'd have her take the video and slowly step through it. I'd say 'what's happening to the speed here? And then, what happened when the hand touched?' I mean, so that took a lot of time. ... It was really tedious and very, very difficult and time consuming.

Sam and Tabitha both conveyed their experiences with the difficulties they faced in the laboratory portions of their courses. For Sam, who is at a smaller institution than Tabitha, the difficulty was logistical in nature. For Tabitha, the difficulty was the inordinate amount of time she spent accommodating the students in a one-on-one setting.

**Biology.** Five participants in this study are tenured biology faculty. Three of the five participants perceived the laboratory portion of the course as more difficult to provide accommodations for than the lecture portion of the course. The participants cited two reasons for the laboratory portion of their courses being more difficult to provide accommodations for: assessments were given in the laboratory portion of the courses and the extra time that was required to support the students. These two reasons are paired because the time constraints often came about because of the assessments in the laboratory. The two participants who stated the laboratory portion of their courses were not more challenging than the lecture portion of their courses taught at a small satellite campus of their institution, which, according to them, enabled them to be more flexible with the laboratory portion of their courses.

Elena provided two examples of why she perceived that providing student accommodations in the laboratory portion of the course required additional work. Although providing accommodations in the laboratory portion of the course increased Elena's workload, Elena felt that it was necessary to provide the required accommodations. In this first example, Elena spoke of the extra time required to be in the laboratory with the student. She stated:

So, for me to have to set up that special lab [for the student with accommodations] was an inconvenience. I had to pick a time where there wasn't anybody having a lab and that was three hours that I had to spend with that student in that room testing by themselves. It adds a lot more work.

In Elena's second example, she spoke of the extra time required to set up the special laboratory session for the student. Although Elena provided the accommodation, the student was required to test with a different laboratory section than the section the student was enrolled in so that Elena could meet the accommodation.

It's pretty black and white. ... They're either going to test off their class [a class time that they are not enrolled in] or they're not going to get the accommodation. We can't do both. ... I've got 23 other students in that class. This is what you're going to have to do, and for me, I change out the practical station. So, unless that student is in the first lab of the day, like the eight o'clock lab, then I will come in at seven o'clock in the morning, set the lab up. Then the student comes in at eight to nine to do the practical by themselves. I let the rest of the class in at nine. So, I have them [the student with the accommodation] come out, come back in [to the laboratory session at nine o'clock] so that nobody knows that they're the DSS student and then I run the lab. That's how I do it. If they're at 11 [in the 11 o'clock laboratory course], I can't do that.

Alicia addressed the need to make special laboratory examinations for one of her students whose test anxiety required that his mother attended class with him while the student sat for an examination. Alicia relayed that the student would pass out because of the test anxiety and be disruptive to the other students in the class, especially since an ambulance was called. Alicia recalled the amount of work that was required to meet this student's need because she could no longer have the student test with his peers.

That meant me making alternative types of exams because this was a course, it was for the majors' course. So occasionally there was, um, like test tubes and things set up that they had to interpret in the classroom or machines that they had to show competency to use in the classroom. So, I had to find other ways to test his abilities on those outside of the classroom because he was at the testing center.

The tenured biology faculty members also found accommodations in the laboratory more challenging because examinations were given in the laboratory. The tenured chemistry and physics faculty members in my study did not have this issue as neither group gave assessments in the laboratory. The assessments given by the tenured biology faculty were practical exams in which the students were required to move around the room and identify the various parts of the species' anatomy.

When asked whether Daniel found it easier to accommodate students in the lecture versus the laboratory, Daniel stated the laboratory portion of the course was more complicated. Daniel contended:

Accommodations and labs are always more tricky because of the lab exams. For example, ... practical exams. So, it's not, again, it's not just a paper. It's, you're moving around through the room. ... I remember teaching in a room where one of the students

was in a wheelchair. So, it wasn't a cognitive type of accommodation, it was physical. And during our exams you literally had to move from station to station around all these lab positions and, not that they couldn't move, obviously in the wheelchair, but in a lab with the cramped space and going between tables and all that stuff. ... It was difficult and, and then, just the hands-on stuff. So, there were times, where we had to provide somehow pictures of things rather than models, because the model whatever it was, was too small on the model. And so, we needed some big and large picture of the exact same thing. Just the practical nature of what takes place in lab, that kinesthetic aspect and so forth makes it more difficult. Plus, if a student needs extended time for assignments or exams or quizzes that becomes difficult when you're working like a team. And so, we're doing this task and, well, the student's going to need extended time on that task but they're also part a test lab team of four and so we're trying to move to the next experiment or the next thing and it's very hard to sometimes to build that accommodation into something that's so structured to begin with and involves teamwork, and so I mean it can be done, but it's just it's more difficult.

**Providing Comparable Laboratory Experiences.** Five participants perceived that a challenge to providing student accommodations in a laboratory science was providing students with disabilities a comparable laboratory experience to students without disabilities. Participants perceived that it was necessary for the student to receive a hands-on experience that was comparable to the experience their peers without disabilities would experience in the laboratory instead of a virtual option or looking solely at pictures of the species. The participants perceived a hands-on approach as providing better learning experiences for the students.

Alicia spoke about her desire to provide a student with accommodations the same type of experience that a student without accommodations received. Alicia explained this through her teaching philosophy. Her teaching philosophy is that providing students with a hands-on experience is better than a virtual option or an option where a student reviews pictures.

But I have as a teaching philosophy: hands on is best for me with science. ... When a student is looking at a femur, it's going to be easier for them to tell me what this part of the femur is if they can pick it up and rotate it and see how it would be in its normal environment. To see, is that a left femur or a right femur? Or, is this the front? Is this the back? So, to me that's more tangible and identifiable and more realistic than a picture.

Jack addressed his perceptions regarding the experience a student has in a chemistry laboratory compared to performing a virtual experiment. When addressing the importance of experiencing the laboratory portion as it is traditionally taught Jack noted the conundrum of providing the same tactile experience but also maintaining safety.

It's also tactile. Because the administrator's response is always do something virtual.

Yeah ... that's not tactile in the least. ... I mean safety is always a worry, but that, you'd lose a lot by not handling the equipment yourself, in pouring the acid yourself, and so, you know, those kinds of things are lost as well.

The participants had a desire to provide comparable experiences to their students who required accommodations so that those students could have the same learning experiences as their peers without disabilities. This demonstrates the faculty member's concern for their students' learning. The focus is on learning and not on disability. This is an important distinction as this indicates a social model view of disability and not a medical model view of disability. The

focus on learning implies that the participants do not see disability as a biological defect but rather as an aspect of being human.

#### ***Research Question 4***

How do tenured science faculty characterize their willingness to provide accommodations?

This research question focused on how each tenured science faculty member characterized their willingness to provide accommodations for students with disabilities. Willingness to provide accommodations to students with disabilities is linked to the perceptions and attitudes of faculty members (Sayle, 2016), so positive perceptions and attitudes on the part of the faculty are important. I identified three themes after reviewing the data: very willing to provide accommodations, legally obligated to provide accommodations, and knowing or being someone with a disability provides awareness.

**Very Willing to Provide Accommodations.** All participants characterized themselves as very willing to provide student accommodations to help students with disabilities. Participants were willing to provide accommodations so that students with disabilities had the opportunity to succeed regardless of personal feelings or any reservations that the faculty members had. This distinction is significant since faculty member's attitudes and beliefs directly impact the willingness to provide accommodations (McCarron, 2017). For example, Alicia had strong reservations about providing accommodations and how those accommodations impacted the students in their future endeavors, but Alicia was still willing to provide accommodations to students with disabilities stating, "I think every student deserves the opportunity to learn regardless of their physical, mental, or otherwise status."



All 13 participants characterized themselves as very willing to provide accommodations to students with disabilities, but the participants expressed their willingness in different ways. Below are the statements from Elena, Daniel, Aaron, Michael, Jeff, Tabitha, Gabe, Derek, Jack, Sam, Janet, and Melissa that demonstrate their characterization of how willing they are to provide reasonable accommodations to students with disabilities. The statements range from short comments stating they are willing to provide accommodations to longer statements regarding the reason for their willingness to accommodate students.

- I do not mind if this is what they [students] need to be successful. (Elena)
- From a personal, philosophical standpoint, I'm certainly supportive of the idea.  
(Daniel)
- If they are medically entitled to it [accommodations], then I am happy to give it.  
(Aaron)
- I personally feel that it is a good thing. (Michael)
- The rate at which people learn or able to acquire material is not the same and it's not the same from discipline to discipline. ... It's perfectly reasonable [to provide accommodations]. (Jeff)
- I like to provide them [students] with accommodations. I do know I have students who need it [accommodations], so I do not mind doing that at all. ... Again, some students really need that. ... I don't find it a negative experience to accommodate students. (Tabitha)
- I totally feel that it is appropriate for me to do. It is something that I want to do, because in the end ... I want all of them to be successful. (Gabe)

- I'm glad to [provide accommodations]. ... I think it just levels everything out.  
(Derek)
- Well, I mean it gives them [a student with a disability] the chance to participate. ... I don't like to see anybody closed out when they have the mental ability to do it. If there's a way to work around [a disability] and get them approved, even approximately the same learning experience, then I'm all for it. (Jack)
- Oh, it doesn't bother me at all [to provide accommodations]. ... I'm disgusted by that [faculty who cannot be empathetic towards students with disabilities]. ... That just really reflects a low level of empathy and their [nonempathetic faculty members] inability to put themselves in someone else's place. ... I'm disgusted by that. ... You know, 1964 called and they want their attitude back! (Sam)
- The ODS (office of disability services) person says we do what's required by law, and I'm like yeah, but we can go one step further. So, I think it would be great if there was more outreach [to students with disabilities]. (Janet)
- I say to them [students]: if you need an accommodation, I promise them this is confidential, you know promise, and tell them, and really tell them, and I think they get it, I mean I think they know I'm being honest, that I really do want to help them.  
(Melissa)

Although the participants characterized themselves as willing to provide accommodations, some of the participants also mentioned being legally obligated to provide those accommodations (Leuchovius, n.d.; Zhang et al., 2010).

**Legally Obligated to Provide Accommodations.** Postsecondary faculty are legally obligated to provide accommodations to students with disabilities (Leuchovius, n.d.; Zhang et

al., 2010). There have been several lawsuits filed over violations associated with accommodations for students with disabilities and the ADA (Taylor & Weisberg, 2021). Typically, postsecondary faculty lack general knowledge concerning disability legislation (Baker, 2021; Basilice, 2015; Bolt et al., 2011; Diez et al., 2015; Price, 2018; Zhang et al., 2010); however, the participants in my study had general knowledge about disability legislation and are cognizant that they are legally required to provide accommodations to students with disabilities.

Eight of the 13 participants commented on being legally obligated to provide accommodations, expressed a fear of negative legal repercussions for not appropriately accommodating a student, or mentioned disability legislation in general. For example, Sam spoke about providing accommodations to a student in a wheelchair and the difficulty the student had moving about the laboratory and using the tables in the laboratory. During that story, Sam mentioned his legal obligations to provide accommodations to students with disabilities. Sam recognized the potential for a lawsuit because of not providing accommodations to a student with disabilities (Blank, 1997) and went so far as to describe his concern as fear. Sam stated:

And then you always have this little fear in the back of your head: well, oh shoot. What if I screw this up and the student gets pissed off and mommy or daddy gets pissed off and they bring a lawsuit, right? ... Not that we're motivated out of fear that way, but that you know that's like, this little thing, like alerting that there are legal issues. ... This isn't just a matter of courtesy; it is also a matter of law.

Sam's comments demonstrates that Sam is cognizant of the litigious mindset of society (Rubin, 2010) and the possibility of being involved in a lawsuit.

Melissa also spoke about our society being litigious and linked that to the fear she and other faculty have concerning accommodations. Melissa stated:

The way our society is, so, yeah, I feel like we're [faculty members] on ... pins and needles all the time. We're in front of students who can make claims that we said or did something inappropriate, disability or anything else. ... I think that's where the fear comes from.

Jack conveyed his concern regarding living in a litigious society and how it impacted safety for the students in his chemistry laboratory. Jack reported a concern about the administration at his institution removing fire extinguishers from the chemistry laboratory. He connected the act of removing the fire extinguishers from the laboratory to administration's concern regarding a lawsuit because of an ADA violation, which Jack perceived as more important to administration than maintaining safety.

I think they're [administration] are more worried about a potential lawsuit for not meeting the accommodation. What about the lawsuit that comes from an injury or multiple injuries if something in the lab catches on fire? They're [administration] not concerned about that. It's, you know, accommodations. To them [administration], that [accommodations] outranks, I mean they would never come out and say it, but it seems to me like that [accommodations] outranks safety.

**Knowing or Being Someone with a Disability Provides Awareness.** Several participants disclosed having a relative who has a disability or disclosed that they have a disability. The participants stated that the knowledge gained from knowing someone with or having a disability did not appreciably change their perceptions about disabilities and student accommodations; however, participants did mention that knowing someone with or having a disability gave them more awareness of issues that those with disabilities encounter.

Elena and Tabitha both stated that they each have a nephew who has dyslexia. Neither Elena nor Tabitha perceived that knowing someone who has a disability changed their perceptions appreciably regarding students with disabilities or providing accommodations to students with disabilities. Elena mentioned that she understood the rationale for providing students extra time and related it to her nephew.

I have a nephew who's dyslexic. And so, I understand how hard it is for him ... when the letters are transposed, so I get that. Giving him extra time, giving a student time and a half, double time, you know, my cut off is like triple time, but time and a half and double time, I'm fine with because at the end of the day, if you don't know it, you're not going to know it.

Tabitha perceived that having a nephew who was dyslexic made her more aware of dyslexia, especially when she had a student who confided in her about having dyslexia. Tabitha believes that knowing about the challenges encountered by her nephew has made her more aware overall about disabilities. When asked about her nephew and if her perceptions changed because of having a nephew with a disability, Tabitha explained:

My nephew is dyslexic, and my sister got a master's degree in education, and she focused on dyslexia. ... They made me more aware of that. ... Just her [Tabitha's sister] experience with my nephew ... helps me be aware that there are other forms of disability that I was unaware of. So, ... that part definitely has influenced me because I may not have been fully aware of all the possible disabilities a student could have.

Gabe stated that having a son with learning disabilities did not change his perceptions about providing accommodations to students with disabilities but rather made him aware of all

the possible accommodations. Gabe also mentioned that his self-recognition also benefits his students who do not have a disability.

I'm not sure that it's changed my viewpoint on providing accommodations, but it's made me aware of the breadth of possible accommodations a student might need. ... I don't think that I think differently today about why or how, or I mean whether I should provide accommodations but my older son who's 14, he has ADHD. He has some nonverbal learning disorders. He has a bunch of sensory issues ... but his biggest challenge is total lack of executive functioning ability. ... So, he sort of has no ability to plan or to like put steps, like in a sequence. ... I had never sort of thought about the breadth of possible challenges. And so, it does sort of help me think about like how do I sequence things, how do I remind students, and this isn't even just for my students who have accommodations, it's when I create anything for my class, like, how do I sequence things, how do I write instructions, how do I provide background? So, it has definitely changed the way that I designed my materials for everyone, not just for my students who receive accommodations.

Sam disclosed that he has a physical disability caused by an autoimmune disease. The autoimmune disease is a degenerative disease in which Sam's muscles slowly become weaker. Because of the muscle weakness, Sam uses a power chair when not at home. His perceptions about those with disabilities has changed because of his own disability. Sam explained:

Because I am disabled, that has changed my experience. ... I'm more aware of all these physical challenges that I know other people don't see, right, and that I didn't see before I was in this position, but that has sort of morphed itself over to thinking about these physical accommodations. That's why I'm more ... sympathetic with what is it like to

him [a student Sam taught who had Tourette's syndrome] to have that condition.

...Before my own disability, I don't think I would have been empathetic. I mean, I would have been understanding and I would not have judged him [the student] and I would have done whatever he [the student] needed but sort of the ability to fake what is this like, what is everyday life like for him [the student] ... that way of thinking has come, I think, as a result of my own disability. So, definitely, I've evolved on that.

### **Chapter Summary**

The above data demonstrated how the 13 participants perceived the provision of academic accommodations to students with disabilities. The four research questions were developed prior to interviews with the participants. I coded the interviews after all interviews were complete. Chapter 4 explored how the interviews addressed each of the four research questions. I will provide a discussion of the data and the implications for future research in Chapter 5.

## **Chapter 5. Conclusions**

The purpose of this phenomenological study was to explore the perceptions of tenured science faculty about providing reasonable accommodations for students with disabilities at institutions of higher education in the United States. Previous chapters outlined the problem my study sought to explore, addressed the research questions that guided the study, provided the significance of the study, defined the key terms used, addressed the limitations and delimitations of the study, reviewed pertinent literature, and discussed the qualitative methodology used in the study. My role as the researcher, the population, the data collection methods, data analysis methods, credibility and trustworthiness, and ethical considerations of the study were also discussed. In Chapter 4, I explored and identified key themes that addressed the four research questions. I identified data from participant interviews that expressed those themes. In this chapter, I will restate the problem, address findings and conclusions from the research, and discuss implications for practice and further research.

### **Statement of Problem**

The problem addressed in this study was that students with disabilities face challenges when requesting accommodations in science courses in postsecondary education and that those challenges are linked to the perceptions of science faculty members. Science faculty members may perceive students with disabilities negatively and these perceptions may influence the willingness to provide reasonable accommodations to students with disabilities. The phenomenon of being a tenured science faculty member at a postsecondary institution who provides academic accommodations to students with disabilities was the basis of this study's exploration. Because of the challenges regularly faced by students with disabilities in postsecondary education, especially in the STEM disciplines, I sought to learn more about the



perceptions, experiences, and willingness of tenured science faculty members to provide accommodations to students with disabilities.

## **Discussion**

This phenomenological study was completed by conducting one-on-one interviews with 13 tenured science faculty from across the United States. Identification of the themes in the data were based on my analysis of the participant interviews coupled with the review of my memos and field notes. These themes formed the basis for the answers to the research questions that guided my study. The findings of my study could inform postsecondary educators and administrators about the challenges that impede the success of students with disabilities in the sciences as well as inform postsecondary educators and administrators on how to support students with disabilities in science courses. Additionally, the findings can aid in developing the body of literature concerning the perceptions of science faculty members regarding the provision of reasonable accommodations for students with disabilities.

### ***Research Question 1***

What do tenured science faculty report as their perceptions about providing reasonable accommodations to students with disabilities?

Students with disabilities regularly face challenges in using accommodations when taking a science course in higher education (Bettencourt et al., 2018). These challenges are linked to the perceptions held by science faculty (Bettencourt et al., 2018); therefore, it is important that faculty perceive accommodations as an aspect of success for students with disabilities. Previous research indicated that some of the most negative faculty perceptions regarding student accommodations belonged to faculty in science, engineering, and industry (Zhang et al., 2010) and that the climate in STEM towards students with disabilities is negative (Bellman et al., 2018;

Bettencourt et al., 2018; Friedensen et al., 2021). The findings in my study are counter to the findings in the literature. Elena, Tabitha, Gabe, Jeff, Janet, Aaron, Michael, Derek, Daniel, Sam, Jack, and Melissa perceived student accommodations as an important aspect of success for students with disabilities. This finding is significant in that positive faculty perceptions are linked to the willingness to implement student accommodations, which facilitates positive academic outcomes for students with disabilities (Sayle, 2016). Furthermore, the findings from studies performed by Friedensen et al. (2021), Martin et al. (2011), Monagle (2015), and Rao (2002) indicated that STEM faculty have negative perceptions regarding the provision of student accommodations to students with disabilities and that STEM faculty are resistant to providing reasonable accommodations. The findings of my study are contradictory to those findings. All participants in my study characterized themselves as very willing to provide accommodations and the participants shared experiences that supported their characterization as being very willing to provide accommodations to students with disabilities.

Providing academic accommodations to students with disabilities does not compromise academic standards but adjusts how students with disabilities learn and how they are evaluated (Khouri et al., 2019; Lovett, 2021). There is a common perception among postsecondary faculty that providing a student with accommodations gives that student an advantage over other students (McCarron, 2020). Previous research indicated that faculty members at postsecondary institutions generally perceived accommodations to be an unfair advantage for the student who receives those accommodations (Leuchovius, n.d.; McCarron, 2020); however, most of the tenured science faculty in my study perceived accommodations as both fair and necessary to level the playing field between students with disabilities and students without disabilities. Additionally, the participants perceived accommodations as necessary for positive academic

outcomes for students with disabilities. These findings indicate that the science faculty in my study do not have the perception that student accommodations give students with disabilities an unfair advantage over students without disabilities, which is counter to the findings regarding faculty perceptions from previous studies (Bahraini, 2018; Bettencourt et al., 2018; Clark, 2017; Khouri et al., 2019; Leuchovius, n.d.; McCarron, 2020; Zhang et al., 2010). Elena, Tabitha, Gabe, Jeff, Janet, Aaron, Michael, Derek, Daniel, Sam, Jack, and Melissa perceived student accommodations as being fair and not providing students with disabilities with an advantage over other students. The participants recognized that students with disabilities are at a disadvantage when compared to their peers without disabilities, which is consistent with the findings from Freedman et al. (2020) and Toutain (2019) who indicated students with disabilities are at a disadvantage compared to their peers without disabilities.

The participants in my study recognized that students with disabilities require accommodations to be successful and recognized that accommodations do not provide an advantage to students with disabilities compared to students who do not have disabilities; however, some of the participants in my study perceived accommodations as not being indicative of the real world. This finding aligns with studies performed by Bahraini (2018), Clark (2017), Foss (2002), and Zhang et al. (2010) in which faculty members perceived academic accommodations as not indicative of the real world or inhibited future success of the students. Elena, Alicia, Aaron, Derek, Tabitha, Daniel, Jack, and Michael perceived accommodations to be unrealistic of what students will face in their desired careers or expressed concerns about accommodations negatively impacting future endeavors. Elena, Alicia, and Derek focused primarily on nursing students and setting the students up for failure in their chosen profession while other participants focused on life after academia in general.

All participants in my study perceived the expectations and processes surrounding academic accommodations for students with disabilities as vague and somewhat mysterious. Results from several studies (Baker, 2021; Bellman et al., 2018; Diez et al., 2015; Fanger, 2019) indicated that faculty lack training regarding student accommodations and lack knowledge of how to effectively work with students who have disabilities. West et al. (2016) reported that only 64% of institutions provide faculty information about working with students with disabilities. The participants in my study reported that they want to understand the accommodation processes and requirements to be successful in implementing student accommodations. The faculty are willing to undergo training concerning student accommodations to increase their knowledge of and experience with student accommodations. Additionally, the participants provided examples of what they believed a good training for student accommodations would entail, which is beneficial for designing training specifically for faculty in the sciences regarding students with disabilities. The participants indicated that training for working with students who have disabilities should contain a theoretical portion and a practical portion. The participants reported that case studies that are specific to the sciences would be beneficial.

Faculty perceptions are an integral aspect of providing accommodations to students with disabilities (Bettencourt et al., 2018; Dyer, 2018; McCarron, 2017) and faculty perceptions impact whether the faculty member is willing to provide accommodations regardless of legal requirements (McCarron, 2017). Overall, the perceptions reported by the participants are positive. This is significant because faculty with positive perceptions regarding student accommodations means that faculty are more willing to provide accommodations. Furthermore, the perceptions reported by the participants are consistent with an acceptance of a disability as merely an aspect of human nature and not as a biological defect as the participants recognize that

students with disabilities have different needs. The recognition by the participants that students with disabilities have different needs appears to be based on the concept that learning differs from person to person and not because of a biological defect. The implication being that the participants in my study viewed disability through a social model lens and not a medical model lens, which is not the lens typically linked to faculty perceptions in postsecondary education. (Meyer, 2008).

### ***Research Question 2***

What experiences do tenured science faculty link to their perceptions of accommodations?

The beliefs and perceptions regarding the provision of academic accommodations to students with disabilities are linked to the willingness to provide accommodations to students with disabilities (Bettencourt et al., 2018). An integral aspect of my study was to link participant experiences to participant perceptions regarding student accommodations. Participants reported their experiences with students who have disabilities over the course of their careers and recalled those experiences in detail. The participants were asked to provide examples of experiences with providing academic accommodations to students with disabilities that they perceived were positive and the participants were asked to provide examples of providing academic accommodations to students with disabilities that they perceived were challenging.

The participants provided both examples that they perceived were positive and examples they perceived were challenging or not as positive as other experiences; however, the participants were more animated and detailed when recounting positive experiences. This aligns with the perceptions that participants reported regarding the provision of student accommodations and aligns with their reported characterization of their willingness to provide

accommodations. There is a link between the experiences they had and their perceptions concerning student accommodations, which aligns with the findings from previous studies (Basilice, 2015; Bettencourt et al., 2018; McCarron, 2017; Sayle, 2016). Moreover, the faculty members in my study acknowledged that students with disabilities require accommodations to be successful and the experiences the participants shared indicated that they provided the necessary accommodations to improve the academic outcomes for students with disabilities. The participants recognized that students with disabilities have needs that are different than students who do not have disabilities and the participants willingly met those needs by providing accommodations.

The participants' focus on the positive experiences and the positive impacts that providing accommodations to students with disabilities has on academic outcomes for those students indicated that the participants view disability through the social model lens. The social model of disability states that society creates barriers for those with disabilities; therefore, society should change to minimize those barriers (Meyers, 2008). The faculty members in my study removed barriers to increase the possibility of successful academic outcomes for students with disabilities as evidenced by their reported experiences and interactions with students with disabilities. This finding is contradictory to the literature, which indicated that the prevalent perception of faculty members in postsecondary education regarding disability aligns with the medical model view of disability (Meyer, 2008).

### ***Research Question 3***

What do tenured science faculty perceive as the greatest challenge with providing reasonable accommodations to students with disabilities in a laboratory science?

Providing accommodations to students with disabilities in a laboratory science can pose unique challenges for science faculty (Bettencourt et al., 2018; Schneiderwind & Johnson, 2020). Science laboratory courses are typically three hours long, they usually have a capacity limit of 24 students, and courses can be scheduled back-to-back throughout the day. Additionally, science faculty are held personally and legally responsible for the safety of students and visitors while in the laboratory (American Chemical Society, 2017). This aspect is unique to science courses and not one that is encountered in non-STEM disciplines where there is no laboratory portion of the course.

The greatest challenge with providing reasonable accommodations to students with disabilities in a laboratory science in my study was dependent on the discipline; however, there was one challenge that was consistent among all disciplines: providing the required accommodations to the student with disabilities while also providing those students with a comparable laboratory experience as their peers without disabilities. Because only two of the participants are physics faculty members, no discernable theme emerged that was consistent between the two participants that was specific to physics courses.

**Chemistry.** Aaron, Jack, Michael, and Janet perceived one of the greatest challenges to providing accommodations to students with disabilities in a chemistry laboratory course was ensuring that the safety of all students was the priority in the laboratory and that providing the required accommodation did not take priority over safety. The participants were particularly concerned about safety because science faculty are held personally and legally responsible for the safety of students and visitors while in the laboratory (American Chemical Society, 2017). The chemistry faculty members also perceived that service animals can be problematic in a chemistry laboratory as keeping the service animals safe becomes the responsibility of the

faculty member (American Chemical Society, 2017). These types of challenges are not present in non-STEM fields (Bettencourt et al., 2018; Schneiderwind & Johnson, 2020).

The reported perceptions by the chemistry faculty members were that safety should be a higher priority than providing student accommodations in the laboratory portion of their courses. The use of chemicals, glassware, and heat sources in the chemistry laboratory are an added dimension to providing academic accommodations that need consideration. Jack mentioned the student who had poor vision several times during the interview and spoke of his concern about the student placing her face too close to the Bunsen burner and chemicals because of the consequences for the student. Jack's concern focused on safety and not an unwillingness to provide the required accommodations, which is consistent with the perceptions relayed by Aaron, Michael, and Janet.

The priority in a chemistry laboratory is safety. The chemistry faculty members in my study placed the safety of students above the provision of accommodations. The safety-first mentality focuses on the human aspect of students with disabilities instead of focusing on a biological defect that needs changed to meet the requirements that society demands. On the contrary, the faculty members perceived the students with disabilities as no different than students without disabilities in this regard. The implication being that chemistry faculty members in my study view disability as an aspect of human difference. This is supportive of the social model of disability, which is not prevalent in postsecondary education and contradicts the literature concerning the prevalent perceptions that postsecondary faculty members and society have regarding disability (Meyer, 2008; Mullins, 2019). Overall, the chemistry faculty members were willing to provide student accommodations in the laboratory portion of their courses if a safe environment was maintained.



**Biology.** The biology faculty members reported that it was a challenge to meet the required accommodation(s) because assessments were given in the laboratory portion of the course and because of the amount of time required to provide the accommodations. Elena, Alicia, and Daniel perceived one of the greatest challenges to providing accommodations to students with disabilities in a biology laboratory course was related to the fact that assessments are given in the laboratory portion of the course. The faculty perceived this as a challenge when students required extra time on assessments and when students required alternate testing arrangements. Both accommodations required the faculty to either provide opportunities for assessments outside of normal class times or provide alternate means to test the knowledge of the students. Elena and Alicia both mentioned this challenge in detail during their interviews.

The biology faculty members in my study reported challenges that they faced in the laboratory portion of their course and the impacts those challenges had on them. The faculty members encountered difficulties in the laboratory portion of the courses because assessments are given in the laboratory and because of the extra time comment required to meet some accommodations. Although the participants stated that more work was required on their part to provide the accommodations, their responses did not indicate any hostility towards the students or towards providing accommodations for the students.

**Providing Comparable Laboratory Experiences.** The theme of providing a comparable laboratory experience emerged as the biology faculty members and chemistry faculty members spoke about their perceptions of the challenges that they encountered in the laboratory portion of their courses. The participants spoke about how providing a student with disabilities with a virtual laboratory experiment or pictures of anatomy were not the same as performing the actual experiments or holding bones in one's hands. The chemistry faculty members reported that

virtual laboratory experiments do not provide the same experience as performing the experiment in the laboratory. For example, the tactile ability to pour chemicals and use a Bunsen burner is not the same as watching someone pour chemicals or watching someone use a Bunsen burner. Virtual laboratory experiments were perceived as taking away from the student's learning. The biology faculty members also perceived that providing students with a tactile experience was important. For example, the tactile ability to pick up a bone and rotate the bone in their hands.

The participants stressed the importance of providing a comparable learning experience for students with disabilities while meeting the required accommodations would be best for student learning. The participants reported their perceptions based on concerns for student learning and not based on concerns regarding student disability and impairments. The implication being that the participants do not perceive disability as a biological defect that causes a person with disabilities to have something intrinsically incorrect with them (Gershon, 2020). This finding is contrary to the findings in the literature. According to the literature, faculty typically perceive disability through a medical model lens (Meyer, 2008). Additionally, the focus on learning equates disability with ability, which is counter to the societal descriptor of disability. The societal descriptor for disability is intrinsically negative viewing disability as synonymous to inability instead of understanding that disability is merely a descriptive characteristic (Bellman et al., 2018; Booksh & Madsen, 2018). The faculty members in my study appear to recognize disability as a descriptive characteristic.

The tenured science faculty members in my study are willing to provide academic accommodations to students with disabilities in the laboratory portion of their courses; however, there are obstacles faced in science laboratory courses that are not encountered in courses without a laboratory component (Bettencourt et al., 2018; Schneiderwind & Johnson, 2020). The

safety requirements associated with working in a chemistry laboratory and the time requirements associated with working in a biology laboratory pose unique problems that are not seen outside of science courses (American Chemical Society, 2017). Furthermore, the participants reported that they want students with disabilities to have comparable experiences to those without disabilities while simultaneously fulfilling the required accommodations. These findings indicate that the participants recognized that there are challenges that are unique to the sciences because of the laboratory work. This finding is consistent with previous research by Bettencourt et al., (2018) and Friedensen et al. (2021) as both reported challenges in science courses because of the laboratory work.

#### ***Research Question 4***

How do tenured science faculty characterize their willingness to provide accommodations?

Zhang et al. (2010) reported that faculty willingness to provide reasonable accommodations to students with disabilities hinged on whether faculty felt the accommodations were unfair, whether faculty felt the accommodations lowered academic integrity, and whether faculty felt that the accommodations were efficacious. The participants in my study reported that they were very willing to provide accommodations to students with disabilities and did not link their willingness to specific requirements, which does not align with the findings from Zhang et al (2010). Additionally, as noted in discussion for research question one, some faculty members reported reservations about providing accommodations expressing their concern regarding future endeavors. Although some faculty members reported this concern, those same faculty members did not report any unwillingness to provide accommodations. On the contrary, the faculty members reported positive experiences. Furthermore, some participants during their interview

mentioned that they made mistakes because of misunderstanding the accommodation process and expectations associated with accommodations; however, those errors were neither malicious nor an attempt to sabotage the students (Khouri et al., 2019). These types of errors are indicative of a lack of knowledge about or understanding of the accommodation processes and procedures (Khouri et al., 2019), which could be alleviated with proper training (Baker, 2021; Fanger, 2019).

Participants in my study reported a willingness to provide accommodations to students with disabilities and a desire to help students with disabilities succeed; however, some participants reported that they were legally obligated to provide accommodation. Moreover, faculty members disclosed a fear of litigation concerning a violation of student rights under the ADA. The participants perceived that the students, or even the parents, could file a lawsuit against them, which is a reference to the current litigious nature of society and an understanding of disability law (Rubin 2010).

Previous studies (Baker, 2021; Basilice, 2015; Byrd, 2018; Zhang et al., 2010) indicated that faculty members lacked a proper knowledge and understanding of or had minimum knowledge and understanding of disability legislation. The participants in my study clearly understood their legal obligations and the consequences for violation of those obligations. The findings from my study do not align with the findings of previous studies performed by Baker (2021), Basilice (2015), Byrd (2018), and Zhang et al. (2010). Previous studies that focused on faculty knowledge about legislation and included STEM faculty did not delineate their findings based on discipline, so it is difficult to compare the science faculty in my study to science faculty who participated in other studies.

There is a dearth in the literature regarding science faculty, which makes it difficult to compare the finding to other studies; however, it is possible that the science faculty have some knowledge concerning legislation pertaining to students with disabilities because of their legal responsibility to students in the laboratory (American Chemical Society, 2017). Because science faculty members are held legally and personally responsible for students while in the laboratory, science faculty may be amenable to learning about other applicable legislation. Regardless, the finding that science faculty were familiar with disability legislation does not align with the findings from Price (2018) who noted that STEM faculty were less familiar with disability legislation than non-STEM faculty. However, there are some finding in my study that align with some aspects of the Byrd study and the Zhang et al. study.

The study by Byrd (2018) established a link between the knowledge of legal issues regarding disability and faculty attitudes. Byrd found that faculty members who have more positive attitudes toward disability and student accommodations were more likely to understand disability legislation whereas faculty with more negative attitudes toward disability and student accommodations were less likely to understand disability legislation. The participants in my study generally had positive attitudes, perceptions, and beliefs toward students with disabilities and the provision of academic accommodation, which could be why the participants had a knowledge of disability legislation. Zhang et al. (2010) found that faculty members who had more knowledge of disability legislation were more willing to provide accommodations to students with disabilities. In this aspect, the findings from my study align with Byrd (2018) and Zhang et al. (2010).

Four of the participants either have a disability or have a family member who has a disability. Gaining knowledge of disabilities through having a disability or knowing someone

with a disability was beneficial to the faculty members, which in turn benefited their students who have a disability and require accommodations. The knowledge gained by the faculty members because of having a disability or a family member having a disability positively affected their personal beliefs about disability. Consequently, their beliefs affected their willingness to implement accommodations. This finding is consistent with the findings from Zhang et al., (2010) and McCarron (2017). Zhang et al. and McCarron reported a definitive link between faculty member's personal beliefs and their willingness to provide reasonable accommodations to students with disabilities.

Overall, the responses provided by the participants indicated that the faculty members in my study recognized that students with disabilities require accommodations; therefore, the participants willingly provided the accommodations. The responses demonstrated a willingness to accommodate students with disabilities centered on the observation that students with disabilities having different needs than other students, which required a different learning environment and a different assessment environment (Khouri et al., 2019). Although the participants recognized the difference among students who have disabilities and students who do not have disabilities, none of the responses indicated that the faculty members perceived that the students required accommodations because of a biological defect. The participants embraced disability as a form of diversity (Siebers, 2008) and removed the barriers constructed by society that disable people (Siebers, 2008; Watson, 2012; Wieseler, 2018). This finding aligns with the social model of disability and not the medical model of disability.

## **Conclusions**

The perceptions these tenured science faculty have regarding the provision of reasonable accommodations for students with disabilities are positive. Participants reported that having

training that covered basic information regarding student accommodations, how to successfully implement student accommodations, and understanding the processes involved for the determination of accommodations as well as the options available to them would be beneficial. Participants reported challenges that are unique to laboratory sciences and were discipline specific; therefore, training that was specific to the challenges faced in the laboratory sciences would be beneficial to science faculty. Regardless of the lack of training, the challenges associated with laboratory work, the perception that accommodations are potentially detrimental for future endeavors, and the amount of work involved to meet the required accommodations, participants willingly provided accommodations. The participants perceived academic accommodations as an important aspect of success for students with disabilities, thus, the participants strove to meet the accommodations.

### **Implications for Practice**

Based on the research findings, I recommend several areas of improvement for future practice.

- Provide professional development opportunities for faculty members regarding general information about the provision of academic accommodations, faculty expectations and options, the process of determining student accommodations, and disability legislation.
- Provide professional development to science faculty members centered on science specific approaches to supporting and mentoring students with disabilities, including inclusive pedagogy, person-first language, and operational definitions regarding disability and accommodations.

- Provide opportunities for science faculty that are informal, but facilitated by disability support services, to meet and discuss challenges and solutions that are specific to the sciences.
- Institute a mentoring program for students with disabilities who enroll in science courses or major in the science disciplines that is facilitated by science faculty members.
- Provide science faculty members with the support and resources to successfully integrate accommodations in the laboratory portion of their courses.

First, there is a need for professional development for faculty members that addresses the processes associated with providing accommodations to students with disabilities, expectations and options for faculty, and disability legislation. Science faculty desired to understand the processes, including how accommodations are determined and how they as faculty can better help students with disabilities. This type of professional development will build knowledge and understanding, which will benefit students with disabilities.

Second, there is a need for professional development for science faculty members that addresses the unique challenges that are encountered in science courses, especially the laboratory portions of the courses. The professional development should include case studies that address challenges encountered in the sciences while providing student accommodations. Additionally, the professional development opportunity should include evidence-based, data-driven information to satisfy science faculty members' desire for hard data. Furthermore, the professional development opportunity should address teaching using inclusive pedagogy, address using person-first language, and address the detrimental aspects of the "weeding-out" mentality



that is prevalent in science. Doing so will improve conditions and academic outcomes for students with disabilities in the sciences.

Third, informal opportunities, for example, brown bag lunch series, could be implemented that allow science faculty members to meet and discuss challenges they encounter with providing accommodations to students with disabilities and elicit feedback from other science faculty members on possible solutions. The theoretical aspect of professional development opportunities is a good foundation, but a practical aspect to the challenges encountered and solutions implemented would be essential for science faculty. The practical aspect of this type of professional development will facilitate improvement in academic outcomes for students with disabilities in the sciences.

Fourth, science faculty require support to successfully integrate reasonable accommodations for students with disabilities into the laboratory portion of their courses. Institutions can provide support and resources by providing information that is science specific regarding the implementation of accommodations in the laboratory. Additionally, institutions can provide faculty members with someone, such as a laboratory technician or teaching assistant, who could help assist faculty members while in the laboratory. The support and resources would benefit the faculty members as they attempt to provide accommodations while keeping students safe. This would benefit the students who require the accommodations as they would be able to fully participate in the laboratory keeping their experiences comparable to the experiences of students without disabilities.

Finally, instituting a mentorship program for students with disabilities who enroll in or major in science disciplines would be beneficial for both students with disabilities and science faculty members. A mentorship program would help students with disabilities traverse the

challenges they encounter in sciences courses to improve academic outcomes as well as provide science faculty members with awareness regarding the challenges encountered by students with disabilities. Faculty can then work on removing those challenges. The mentorship program would be beneficial for faculty members as they interact with student with disabilities, which would not only build rapport between the faculty members and the students with disabilities, but also help build empathy on part of the faculty member.

### **Implications for Further Research**

During my research, I noted additional areas of focus for further research.

- A qualitative study that explores the relationship between science faculty members' perceptions about providing accommodations to students with disabilities and students with disabilities' perceptions of science faculty members' provision of accommodations.
- A qualitative study that explores the relationship between science faculty perceptions regarding their willingness to provide student accommodations to students with disabilities and familial connections to someone who has a disability.
- A qualitative study that explores the perceptions of science faculty members regarding the challenges of providing accommodations to students with disabilities that is science discipline specific, that is, specific to chemistry courses, specific to physics course, and specific to biology courses

First, there is a need to further explore the perceptions of science faculty members about their willingness to provide accommodations to students with disabilities and determine how students with disabilities perceive the willingness of science faculty members to provide student accommodations. This would allow exploration into determining whether the actions of science

faculty align with the perceptions that science faculty have. Additionally, exploring student perceptions will allow faculty to understand whether their body language and words are perceived negatively by students with disabilities, which negatively impacts the use of accommodations by students with disabilities when enrolled in a science course.

Second, a qualitative study that explores the relationship between the perceptions of science faculty members to provide accommodations to students with disabilities and the faculty member knowing someone or being someone who has a disability would be beneficial. This type of study could explore any possible links between a faculty member's willingness to provide accommodations and a faculty member having a disability or knowing someone with a disability to determine whether that knowledge influences how the faculty member approaches accommodations. A study like this could help by gaining knowledge about outside influences on perceptions.

Finally, my study explored the perceptions and challenges of chemistry, physics, and biology faculty members collectively. There is a need to explore the perceptions and challenges that are specific to each science; therefore, a study designed to explore the perceptions and challenges of chemistry faculty, a study designed to explore the perceptions and challenges of physics faculty, and a study designed to explore the perceptions and challenges of biology faculty would be beneficial. Studies performed in this way would provide insights into discipline specific perceptions and challenges, which could potentially provide solutions that are discipline specific to aid in overcoming the challenges that students with disabilities encounter based on the course discipline.

## **Chapter Summary**

This phenomenological study sought to explore the perceptions of tenured science faculty regarding the provision of reasonable accommodations to students with disabilities. Chapter 1 introduced the phenomenon of students with disabilities in postsecondary education, the challenges faced by students with disability in postsecondary education, and the challenges faced by students with disabilities in STEM. I stated the problem being studied, addressed the research questions that guided my study, presented the significance of my study, defined pertinent terms related to my study, discussed the limitations and delimitations of my study, and provided the statement of researcher perspective. In Chapter 2, I explored the literature relevant to students with disabilities in postsecondary education. The topics covered in Chapter 2 included disability legislation, faculty knowledge of disability legislation, the stigma of disability, common barriers encountered by students with disabilities, common student accommodations, non-disabled students' perceptions regarding student accommodations, students' perceptions of faculty regarding student accommodations, faculty perceptions of student accommodations, discipline specific studies, STEM studies, and the sciences. In Chapter 3, I outlined the methodology used in my study. I provided explanations of the qualitative research method used, the research questions that guided my study, my role in the study, the population, data collection and analysis methods, credibility and trustworthiness, and the ethical considerations. In Chapter 4, I provided the data that I collected. Chapter 4 provided an explanation of data collection, a description of the participants, and the interview results as the results pertained to each research question. In Chapter 5, I summarized the findings of the study, provided implications for practice and for future research.

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## APPENDIX: Interview Protocol

Good morning/afternoon. My name is Rebecca Riggs, and I am a doctoral student at East Tennessee State University in the Department of Educational Leadership and Policy Analysis. The purpose of this interview is to learn about the perceptions that tenured science faculty have concerning student accommodations. I would like for you to feel comfortable to tell me how you feel about student accommodations. Please keep in mind that there are no correct or incorrect answers, and there is no answer more desirable than another answer. Your answers will help me to understand faculty perceptions of student accommodations in the sciences.

If you have no objections, I am going to record our interview. Recording the interview allows me to focus my attention on you and what you are saying instead of trying to listen and write simultaneously, which is difficult for me. If at any time during our interview you would like to discontinue being recorded, please feel free to let me know. All responses you give will be kept confidential. (Start recording.) At this time, I would like to remind you of your oral consent to participate in this study, which certifies that we agree to continue this interview. I am the responsible investigator for this study. Your participation in this interview is voluntary. If at any time you need to stop or take a break, then please let me know. You may also withdraw your participation at any time without consequence. Do you have any questions or concerns before we begin? Then with your permission, I would like to begin.

1. Interviewee background information
  - a. Tell me a little about yourself/ background.
2. Teaching Background
  - a. What do you teach?
  - b. How long have you been teaching?
  - c. How many universities and/or colleges have you taught at?
  - d. How long have you been tenured?
3. Have you received training concerning student accommodations?
  - a. Where did you receive the training?
  - b. At what stage in your career did you receive training?
  - c. Do you feel that the training you have received was adequate?
    - i. Why or why not?
    - ii. What would a good training look like to you?
4. How do you feel about providing students with accommodations?
  - a. Can you give (an) example(s) of why you feel that way?
  - b. What experiences have you had that you feel were positive?
  - c. What experiences have you had that you feel were negative/challenging?
5. What challenges do student accommodations present for you? (Prompt: challenges in lecture versus laboratory; group work)
  - a. How have you overcome those challenges?
  - b. Can you give examples of the types of accommodation requests that you receive?
6. Do you think your personal beliefs carry over into the classroom, or laboratory, when it comes to student accommodations?

Are there any final thoughts or experiences you would like to share? (Stop recording). How do you feel about sharing your experiences with me or feel about the interview process? Do you have any questions for me? Thank you for speaking with me today.

NB: Interviews will be semi-structured, meaning these questions may not be asked verbatim and conversation will be allowed to flow in a friendly style. The investigator will be led by the subject into areas that may not be touched upon here, but that will remain within the bounds of minimal risk.

VITA

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