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A Case Study: Perceptions of an Indigenous STEM Nonprofit Contributions to Self-Efficacy and Educational Experience

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Abstract

Native American people and Indigenous people are underrepresented in the Science, Technology, Engineering, and Mathematics (STEM) disciplines. According to the National Science Foundation (NSF, 2015), Indigenous people represented 1.7% of the United States population, but only accounted for 0.6% of bachelor's degrees, 0.4% of master's degrees, and 0.2% of doctoral degrees in science and engineering. The low participation of Indigenous people in STEM disciplines have been attributed to reasons such as (a) lack of exposure, (b) lack of interest, (c) lack of confidence, (d) lack of a sense of belonging, and (e) lack of goal congruency. This qualitative research study sought to discover how Indigenous STEM graduates perceive a STEM nonprofit has contributed to their self-efficacy and educational experience. Data were gathered through a questionnaire, interviews, and a focus group with self-identifying Indigenous people who have completed a college degree within a STEM field since 2015 that have also held membership within AISES. Seventeen participants participated in the study. After manual and software coding, the data were analyzed in reference to the research question. Results revealed AISES has made major contributions to the self-efficacy and educational experiences of Indigenous STEM graduates. While both internal and external factors influenced graduates, self-efficacy, and educational experience, membership in AISES contributed to greater self-efficacy and the participants perceived AISES contributed to their educational and professional success. The findings also indicated more can be done to highlight the importance of STEM nonprofits and their contributions.

Keywords: self-efficacy, American Indian/Alaskan Native, American Indian Science and Engineering Society (AISES), predominately White institutions (PWI), identity

Dedication

This dissertation is in honor of my ancestors, my grandparents, my parents, and my family. To my ancestors whose resilience and strength is the reason I am here today. To my grandparents who taught me the importance of hard work and education, you are my inspiration. To my parents who celebrated every success with me, supported me through every challenge, and taught me to be the man I am becoming. Lastly, to my family for your belief in my educational endeavors.

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This dissertation has been the single most challenging thing I have done to date. None of which would have been possible without the support and motivation from my mentors, peers, colleagues, friends, family and many others. No matter how many times I have felt defeated, I had an army of supporters behind me.

There are a number of people that I want to acknowledge. First, I want to say thank you to my parents and siblings. I know that my struggles have been your struggles and my successes have been your successes over the last five years, and I wanted to say thank you for your unwavering support and love. Mom and dad, you have been the greatest support of all, whether it be financially, helping me code my data or simply being a listening ear to my constant complaining, thank you. Thank you to my family, I would not be here without the motivation and support you have all provided me.

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Thank you to my participants and to the American Indian Science and Engineering Society (AISES) for allowing me to focus my research on Indigenous STEM graduates and nonprofits. I appreciate you giving me the opportunity to share your stories through this study. It

has been my honor and pleasure to work with you and to shed some light on a great organization that has changed my life.

Finally, thank you to Dr. Donna Graham, my dissertation chair. Your guidance, critique, and encouragement provided a solid backbone for my work. You have challenged me constantly since we began working together and I appreciate your guidance and dedication. Thank you to my former chair, Dr. Yvette Ghormley, for helping me lay the groundwork for this study. Thank you to my committee, Dr. Julie McCann and Dr. Mike Hollis for feedback and support through this process.

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Chapter 1: Introduction

Introduction to the Problem

Native American people and Indigenous people are underrepresented in the Science, Technology, Engineering, and Mathematics (STEM) disciplines (Page-Reeves, Marin, DeerInWater, & Medin, 2017). According to the National Science Foundation (NSF, 2015), Indigenous people represented 1.7% of the United States population, but only accounted for 0.6% of bachelor's degrees, 0.4% of master's degrees, and 0.2% of doctoral degrees in science and engineering. The low participation of Indigenous people in STEM disciplines have been attributed to reasons such as (a) lack of exposure, (b) lack of interest, (c) lack of confidence, (d) lack of a sense of belonging, and (e) lack of goal congruency (Williams & Shipley, 2018). Indigenous people serving STEM-based nonprofits have been established with the mission to promote the advancement of Indigenous people in STEM fields (AISES, 2016).

Colleges and universities contribute specific programming and support services for Indigenous people. Studies have been conducted on recruitment and retention of Indigenous students (e.g., Keith, Stastny, & Brunt, 2016; Patterson, Silverwolf, Butler-Barners, & Van Zile-Tamsen, 2017), yet there is evidence that Indigenous educational studies are not represented in large numbers and are often difficult to find (Tippeconnic Fox & Tippeconnic, 2017). Specific types of programs can include (a) cultural diversity tuition waivers, (b) cultural centers on campus specifically for Indigenous people, (c) Indians into Medicine programs (InMed), (d) Recruitment/Retention of American Indians in Nursing (RAIN), (e) Multicultural learning communities, (f) curriculum that includes Indigenous culture and history, to name a few examples. Windchief and Joseph (2015) discussed the importance and effectiveness of

programming at universities and recommended that Indigenous students seek out campuses with Indigenous people-specific programs and support services.

Organizations such as the American Indian Science and Engineering Society (AISES) and the Society for Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS) focus specifically on serving Indigenous people with missions that represent a similar goal, to increase the representation of Native Americans in STEM disciplines (AISES, 2016). This study explored how a STEM nonprofit contributes to self-efficacy and educational experiences, as perceived by Indigenous STEM graduates. Understanding the impact organizations like AISES has on Indigenous people pursuing STEM degrees provides information for current and future students, as well as recent graduates getting into a STEM career.

The participants for this study were general members of AISES. Specifically, participants were self-identifying Indigenous people that have completed a STEM-based degree since 2015. AISES offers membership for individuals as well as membership for high schools, colleges and universities, and professional groups. AISES categories individual members into pre-college, college student, professional, and retiree (Membership, 2019). The various experiences and perspectives of previous college student organizational members may provide valuable information to determine the impact AISES has on Indigenous people. Experiences of Indigenous STEM graduates who have participated in AISES as college student members were analyzed.

Background, Context, History, and Conceptual Framework

Indigenous people have the lowest representation in STEM professions, according to the National Action Council for Minorities in Engineering (NACME, 2016). There is a considerable

need to increase Indigenous representation in STEM fields in order to create a STEM workforce that represents the diversity of America and incorporates Indigenous ways of knowing (NACME, 2016). Indigenous people often have trouble picturing themselves in a STEM career due to a lack of perception to overcome barriers, lack of role models, stereotypic images of scientists, cultural differences and society representing that STEM is not a place for Indigenous people (Sharkawy, 2015; Williams & Shipley, 2018).

Native American and Alaskan Native students represented only 0.9% of the total student body at degree-earning institutions across the nation in 2016 (NACME, 2016). Indigenous student success in higher education is subjectively understood, and various strategies have been used to combat this issue in higher education institutions. Bickel and Jensen (2012) found that all students undergo a feeling of alienation in new systems, and at various degrees. Students who are entering a new cultural, social, academic, or personal environment may have a more pronounced and complex feeling of alienation. The bicultural identity formation model designed by Bickel and Jensen (2012) suggested that in order to adapt, these students go through four stages of feelings and development, which include alienation, self-discovery, realignment, and participation.

Similarly, Charleston and Leon (2016) developed the social cognitive career theory (SCCT), which predicts that self-efficacy promotes favorable outcome expectations. Self-efficacy and outcome expectations influence the development of career interests and career choices. These studies suggest that if an Indigenous student cannot undergo a form of transculturation or immersion along with positive self-efficacy, then these students may not persist to the completion of a STEM degree or STEM career.

Research has been conducted on how Indigenous students and institutions of higher education are creating a more inclusive campus environment and support systems that are conducive to the success of Indigenous students in higher education through the scope of these theories (e.g., Keith et al., 2016; Patterson et al., 2017). In addition, research has been conducted on Indigenous student persistence and non-persistence in STEM majors uncovering similar themes as these theories (e.g., Page-Reeves et al., 2017). Researchers, such as Keith et al. (2016), have explored the barriers and strategies for success in Indigenous students to try to get a better understanding of *how* and *what* can be done to support their persistence in higher education and STEM careers.

Statement of the Problem

It is not known how a STEM nonprofit contributes to self-efficacy and educational experiences, as perceived by Indigenous STEM graduates. Data were gathered through interviews with self-identifying Indigenous people who have completed a college degree within a STEM field since 2015 who have also held membership within AISES. Data were also collected through a focus group. Insights from these Indigenous people could be shared with students, professionals, institutions of higher education and employers who may not have direct experience with Indigenous people STEM nonprofits and how these nonprofits provide a professional and learning community network.

Purpose of the Study

The purpose of this study was to explore how a STEM nonprofit contributes to self-efficacy and educational experiences, as perceived by Indigenous STEM graduates. The researcher conducted semistructured interviews with AISES members who self-identify as Indigenous and have graduated with a STEM-based degree since 2015. A focus group was also

conducted. The study findings may contribute to the literature surrounding postsecondary persistence among Indigenous people in the STEM fields, which may develop into further research or increase the awareness of the impact of Indigenous nonprofits.

Indigenous people have the lowest representation in STEM professions (Page-Reeves et al., 2017). Low numbers of Native Americans, Latinos, and African Americans in STEM fields are attributable to several factors that include barriers of cultural, structural, and institutional nature (Fouad & Santana, 2017). Research that focuses more on Indigenous populations found that addressing self-efficacy in an educational environment can help Indigenous people feel more capable of success (Keith et al., 2016). Higher education is essential for Indigenous people to support their goals of self-determination and strengthen self-government.

Researchers have taken various approaches to uncover why Indigenous people are so underrepresented in STEM fields, mostly, what strategies colleges and universities are taking to support these students in these programs (Fouad & Santana, 2017; Huffman, 2001; Sharkawy, 2015). Additionally, researchers have surveyed members of nonprofits analyzing the effects of support services on self-efficacy and identity but have not focused their research on Indigenous people (Chemers, Zurbriggen, Syed, Goza, & Bearman, 2011). This research is important because the strategies that nonprofit organizations are taking to be an asset to Indigenous people in the STEM fields are unknown in comparison to the strategies that educational institutions employ.

Research Question

RQ: How does a STEM nonprofit contribute to self-efficacy and educational experiences, as perceived by Indigenous STEM graduates?

Rationale, Relevance, and Significance of the Study

While research exists on how institutions of higher education are creating a more inclusive campus environment and support systems, there is little research regarding STEM nonprofit contributions. (e.g., Guillory, 2009; Patterson et al., 2017). Chemers et al. (2011) surveyed members of SACNAS, focusing on the effects of science support experiences on a commitment to science careers and how they are mediated by self-efficacy and identity. In addition, research has been conducted on Indigenous student persistence and non-persistence in STEM majors (Page-Reeves et al., 2017). Yatchmeneff (2015) researched how pre-college and college programs have or can promote the success of Indigenous students in STEM. These studies demonstrate a gap in the literature that allows for a qualitative study focusing on Indigenous STEM graduate perceptions of STEM nonprofits' contributions to their self-efficacy and educational experience.

Indigenous people STEM nonprofits have been established with the mission of increasing the representation of Indigenous people in STEM fields, some having been around since the late 1970s (AISES, 2016). Many Indigenous students pursuing STEM degrees have heard of some or all Indigenous people serving STEM-based nonprofits, however, there is no research on Indigenous STEM graduates' perceptions of how these STEM nonprofits contributed to their self-efficacy and educational experience. The research study will add to the current literature by researching how a STEM nonprofit contributes to self-efficacy and educational experiences, as perceived by Indigenous STEM graduates.

Definition of Terms

American Indian/Native American. Horse (2005) defined Native American identity as multifaceted and includes both the legal and political status of American Indian/Native American

people. Youngbull (2017) defined American Indian/Native Americans as persons belonging to the Indigenous tribes of the continental United States.

American Indian Science and Engineering Society (AISES). The American Indian Science and Engineering Society (AISES) is a national, nonprofit organization focused on substantially increasing the representation of American Indians, Alaska Natives, Native Hawaiians, Pacific Islanders, First Nations and other indigenous peoples of North America in STEM studies and careers (AISES, 2019).

Indigenous. Shotton, Lowe, and Waterman (2013) defined Indigenous as representing people who identify as Native American, Alaskan Native, members, or descendants of both state- and federally-recognized tribes. The term is also used to identify any person or people who are Indigenous to North America.

Predominantly White institutions *(PWIs)*. This term is used to describe institutions of higher learning in which Whites account for 50% or greater of the student enrollment (Brown & Dancy, 2010).

Self-efficacy. Bandura (1977) originally proposed the concept of self-efficacy and described it as how well one can execute courses of action required to deal with prospective situations. Charleston and Leon (2016) defined self-efficacy as a person's belief in their ability to succeed in a particular situation.

Assumptions, Limitations, Delimitations

Assumptions. The following assumptions were present in the study:

- The researcher assumed, as indicated in the literature, that there is an underrepresentation of Indigenous people in STEM programs and fields.

- Participants were able to retell their experiences accurately, honestly, and to the best of their ability. Participants were told that there are no right or wrong answers and to address the questions.
- Participants were only asked to reflect on their personal experiences and interpretations from their prior experiences as AISES members.
- Participants understood that their identities were confidential.

Limitations. The following limitations were present in the study:

- The data were dependent upon the participants' memories, which can be subject to memory loss, participant errors, or modifications of the experience.
- The sample is not representative of all Indigenous AISES members having graduated with STEM-based degrees since 2015.
- Participants only included the experiences of recent graduates, not that of all AISES members who have graduated with STEM degrees since the organization was founded.
- The definition of a STEM-based degree is based on the organization's policy on what constitutes a STEM degree.

Delimitations. The following delimitations are present in this study:

- The inclusion criterion was AISES members who have graduated since 2015 with a STEM degree.
- Participants were chosen for the study based on the order of invitation response.
- AISES members who have graduated since 2015 in a field other than STEM were not included.

- Semistructured interviews were conducted to allow every participant the opportunity to describe their experience based on their terms.
- Qualitative research was selected due to the researcher wanting to explore the experiences of Indigenous people within a professional and learning community network within an Indigenous STEM nonprofit.

Chapter 1 Summary

There continues to be a low representation of Indigenous people in STEM programs and professions (NACME, 2016). Indigenous people have trouble seeing themselves in STEM careers due to the factors listed throughout this chapter. Studies have been conducted detailing the impact that science support services have had on Indigenous people's commitment to science careers (Chemers et al., 2011). Researchers have also focused on Indigenous student persistence and non-persistence in STEM majors (Page-Reeves et al., 2017), yet limited research is available detailing the perceptions of STEM graduates on the impact an Indigenous STEM nonprofit may have had on their self-efficacy and educational experience.

Chapter 1 is an introduction to the content and overview of this research study. In this study, the researcher investigated how Indigenous STEM graduates perceive how a STEM nonprofit contributed to their self-efficacy and educational experience. Indigenous people STEM nonprofits have been around for years and little is known about how Indigenous STEM graduates perceive the contributions of these nonprofits. This study uncovered and described the impact of these organizations. Chapter 2 includes the literature review of relevant research pertaining to Indigenous people's persistence in higher education and STEM programs. Also, addressed in Chapter 2 is the conceptual framework for this study, the methodological issues of previous studies, and the assessment and evaluation of past research findings relevant to this study.

Chapter 3 will explain the researcher's reasoning for choosing a qualitative case study design, as well as the participant selection, ethical considerations, data collection, and analysis protocols.

Chapter 2: Literature Review

Introduction to the Literature Review

The purpose of this study was to explore how a STEM nonprofit contributes to self-efficacy and educational experiences, as perceived by Indigenous STEM graduates. Indigenous people have the lowest representation in STEM professions, according to NACME (2016). Society represents STEM is not a place for Indigenous people (Sharkawy, 2015; Williams & Shipley, 2018). Native American and Alaskan Native students represented only 0.9% of the total student body at degree-earning institutions across the nation in 2016 (NACME, 2016).

Students range from traditional tribal-specific to urban Pan-Indian, and from both rural and urban populations. Indigenous populations are ever-changing and there is concern that Indigenous people need to remain cognizant of the inner workings of higher education. Numerous efforts are being made to increase minority representation in STEM (Schmidtke, 2019). On such effort is implementing culturally relevant pedagogical practice within the college classroom. Culturally relevant support can assist American Indian students through understanding the inner workings of higher education and have an impact on retention in STEM (Schmidtke, 2019). Research surrounding efforts to increase minority representation in STEM is primarily focused on educational institutions. Contributions to self-efficacy and educational experience by STEM nonprofits are often referenced, but not studied.

There is no literature available that highlights the perceptions of Indigenous people on how STEM nonprofits support the advancement of Indigenous people in STEM fields. However, members of SACNAS have been surveyed regarding the effects of science support experiences on a commitment to science careers and how they are mediated by self-efficacy and identity. The research does not focus on Indigenous STEM graduate perceptions of the organization's

contribution (Chermers, Zurbriggen, Syed, Goza, & Bearman, 2011). The purpose of this research is to explore how a STEM nonprofit contributes to self-efficacy and educational experiences, as perceived by Indigenous STEM graduates.

Conceptual Framework

The pursuit of higher education is central to Native American self-determination and native nation-building; however, most native students must rely on non-Native colleges and universities (Tachine, Cabrera, & Yellow Bird, 2017). Research focuses heavily on four main factors influencing postsecondary persistence among ingenious people, which include: family support, institutional support, tribal community support and academic performance (Tachine et al., 2017). Page-Reeves et al. (2017) presented an additional theme focus around self-efficacy and the importance of how Indigenous people rely heavily on self-identity to support their pursuit of higher education. The conceptual framework for this research focused on themes centering around environmental and behavior variables, as well as the importance of self-efficacy/self-identity.

Bicultural identity formation model. Bicultural identity formation model (Bickel & Jensen, 2012) and social cognitive career theory (Charleston & Leon, 2016) are the theoretical concepts that drove the conceptual framework for this study. The bicultural identity formation model has four constructs that organize this model, they include alienation, self-discovery, realignment, and participation (Bickel & Jensen, 2012). The bicultural identity formation model is used to understand how Indigenous students draw upon their innermost values as needed for their psychological and personal support as they progress in higher education. Social cognitive career theory is used in understanding the interrelationships among individual environmental and

behavioral variables that are assumed to influence a person's academic and career choices (Charleston & Leon, 2016).

The bicultural identity formation model is designed with four constructs or stages. These stages include alienation, self-discovery, realignment, and participation (Bickel & Jensen, 2012). All students undergo a feeling of alienation in new systems, and at different degrees. Some students who are entering a new cultural, social, academic, or personal environment may have a more pronounced and complex feeling of alienation that is difficult to organize into their life-world experience (Windchief & Joseph, 2015). Cultural dissonance has been suggested as a major cause of student failure and has been connected to alienation (Bickel & Jensen, 2012). Students who are feeling extreme alienation must learn to adapt to their new environment in order to be successful.

Self-discovery is where Native American students will draw on traditional values throughout the transition process to become self-actualized with reduced cultural dissonance and stress (Bickel & Jensen, 2012). Self-discovery happens without cultural loss or a loss of self-identity and reaffirms the identity of the student in relation to the mainstream educational environment. Windchief and Joseph (2015) discussed the importance of American Indians' abilities to achieve success while maintaining cultural integrity vs. transculturation and/or creating new identities in order to be successful in higher education.

Students undergo realignment when they learn to adapt to new cultural needs and academic expectations. Windchief and Joseph (2015) maintained that Indigenous students need to claim educational space as their own. Participation in American Indian Student Service programs, sharing survival tactics and essentially taking ownership of their own educational experiences will promote success while maintaining cultural integrity. Bickel and Jensen (2012)

noted that Indigenous students will learn to take care of their self-esteem through self-discovery within the demands of the new academic cultural environment and go through realignment. Indigenous students will take the new identity they have actualized and use it to filter the experience of the new environment through their cultural values. Native American students' ability to draw personal and psychological strength from their values and will allow them to work through the new expectations and relationships in the new environment, determining appropriate responses through observation, practice, and demonstration without a cultural loss (Bickel & Jensen, 2012).

The final stage of the bicultural identity formation model has many names such as participation, transculturation, or *walking between worlds* (Bickel & Jensen, 2012). This stage is identified by students' abilities to participate in both cultures at the same time because they developed the skills necessary for school success and intercultural competence. Native American students weave in and out of the four stages of the bicultural identity formation model.

Transculturation facilitates student success because the increased ability for full participation allows benefits of insider insight unavailable to those who are unable or unwilling to fully commit to the immersion learning experience (Bickel & Jensen, 2012). Realigned perspectives, attitudes, knowledge, behaviors, and skills that are facilitated through the mainstream educational institution will allow students the increased ability to effectively interact with others who are different from themselves and to empower the student. Indigenous students will share experiences in college that can negatively affect a person, but Indigenous students do not need to fully integrate and assimilate to mainstream culture to be successful in higher education, they simply need to be proactive at claiming higher education as an Indigenous space (Bickel & Jensen, 2012; Windchief & Joseph, 2015).

Social cognitive career theory. SCCT is focused on the interrelationships among individual environmental and behavioral variables that are assumed to influence students' academic and career choices (Charleston & Leon, 2016). Indigenous people are often confined into a narrow image of what others assume they should be based on historical and caricatured images portrayed by mainstream society. Page-Reeves et al. (2017) noted that it is often hard for Indigenous people to believe in themselves or their ethnic identity because of the image that is portrayed in society. Essentially, the goal of interactions between the dominant U.S. society and American Indian has been to *colonize* or *civilize* American Indian people to be more like those who hold power in the dominant society, but the images of Indigenous people that are share do not promote self-efficacy (Jones-Brayboy, 2005).

Charleston and Leon (2016) derived social cognitive career theory from Bandura's (1986) general social cognitive theory, and their model predicts that self-efficacy promotes favorable outcome expectations. Self-efficacy and outcome expectations influence the development of individual career interests and career choices. Indigenous students who believe they can be true to themselves and their ethnic identity that draw strength from their identity will find success in higher education and beyond. Fouad and Santana (2017) uncovered that social cognitive career theory is a useful tool when researching Indigenous people pursuing higher education in STEM fields. Garriott, Navarro, and Flores (2017) found through their research that self-efficacy did not significantly predict outcome expectations. While some research found a connection between self-efficacy and outcome expectations, Garriott et al. (2017) found this connection is modest. Researchers need to continue to focus on distal contextual supports and barriers that promote self-efficacy and realistic outcome expectations for Indigenous people.

Review of Research Literature and Methodological Literature

Recent studies have examined efforts of institutions of higher education are creating a more inclusive campus environment and support systems for Native American students, but little research is conducted regarding how a STEM non-profit contributes. This section highlights research conducted on Identity, STEM degree completion and non-persistence, self-efficacy, sense of belonging, professional learning community networks and campus racial climate. While the research discusses issues surrounding postsecondary persistence among Indigenous peoples, the research falls short when addressing contributions of STEM non-profits.

Identity. In order to understand the struggles of Native American people in higher education, researchers must first consider identity, how this identity is formed, and the effects that identity has on pursuing a degree and career in STEM (Datta, 2018; Wilson, 2009). Native American identity is multifaceted and includes the legal and political status of American Indians/Native American people in this country (Horse, 2005). *White privilege* is synonymous with dominance in a racially stratified society that has been based on oppression. To be White in this society is to be privileged, and all others are underprivileged by definition. Understanding that American Indian/Native American people have been and still are part of the oppressed population in the United States is to understand their identity (Horse, 2005).

What truly sets American Indian/Native American people apart from others in the United States is their legal and political status. “Under tribal sovereignty, tribal governments are the sole authority that can determine who is or is not a member, or citizen, of a given tribal nation” (Horse, 2005, p. 63). American Indian/Native American people commonly identify first with one’s tribal affiliation and secondary as American Indian or Native American. No culture or language remains static, and change is the natural order of things (Horse, 2005). The culture of

American Indian/Native American people has changed and will continue to change. Identity is and will remain an important factor in American Indian/Native American people's lives.

Studies have been built around Horse's (2005) perspective on American Indian/Native American identity and its importance, while others have addressed the importance of identity for the persistence of Indigenous people in higher education. Page-Reeves et al. (2017) conducted a qualitative research study broadening the conceptualization of Native identity as foundational for success among Native Americans in STEM fields. Okagaki, Helling, and Bingham (2009) conducted a quantitative study where they surveyed American Indian students' success in college and identified factors that assist in understanding why some students persist and some students do not.

Page-Reeves et al. (2017) found that even through the significant differences in background, geography, discipline, and work sector, native STEM professionals found strength in their self-identity as Native people. The data showed that a strong sense of Native self is something that the interviewees drew on for strength that provided them the foundation for their success in STEM. Similarly, Okagaki et al. (2009) found that American Indian students placed a greater value on the instrumental importance of education, more strongly affirmed their ethnic identity, and felt closer to their ethnic group than did European American students. Bicultural efficacy was positively correlated with American Indian students' ratings of academic identity and belief in the power of education. Both studies, through different methodologies, reaffirmed the importance of ethnic identity for the persistence of American Indian students in higher education and STEM careers.

Science, technology, engineering, and mathematics degree completion and non-persistence. Indigenous people have the lowest representation in STEM professions (NACME,

2016). This lack of representation is a growing concern for Indigenous people throughout the United States because a lack of a voice in STEM fields means a lack of Indigenous knowledge and perspective in policy and practice. Underrepresentation of minority groups in STEM higher education and careers is one of the most challenging problems for science education, policymakers and researchers (Sharkawy, 2015).

Indigenous people often have trouble picturing themselves in a STEM career due to a lack of perception to overcome barriers, lack of role models, stereotypic images of scientists, cultural differences, and society representing that STEM is not a place for Indigenous people (Sharkawy, 2015). Native American and Alaskan Native students represent only 1% of the total student body at degree-earning institutions across the nation (Collins, 2013). They range from traditional tribal-specific and urban Pan-Indian and from both rural and urban populations. Sharkawy (2015) discussed the underrepresentation of minority students in STEM higher education and careers and asks the question, why they are not represented.

Ortiz and Sriraman (2015) conducted a three-part organizational self-study exploring the factors thought to impact students' decisions to persist in STEM fields of study. The self-study was presented as a model first step for institutions of higher education interested in launching efforts to improve STEM education and STEM student success. Through the self-study, Ortiz and Sriraman (2015) discovered that underrepresented students do not pursue STEM degrees percentage-wise in comparison to other degrees.

Foltz, Gannon, and Kirschmann (2014) studied factors that contribute to the persistence of minority students in STEM fields through ethnographic interviews. Foltz et al. found a myriad of influence affects a student's decision to persist in college, and they examined these concepts in the context of students' lives and looks and how and why these influence a student's

persistence. Ortiz and Sriraman's (2015) self-study and retention theories suggested that supportive faculty is needed and that a transformational approach to their teaching methods is necessary. These studies also suggest that supplemental instruction in math and science, early internship experiences and including discipline-specific introductory courses is necessary.

College preparatory courses are critical for college success among Native American students. College preparatory courses for Native American students was listed by Oritz and Sriraman (2015) to be one of the influential factors for persistence to both STEM degree selection and completion. Yatchmeneff (2015) explored whether Alaska Native ANSEP high school students gained a sense of autonomy, competence, or relatedness to motivate them to take advanced math and science. Qualitative interviews with Alaska Native high school students indicated that relatedness was an important element to them being motivated to take advanced math and science courses and that relationship building between peers and staff played an influential role in helping them gain a sense of autonomy (Yatchmeneff, 2015).

Communal congruence may be another important component of Native American students' success in education. *Communal goal incongruence* is the mismatch between a student's emphasis on communal work goals and the non-communal culture of STEM (Smith, Cech, Metz, Huntoon, & Moyer, 2014). Communal goals are defined primarily by the student's value placed on giving back to their tribal communities (Smith et al., 2014).

STEM fields are not viewed as allowing opportunities for everyone; additionally, STEM fields are not perceived as allowing opportunities to work with people or to help people (Diekman, Steinberg, Brown, Belanger, & Clark, 2017). Communal goal incongruence is not only a factor that affects Native American students' choice to pursue STEM degrees but also has similar findings with gender disparities in STEM fields. Diekman et al. (2017) created a

framework to understand communal goal processes as proximal motivators of decisions to engage in STEM.

Smith et al. (2014) conducted a mixed-method study surveying 80 Native American men and women in STEM, with a follow-up survey and interviews. Smith et al. (2014) found that the endorsement of communal goals by Native Americans in STEM majors at the start of their college careers was negatively associated with their stated intentions to persist, and negatively associated with their perceived performance after their first semester in college.

Self-efficacy. The United States has nearly 600 federally recognized American Indian and Alaska Native (AI/AN) tribes and AI/AN students enrolled in college bring a wealth of cultural experiences, values, and strengths to the learning environment (Keith et al., 2016). American Indian and Alaska Native students had a significantly lower college enrollment rate than any other group in the United States and dropout rates were on a continual rise (Keith et al., 2016). Traditional research and theories do not always focus on the cultural knowledge, skills, and abilities of Indigenous people and research often comes from a deficit perspective focusing on those who fail. Keith et al. (2016) stated that research focusing on those who fail in Indigenous populations can contribute to a negative and prejudicial attitude and lowered expectations among staff, faculty, and administrators. Research focusing on those who fail can also have a negative impact on the self-efficacy of Indigenous populations.

Bandura (1986) describes self-efficacy as a perception of capability. Self-efficacy and outcome expectations can influence the development of a person's career interests and career choices (Charleston & Leon, 2016). An Indigenous person's level of self-efficacy plays an important role in determining their educational achievement. Indigenous people who experience a higher degree of self-efficacy generally set goals that are higher, continue attempts at difficult

tasks longer, and experience more academic success than those with lower self-efficacy levels (Keith et al., 2016).

Indigenous people often face challenges when constructing and defining their own cultural identities. Indigenous people often find themselves confined to a narrow image of what others perceive they should "be" based on historicized and caricaturized cultural visions of their people. Identity and self-efficacy play a vital role in predicting the success of Indigenous people in higher education (Page-Reeves et al., 2017). Chermers et al. (2011) conducted a web-based survey of members of the Society for the Advancement of Chicanos and Native Americans in Science (SACNAS) and tested a model that proposed that the effects of science support experiences on a commitment to science careers would be mediated by science self-efficacy and identity as a scientist.

Indigenous people have a strong connection to their Native culture and researchers found this connection was shown to be associated with academic success (Huffman, 2001; Jones-Brayboy, 2005). Keith et al. (2016) stated that addressing self-efficacy in an educational environment can assist in helping Indigenous people feel more capable of success. Students who perceive that they can be a successful student and overcome obstacles often times will find success in their academic outcomes.

Garriott et al. (2017) took a quantitative approach and found that self-efficacy and outcome expectations were predictors of engineering persistence intentions, however, self-efficacy was not a significant predictor of outcome expectations. Self-efficacy was the strongest predictor of academic satisfaction and persistence intentions (Fouad & Santana, 2017). Fouad and Santana (2017) reviewed published research and found that social cognitive career theory predicts that college students must receive social supports and educational opportunities to

strengthen their identity as future scientists. Garriott et al. (2017) focused their research on first-generation college students, and their research is not reflective of Indigenous populations. Fouad and Santana's reviewed studies focused on underrepresented groups in STEM and found that lacking a sense of belonging in college is associated with lower self-efficacy and academic persistence for these groups. Research has identified self-efficacy as a factor influencing academic success among Indigenous populations.

Sense of belonging. One of the most discussed challenges for Indigenous students in higher education is the feeling that they do not belong. Museus, Yi, and Saelus (2017) claimed that students' ability to find a sense of belonging in college is positively associated with their intent to persist to degree completion. Museus et al. (2017) conducted a quantitative survey on everyone at an institution and focused on key variables which include: (a) race, (b) age, (c) sex, (d) parental education level, (e) family income, (f) academic preparation, (g) tuition and financial aid, and (h) status in undergraduate career.

Focusing on the effect of culturally relevant and responsive campus environments on a sense of belonging is something that many researchers do, either directly or indirectly. Higher education is an important tool for capacity building and assisting Indigenous communities to achieve their goals of self-determination and self-government. In addition, culturally engaging campuses create an environment that fosters a greater sense of belonging and ultimately leads to degree completion (Museus et al., 2017).

Indigenous people have heavy ties to their families. The connection Indigenous students hold to their families is strong that students often mention family as a driving force for pursuing higher education. The reasons may be not wanting to let the family down and/or obtaining an education to better the lives of their families (Guillory & Wolverton, 2009; Tachine et al., 2017).

This drive highlights the importance of family for Indigenous students. Guillory and Wolverton (2009) conducted focus group interviews with AI/AN students alongside face-to-face interviews with university presidents, faculty members and state representatives. Guillory and Wolverton (2009) compared perceptions of AI/AN students to that of policymakers and university leaders in order to uncover similarities and differences in perceptions.

Tachine et al. (2017) took an Indigenous methodological approach and interviewed participants via *sharing circles*, much like a focus group but with an Indigenous perspective and researcher. Replicating the extended family structure of Indigenous people within the college culture and creating a family structure or finding a *family* on campus gives these students a greater sense of belonging and leads to higher retention rates (Tachine et al., 2017).

There is a failure of mainstream colleges and universities to accommodate Indigenous students by creating environments suitable for perseverance resulting in degree completion. Heavyrunner and DeCelles (2002) reviewed the literature and demonstrated the effectiveness of the family education model for retention. Participation at American Indian student centers can lead to academic and social engagement for American Indian students and, subsequently, can contribute to retaining this group of students. Guillory and Wolverton (2009) also stressed the importance of Native American people researching Native American issues in higher education; stating "Native Americans are the experts at being Native American, and thus it is imperative that their voices be heard when creating policy that can directly or indirectly affect their educational lives" (p. 63).

While research has been done identifying the importance of finding a sense of belonging for Indigenous students in higher education, Bickel and Jensen (2012) created a model that highlights the stages Indigenous students go through to feel like they belong. The bicultural

identity formation model is designed with four constructs or stages. These stages include alienation, self-discovery, realignment, and participation (Bickel & Jensen, 2012). Realigned perspectives, attitudes, knowledge, behaviors, and skills that are facilitated through the mainstream educational institution will allow students the increased ability to effectively interact with others who are different from themselves and helps to empowers the student. Based on the extant research, either students must change or institutions must change. Huffman (2001) found that the best alternative toward realizing educational success among culturally traditional American Indians is to strive for achievement through cultural autonomy. Students continue to struggle as they maintain their identities. It is evident from Tachine et al. (2017) that family and identity are important support structures.

Even though Indigenous students go through an acute phase of estrangement, through transculturation they may find success in higher education, again, highlighting the point that an identity shift is one avenue for success. Alternatively, to help with the academic persistence of Indigenous students, institutions of higher education could transform themselves to be more consistent with the cultural values, traditions, and beliefs of Indigenous students (Fish & Syed, 2018). The research is somewhat mixed about whether success for these students is best found when Indigenous students must transform themselves (Windchief & Joseph, 2015) or whether the institution changes in order to support Indigenous students in higher education (Fish & Syed, 2018). Patterson et al. (2017) indicated that a one-size-fits-all approach to dealing with low retention (and success rates) of Indigenous students in higher education does not work. In order to fit the needs of Indigenous students, both the students and the institution must be willing to transform to suit the unique needs of Indigenous students.

Transculturation is viewed as the process of merging and converging cultures, and transculturation is the ability for Native American students to adapt to life at college without losing their cultural identity (Bickel & Jensen, 2012). Estranged students, versus transcultured students, are culturally traditional Native American students who experience intense alienation while in college and did poorly academically due to this alienation (Windchief & Joseph, 2015). Tachine et al. (2017) found that people need to belong and feel connected to a community or group and a *sense of belonging* is fundamental for a person's well-being. Estranged students are the students most likely to have to endure the process of transculturation in order to find success in higher education (Windchief & Joseph, 2015).

Marroquin and McCoach (2014) conducted a quantitative analysis utilizing the North American Indigenous College Students Inventory (NAICSI) as their instrument to assess cultural integrity for American Indian and Alaska Native college students across the domains of faculty and staff support, social or peer support, along with cultural reciprocity and resiliency, through the lens of transculturation. Marroquin and McCoach (2014) surveyed 501 AI/AN students at over 40 colleges and universities and analysis revealed that the more transcultured a student is, the higher their grade point average is, the higher the cultural exchange is for a student and the more cultural resilience they have.

Higher levels of transculturation are linked to the higher perception of support from faculty/staff, social/peers, tribal community, family and institutions. Native students will converge their traditional culture and home life with their life on campuses. This is done in order to feel that *sense of belonging* and essentially undergo transculturation in order to be successful on college campuses away from home.

Professional and community learning networks. Researchers have uncovered the positive effect that institutional support can have on American Indian/Alaskan Native persistence in higher education (Lopez, 2017). Lopez (2017) found support services as a major influence of student persistence in higher education, specifically culturally relevant support services such as an American Indian Student Services department. American Indian Student Service departments help students help ease American Indian/Alaskan Native students into university life by connecting them to the community or formulating a community on campus (Lopez, 2017).

Windchief and Joseph (2015) examined the importance of Indigenous students to formulate a community on college campuses and claim higher education as an Indigenous space. Professional learning communities through the lens of indigenous students and scholars will engage education through their community-specific lens. Professional Learning Communities are described as communities where professionals can develop their teaching strategies or teaching practices, enhance their knowledge and develop other relevant affective characteristics (Chauraya & Brodie, 2017; Dogan, Pringle, & Mesa, 2015). Through their case study research, Chauraya and Brodie (2017) found that learning is not an individual accomplishment, but rather a developing participation in a practice that is situated within a community of practice. Communities of practice negotiate joint enterprises that members work towards and find ways to engage each other to pursue their enterprises in a way that participants find meaningful interactions and progress towards their goals (Chauraya & Brodie, 2017). Pike, Kuh, and McCormick (2011) analyzed data from the 2004 administration of the National Survey of Student Engagement (NSSE) and discovered that learning community participation was positively and significantly related to student engagement. Learning communities have been

around since the late 1980s and have become recognized as a high impact education practice that positively affects student earning and success during college (Pike et al., 2011).

Learning communities can carry many definitions, but are generally labeled as a community where students or professionals with similar backgrounds or experiences can come together and focus on a common theme (Pike et al., 2011; Weiss, Visher, Weissman, & Wathington, 2015). Professional Learning Communities can also be found on college campuses as a place where college students are able to connect with other students and learn new learning practices. Tachine et al. (2017) mentioned how Native centers on college campuses provide a place where Native students could congregate, find commonality and create a sense of community on campus.

Indigenous students often feel isolation or marginalization on large university campuses and some universities have established Multicultural Learning Communities (MLC) that are designed to combat this feeling of isolation (Jehangir, Williams, & Pete, 2011). While MLC's have been found to be successful in larger universities, there is discernible evidence that learning communities improved persistence in community colleges (Weiss et al., 2015). Weiss et al. (2015) found that learning communities benefited students in developmental education by small margins. Whether a learning community is established on campus, off-campus, online or within a professional organization, the research shows they have a positive impact on student success.

Campus racial climate. Studies of on-campus racial climate are conducted due to traditional approaches to curriculum and campus climate not fostering an area for growth and retention for Indigenous people or people of color. Higher education institutions may be looking in the wrong places for answers. It is important to focus on the students as the sole unit of

analysis in retention and degree completion efforts, as well as addressing the racial climate on college campuses (Mayes, 2014).

Harwood, Mendenhall, Lee, Riopelle, and Huntt (2018) took a mixed-method approach in order to map the experiences of students of color at PWIs and found that many students of color experience racial hostility and exclusion in their daily routines on campus. Through qualitative interviews, Mayes (2014) uncovered that at some universities, underrepresented minority students feel that the campus climate is unsupportive of issues around race and culture, but supportive of all students. Some students feel that they *belong* to the campus community early in their college experience but develop a greater sense of belonging once they found or created a community where they felt comfortable and could relate to others. Windchief and Joseph (2015) stated that Indigenous students need to claim postsecondary education as Indigenous space utilizing curriculum, American Indian student services and digital media.

Minority groups remain underrepresented on campus and in graduate programs. Many college campuses promote themselves as integrated multicultural spaces and support diversity in their campus climate (Harwood et al., 2018). The internal and external climate-related-forces may sometimes affect the ability of a graduate diversity officer to recruit and retain minority students (Griffin, Muniz, & Espinosa, 2012). Graduate diversity officers maintain the primary responsibility for coordinating diversity efforts at the graduate level, either campus-wide or within an academic school (Griffin et al., 2012). Graduate diversity officer positions indicate a college's commitment to increasing diversity; however, they do not guarantee a more diverse graduate community.

Universities must go beyond demonstrating institutional commitment by creating graduate diversity officer positions and attending to campus racial climate to increase graduate

diversity. American Indian student service departments also demonstrate institutional commitment by creating a space where Indigenous students can host celebrations that showcase their Indigenous students and communities (Windchief & Joseph, 2015). Windchief and Joseph (2015) maintained that universities with a substantial Indigenous populations host events such as powwows, athletic competitions, movie screenings, and so forth which reflect Indigenous students successfully navigating the higher education experience.

Jehangir et al. (2011) discussed the impacts of Multicultural Learning Communities on campus that are designed to challenge the isolation and marginalization such students experience at large universities. American Indian Student Service departments, Native American specific student organizations, and curriculum including the history of Native American or Indigenous people can help create a more welcoming campus climate (Harwood et al., 2018; Jehangir et al., 2011; Mayes, 2014). Through these various sources, we can conclude that there is more than one factor associated with the campus racial climate affecting the persistence of Indigenous people.

Review of Methodological Issues

Research focused on Indigenous people is typically carried out by a researcher who is external to the community, rather than in collaboration with Indigenous people. Some researchers (e.g., Wilson, 2009) have indicated that it is hard to adapt dominant system tools for use when researching Indigenous people. When using a traditional scientific approach to research aspects of Indigenous peoples' lives and experiences, researcher biases are introduced. Researchers tend to focus on the problem and promote outside, culturally unaware resolutions rather than looking to the Indigenous communities and resources available to create resolutions.

In addition to the external aspect of research, there is a need for development and solutions that are rooted in the Nations and communities. Guillory and Wolverton (2009)

stressed the importance of Native Americans researching Native American issues. Researchers must consider the voices of the people they are researching, in any context, when making recommendations or creating policies that can directly or indirectly affect the lives of Indigenous people. Indigenous scholars make research more visible and beneficial to the communities they research because they are deciding what needs to be studied and include the beliefs, customs and values of Indigenous people into the research process (Datta, 2018; Wilson, 2009). Researchers from outside the community often make the mistake of making comparisons between the culture of the studied and that of the researcher. Researchers should use the strategy of talking circles as a form of focus group discussion so that each person has an opportunity to take an uninterrupted turn in discussing the topic (Datta, 2018; Wilson, 2009). Highlighting the importance of considering the culture of the Indigenous people being studied is necessary for a researcher.

Qualitative research methods are widely used to research American Indian/Indigenous people in higher education. Huffman (2001) focused his study on ethnic identity as it directly relates to the academic experience and vast amounts of research have been conducted following Huffman's lead. Qualitative research allows the researcher to incorporate the perceptions and experience of Indigenous people in their research, which helps higher education institutions and policymakers better understand specific challenges and needs. Griffin et al. (2012) conducted a qualitative study focusing on how campus racial climate influences diversity programs. Griffin et al.'s (2012) study was limited due to only one perspective on barriers to increasing graduate student diversity being considered; additionally, perspectives of other institutional leaders, faculty, or students were not considered.

Pewewardy and Frey (2004) conducted quantitative research focusing on American Indian students' perceptions of campus racial climate at NNCU. Limitations of the study also

existed for quantitative analysis of campus racial climate because the study cannot be generalized for all American Indian students. The study was conducted on the population of one state university and does not represent all culturally diverse populations of undergraduates on other college campuses (Pewewardy & Frey, 2004). Additionally, Thompson (2012) suggested that tribal affiliation, age, year in school, geographic regions and gender all have to be considered when researching American Indian students.

One aspect of much of this research that is problematic is the lack of consideration for the culture and context, yet some qualitative researchers have made strides in considering the context and needs of the Indigenous people participating in their study. For example, Foltz et al. (2014) conducted an exploratory study where they qualitatively examined factors contributing to the college persistence of minority students in STEM graduate programs at LMCU. Data were collected by interviewing students to get a first-person account of students' experiences. Foltz et al. collected data while keeping their personal biases in mind. Ultimately, their recommendation was that more research conducted, more in-depth, and with less bias. Page-Reeves et al. (2017) also took a qualitative approach, examining factors that contribute to success among Native Americans in STEM. Data were collected via one-on-one ethnographic interviews and through one dialog group session. The selection of interviewees was systematic and provided for a wide array of backgrounds to be represented.

Both of these studies are examples where the researchers were focused on reducing bias and meeting the needs of the Indigenous people. While Foltz et al. (2014) focused on graduate student persistence and the student's experiences, they also interviewed faculty and staff members, triangulating their findings of the elements needed that fostered college persistence for minority students in STEM. Page-Reeves et al. (2017) interviewed successful Native STEM

professionals and focused on the concept of identity and found through their research that Native people draw strength from their identity. Page-Reeves et al. (2017) rejected approaches that emphasized individual failure and weakness. The authors also rejected those comparative perspectives upholding White middle-class values and practices as *normal*. White middle-class values and practices lead to researcher explanations that situate *cultural failure* as the problem (Page-Reeves et al., 2017). Both sets of researchers aimed to create a study that focused on understanding the identities that successful Native STEM professionals bring to their career and practical experience. Page-Reeves et al. (2017) emphasized the importance of researching Indigenous people from an Indigenous lens. Foltz et al. did not touch on Indigenous research in their study but included the perceptions of faculty and staff as part of their database.

Mayes (2014) took a qualitative approach to explore the experiences of underrepresented minority students in an engineering program on a campus with a predominately White and Asian population. The data were collected from interviewing 11 students through personal interviews. Mayes (2014) found that higher education institutions may be looking in the wrong places for answers. Important to focus on the student as the sole unit of analysis in retention and degree completion efforts, as well as addressing racial climate on campuses.

Mixed methods have also been used to collect data on Indigenous students' experiences. Ortiz and Sriraman (2015) conducted a mixed-method study analyzing faculty insights into why undergraduate college students leave STEM fields. Ortiz and Sriraman (2015) explored thought to affect student decisions to persist in STEM fields. Data were collected from online surveys, focus groups, and self-study institutional data. The data indicated that underrepresented groups are not pursuing STEM degrees and looked to remedial measures to fix this problem.

While the data collected by Ortiz and Sriraman (2015) is reliable, it directly contradicts with Mayes' (2014) suggestion that researchers and practitioners focus on the student as the sole unit of analysis. Wilson's (2009) findings and implications were similar to Mayes (2014). When researching Indigenous people, researchers must consider students' personal experiences because faculty and staff insights into what needs to be done to support Indigenous students may directly contradict what the students themselves believe would be effective.

One of the main issues when researching American Indian students is the fact that researchers cannot generalize these students into one size fits all group; whether qualitative or quantitative methods are used there will always be some limitations to the data. These limitations do not hinder the importance of the research; however, limitations leave room for further research to be conducted. Researchers can continue to learn the way American Indian/Indigenous students perceive, operate within, and experience higher education and future research utilizing qualitative designs will enrich American Indian education literature and assist in creating educational policy to support these groups. In addition, when researching the underrepresentation of these groups in higher education, researchers should not only focus on what the institution can do to provide support.

Synthesis of Research Findings

Reviewing the literature discussing Indigenous people's pursuit of higher education, recurring themes focusing on the unique needs of Indigenous people as they attend college was identified. Some of these themes include self-identity, the ability to adapt, academic barriers, campus racial climate, and multicultural support services. Indigenous students, compared to their peers, have to go through personal change and growth in order to gain a sense of belonging in a higher education setting. Bickel and Jensen (2012) created a model that highlights the stages

Indigenous students go through in order to feel like they belong. The bicultural identity formation, model was designed with four constructs or stages, which include: alienation, self-discovery, realignment, and participation (Bickel & Jensen, 2012).

Schooler (2014), like Bickel and Jensen (2012), created the American College Student Transition Theory to address the underrepresentation of Indigenous people in higher education. This theory is called the Native American college student transition theory and focuses heavily on how Native American students transition into higher education environments. Simi and Matusitz (2016) observed that Native American students find difficulty in changing their attachment style and these students often have to learn to adapt a bicultural way of life and grasp White customs while maintaining their Native American values and traditions. Indigenous students have to mold themselves to fit into a higher education environment, whereas their peers do not have to undergo this transculturation in order to be successful.

Mayes (2014) collected data from interviewing Indigenous students in an engineering program at an NNCU and also found that students did not feel like they belonged and had to deal with problems of self-efficacy, microaggressions, and academic barriers. Indigenous students are often ill-prepared for university-level courses and, oftentimes, they struggle to feel like they belong becomes too much (Mayes, 2014). Colleges must address both institutional climate issues as well as the growing achievement gap between Indigenous students and their peers. Indigenous students who feel like they belong are more likely to persist to degree completion and that sense of belonging can be strengthened through a culturally engaging campus (Museus et al., 2017).

Professional Learning Communities have been discussed in the research. Researchers uncovered a positive connection between institutional support and Indigenous persistence in higher education (Lopez, 2017). Windchief and Joseph (2015) discussed the need for Indigenous

students to find or formulate a community on college campuses and recommend students get involved in culturally relevant communities such as American Indian Student Service departments. Chauraya and Brodie (2017) stated that learning is not an individual accomplishment but a participation in a practice that is situated within a community. Learning communities can have a positive impact on Indigenous students and can help combat the feeling of isolation and promote success (Jehangir et al., 2011; Weiss et al., 2015). Research shows that learning communities have a positive impact on student success.

Self-efficacy and outcome expectations are other themes that have been uncovered through the research. Indigenous people are strongly connected to their culture and this connection is challenged when pursuing higher education. Research has found a strong connection between allowing Indigenous people to feel connected to their culture and academic success (Huffman, 2001; Jones-Brayboy, 2005). Garriott et al. (2017) found that self-efficacy and outcome expectations were predictors of engineering persistence expectations, however, self-efficacy did not significantly predict outcome expectations. Research that is focused more on Indigenous populations found that addressing self-efficacy in an educational environment can help Indigenous students feel more capable of success (Keith et al., 2016). Identity and self-efficacy play a vital role in predicting the success of Indigenous people in higher education (Page-Reeves et al., 2017). There is a need for activities and discussions relating to self-efficacy to be incorporated into the educational environment of Indigenous students to improve college success measures (Keith et al., 2016).

Research centralizes around the theme that Indigenous students, both pursuing a STEM degree and not, need specific support from institutions of higher education and need to develop a sense of belonging to be successful. Smith et al. (2014) found a direct correlation between the

failure of Indigenous students and not having a sense of belonging at their institution. Indigenous students pursuing STEM degrees need continued support beyond finding that sense of belonging. STEM programs need to go beyond building excitement and content knowledge but need to put systems of support in place that will help Indigenous students move from one step to the next in their academic career (Dalbotten et al., 2014).

Critique of Previous Research

The articles reviewed centered around the theme that Indigenous students, both pursuing a STEM degree and not, need specific support from institutions of higher education and need to develop a sense of belonging to be successful. None of the researchers considered that Indigenous students can obtain the support and sense of belonging they need from outside the institution. Yatchmeneff (2015) studied the motivations of Alaska Native high school students who participated in the Alaska Native Science and Engineering Program (ANSEP) and found that students who participated in the program were more motivated to take advanced STEM courses prior to college. These studies support the idea that organizations and programs outside of the college environment can also contribute to an Indigenous student's need for support and a sense of belonging. Organizations like AISES and SACNAS offer unique programs and support that often times cannot be found on a college campus, yet these organizations have not been researched. Page-Reeves et al. (2017) conducted research with Native STEM professionals and found that a common factor in the experience of these professionals is the strength of their self-identity as Native people. Self-identity and maintaining the feeling of being Native is something that can be supported by college programs but can also be supported by being members of organizations and programs such as AISES and SACNAS.

Harwood et al. (2018) found that many college campuses promote themselves as integrated multicultural spaces and support diversity in their campus climate. It is difficult for a researcher to study how well colleges are designed to be supportive of diversity and to create an environment that promotes a sense of belonging because every college campus is different, and not all Indigenous people identify themselves the same. Research conducted on the population of one state university does not represent all culturally diverse populations of undergraduates on other college campuses, nor do studies of multiple college campuses (Pewewardy & Frey, 2004). The studies I have critiqued show that Indigenous students who attend colleges that promote cultural diversity may also need additional options to build support systems and to find a sense of belonging within the STEM community. This is crucial to the research of this study, emphasizing the need for Indigenous people serving STEM-based nonprofits and how they contribute to creating a foundation to succeed in STEM education programs and careers.

Chapter 2 Summary

Native American People and Indigenous people alike remain underrepresented in the STEM disciplines (Page-Reeves et al., 2017). Williams and Shipley (2018) attributed the low participation of Indigenous people in STEM disciplines to reasons such as lack of exposure, lack of interest, lack of confidence, lack of a sense of belonging, and lack of goal congruency. Bicultural identity formation model (Bickel & Jensen, 2012) and social cognitive career theory (Charleston & Leon, 2016) are the theoretical concepts driving the conceptual framework or this study. The bicultural identity formation model has four constructs that organize this model, they include alienation, self-discovery, realignment, and participation (Bickel & Jensen, 2012). Charleston and Leon (2016) derived social cognitive career theory from Bandura's (1986)

general social cognitive theory, and their model predicts that self-efficacy promotes favorable outcome expectations.

Pursuing higher education is central to the Native American self-determination and native nation-building concepts; however, Native students must rely on and learn to adapt to non-Native colleges and universities (Tachine et al., 2017). Higher education is an essential tool for capacity building and assisting Indigenous communities to achieve their goals of self-determination and self-government. Understanding the unique needs of Indigenous people leads to positive outcomes in higher education. Institutions and nonprofits can foster success by understanding the unique needs of Indigenous people, which include but are not limited to (a) early academic preparation, (b) positive self-identity, (c) self-efficacy, (d) peer mentoring/positive role models, and (e) transculturation (Tachine et al., 2017).

Based on this review of literature, which develops a unique conceptual framework using bicultural identify formation model and social cognitive career theory to understand the experiences of Indigenous people within an Indigenous STEM nonprofit, there is a significant reason for thinking that an investigation examining the experience of Indigenous people would yield socially significant findings. I can, therefore, claim that the literature review has provided strong support for pursuing a research project to answer the following research question:

RQ: How does a STEM nonprofit contribute to self-efficacy and educational experiences, as perceived by Indigenous STEM graduates?

Chapter 3: Methodology

Introduction to Chapter 3

Chapter 3 includes a detailed description of the methodology used to examine how a STEM nonprofit contributes to self-efficacy and educational experiences, as perceived by Indigenous STEM graduates. Chemers et al. (2011) studied the role of self-efficacy and identity in science career commitment among underrepresented minority students. Additional studies (Williams & Shipley, 2018) have been conducted on the low participation of Indigenous people in STEM disciplines and listed potential factors contributing to this low participation. According to the NACME 2016 annual report, Indigenous people have the lowest representation in STEM professions.

Chapter 3 details the rationale for selecting the method and design, the problem statement, participants, and discusses the trustworthiness of the data. Details of how the study was conducted, beginning with the context of the study are also outlined in Chapter 3. The decisions regarding the overall design, target population, sampling method, data collection method, and data analysis procedure were driven by the research question and are also presented here. Chapter 3 includes limitations, expected findings, and a summary of the ethical issues of this study.

Research Question

RQ: How does a STEM nonprofit contribute to self-efficacy and educational experiences, as perceived by Indigenous STEM graduates?

Purpose and Design of the Study

The purpose of this study was to explore how a STEM nonprofit contributes to self-efficacy and educational experiences, as perceived by Indigenous STEM graduates. The

researcher conducted semistructured interviews with AISES members who self-identify as Indigenous and have graduated with a STEM-based degree since 2015. A focus group was also conducted from the same sample. The study findings may contribute to the literature surrounding postsecondary persistence among Indigenous people in the STEM fields, which may develop into further research or increase the awareness of the impact of Indigenous nonprofits.

Researchers must consider the voices of the people they are studying when making recommendations or creating policies that can directly or indirectly affect the lives of Indigenous people (Datta, 2018; Wilson, 2009). Considering the voices of Indigenous people can remove barriers. Removing barriers can result in an increase in representation in STEM fields, which can help reduce disparity and capitalize on the strengths of ethnic diversity in the United States (Estrada et al., 2017). Indigenous people have the lowest representation in STEM professions (Page-Reeves et al., 2017). Moreover, Indigenous people have difficulty viewing themselves in STEM careers due to cultural barriers, low numbers of Indigenous people in these careers, stereotypic images of scientists, cultural differences and society representing that STEM is not a place for Indigenous people (NACME, 2016; Sharkawy, 2015). Low numbers of Native Americans, Latinos, and African Americans in STEM fields are attributable to several factors that include barriers of cultural, structural, and institutional nature (Fouad & Santana, 2017).

The researcher selected a case study design. The case study was carried out by conducting interviews, a focus group, and a questionnaire. Yin (2018) described a case study as an empirical method that investigates a contemporary phenomenon in depth and within its real-world context. The case study design is flexible, and the researcher has the ability to be as general or as specific as is felt appropriate in order to capture the data adequately. In addition, a study is considered a case study if there are no analytic comparisons between groups and no

attempts to make causal statements. The case study design was most appropriate for this research because the researcher is studying specific phenomena within the Indigenous STEM population.

The central tendency among all types of case studies is to focus on a decision or set of decisions: why the decision made, how the decision was implemented, and with what results (Yin, 2018). Yin (2018) indicated that a researcher would want to conduct a case study to understand a real-world case and that such an understanding is likely to involve important contextual conditions pertinent to the case. A case study design was chosen because the design allows for a real-world understanding of Indigenous people in STEM professions. The case study design was beneficial for this study because the researcher was able to use different tools for capturing the peculiarities of the phenomenon under investigation.

The researcher utilized a qualitative research methodology. Qualitative researchers focus on uncovering multiple realities that are rooted in the subjects' perceptions (McMillan, 2012). Qualitative methodology is implemented to allow the researcher to describe the individual perspectives of the participants (Yin, 2014). Qualitative researchers focus on uncovering an in-depth and detailed understanding of a specific phenomenon based on rich and detailed data; data comes from subjective experiences and perceptions of the individuals sharing their stories (McMillan, 2012). A qualitative methodology was suitable for this study because the researcher explored the study topic through the collection of participants' contextual input.

Research Population and Sampling Method

The general population for this study was Indigenous people who are general members of AISES. AISES defines members as *American Indian*s, which means a person who is a member of any of the Indigenous peoples of North American, which includes American Indians, Alaska Natives, Native Hawaiians, Pacific Islanders, and First Nations (Membership, 2019). AISES has

given the researcher permission to specifically name the AISES as the organization of interest for this study (see Appendix A). The targeted sample for the interviews included self-identifying, Indigenous people who have completed a college degree within a STEM field since 2015 and who were also members of AISES. The focus group sample was comprised of participants from the target sample. Participants were recruited on a volunteer basis and on their availability to participate in a focus group.

Indigenous people have the lowest representation in STEM professions (NACME, 2016). This low representation is in part due to their lack of perception to overcome barriers and society representing that STEM is not a place for Indigenous people (Williams & Shipley, 2018). Foltz et al. (2014) focused on student's experiences, while also interviewing faculty and staff members to triangulate findings, while Page-Reeves et al. (2017) focused on interviewing successful Native STEM professionals. This study focused on interviewing Indigenous STEM graduates who have participated in AISES. AISES membership is open to anyone and is not limited to a specific group of individuals. When registering for AISES membership, members are expected to include their tribal affiliation and list the degree they are pursuing or have completed. Interviewing AISES members who recently graduated may add to the current body of knowledge regarding the experiences of Indigenous people. The target population was representative of Indigenous people who have overcome personal and academic barriers and successfully completed a STEM degree, thus providing relevant information to address the research questions.

Purposive sampling was used in this study. When implementing purposive sampling, the researcher selected participants deliberately based on unique individual characteristics regarding the subject matter under the study (Sangestani & Khatiban, 2013). Sangestani and Khatiban

(2013) noted that purposive sampling is a nonprobability sampling technique in which the researcher uses her or his best judgment based on her or his knowledge of the demographic group. The researcher contacted the AISES Membership Director who assisted with purposive sampling in this study.

The AISES Membership director agreed to identify members that have graduated with a STEM-based degree since 2015 (see Appendix B). AISES Member's contact information was not provided to the researcher due to membership rights to confidentiality. Once members were identified, the membership director contacted participants who meet the study criteria via e-mail detailing the study and asking potential participants to contact the researcher directly with the contact information provided. The researcher progressed to set up interviews with participants in the order they contacted the researcher. The researcher interviewed 10 participants, with seven additional participants for the focus group. No new themes emerged after the 10 interviews and the researcher concluded interviews. Purposive sampling enabled the researcher to select participants with an understanding of the underrepresentation of Indigenous people in STEM fields.

Sources of Data

Yin (2018) indicated that interviews are one of the most important sources of study evidence, primarily because they can help by suggesting explanations of key events, as well as the insights reflecting the participants' perspectives. Interviews are meant to resemble guided conversations rather than structured queries (Yin, 2018). Interviews provide a setting for the study participants to talk about their shared experiences with respect to degree completion and membership within the organization and allowed the researcher to understand the quintessence of their journey.

Interviews. Interviews were conducted face-to-face and in-person when possible. If a participant was unable to meet face-to-face, then the researcher and the participant conducted the interview via Skype. The researcher anticipated participants were spread out across the United States and conducted Skype interviews when traveling to the participants was not an option. Oltmann (2016) implied that most scholars will resort to Skype interviews when face-to-face is not an option. Interviews took between 35 and 60 minutes.

The researcher collected data using semistructured interviews with open-ended questions (see Appendix C). Qualitative researchers utilize semistructured interviews for data collection (Yin, 2018). Semistructured interviews are a valid data collection instrument and open questions allow for greater interaction with participants (Cachia & Millward, 2011). Qu and Dumay (2011) noted that using semistructured interviews allows the researcher to disclose hidden facets of human and organizational behavior because participants respond in the way they can best address the interview question.

Focus groups. Focus groups provide a setting for participants to talk about their shared experiences with respect to the research question (see Appendix D). According to McMillan (2012), the focus group is the most useful technique for encouraging subjects, through their interaction with one another, to offer insights and opinions about a concept, idea, value or other aspects of their lives about which they are knowledgeable. Liamputtong (2009) wrote that the primary aim of a focus group is to describe and understand meanings and interpretations of a select group of people to gain an understanding of a specific issue from the perspective of the participants of the group. In order for a focus group to be successful, a permissive, non-threatening environment where the participants can feel comfortable to discuss their opinions and experiences without fear of being judged must be established (Liamputtong, 2011).

Questionnaire. The researcher created a questionnaire in Qualtrics that was issued to interview and focus group participants. The questionnaire focused primarily on demographic information but also determined participation in AISES beyond degree completion. The questionnaire discussed participants' involvement with AISES and tribal communities beyond completing a STEM degree and allowed the researcher to gain further insight into the participants' educational experience and beyond.

Member checking. The researcher applied member checking in this study. Houghton, Casey, Shaw, and Murphy (2013) noted that membership checking assures rigor in case studies. Culver, Gilbert, and Sparkes (2012) detailed that member checking provides an opportunity for a researcher to seek participants' verification of the accuracy of interview response. Member checking allows the researcher to use a form of quality control to confirm, clarify, and augment data collected during qualitative research interviews (Harper & Cole, 2012). The researcher provided participants with a summary of the overall findings. The participants were asked for feedback and verification that the viewpoints collected from the data were accurately documented.

Field test. Prior to conducting an interview, the researcher conducted a field test with four individuals who are AISES members and have graduated with a STEM degree. The participants were selected through a professional contact and did not directly represent the data sample in order to keep potential participants available if needed. The field test participants were not included in the study. Participants in the field study are utilized to practice the interview process and make notes about research questions. The researcher should practice the interview process with other research participants who are not involved in the study (Ranney et al., 2015). Bender and Hill (2016) wrote that a field test can be valuable to a researcher in improving clarity

and focus, ensuring that any underlying values or assumptions will not transfer into the research setting or the study. The researcher discussed with the participant the wording of the questions and ask if any of the questions are confusing or unclear. The researcher determined that no changes were needed to the research questions.

Data Collection

The first step in gathering data was to obtain permission from the Concordia University–Portland Institutional Review Board (IRB) and the AISES Board of Directors. Participants were gathered from AISES membership and this study directly mentions the organization, so permission was needed. The AISES Membership director agreed (see Appendix B) to identify members that have graduated with a STEM-based degree since 2015. Due to membership confidentiality, member information was not provided to the researcher or included. Once members were identified, the membership director contacted these members via e-mail, detailing the study and asked potential participants to contact the researcher directly with the contact information provided. A recruitment flyer was used to detail the study and recruit participants (see Appendix E). The researcher then progressed to set up interviews with participants in the order they responded.

The interviews began with the signing of an informed consent form from all persons who volunteered to participate in the study (see Appendix F). Each participant was advised in writing that participation is completely voluntary and that he or she was able to leave the study at any time. A demographic questionnaire was completed by each participant (see Appendix G). Upon completion, the researcher began with a greeting, formally introducing himself as an Indigenous researcher in order to establish a relationship of trust and understanding between himself and the participants. Once the researcher established a relationship with the participants, the researcher

requested permission to auto-record the interview. The researcher reviewed the purpose of the study with the participants and began asking the interview questions following an interview protocol (see Appendix C). As the primary data collection instrument, the researcher listened precisely, made eye contact, asked questions if responses need further clarification and avoided being judgmental or bias.

Interviews were conducted face-to-face via Skype and lasted approximately 30 to 45 minutes. The interviewee determined the place and time of the interview that was most comfortable for them. The goal of the researcher was to satisfy the needs of the line of inquiry while simultaneously putting forth friendly, non-threatening, but relevant questions (Yin, 2018). Yin (2018) wrote that asking the same interview questions to different participants allows for a diverse range of answers and interactions. The third step for data collection involved the interviewer repeating the main topics discussed during the interview to ensure the researcher recognized the topics of discussion. In addition, once the data were analyzed, the participants received a follow-up contact to verify if the ideas expressed during the interviews were a true representation of their perspectives.

Initiating the fourth step of data collection, the researcher contacted volunteering participants via a Doodle poll asking them to select available times they were able to participate in a focus group. The focus group consisted of seven participants who did not participate in interviews and was conducted via Skype. The study is stronger by not including interview participants in the focus group. Participants signed informed consent prior to participating in the focus group. The focus group began with a greeting, formally introducing the researcher as an Indigenous researcher in order to establish a relationship of trust and understanding between the researcher and the focus group. Once a relationship was established with the participants of the

focus group, the researcher requested permission to auto-record. The researcher reviewed the purpose of the study with the participants and began asking the interview questions following a focus group interview protocol (see Appendix D). As the primary data collection instrument, the researcher listened precisely, made eye contact, ask questions if responses need further clarification and avoid being judgmental or biased.

Identification of Attributes

The method of data collection was designed to explore the connection between STEM graduate perspectives, focus group perspectives, questionnaires and how they correlate. The interviews and focus group were focused on the perceptions of recent STEM graduates that were members of the organization and have graduated with a STEM degree since 2015. The study was defined by two primary attributes.

The first attribute is self-efficacy; when reviewing scholarly studies, a correlation between self-efficacy and positive outcome expectations was discovered. Charleston and Leon (2016) developed the social cognitive career theory, which predicts that self-efficacy promotes favorable outcome expectations. Fouad and Santana (2017) found that self-efficacy is a useful concept when researching Indigenous people pursuing higher education in STEM fields.

The second attribute is identity. Horse (2005) stated that Native American identity is multifaceted and includes the legal and political status of American Indians/Native American people. Researchers who are attempting to study the Indigenous people in higher education must first consider their identity with, how it is formed, and the effects identity has on pursuing a degree and career in STEM. Understanding that American Indian/Native American people have been and still are part of the oppressed population in the United States is important to understanding their identity (Horse, 2005).

Data Analysis Procedures

Data analysis allows the researcher to make sense of what they have seen, heard, and read and to analyze the collected data for interpretation. Throughout this study, the researcher used the purpose of the study and the research questions as a guide during data collection and data analysis. This case study addressed the following research question:

RQ: How does a STEM nonprofit contribute to self-efficacy and educational experiences, as perceived by Indigenous STEM graduates?

Analysis within a qualitative case study involved the researcher thoroughly describing the case and the special conditions of the study, which was accomplished from the combination of several procedures. According to Yin (2018), a case study researcher has no set formula, recipe, or software like statistical analysis that will produce the outcome from the data. Data must be studied first for the emergence of meaningful patterns or themes. Yin (2018) described pattern matching as one of the most desirable techniques used by researchers, which makes it the most relevant type of coding for this study.

Patterns that emerged for this case study related to the "how's" and "why's" of the research question. Saldaña (2013) described a code in qualitative inquiry as a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data (p. 3). Interviews and focus groups were recorded using Rev.com, Inc. recorder and transcription app for iPhone XR. The textual data collected from participants were then be entered into Dedoose, a data management software, for the initial set of codes that were derived from the words and phrases transcribed from each participant's recorded interview and focus group session.

Saldaña (2013) suggested dividing coding methods into two main sections: First Cycle and Second Cycle coding methods. This study implemented in vivo coding as the First Cycle method of coding due to the use of the participants' own language (Saldaña, 2013). Saldaña (2013) observed that the in vivo coding method may be used for most qualitative studies but is especially useful for newer qualitative researchers just beginning to code data. The researcher chose to follow Saldaña's (2013) recommendations and code in two cycles in order to get familiar with the participants' language, beliefs, and attitudes. The second cycle coding was also used in this study following the pattern matching method for codes for specific patterns.

Saldaña (2013) explained that a researcher should expect to code, recode, and recategorize the data in order to refine the codes and categories. This was done utilizing Dedoose. The researcher determined through the coding process that the first cycle should be relabeled, rearranged, or even dropped during the second cycle coding process. The researcher did not find that pattern matching alone proved the best method for data analysis.

Interview data, focus group data, and the demographic questionnaire data were analyzed through the lens of social cognitive career theory and bicultural identity formation model. Data triangulation is the process of utilizing data from a variety of courses by applying a variety of sampling strategies (Denzin, 2012). Data triangulation was implemented by utilizing various sampling strategies, collection of data at different times, and in different social situations on a variety of people (Graue, 2015). Triangulation helps the researcher avoid the use of intuition and subjectivity in data interpretation (Flick, 2007). Data triangulation was employed in this study to increase the reliability of data.

Limitations of Research Design

Qualitative research designs are not without limitations. The primary limitation that affected this study was the ability of the researcher to stay unbiased during the data collection and analysis portion of the study. Another limitation of the design is the small number of participants who are all members of the organization being studied. This study relies on participants' experiences and findings to compare how participants perceive the organization's usefulness in supporting Indigenous people. Another limitation was the lack of an external evaluator. The researcher focused on question articulation, and the study included member checking to ensure the unbiased interpretation of data.

Validation

Credibility. McMillan (2012) declared that credible qualitative studies utilize detailed, in-depth, thorough, and extensive descriptions that contain an abundance of detail. Written descriptions of the researchers' interpretations and quotes from the individual interviews enhanced credibility by indicating substantial engagement with the data and respect for the value of the information being presented (McMillan, 2012). Yin (2014) noted that reliability in research ensures that another researcher who is investigating a similar case and utilizing the same research method would arrive at the same conclusion. The objective of a qualitative researcher is to establish credibility in their work. McMillan (2012) stated that asking participants to review interpretations and conclusions in order to confirm the findings is member checking. At the conclusion of the study, the results and summaries of data were made available without identifying information linking participants to the research. These summaries were provided to the study participants to review for accuracy, thus accomplishing member checking.

This study included data triangulation and member checking to assure accuracy and credibility. Triangulation was implemented through the provision of evidence through focus groups, interviews, and archival documents. Triangulation helps the researcher avoid the use of intuition and subjectivity in data interpretation (Flick, 2007). Data triangulation is the use of different sources of data as distinct from using different methods in producing that data (Denzin, 2012). This study involved collecting data from different sources such as general AISES members a questionnaire. Data were also collected using different methods specific for each source, such as focus groups, interviews, and a questionnaire. Denzin (2012) distinguished data triangulation in different ways; Denzin suggested studying the same phenomenon at different times, places and with different people. This study included different methods, at different times, and with different people. The study followed a purposive and systematic selection and integration of persons, populations, and settings.

Dependability. Data saturation is a key element in ensuring credibility in qualitative research (White, Oelke, & Friesen, 2012). Given (2008) described data saturation as the point in data collection when no new or relevant information emerges. After interviews with 10 participants, there was no new information that emerged in relation to the research topic and data saturation was achieved. Data saturation was reached in focus groups through continuing the discussion until no new themes emerged.

Expected Findings

Through the literature review, a reader can ascertain that many efforts are being made by colleges and universities to support postsecondary persistence in STEM fields (e.g., Guillory, 2009; Patterson et al., 2017). Self-efficacy and outcome expectations were also found to influence the development of individual career interests and career choices in Indigenous

students (Fouad & Santana, 2017). In addition, other researcher discusses professional and learning community networks as a positive resource for Indigenous people (Lopez, 2017). The results of this study added depth to available research by providing a richly detailed portrayal of how Indigenous STEM nonprofits promote self-efficacy and postsecondary persistence in Indigenous people. Although these results are not generalizable, they act as an impetus for future researchers to conduct similar inquires on AISES or other similar organizations.

Ethical Issues

Ethical issues can arise regardless of the approach to qualitative inquiry in all stages of the research process (McMillan, 2012). Ethical issues can unfold when a researcher becomes more sensitive to the needs of the participants and the study sites. A researcher must be able to recognize and address ethical issues involved more than obtaining permission and approval from an IRB. Human subjects of this study were protected from harm by maintaining privacy and confidentiality throughout the process. Additionally, obtaining informed consent assisted with protecting human subjects in this study as they become aware of the parameters of their involvement in the study during the consent process. According to McMillan (2012), a researcher must convey honesty and trust by providing disclosure of the purpose of the study in order to minimize ethical issues. Furthermore, implementing member checking by providing the participants with the researchers' interpretations and quotes from the individual interviews and focus groups is a valuable tool for addressing potential ethical issues (Harper & Cole, 2012). The ethical issues addressed during the process of this study included a conflict of interest assessment, identification of the researcher's position to the study, and the possible ethical issues in the study.

Conflict of interest assessment. As a lifetime member for the AISES, this research inquiry was personally driven by the need to prove how Indigenous people serving STEM-based nonprofits like AISES are beneficial to the success of Indigenous people pursuing STEM degrees and careers. Many members of these organizations believe in maintaining relationships within and giving back to their communities and focusing this dissertation topic on organizations like AISES is my way of giving back to my community, and to the organization that paved the way for my success in higher education. Having a strong belief in the purpose and potential impact of this research is what lead the researcher to pursue this topic.

Researcher's position. Researchers must identify themselves in relation to the research topic. Indigenous research methodologies state the importance of research done on Indigenous people by Indigenous people (Datta, 2018; Wilson, 2009). The insider perspective may provide a common understanding between the participants and the researcher that encouraged the participants to openly share their experiences without fear that their words would be misrepresented in this research. Member checking ensured the unbiased interpretation of data. Research conducted on Indigenous people has often been to serve the advancement of the politics of colonial control and often Indigenous people will regard Western research with apprehensions and mistrust (Datta, 2018; Wilson, 2009). Wilson (2009) noted that Indigenous scholars make research more visible and beneficial to the community because they are deciding what needs to be studied and include beliefs, customs, and values into the research process. This research was carried out by an Indigenous researcher on Indigenous perspectives, which made the participants more willing to invite the researcher into the dimensions and nature of the experience (Datta, 2018; Wilson, 2009).

Ethical issues in the study. To ensure ethical research, the research proposal was submitted for approval to Concordia University–Portland's IRB prior to beginning data collection. Each participant signed an informed consent document congruent with Concordia University's IRB requirements prior to the individual interviews and focus groups. Chiumento, Khan, Rahman, and Frith (2015) noted that informed consent protects and respects the rights of participants to ensure the study follows ethical standards. The informed consent form addressed, in writing, the conditions related to the participation in this research study, and participants were made aware of the duration of the potential risks centered on confidentiality. Research participants did not receive any incentives, payment, or rewards for participating in the study and participation was strictly voluntary. The participants were protected through confidentiality and if direct quotations were utilized participants were identified with a designated codename and all data were stored on a private computer. All collected data, including questionnaire results, recorded interviews, and transcripts were stored in a secure location throughout the study and will be destroyed after three years. Printed transcripts were stored in a locked file cabinet in the researcher's office and will also be destroyed after three years.

Chapter 3 Summary

The number of Indigenous people attending college, graduating, and pursuing graduate degrees has increased over the past 25 years, but yet there is still a dramatic underrepresentation of Indigenous people in the STEM field (Page-Reeves et al., 2017). The goal of this qualitative case study was to explore how Indigenous STEM graduates perceive how a STEM nonprofit has contributed to their self-efficacy and educational experience.

Participants were recruited through the organization being studied. The AISES Membership director agreed to contact potential research participants to schedule interviews.

Data collection methods were conducted using interviews, focus groups, and a questionnaire. The data were analyzed utilizing in vivo coding and pattern matching coding techniques with Dedoose software. The study findings may contribute to the literature surrounding postsecondary persistence among Indigenous people in the STEM fields, which may develop into further research or increase the awareness of the impact of Indigenous nonprofits. The next chapter reveals the data findings of the phenomenological study, including data collected from face-to-face interviews.

Chapter 4: Data Analysis and Results

Introduction

The purpose of this study was to explore how a STEM nonprofit contributes to self-efficacy and educational experiences, as perceived by Indigenous STEM graduates. This study is based on the framework of Charleston and Leon's (2016) social cognitive career theory and Bickel and Jensen's (2012) bicultural identity formation model. Charleston and Leon (2016) predicted through social cognitive career theory that self-efficacy promotes favorable outcome expectations. Bickel and Jensen's (2012) bicultural identity formation model suggested that in order to adapt, students go through four stages of feelings and development, which include alienation, self-discovery, realignment, and participation. These theories suggest that if an Indigenous student cannot undergo a form of transculturation or immersion along with positive self-efficacy, then these students may not persist to degree completion. This study addressed the following research question:

RQ: How does a STEM nonprofit contribute to self-efficacy and educational experiences, as perceived by Indigenous STEM graduates?

The perceptions of Indigenous STEM graduates can increase further representation in STEM fields, which can help reduce disparity and capitalize on the strengths of ethnic diversity in the United States. Exploring the perceptions of Indigenous STEM graduates directly allows their stories to be told and provides examples of how Indigenous nonprofits affected their lives.

In this chapter, the presented data and summary fully address the research question. The instruments used in this study include a questionnaire, interviews and a focus group. The questionnaire was used to determine the participants' involvement in their community, demographics, and identity. Face-to-face Skype interviews and a focus group were conducted to

answer the research question. The findings of this study highlight the importance of Indigenous STEM nonprofits, such as AISES, and how they contribute to self-efficacy and educational experiences of Indigenous students. The study findings may contribute to the literature surrounding postsecondary persistence among Indigenous people in the STEM fields, which may develop into further research or increase the awareness of the impact of Indigenous nonprofits. The findings support the assumption that Indigenous nonprofits have a direct impact on the self-efficacy and educational experiences of Indigenous STEM graduates.

Description of the Sample

The data for this study was collected over a period of one month from 17 Indigenous STEM graduates through one-on-one semistructured interviews, a Qualtrics questionnaire, and a focus group. The focus group and interviews were conducted via Skype, as the participants were located throughout the United States. The study began after receiving approval from the University's Institutional Review Board (IRB) and the AISES Board of Directors and concluded in December 2019 with the focus group.

Study participants were chosen through purposive sampling. The participants were identified and contacted by the AISES Membership director via email utilizing a recruitment flyer (see Appendix E). Participants who agreed to participate in the study contacted the researcher via email and scheduled an interview, with the final seven volunteers participating in the focus group. The first 10 volunteers participated in a one-on-one interview session, while the remaining seven volunteers participated in the focus group. Each individual interview was recorded and transcribed immediately after the interview. Interviews were completed in December 2019.

The Qualtrics questionnaire was self-designed to develop a better understanding of the participants' participation in their community and AISES. The questionnaire also collected data that was used in connection to identity and demographic information. The questionnaire was issued and completed by the participant prior to interviews or the focus group. The questionnaire allowed the researcher to gain further insight into the participants' experience that may not have been directly shared in interviews or the focus group.

A sample of 17 participants resulted from purposive sampling. Study participant demographic information was collected through a Qualtrics questionnaire and yielded information regarding participant tribal affiliation, alma mater, title, age, sex, degrees obtained, and employment status. Demographic information is presented in Appendix H. The sample of 17 included 13 female participants and four male participants. Total years of AISES participation ranged from two years to over 18 years of membership in the organization. Participants were asked about their Tribal Affiliation with the following tribes being represented:

- Dine'/Navajo Choctaw
- United Keetoowah Band of Cherokee Indians
- Cherokee Nation
- Three Affiliated Tribes
- Yurok Laguna Pueblo
- Crow Creek Sioux Tribe
- Seneca Nation
- Native Village of Kotzebue
- White Earth Ojibwe
- Nimiipuu (Nez Perce)
- Lac Courte Oreilles Band of Chippewa

Interview and focus group protocol was used to gather raw data from study participants (see Appendices C and D). Identities of study participants were kept confidential unless participants choose to name themselves in the focus groups when speaking. Participants will be referenced in this study by a unique participant number associated with their data (P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P 11, P 12, P13, P14, P15, P16, P17).

Research Methodology and Analysis

The single case study methodology was used in this study to gain a better understanding of how a STEM nonprofit contributes to self-efficacy and educational experiences as perceived by Indigenous STEM graduates. The following research question guided this study:

RQ: How does a STEM nonprofit contribute to self-efficacy and educational experiences, as perceived by Indigenous STEM graduates?

Qualitative research was employed in this study as it allowed the researcher to describe the individual perspectives of the participants (Yin, 2014). The researcher is exploring the study topic through the collection of the participants' contextual input, which made qualitative research the most suitable for this study. The study examined perceptions of Indigenous STEM graduates on how a STEM nonprofit contribute to self-efficacy and educational experience. Self-efficacy and educational experience was the central phenomenon that the researcher explored for deeper understanding.

Data were analyzed based on the researcher's data analysis procedure detailed in Chapter 3. The first step was data collection. The researcher then printed transcripts from the interviews and focus groups and begin the first cycle of coding, which included highlighting the main point, ideas or topic the participant mentioned, identifying categories from these highlights, combining and eliminating categories and generating themes. These major themes related to the research question. The researcher applied these themes into Dedoose as parent codes (theme) and created daughter codes, which were then applied to under each of the major themes based on commonalities. Each theme (parent code) had corresponding codes (daughter codes) that help establish the themes present in the data. The researcher then performed second cycle coding and further coded the data in Dedoose.

The researcher interpreted the data for patterns and meaning by comparing the findings with information gathered from previously reviewed literature and theories. This comparison allowed the researcher to develop questions that need to be asked in the future and to make recommendations to Indigenous scholars and higher education institutions. The following sections provide greater detail of the steps the researcher used for data collection, coding, theme development and interpretation throughout the study.

Interviews. A field test was conducted in person with four Indigenous STEM graduates who had participated in AISES prior to 2015 to discover and recognize any weaknesses or errors in the interview protocol, process, and design. The four participants in the pilot study were selected based on the fact that they would not be eligible to participate in the study due to their graduating with a STEM-based degree prior to 2015 and therefore would not limit recruiting for this research. The researcher found no weaknesses or errors in the interview protocol during this field test and proceeded with the recruitment of research participants.

The interview protocol was applied to each of the 10 interviews. Participants who volunteered for the study and scheduled an interview were asked to complete the online Qualtrics questionnaire and consent form prior to the interview. The participants were made aware that data would be analyzed, and a summary of the overall findings would be provided to them once completed. Following data analysis, the participants were asked for feedback and verification that the viewpoints collected from the data were accurately documented.

Each interview was conducted face-to-face via Skype and was scheduled based on the participants' availability. A time block of 60 minutes was scheduled for each interview; however, the average interview lasted 37 minutes. During the interviews, the researcher took handwritten notes of emerging themes that were identified to better understand the phenomenon

and to keep the researcher's own perceptions out of the data. Through the interview protocol, each study participant was able to draw upon their personal experiences to add to the body of data collected. This design was intended to provide insight from each of the participants' perceptions of the contributions of an Indigenous STEM nonprofit on their self-efficacy and educational experience.

The interview protocol consisted of 14 open-ended questions (see Appendix C) designed to explore the participants' thoughts and perceptions of the contributions of AISES. Each participant had a unique view of the phenomenon and the connection between AISES and their self-efficacy and educational experience. The semistructured interviews were conducted with minimal disruptions. All interviews were recorded and transcribed by Rev.com, Inc. recorder and transcription app for iPhone XR. The Rev.com, Inc. recorder was paused during interruptions and resumed recording when the interruption had ended. Participants were able to answer questions without losing their train of thought and were given time to gather their thoughts when needed.

Focus group. Upon completion of the individual interviews, one focus group was convened. The focus group consisted of the remaining study volunteers after 10 interviews were completed. The list of participants was created through purposive sampling, and participants were scheduled based on the order they contacted the researcher. The focus group participants were not the same participants as individual interviews in order to enrich the data. Seven participants agreed to participate in the focus group and a date and time were established by the researcher. All seven volunteers were able to make the focus group meeting and participate.

The focus group was conducted via Skype and a time frame of 120 minutes was set aside for the focus group, with the focus group lasting 1 hour and 52 minutes. Like the individual

interviews, the focus group was recorded and transcribed by Rev.com, Inc. recorder. 10 transcribed interview files and 1 transcribed focus group file was exported to Word format and printed. Interview and focus group files from word were also uploaded into Dedoose. 17 Qualtrics surveys were exported into Excel format and were uploaded to Dedoose as descriptors and were linked to the interview files of participants. Focus group participants were made aware that data would be analyzed, and a summary of the overall findings would be provided to them once completed. Following data analysis, the participants were asked for feedback and verification that the viewpoints collected from the data were accurately documented.

Analysis. The researcher read manually and coded each of the 11 printed transcription files carefully using personal judgment and context as critical factors in organizing and analyzing the data. Saldaña (2013) asserted that the in vivo coding method is useful for newer qualitative researchers wanting to get familiar with the participants' language, beliefs and attitudes. The first cycle (in vivo coding) began with the researcher analyzing and highlighting the text based on word use, definitions of words and for the main topic of paragraphs. Coding is subjective, and there are many different ways to interpret the data. The researcher focused on a personal understanding of the data and context to explore and discover emerging themes and patterns and coded them based on the participant's own language. Once all transcripts were highlighted, the researcher pulled the highlighted topics out of the data and created categories based on their meaning. Once categories were identified the researcher compiled these categories into a word document and combined or eliminated categories as needed. After the first coding cycle, there were still a large number of categories. These categories were further condensed into major themes and codes related to the research question.

Five primary themes emerged from the data: (a) Community, (b) Culture, (c) Support, (d) Opportunities, and (e) Representation. The researcher also discovered through coding that each of these five primary themes had specific codes that fit within each theme. Table 1 illustrates the results of the interviews and focus group and how the themes and codes were grouped.

Table 1.

Themes and Codes

Theme	Code
Community	Mentor/Mentorship
Culture	Culturally Specific Groups
	Identity
	Indigenous Knowledge
	Values/Goals
Support	Indigenous Society
	Membership
Opportunities	AISES
	Funding
	Internship
	Leadership
	Lighting the Pathway
	Networking
	Research
Representation	Confidence
	Empowerment

In the second coding cycle (pattern matching), the researcher applied the themes into Dedoose as parent codes and the codes as child codes. Throughout this cycle, the researcher manually read the transcripts on Dedoose and applied child codes and parent codes to excerpts of the data as they appeared. This cycle of coding allowed the researcher to begin to make connections between the data and the codes, finding patterns where the themes and codes were

used congruent and applying meaning to these patterns. Social cognitive career theory and the bicultural identity formation model were used in generalizing constructs and theories to make sense of the complex and rich data collected. This comparison allowed the researcher to develop questions that need to be asked in the future and to make recommendations to Indigenous scholars and higher education institutions.

Summary of the Findings

This case study explored the perceptions of Indigenous STEM graduates on how Indigenous nonprofits contributed to their self-efficacy and educational experience. Once all data were collected and analyzed, five significant themes emerged from the repeated code words. A representation of themes, the code words used to develop the theme, and the number of mentions is in Table 2.

Table 2.

Themes, Codes, and Mentions

Theme	Code	Number of mentions
Community	Mentor/Mentorship Find that community	181
Culture	Identity Indigenous Knowledge Values/Goals Culturally Specific Groups	312
Opportunities	AISES Funding Internship Leadership Lighting the Pathway Networking Research	411
Representation	Confidence Empowerment	88
Support	Indigenous Society Membership	102

Note. The themes were mentioned by every participant in the study, the number of mentions is based solely on the number of times the theme was represented/mentioned in the study.

The themes that emerged were community, culture, opportunities, representation, and support. Each theme had specific codes that were applied as daughter codes that helped identify when a theme was being referenced. Codes combined for community were mentor/mentorship, and "find that community." The codes combined for culture were culture, identity, Indigenous knowledge, values/goals, and culturally specific groups. The codes combined for opportunities were opportunities, AISES, funding, internship, leadership, lighting the pathway, networking, and research. The codes combined for representation were confidence and empowerment. The codes combined for support were support, Indigenous society, and membership. Community was

mentioned 181 times, culture was mentioned 312 times, opportunities was mentioned 411 times, representation was mentioned 88 times, and support was mentioned 102 times. Each theme was addressed by all 10 interview participants and through the focus groups.

Presentation of the Data and Results

Data from this study included interviews, a focus group, and a questionnaire. The data and analysis of the results are presented in this section. Following the social cognitive career theory and bicultural identity formation model, the presentation of data and results are guided by the study participants' perceptions as Indigenous STEM graduates. Interview and focus group transcripts were analyzed and coded to produce data for this research. In total, the researcher identified 5 themes from the analysis of the collected data, with 17 codes that helped further develop the themes. Patterns identified in this process demonstrated commonalities between the study participants' perspectives. Data and results will be presented based on questionnaire responses and themes that emerged from coding patterns.

Questionnaire. Each of the 17 participants participated in a Qualtrics questionnaire prior to participating in their respective data collection method. The questionnaire was designed to focus on demographic information and to determine participation in AISES beyond degree completion. The questionnaire also questioned the participant's involvement with tribal communities in order to gain further insight into their identities. Study participant demographic information was collected through a Qualtrics questionnaire and yielded information regarding participant tribal affiliation, alma mater, title, age, sex, degrees obtained, and employment status. Demographic information is presented in graph form (see Appendix H).

Social cognitive career theory focuses on the interrelationships among individual environmental and behavioral variables that are assumed to influence a students' academic and

career choices. The questionnaire asked participants the current employment status, years in their position, if they planned to continue their education, and if they contribute to their tribal community in any way (see Table 3).

Table 3

SCCT Questionnaire Data

Participant	Employment Status	Years in position	Plan to continue education	Contribute to tribal community
P1	Ph. D. Student	-	Yes	Yes
P2	Employed	2	Yes	Yes
P3	Unemployed	-	No	Yes
P4	Employed	3	Maybe	Yes
P5	Employed	1	No	Yes
P6	Student	-	Yes	Yes
P7	Employed	1	Yes	Yes
P8	Employed	2	Maybe	Yes
P9	Employed	3	Yes	Yes
P10	Employed	6 months	Yes	Yes
P11	Employed	1 year	Maybe	Yes
P12	Employed	10 months	Maybe	Yes
P13	Student	-	Yes	Yes
P14	Employed	Just started	Yes	Yes
P15	Ph. D. Student	-	Yes	No
P16	Employed	<1 year	No	No
P17	Unemployed	-	Yes	Yes

Data collected from this questionnaire helped the researcher apply meaning to the themes and patterns that emerged from interviews and the focus group. As shown by Table 4, 65% of study participants have found employment after completing their STEM degrees. Furthermore, 24% of the study participants who are not employed are still considered students, working on obtaining another degree beyond that of their last. The final 11% of participants remain unemployed; P3 mentioned difficulty finding work in academia as the reason, while P17

mentioned applying to medical school to continue education. When referencing community involvement, 88% of study participants answered that they were involved in their tribal communities in some way. Data presented from this questionnaire help the researcher with proving the validity of results by showing connections between participants' interview responses and questionnaire answers. Additionally, involvement in tribal communities shows connections between identity, culture and community, which will be discussed in chapter 5.

Interviews and focus group. The themes of community, culture, opportunities, representation, and support emerged from the data obtained from interviews and a focus group. Each of the 14 interview questions was analyzed for frequently used words to uncover codes and themes in the data. Codes appeared in each question that contributed to the overall data for this research. The following section presents the data by themes.

***Theme 1: Community*.** The theme for community emerged from the codes of community, mentor/mentorship, and find that community. When coding for community, a majority of the codes came directly from the mention of the code community, which was mentioned 122 times. The subtheme mentor/mentorship was mentioned 59 times throughout the interviews and focus groups, which came to a total of 181 mentioned for the theme community. Although all study participants addressed community directly, only eight interview participants mentioned the code mentor/mentorship. The study participants that directly referenced the code mentor/mentorship were P8, P9, P11, P13, P14, P15, P16, P17 and in the focus group. The theme community was mentioned with various meanings and references, which will be discussed in chapter 5.

Focus group participant P4 discussed a connection between community, support, and culture stating: "I just wanted to say I think community is a big part in these groups, native people have the talent of wherever we go, finding out community." Another focus group

participant discussed a connection between AISES, mentorship, and community. Focus group participant P1 stated: “I don’t think I would be doing my Ph.D. without the mentors who I’ve met through AISES, pushing me and challenging me, and saying that we need more natives in academia, and you can do this.” Focus group participants often mentioned the importance of mentors and community to their success; often finding both through AISES. Focus group participant P2 stated:

> I remember I just wanted to join a club that has natives in it and wanted to have that community, and then I found out that there was the science native community and I was like, “Oh yeah, this is definitely like the real deal.”

Interview participant P14 discussed her need for a community by stating: “It was key to find the community or the need of community that I felt like I belonged and people with the same, what it, goals in mind, like obtaining a degree.” While another participant P15 found a connection between AISES, community, and mentorship stating “everyone you interact with has some other mutual connections through them and through AISES and its proof that AISES has done a really good job connecting people and keeping this strong knit community.” Some participants mentioned mentor/mentorship building through community connections. Participant P17 stated, “I know several times it [AISES] helped me network and get acquainted with people that count point me in the direction of doing internships or research with them.”

***Theme 2: Culture*.** The theme for culture emerged from the codes of culture, culturally specific group, identity, Indigenous knowledge, and values/goals. When coding for culture, a majority of the codes were linked to the mention or discussion of identity, which was referenced 149 times out of the 312 times culture was mentioned. Table *4*4 shows the number of times each

specific code was mentioned regarding the theme culture and number of participants referencing each code.

Table 4

Culture Codes

Code	Number of mentions	Number of study participants
Culturally Specific Group	65	10
Identity	149	10
Indigenous Knowledge	23	6
Values/Goals	68	10
Culture (alone)	7	10

Note. Codes are represented in the first column. The number of times the code was mentioned is represented in the second column. The number of study participants who mentioned the code is represented in the third column. Column three does not include focus group participants, all codes were mentioned in the focus group.

The codes culturally specific group, identity, values/goals, and culture (alone) were mentioned by all interview participants and in the focus group. Indigenous knowledge was mentioned by study participants P8, P10, P11, P14, P15, and P17. The theme culture was often uncovered when the participants were answering interview questions regarding identity, so it is no surprise to the researcher that identity was a code for culture.

Focus group participant P4 discussed the connection between identity, culture, community and culturally specific groups stating:

> It (educational experience) has really shaped my identity in that, now we have the opportunity to be. . . . Like they have mentioned, native scientists, to be a part of organizations that strengthen our cultural ties in our cultural communities and our traditions. This is very special. I feel very lucky that I was given this opportunity.

Focus group participant P5 discussed experiencing a connection between Indigenous knowledge and science at an AISES conference mentioning and this connection allowed for a convergence of culture and science. Participant P5 stated,

> I was pretty interested in STEM already, before coming to AISES, but I will say that I think that when I went to the AISES conferences, it was the first time that I ever saw Indigenous kind of thinking in a scientific space. So, I think that in that regard it did increase my interest in being able to better merge the two worlds.

Participant P13 discussed the connection between AISES and culture stating, “So, I think having the opportunity to learn about my culture and being around other like-minded individuals and I guess learning Cherokee traditions from other members, I don’t think I would have gotten those opportunities elsewhere.” While participant P10 found a connection between culture and identity stating, “To me, that is really important for our culture identity because we have things here that help remind us that the power and that strength of where we come from and the language we had.” Interview participant P14 found pride in her identity through educational experience but having to sacrifice some Indigenous knowledge for that experience. Participant P14 stated:

> It (educational experience) made me feel more pride and made me feel more interested in learning more about where I came from, and what I can learn from the elders, because there is that balance that you have to take leaving home to learn more about the sciences, or going to get your degree, but you're also sacrificing, leaving the wisdom and knowledge that the elders have to offer, so there was that balance that you had to create, and it made me feel proud that I come from such a background. And sure, it may have put me at a disadvantage because I didn't get the best education in high school, but it made

me feel proud because I can come back from having that lack of education in high school and, building upon that, growing in college and defeating the odds.

***Theme 3: Opportunities*.** The theme opportunities emerged from the codes AISES, funding, internship, leadership, lighting the pathway, networking, and research. When coding for the theme opportunity, a majority of the codes were linked to the code AISES, which was referenced 179 times out of the 411 times opportunities was mentioned. The theme opportunities was the most referenced theme out of all five themes present and had the most code applications for it. Table 5 shows the number of times each specific code was mentioned regarding the theme opportunities and the number of participants referencing each code.

Table 5

Opportunities Codes

Code	Number of mentions	Number of study participants
AISES	179	10
Funding	36	10
Internship	28	6
Leadership	30	7
Lighting the Pathway	9	2
Networking	120	10
Research	62	7

Note. Codes are represented in the first column. The number of times the code was mentioned is represented in the second column. The number of study participants who mentioned the code is represented in the third column. Column three does not include focus group participants, all codes were mentioned in the focus group.

The codes AISES, funding, and networking were mentioned by all interview participants and in the focus group. The code Internship was mentioned by participants P8, P9, P11, P14, P15, and P17. The code leadership was mentioned by participants P9, P10, P11, P13, P14, P15,

and P16. The code lighting the pathway was mentioned by participants P8 and P11 but was referenced multiple times in the focus group. The code research was mentioned by participants P8, P9, P10, P11, P14, P15, and P17. All codes were mentioned by the focus group and opportunities itself was mentioned by all participants.

Opportunities was a code that was mentioned to answer nearly every question and was present throughout the data in multiple ways with multiple meanings. Focus group participant P1 found a connection between AISES, identity, and opportunity by stating, “It [AISES] really gave us an opportunity to explore what it meant to be native scientists, or what that meant.” Focus group participant P7 discussed networking opportunities and how these connections have helped, stating:

> but I've always felt like those relationships that I've made at AISES have helped carry me through the toughest of times and encouraged me to continue when it's been difficult. And so, having you all as family has been something that can't be replaced or. . . . I have no idea where I would be without the folks who have I’ve met through AISES gatherings.

Participants often discussed opportunities that were afforded to them through AISES, one of those opportunities being the Lighting the Pathway program. Focus group participant P5 stated:

> and I definitely would not have had the chance to meet her, or have this relationship without AISES and the Lighting the Pathway program. . . . And then, I just really found going to the national conferences, and leadership summits or whatever, just really helpful, because it just made me feel a lot less isolated and I see all my friends out there doing all these incredible things, and it just encouraged me and I might admit that I could accomplish all that I had wanted to accomplish.

Interview participant P8 discussed the connection between AISES, Internship and funding opportunities and stated, “AISES contributed, yeah. Day to day, no, not so much. But summer internships, scholarships, which helped pay for my tuition, stuff like that.” One participant discussed opportunities and networking through AISES by stating “AISES has allowed me to have that platform where I can connect with other Indigenous scholars on an academic level.” Another participant discussed opportunities to present research at AISES conferences and stated:

> I really liked the idea of being a part of a professional organization and trying to present your research or be acquainted with people and networking and having that as an option while still as an undergraduate student really intrigued me.

Theme 4: Representation. The theme for representation emerged from the codes of confidence and empowerment. Representation itself was mentioned 88 times throughout the data with 44 of those times being tied to the codes confidence and empowerment. Empowerment was mentioned 29 times by 9 participants and in the focus group. Confidence was mentioned 15 times by 4 participants and the focus group. Empowerment was mentioned 29 times by 9 participants and in the focus group. Confidence was mentioned by participants P8, P9, P15, and P17. Empowerment was mentioned by P8, P9, P10, P11, P13, P14, P15, P16, and P17. All codes were mentioned by the focus group and representation was mentioned by all participants.

Representation was not directly stated by a majority of the participants, but rather it was inferred by their statements. Focus group participant P2 stated, “This is where I first saw a native woman who also had a doctorate degree, so that was really inspiring for me.” Another focus group participant P4 connected representation to AISES by stating: “It did a lot for me to see other natives accomplishing the same goal that I had.” Representation as a theme presented itself

through the code confidence, often referred to by participants as gaining confidence in identity through the representation of Indigenous people in STEM. Focus group participant P7 stated:

> And so, for me, there was never like a moment of doubt along the way of my Indigenous identity, and to not be proud of that, or to not have that as my foundation in the way that I was raised. Nobody was ever going to set that back. And so, not only through AISES but just at my institution, I was really. . . . Just everything, just continued to grow that strength and that confidence, and show me that my identity was something to be proud of.

Interview participant P10 connected empowerment as the biggest thing she got from AISES membership stating: "Just to be able to have that empowerment and that encouragement from AISES to know that what I'm doing is good and it can be continuously built off of." Participant P8 believed his identity was shaped by AISES stating, "It [AISES] has formed me into a much more self-confident scientist and empowered me to realize I'm not an imposter." Study participant P14 discussed representation in the sense they wanted to be the one representing something and stated:

> it taught me to be resilient and persevere, even when there was unknowns, and because I wanted to be the first woman in my family to finish my degree or the first person in my family to finish my degree.

Theme 5: Support. The theme for support emerged from the codes Indigenous society and membership; however, support itself represented a majority of the codes for this theme. Support was mentioned 102 times, with 37 of those times being tied to Indigenous society and 31 times being tied to membership. Support as a standalone code or theme was mentioned 34 times. Indigenous society was referenced or mentioned 37 times by all study participants and in the

focus group. Membership was mentioned 31 times by 9 participants and in the focus group. Membership was mentioned by P8, P9, P10, P11, P12, P13, P15, P16, and P17. All codes were mentioned by the focus group.

Study participants mentioned support with various meanings and not all of the meanings were tied to the codes Indigenous society and membership. When referencing membership, participants were discussing their membership in AISES and often discussed a Sequoyah fellowship. Focus group participant P1 stated,

> And I think for me one of the most pivotal experiences of my whole time at AISES was when I got my Sequoyah fellowship. And I think it's a very concrete example of that feeling, of what it means to be a member, because you feel it kind of all at once.

Interview participant P13 described what a Sequoyah fellowship was and stated "Something that was really cool is that a lot of the businesses that sponsor AISES will choose a student to sponsor, that they feel is deserving and should be a lifetime member of AISES" describing the fellowship as a lifetime membership with AISES.

This study is focusing primarily on AISES; however, other Indigenous societies were mentioned through data collection. One of those societies being the Society for Advancement of Chicanos/Hispanic and Native Americans in Science or SACNAS. One focus group participant P2 stated, "I did a little bit in SACNAS, but AISES is where I felt like I belonged more, so I mostly just worked with AISES." Another focus group participant P4 stated,

> I think one thing I should add is that my PI in undergrad was native as well, and he really encouraged me to seek like SACNAS and AISES out and having an ADA faculty as a mentor was completely instrumental in my success, and I think I'm very grateful for that.

Interview participant P10 described Indigenous societies and their importance, stating:

> American Indians and Indigenous Society is about Indigenous people from all over America coming together in a centralized location to be able to share the values that we have as Indigenous people, and to talk about the research past, future, and present.

Support as a theme had various meanings. One focus group participant P3 described how AISES contributed to their self-efficacy and stated, “And then there's other people who support you, and will be kind to you, and will be friends with you.” Another focus group participant P4 stated, “it's really helped me want to achieve my goals, and knowing I have a support system and knowing that I'm not alone on the campus and that I have friends” describing support as a system. Interview participant P17 referenced support as something that comes from faculty and stated:

> it's always better to make a connection with those people who are helping you to get into research or to teach your classes, and it just made it a lot easier for me to approach them in a more comfortable way because I had got to know them some and they were helping support all of us in the AISES program.

Interview participant P15 discussed support and Indigenous societies by stating: “there’s actual support and growth coming from those organizations.”

Chapter 4 Summary

Chapter 4 utilized social cognitive career theory and bicultural identity formation model to present the perspectives of Indigenous STEM graduates on the contributions of an Indigenous STEM nonprofit on self-efficacy and educational experience. The objective of Chapter 4 was to provide a summary of the data collected through interviews, a focus group and a questionnaire in an accurate and reliable manner. In vivo coding and pattern matching were used for analysis in

this research design. Questionnaire data represented participant demographic information as well as information regarding participants' current employment status, years in their position, if they planned to continue their education and if they contribute to their tribal community in any way. Questionnaire data were presented to show interrelationships among individual environmental and behavioral variables that are assumed to influence a students' academic and career choices. The data collected was intended to answer the research question regarding how a STEM nonprofit contributes to self-efficacy and educational experiences, as perceived by Indigenous STEM graduates.

The contributions of Indigenous STEM nonprofits to self-efficacy and educational experience was explored. Furthermore, the way Indigenous STEM graduates perceived these contributions in their own words was presented. The research examined how Indigenous STEM graduates describe their self-efficacy and educational experience. The researcher presented data through the voices of the Indigenous STEM graduates interviewed in order to make the research more visible and beneficial to the Indigenous STEM community. The research was approached in a manner that respected the beliefs, customs, and values of the Indigenous people that participated in this study.

The groundwork for the presentation and evaluation of the results that appear in Chapter 5 were established in Chapter 4. The perspectives and narratives of study participants guided the identification of connections between this research and what it might contribute to the literature surrounding postsecondary persistence among Indigenous peoples in the STEM fields. Themes and patterns identified in this collection of interviews and a focus group led to the results that will be presented in the following chapter. In Chapter 5, the researcher will examine and interpret results, discuss the relationship between literature and the results, discuss study

limitations and implications of the results. The researcher will also make recommendations for further research on Indigenous STEM graduates and Indigenous STEM nonprofits.

Chapter 5: Discussion and Conclusion

Introduction

Native American people and Indigenous people are underrepresented in the STEM disciplines (Page-Reeves et al., 2017). The low participation of Indigenous people in STEM disciplines have been attributed to reasons such as (a) lack of exposure, (b) lack of interest, (c) lack of confidence, (d) lack of a sense of belonging, and (e) lack of goal congruency (Williams & Shipley, 2018). Indigenous STEM-based nonprofits have been established with the mission to promote the advancement of Indigenous people in STEM fields (AISES, 2016). However, it is not known how Indigenous STEM nonprofit contributes to self-efficacy and educational experience, as perceived by Indigenous STEM graduates.

The purpose of this study was to explore how a STEM nonprofit contributes to self-efficacy and educational experiences, as perceived by Indigenous STEM graduates. The participants in this study described their educational experiences and provided insight into how AISES contributed to their self-efficacy and educational experience. The study provided an opportunity for Indigenous STEM graduates to share their stories on factors influencing their successful completion of a STEM degree and the contributions of an Indigenous STEM nonprofit.

The participants were all Indigenous STEM graduates who had graduated with a STEM degree since 2015 and who were members of AISES. The researcher selected participants using purposive sampling to ensure a wide variance in participants. Participants participated in either an individual interview or a focus group. The interview phase of the study included 10 Indigenous STEM graduates that were also AISES members and interview participants were selected based on the earliest response to recruitment emails. The focus group consisted of the

remaining seven volunteers. All participants also completed a Qualtrics questionnaire prior to interviews. Questionnaire data were used to collect demographic data and determine the participants' involvement in their community and details about their identity.

The findings presented in Chapter 4 satisfied the researcher's question. The results of this study add to the limited literature surrounding postsecondary persistence among Indigenous people in the STEM fields. In this chapter, the researcher will present key findings and implications drawing from the existing theoretical framework. This chapter concludes with a discussion of the limitations along with recommendations for further research. The findings for this study will assist in increasing the awareness of the impact of Indigenous STEM nonprofits.

Summary of the Results

This case study intended to explore how a STEM nonprofit contributes to self-efficacy and educational experiences, as perceived by Indigenous STEM graduates. The interview protocol was applied to answer the guiding question in this research study: How does a STEM nonprofit contribute to self-efficacy and educational experiences, as perceived by Indigenous STEM graduates? Indigenous STEM graduate perceptions of how an Indigenous STEM nonprofit contributed to their self-efficacy and educational experiences was explored. The research examined how participants overcame barriers to their successful completion of a STEM degree and how their identity may have changed.

The sources of data collection used in this study included a questionnaire, semistructured interviews, and a focus group. This study included 17 participants selected from the AISES membership data and based on their responses to recruitment emails. To be included in this research, participants had to have graduated with a STEM-based degree since 2015 while also having been or are current members of AISES. Participants for this study were all contacted via

email by the AISES membership director and were recruited on a volunteer basis. Prior to conducting the interviews and focus group, the researcher created a Qualtrics questionnaire designed to collect demographic information, details regarding identity and to determine the participants' involvement in their community. All focus group and interview participants completed the questionnaire prior to their interview or the focus group. This study included 10 participants for 60-minute face-to-face interviews held via Skype, with the average interview lasting 37 minutes. The remaining seven volunteers participated in a 120-minute Skype focus group lasting roughly 112 minutes.

Two frameworks guided this study, social cognitive career theory and bicultural identity formation model. The study emphasized gaining a greater understanding of how Indigenous students perceive their ability to successfully graduate with a STEM-based degree and what factors were found to have influenced their self-efficacy and identity. Additionally, the participants revealed their educational experience and what factors contributed to their experience. The data were used to discuss the relevance of the study's findings to current literature surrounding postsecondary persistence among Indigenous people in the STEM fields. Additionally, provided in this chapter are recommendations for further research and a discussion on increasing the awareness of the importance of STEM nonprofits.

Discussion of the Results

In this case study, Indigenous STEM graduates' perceptions of how a STEM nonprofit contributed to their self-efficacy and educational experience was explored. The results showed that participants believe the Indigenous STEM nonprofit AISES directly contributed to their successful completion of a STEM degree and career/professional success. Through interview and focus group questions the researcher was able to determine how AISES contributed to self-

efficacy, identity, and educational experience. The results of this study were provided by descriptions of the participants' perceptions of the phenomenon.

Themes of community, culture, opportunities, representation, and support emerged from the data. Ultimately, all participants interviewed strongly believed that AISES was a contributing factor to their success. Nearly every question asked in interviews and the focus group was answered with a reference to AISES's contributions. Participants found opportunities, support, cultural ties, community and representation through their membership within AISES. The researcher uncovered that the participants viewed AISES as much more than just an organization, but rather a community or family of Indigenous scientists and researchers. Participants often referenced the importance of representation and how AISES provided opportunities for the participants to see other Indigenous people represented in STEM careers. Programs such as Lighting the Pathways program, conferences such as the national conference and leadership summit, and college chapters were mentioned by participants as ways they stayed involved with the AISES organization and were able to take advantage of what the organization had to offer.

Community. Community was a theme uncovered through data analysis and was referenced by all study participants. The codes of mentor/mentorship and find that community helped develop community into a theme for this study. Participants referenced community in a variety of ways, often describing community as a place where they were from, or a community they found within AISES and on their college campus. Focus group participant P4 stated, "I think community is a big part in these groups, native people have the talent of wherever we go, finding out community," which sums up the primary impression behind this theme. Finding a community while at college led the participants to have a sense of belonging. Museus et al.

(2017) claimed that a sense of belonging is positively associated with intention to persist to degree completion, which was directly expressed through the data uncovered in this research.

AISES was often mentioned as being responsible for creating a community for Indigenous STEM students and professionals. Participants discussed the importance of finding mentors and a community and often contributed mentors/mentorship and community as directly contributing to their success. When asked about self-efficacy, participants mentioned mentors/mentorship and community as contributors to their self-efficacy. Interview participants P15 stated: "It was key to find the community or the need of community that I felt like I belonged and people with the same, what it, goals in mind, like obtaining a degree." Through the data collected in this study, the researcher can conclude that participation in AISES provided Indigenous students with a platform to find mentors and a community that directly contributed to their self-efficacy towards degree completion.

The theme of community was also referenced when participants were asked about identity. Participants referred to their tribal communities when describing or referencing identity and the contributions their tribal communities made to shape their identity. Additionally, when participants were asked about educational experience, community was described as a need for Indigenous students, specifically a community that felt like their tribal communities and gave the participants a sense of belonging. It was clear to the researcher that patterns were established between community, identity, and AISES.

Culture. Culture was a theme uncovered through data analysis and was referenced by all study participants. The codes culturally specific group, identity, Indigenous knowledge, values/goals and culture itself contributed to the development of culture as a code. Culture as a theme was referenced in a variety of ways, most often as a connection between identity and

culturally specific groups. Participants often discussed culture when describing their identity. When asked to define Indigenous identity, participants often referenced their culture, values/goals, and Indigenous knowledge. The researcher found through interviews and focus groups that asking participants to define Indigenous identity was difficult because identity is often inherent to the individual person. Identity was difficult to describe by the participants, and there was always a connection to culture when discussing identity.

The researcher found that identity is multifaceted and when referencing their identity all participants first connected identity to their tribal affiliation, second, to who they were professionally and lastly to who they were as individuals. The researcher found that tribal affiliation and tribal identity is directly connected to land bases and creation stories of the participants' tribal affiliation. Participants felt a great sense of pride when referencing their identity, often stating that their identity remained unchanged, intact, or strengthened through their educational experience. AISES was often referenced as helping find identity and strengthening identity. Focus group participant P2 stated: "AISES just really helped me find my identity in a way where I could be like this female native scientist." Through the data collected in this study, the researcher can conclude that AISES had a direct contribution to the development or strengthening of participants' identity. Additionally, the data supports stage two of the bicultural identity formation model of self-discovery and supports the process of self-actualization with reduced cultural dissonance and stress.

Culture as a theme was also found to have a connection to educational experience among study participants. The code culturally specific group uncovered that participants often referenced seeking out native student organizations or clubs on campus in order to establish a community. Participants described becoming involved with AISES through active recruitment by

other members or from simply stumbling across the organization when researching culturally specific STEM groups. Interview participant P9 referenced culturally specific groups on campus having stated:

> but I think that they helped me in terms of provided that connection to culture and that sense of responsibility to keep pursuing that goal and keep going and reconnecting me to the idea of what it's so important to finish a degree.

Indigenous students have a need for finding a culturally specific group on campus, which gives them a sense of belonging and often strengthens their self-efficacy and contributes to a positive educational experience. All participants referenced AISES as the main group or one culturally specific group they were involved with during their education.

Opportunities. Opportunities was a theme uncovered through data analysis and was referenced by all study participants. The codes that helped establish opportunities as a theme were AISES, funding, internship, leadership, lighting the pathway, networking and research. When analyzing the data, the researcher uncovered that opportunity was the most referenced theme in this study having been mentioned 411 times. Additionally, the researcher uncovered that AISES was the code most referenced when discussing opportunities. The researcher found through data interpretation that the codes funding, internship, leadership, lighting the pathway, networking and research were all direct opportunities provided through membership in AISES. The pattern between the codes, AISES and opportunities led the researcher to believe that AISES has directly contributed to educational experience and self-efficacy by providing opportunities to Indigenous STEM students.

The codes of AISES, funding, and networking were mentioned by all interview participants. This led the researcher to believe that the funding and networking opportunities

provided by AISES were the most valued by participants. Participants referenced networking, mentors, connections, and relationships when discussing AISES and educational experience. The researcher finds that networking and connections also contribute to establishing a community, having been referenced in co-occurrence 81 times in data analysis.

The code Lighting the Pathway was mentioned only 9 times in the data; however, it was described as a program opportunity through AISES where students were paired with a mentor that helped them through their educational experience. Interview participant P8 stated:

> I was assigned to a Ph.D. professor out of Alaska. We have quarterly meetings where they pay for our travel to all meet. We meet really intensively for two days. And at the national conferences, we get there two days early and we have our own meetings for an entire day of the Lighting the Pathways program.

An Indigenous student's need to find a culturally appropriate community and opportunities to form connections have been established as important contributors to self-efficacy, identity and educational experience.

Participants were asked if AISES directly contributed to their educational, career and professional success and if yes, to explain. Nearly all participants answered yes, and when asked to explain, the theme of opportunities was most often referenced. Funding, internship, leadership and research opportunities were specifically mentioned as ways AISES contributed to this success. Additionally, the opportunity to engage in and present research through connections made at AISES was described by participants. Interview participant P15 stated, "I got started in research because of a mentor at AISES." While interview participant P17 stated:

> I guess that it's always better to make a connection with those people who are helping you to get into research or to teach your classes, and it just made it a lot easier for me to

approach them in a more comfortable way because I had got to know them some and they were helping support all of us in the AISES program.

Through these patterns and themes uncovered in data analysis, the researcher was able to conclude that AISES provided opportunities that directly contributed to participants' self-efficacy and educational experiences.

Representation. Representation was a theme uncovered through data analysis and was referenced or inferred by all participants. The theme representation emerged from the codes of confidence and empowerment, having been coded 88 times throughout the data. Study participants did not directly mention representation, but rather the theme was inferred in participant statements. Focus group participant P2 referenced a connection between AISES and representation by stating: “This is where I first saw a native woman who also had a doctorate degree, so that was really inspiring for me.”

Representation as a theme was the most insightful theme when uncovering how a STEM nonprofit contributes to self-efficacy as perceived by an Indigenous STEM graduate. Participating in AISES opportunities and conferences created a space for Indigenous STEM students to meet, connect and see other Indigenous people who have successfully completed a STEM degree and having a STEM career. Visualizing successful Indigenous people in STEM contributed to self-efficacy by allowing Indigenous students to believe they can also be successful in STEM. Focus group participant P4 connected representation to AISES by stating: “It did a lot for me to see other natives accomplishing the same goal that I had.”

Uncovering connections to identity through representation also helped the researcher reveal how a STEM nonprofit contributes to the educational experience. The researcher found that participants gained a sense of confidence or empowerment in their identity through their

membership in AISES. When asked how AISES shaped their identity, participants would often describe a feeling of pride in their identity. This feeling of pride came from the representation of Indigenous people in STEM. One interview participant P14 stated,

> it taught me to be resilient and persevere, even when there was unknowns, and because I wanted to be the first woman in my family to finish my degree or the first person in my family to finish my degree.

This statement provides the researcher with many connections to identity. Interview participant P14 first identified as a woman, second as a first-generation college student, and lastly, as an AISES member that gained strength from the representation witnessed through the organization.

The research can conclude that the data support stage two of the bicultural identity formation model, which is comprised of self-discovered and supports the process of self-actualization with reduced cultural dissonance and stress. Additionally, through representation, the researcher can conclude that a STEM nonprofit directly contributed to self-efficacy and a positive educational experience. Representation allows Indigenous people to visualize themselves in a STEM degree or STEM career, which in turn can help increase the number of Indigenous people in STEM.

Support. Support was a theme uncovered through data analysis and was referenced by all participants. The theme support emerged from the codes Indigenous society and membership; however, support itself represented a majority of the codes for this theme having been mentioned 34 times by itself. Study participants mentioned support with a multitude of meanings; most often described support as something that was given by mentors, peers, community and through a support system. When asked how AISES contributed to self-efficacy, participants would often describe AISES as providing a community or support system that they can lean on through

difficult times. Focus group participant P3 stated, “and then there’s other people who support you, and will be kind to you, and will be friends with you. You don’t have to pretend who you are. Yeah, it’s a great thing.” Focus group participant P3 often discussed challenges with finding employment or space in the professional STEM world to be themselves, meaning an Indigenous scientist, and often referenced AISES as the place where they got to be themselves and that feeling of comfort in their identity contributed to self-efficacy.

The researcher focused this study on Indigenous STEM nonprofits, specifically focus on AISES, however, other Indigenous societies were mentioned through data collection. Through data analysis, the researcher was able to surmise that AISES is the premier STEM nonprofit organization for Indigenous people. When asked about participation in other Indigenous STEM organizations, most participants mentioned SACNAS or stated they only participated in AISES. Focus group participant P2 even went as far as stating, “I did a little bit in SACNAS, but AISES is where I felt like I belonged more, so I mostly just worked with AISES.” Regardless of which STEM nonprofit participants participated in, the common reference to Indigenous societies was that they provided support to Indigenous STEM students and professionals.

Membership in an Indigenous nonprofit was mentioned 31 times by study participants and often was mentioned in reference to membership in AISES. Participants were asked how membership in AISES has contributed to the educational experience and would often discuss opportunities and support provided by the organization. Some participants mentioned a Sequoyah fellowship, which was described as a lifetime membership within the AISES organization. Focus group participant P1 made a very profound statement when describing their Sequoyah fellowship having said

> And I think for me one of the most pivotal experiences of my whole time at AISES was, when I got my Sequoyah fellowship. And I think it's a very concrete example of that feeling, of what it means to be a member because you feel it kind of all at once.

Through data collection and analysis, the researcher is confident in stating that membership in AISES provided support that was pivotal to participants' self-efficacy and educational experiences.

Discussion of the Results in Relation to the Literature

According to Page-Reeves et al. (2017), Native American people and Indigenous people are underrepresented in the STEM disciplines. Indigenous people represented 1.7% of the United States population, but only accounted for 0.6% of bachelor's degrees, 0.4% of master's degrees, and 0.2% of doctoral degrees in science and engineering (NSF, 2015). Williams and Shipley (2018) attributed low participation of Indigenous people in STEM disciplines to reasons such as (a) lack of exposure, (b) lack of interest, (c) lack of confidence, (d) lack of a sense of belonging, and (e) lack of goal congruency. Research uncovered in the literature review primarily focused on efforts educational institutions are taking to increase minority representation. Contributions to self-efficacy and educational experience by STEM nonprofits are referenced, but not primarily studied.

Indigenous people serving STEM-based nonprofits have been established with the mission to promote the advancement of Indigenous people in STEM fields, but there is little research surrounding their contributions (AISES, 2016). Addressing self-efficacy in an educational environment can assist in helping Indigenous people feel more capable of success (Keith et al., 2016). Students who perceive that they can be a successful student and overcome obstacles often times will find success in their academic outcomes.

Participants in this study were unable to define self-efficacy. The researcher provided a definition of self-efficacy as their own personal belief that they can accomplish a specific goal or task, in this study completion of a STEM degree. Once participants understood self-efficacy, they referenced representation and opportunities as ways AISES contributed to their self-efficacy. The participants would often state that they knew they could accomplish their goals because they were able to see other Indigenous people pursuing or having been successful in STEM. Additionally, the opportunities provided through AISES allowed for Indigenous STEM students to find their place in the STEM fields through funding and research opportunities. Participants were able to discover what STEM research and a STEM career can look like for them through AISES and this led to greater self-efficacy and a successful academic outcome.

Fouad and Santana (2017) found through a review of published research that a lack of a sense of belonging in college is associated with lower self-efficacy and academic persistence for these groups. However, there is a failure of mainstream institutions to accommodate Indigenous students by creating environments suitable for perseverance and success. Participants were asked why they joined AISES with most stating that they sought out a community or Indigenous organization to participate in. Some participants stated that AISES found them, mentioning that recruitment efforts by members of the organization are what led to their involvement. Involvement in a culturally relevant group on campus such as AISES, which led to greater involvement on a national level, helps Indigenous students find a sense of belonging on campus and within the STEM fields. Additionally, the support systems Indigenous students find through these organizations help replicate a family structure that Indigenous students lack while attending a mainstream Institution. Support systems and *family* on college campuses help Indigenous

students feel like they belong and ease the transition of moving away from home, which ultimately leads to academic persistence for these groups.

Indigenous students often feel isolation or marginalization on large university campuses and some universities have established Multicultural Learning Communities (MLC) that are designed to combat this feeling of isolation (Jehangir et al., 2011). Windchief and Joseph (2015) observed that Indigenous students need to claim postsecondary education as Indigenous space utilizing curriculum, American Indian student services, and digital media. Transculturation is linked to higher perceptions of support from faculty/staff, social/peers, tribal community, family and institutions. The results of this study indicate that Indigenous students do undergo some transculturation through their educational journey; however, the data support a greater sense of self-actualization and strengthening of identity over transculturation. AISES creates a professional and learning community network for Indigenous students, which reduces the feeling of isolation while also creating a space for Indigenous people in STEM to collaborate and support each other. The researcher believes the professional and learning community network established through AISES is the greatest contribution of a STEM nonprofit to the educational experience and academic persistence.

The purpose of this study was to explore how a STEM nonprofit contributes to self-efficacy and educational experiences, as perceived by Indigenous STEM graduates. The results of the study provided the researcher with a deeper understanding of the influences of a STEM nonprofit on self-efficacy and educational experience on Indigenous STEM graduates. The study's findings provided strong evidence that aligned with Charleston and Leon's (2016) social cognitive career theory, which predicts that self-efficacy promotes favorable outcome expectations. Study findings also supported Bickel and Jensen's (2012) bicultural identity

formation model, which discovers that Indigenous students draw personal and psychological strength from their values will allow them to work through the new expectations and relationships in the new environment, determining appropriate responses through observation, practice, and demonstration without cultural loss.

Limitations

According to Yin (2018), limitations can exist in qualitative research that may affect the findings of the study. The researcher sought to identify and acknowledge the limitations of the study to make recommendations for further research. The case study provided a greater understanding of the contributions of a STEM nonprofit on self-efficacy and educational experiences as perceived by Indigenous STEM graduates, however, the study was limited to only members of AISES. Nevertheless, the sample could be representative of other STEM nonprofits with similar membership demographics across the country. During the sampling and data collection process of the researcher, the researcher encountered other limitations.

Sampling limitations. Another limitation of this study was the sample size. The researcher limited the participants to AISES members who have graduated with STEM-based degrees since 2015. The researcher focused the sample of this study to represent the experiences of recent graduates, not that of all AISES members who have graduated with STEM degrees since the organization was founded. The sample may not be representative of all Indigenous AISES members having graduated with STEM-based degrees since 2015. The study participants were selected through purposive sampling. Although study invitations went out to over 2000 AISES members, only 17 participants responded to recruitment and followed through with participation. The window for participants to respond was open for roughly a month; however,

the researcher found that the 10 interview participants were enough to reach data saturation. At that point, the remaining seven volunteers were invited to participate in the focus group.

Method limitations. The case study focused on Indigenous STEM graduates' perceptions of STEM nonprofits' contributions to self-efficacy and educational experience. While the qualitative case study design was the most reliable methodology for this study, the researcher believed that an Indigenous research methodology might have produced richer data. The researcher found that semistructured interviews did not allow a connection between the researcher and participants, which may have limited the quality of the perceptions shared by participants. It was difficult for the researcher to remain unbiased and share a bond with participants, resulting in some participants forgetting to share some of their experiences until after the interviews concluded. The focus group allowed *a talking circle* environment between participants, and they were able to build from each other's stories and experiences, allowing detailed, rich data to emerge. Finding a more appropriate methodology for studying Indigenous peoples could have provided additional insight into perceptions of Indigenous STEM graduates on contributions of a STEM nonprofit.

Implications of the Results for Practice, Policy, and Theory

The purpose of this study was to identify the contributions of a STEM nonprofit to self-efficacy and educational experience as perceived by Indigenous STEM graduates. The study provided an opportunity for participants to express their thoughts, feelings, and beliefs on self-efficacy, identity and educational experience. The study provided information on how the participants perceived a STEM nonprofit contributed to their self-efficacy and educational experience. These findings have implications for students, professionals, institutions of higher

education, employers and other nonprofits who may not have direct experience with Indigenous people or Indigenous nonprofits.

Implications for practice. Participants frequently discussed opportunities made available to them through membership in AISES. Opportunities ranged from funding or scholarships, leadership, internships, networking, research and research presentations as well as the Lighting the Pathway program. Membership in an Indigenous nonprofit, such as AISES, allowed Indigenous STEM students to pursue social supports and educational opportunities through AISES programming and conferences. Creating a space for Indigenous students to pursue opportunities specific to them allows for a feeling of comfort when pursuing these opportunities. Indigenous students often feel uncomfortable in situations where they are the minority. AISES hosts the largest career fair for Indigenous people, which allows for a greater sense of comfort when talking to employers or universities. When Indigenous people feel comfortable, they are more likely to pursue opportunities that they feel are available for them specifically.

Participants in the study also detailed AISES's contributions to representation, often referencing AISES conferences as a place for them to see other Indigenous people in STEM. Page-Reeves et al. (2017) noted that it is often hard for Indigenous people to believe in themselves or their ethnic identity because of the image that is portrayed in society. The researcher found that participants gained a sense of confidence or empowerment in their identity through their membership in AISES. When asked how AISES shaped their identity, participants would often describe a feeling of pride in their identity. According to Sharkawy (2015), underrepresentation of minority groups in STEM higher education and careers is one of the most challenging problems for science education, policymakers, and researchers. Although AISES is

not an educational institution, it creates a space where Indigenous STEM students and professionals can host conferences and celebrations that can showcase Indigenous research, Indigenous professionals, and opportunities available for Indigenous students.

Study participants mentioned their need for a sense of belonging or need for community at their academic institutions. Participants often mentioned finding that community through participation in an AISES college chapter, or AISES national conferences. Some participants even relayed that AISES found them, through recruitment or recommendations from peers and mentors. Indigenous people have heavy ties to their families and their communities. Through the questionnaire, the researcher uncovered an important connection to community and found that 15 out of 17 study participants relayed that they contribute to their tribal community. Creating spaces specifically for Indigenous people allows for comfort, which leads to positive self-efficacy.

Study participants focused heavily on discussions of identity and often connected identity to their culture and shared values/goals. Bickel and Jensen's (2012) bicultural identity formation model is used to understand how Indigenous students draw upon their innermost values as needed for their psychological and personal support as they progress through higher education. Indigenous students will often go through self-discovered and transculturation in order to be successful in higher education (Bickel & Jensen, 2012). Study participants shared negative experiences in higher education but often discussed positive experiences. Participants found strength and pride in their identity through membership in an Indigenous STEM nonprofit. Additionally, participants made connections through their membership that allowed them to meet people with similar cultural values and goals. Researchers claim that Indigenous students do not need to fully integrate and assimilate to mainstream culture or lose their identity to be successful

in higher education (Bickel & Jensen, 2012; Windchief & Joseph, 2015). Membership in AISES allowed for study participants to be proactive in claiming a space in STEM and higher education as an Indigenous space. AISES as an organization is a place where Indigenous identity and culture is celebrated, while also promoting STEM degrees and careers.

Implications for policy. The results of this study are based on the information provided by a limited sample of Indigenous STEM graduates who have graduated with a STEM-based degree since 2015 and were also members of AISES. Results of this case study indicated that the participants believe AISES contributed to their self-efficacy and educational experience through finding a community, opportunities, support, representation, and culture. There is a lack of representation of Indigenous people in STEM professions and the lack of representation is a growing concern for Indigenous people throughout the United States. Lack of a voice in STEM fields means a lack of Indigenous knowledge and perspective in policy and practice. Sharkawy (2015) stated that underrepresentation of minority groups in STEM higher education and careers is one of the most challenging problems for science education, policymakers and researchers.

An Indigenous researcher conducted this research. Guillory and Wolverton (2009) stressed the importance of Native American people researching Native American issues in higher education and highlighted that Indigenous voices be heard when creating policy that can directly or indirectly affect their educational lives. Qualitative research allows the researcher to incorporate the perceptions and experience of Indigenous people in their research, which helps higher education institutions and policymakers better understand specific challenges and needs. Through the study findings, researchers can continue to learn the way Indigenous students perceive, operate within, and experience higher education and future research.

Data collected in this study highlighted the importance of focusing on STEM nonprofits as well as educational institutions when researching the underrepresentation of Indigenous groups in STEM higher education. Policymakers should be aware of the importance Indigenous people place on identity and community as highlighted in this study. Additionally, when government funding is set aside for higher education, funding should be set aside for nonprofits such as AISES to aid in their successful support of Indigenous people in higher education.

Implications for theory. The theoretical framework of this study was grounded in Charleston and Leon's (2016) social cognitive career theory**,** which is derived from Bandura's (1986) social cognitive theory and predicts that self-efficacy promotes favorable outcome expectations. This study also focused on the framework of Bickel and Jensen's (2012) bicultural identity formation model, which utilizes four stages to track Native American student progression through higher education. The bicultural identity formation model has four constructs that organize this model; they include alienation, self-discovery, realignment, and participation (Bickel & Jensen, 2012). The focus of this study was to explore how a STEM nonprofit contributes to self-efficacy and educational experiences, as perceived by Indigenous STEM graduates, it was appropriate to use social cognitive career theory and bicultural identity formation model.

Concerning the social cognitive career theory, the results of the study supported the notion that Indigenous student believes in their abilities have a direct influence on their motivation and practices. Participants agreed that AISES contributed to their self-efficacy through offering community, opportunities, support, representation and a connection to culture. These findings were supportive of the social cognitive career theory and Charleston and Leon's (2016) belief that self-efficacy promotes favorable outcome expectations, in this case,

progression to STEM degree completion. Additionally, the study's results revealed that membership in AISES had a direct contribution to their academic and professional success. Nonprofits focusing on helping Indigenous people should follow the programming and support offered by AISES.

The results of this study also found a strong connection between culturally specific groups, identity, Indigenous knowledge, values/goals, and culture. While the researcher did not uncover a clear progression through the bicultural identity formation model's four constructs of alienation, self-discovery, realignment, and participation, it was evident that research participants did experience some self-discovery and realignment. Study participants discuss self-discovery and self-actualization, heavily mentioning finding a sense of pride and strength in their Indigenous identity through participation in AISES. Participants made connections through their membership that allowed them to meet people with similar cultural values and goals. It was evident in the study that cultural identity places a major role in claiming a space in STEM and higher education as an Indigenous space. Social cognitive career theory and bicultural identity formation have been found to be valuable theories when researching Indigenous people.

Recommendations for Further Research

In this section, the researcher makes recommendations for future researchers concerning the contributions of a STEM nonprofit to self-efficacy and educational experience as perceived by Indigenous STEM graduates. The study's limitations and results provide an opportunity for future research. Underrepresentation of minority groups in the STEM fields is a concern for minority groups throughout the United States. Future researchers may find the results of this study valuable when exploring the contributions of STEM nonprofits to self-efficacy and educational experience.

The first recommendation would be to increase the sample size to increase the significance level of the findings. A larger sample size may add the risk of repetitive data, but it should more accurately mirror the perceptions of the population. This study was conducted focusing solely on the perceptions of Indigenous STEM graduates that have graduated since 2015 who were also members of AISES. Expanding the research to include all AISES members who have graduated with a STEM degree; researchers could find a sample size that will validate the data by providing more accurate estimations about the population. Additionally, future researchers could expand the population to include members of other Indigenous STEM organizations such as SACNAS. However, SACNAS memberships include populations that some may not consider Indigenous populations.

Another recommendation would be for future researchers to explore other nonprofit organizations with similar missions to that of AISES. Research is currently focused on the efforts taken by higher education institutions, but little is focused on the contributions of nonprofits and societies with similar goals and missions. The results of this study revealed gaps in stages of the bicultural identity formation model. While the researcher can assume participants experience all four constructs of the theory, it was not directly proven through the research questions.

Finally, it is recommended that future researchers include organizational leadership and staff as participants. Having a broader range of individuals who are equally responsible for implementing the programs and supporting the mission of AISES in the study may reveal greater understandings of the contributions of these nonprofits. A conversation with these individuals might give further insight into the specific programing or steps AISES is taking to support its mission and increase the representation of Indigenous people in STEM fields.

Conclusion

The purpose of this case study was to explore how a STEM nonprofit contributes to self-efficacy and educational experiences, as perceived by Indigenous STEM graduates. To gain greater insight into Indigenous STEM graduate perceptions of contributions to self-efficacy and educational experiences as they relate to self-efficacy towards STEM degree completion and bicultural identity formation. This study explored five themes that provided important implications for Indigenous STEM nonprofits. In this study, AISES has made major contributions to the self-efficacy and educational experiences of Indigenous STEM graduates. While both internal and external factors influenced graduates' self-efficacy and educational experience, membership in AISES contributed to greater self-efficacy and participants perceived AISES contributed to their educational and professional success.

According to social cognitive career theory, interrelationships among individual environmental and behavior variables are assumed to influence students' academic and career choices (Charleston & Leon, 2016). The results of this study supported that these variables were supported through AISES membership and contributed to self-efficacy towards STEM degree completion. All of the participants agreed that AISES contributed to their educational and career success in many ways.

The bicultural identity formation model was designed with four constructs or stages used to understand how Indigenous students draw upon their innermost values as needed for their psychological and personal support as they progress in higher education. The results of this study supported that Indigenous STEM graduates did undergo self-discovery and self-actualization through their progress in higher education and membership in AISES directly contributed to strengthening their identity. However, the study did not directly illuminate the stages of

alienation, and realignment. Study participants discussed mostly self-discovery and participation through AISES membership. A better understanding of how a STEM nonprofit contributed to self-efficacy and educational experience was uncovered in this study; however, a gap still exists in connecting the stages of bicultural identity formation through an educational experience.

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Appendix A: Approval Letter from AISES

January 23, 2019

American Indian Science and Engineering Society
4263 Montgomery Blvd NE, Suite 200
Albuquerque, NM 87109

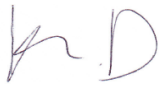
Tyler Parisien
[redacted]

Dear Mr. Parisien,

Per your request, this letter serves as an official approval letter from the American Indian Science and Engineering Society (AISES) for Tyler Parisien to list AISES as the focus organization for their dissertation research. AISES's participation in the research is entirely voluntary and there are no known or anticipated risks to the participation in this study.

AISES reserves the right to review the dissertation proposal before it is submitted for approval by the university, while also recommending the dissertation be submitted to the AISES Director of Programs and Research for review prior to formal publication. These reviews will not alter the results of the dissertation research but will make AISES Leadership aware of how the organization is being represented in the dissertation in order to protect the organization's best interests. After the data has been analyzed, AISES will receive a copy of the entire dissertation to make sure representation is agreeable to the organization.

Sincerely,



Kathy M DeerInWater, PhD
Director of Programs and Research, AISES

Appendix B: AISES Membership Director Agreement

May 23, 2019

American Indian Science and Engineering Society
4263 Montgomery Blvd NE, Suite 200
Albuquerque, NM 87109

Tyler Parisien
[redacted]

Dear Mr. Parisien,

Per your request, this letter serves as an official agreement between the American Indian Science and Engineering Society (AISES) Director of Membership Engagement and Advocacy and Tyler Parisien. The AISES Director of Membership Engagement and Advocacy (Lisa Paz) agrees to identify AISES Members who have graduated with a STEM degree since 2015 and contact them with information regarding the proposed research study.

AISES reserves the right to determine members who fit the population sample and population is determined by the researchers' request. Lisa Paz will distribute all recruitment tools to identify members who qualify to participate in this study and members can contact Tyler Parisien at their discretion to participate.

Sincerely,

Lisa Paz
Director of Membership Engagement and Advocacy, AISES

Appendix C: Interview Protocol

Time of interview:

Date of interview:

Interviewer:

Interviewee:

Introduction:

Hello My name is Tyler Parisien and I am the primary researcher on this dissertation study. You volunteered to participate in this study at your own free will and I wanted to give you a brief description of the study. The purpose of this study is to explore how a STEM nonprofit contributes to self-efficacy and educational experiences, as perceived by Indigenous STEM graduates. The researcher will conduct semistructured interviews with AISES members who self-identify as Indigenous and have graduated with a STEM based degree since 2015. The study findings may contribute to the literature surrounding postsecondary persistence among Indigenous people in the STEM fields, which may develop into further research or increase the awareness of the impact of Indigenous nonprofits.

Questions:

1. What Indigenous STEM organizations have you been a member in? How long?
2. How do you define self-efficacy?
3. What other groups on or off-campus have you participated in and have they contributed to your self-efficacy towards degree completion?

4. Why did you join AISES?
5. How has AISES contributed to your self-efficacy?
6. What has AISES done to improve your interest in STEM?
7. How do you define Indigenous Identity?
8. How has your identity changed through your educational experience?
9. How has AISES helped shape your Identity?
10. How would you describe your educational experience?
11. How has membership in AISES contributed to your educational experience?
12. Why did you choose a STEM degree program or STEM field?
13. Do you perceive AISES has impacted your educational success? If so, in what ways?
14. Do you perceive AISES has impacted your career/professional success? If so, in what ways?

Prompts:

Prompts and Probes used to encourage in depth exploration of experiences:

Prompt – Can you tell me a bit more about that?

Probe – What do you mean by '_____'?

Is there anything you would like to add?

Appendix D: Focus Group Protocol

Time of Focus Group:

Date of Focus Group:

Interviewer:

Interviewees:

Introduction:

Hello My name is Tyler Parisien and I am the primary researcher on this dissertation study. You volunteered to participate in this study at your own free will and I wanted to give you a brief description of the study. The purpose of this study is to explore how a STEM nonprofit contributes to self-efficacy and educational experiences, as perceived by Indigenous STEM graduates. The study findings may contribute to the literature surrounding postsecondary persistence among Indigenous people in the STEM fields, which may develop into further research or increase the awareness of the impact of Indigenous nonprofits.

Questions:

1. What Indigenous STEM organizations have you been a member in? How long?
2. How do you define self-efficacy?
3. What other groups on or off-campus have you participated in and have they contributed to your self-efficacy towards degree completion?
4. Why did you join AISES?
5. How has AISES contributed to your self-efficacy?

6. What has AISES done to improve your interest in STEM?
7. How do you define Indigenous Identity?
8. How has your identity changed through your educational experience?
9. How has AISES helped shape your Identity?
10. How would you describe your educational experience?
11. How has membership in AISES contributed to your educational experience?
12. Why did you choose a STEM degree program or STEM field?
13. Do you perceive AISES has impacted your educational success? If so, in what ways?
14. Do you perceive AISES has impacted your career/professional success? If so, in what ways?

Prompts:

Prompts and Probes used to encourage in depth exploration of experiences:

Prompt – Can you tell me a bit more about that?

Probe – What do you mean by '_____'?

Is there anything you would like to add?

Appendix E : Participant Solicitation Notice

Research participants required

Research title: A Case Study: Perceptions of an Indigenous STEM Nonprofit Contributions to Self-Efficacy and Educational Experience.

The purpose of this study is to explore how Indigenous STEM graduates perceive a STEM nonprofit has contributed to their self-efficacy and educational experience.

You are invited to take part in a research study.

This study is being conducted by Tyler Parisien, who is a Doctor of Education candidate at Concordia University–Portland.

Participant criteria: Self-identifying Indigenous person, active AISES member during college, graduated with a STEM based degree (BS or higher) since 2015.

Participation is voluntary and confidentiality will be ensured. If you meet the participant criteria and are interested, please email Tyler Parisien at [redacted] with the subject: Research

Thank you!

Appendix F: Informed Consent

Research Study Title: A Case Study: Perceptions of an Indigenous STEM nonprofit contributions to self-efficacy and educational experience.
Principal Investigator: Tyler Parisien
Research Institution: Concordia University–Portland
Faculty Advisor: Dr. Donna Graham

Purpose and what you will be doing:

The purpose of this study is to explore how a STEM nonprofit contributes to self-efficacy and educational experiences, as perceived by Indigenous STEM graduates. We expect volunteers to enlist until data saturation is accomplished. No one will be paid to be in the study. We will begin enrollment on December 1, 2019 and end enrollment on when saturation is reached. To be in the study, you will be asked to participate in an interview. Volunteers will be asked to schedule interviews as they contact the researcher. Interviews will either take place in person or via Skype, depending on the volunteer's location. Interview length will be based on volunteer's answers and timeline.

Risks:

There are no risks to participating in this study other than providing your information. However, we will protect your information. Any personal information you provide will be coded so it cannot be linked to you. Any name or identifying information you give will be kept securely via electronic encryption or locked inside the researcher's office. When we or any of our investigators look at the data, none of the data will have your name or identifying information. We will only use a unique identifier to analyze the data. We will not identify you in any publication or report. Your information will be kept private at all times and then all study documents will be destroyed 3 years after we conclude this study. Interviews will be recorded and recordings will be deleted immediately following transcription and member-checking. All other study-related materials will be kept securely for 3 years from the close of the study, and will then be destroyed.

Benefits:

Information you provide will help uncover pros or cons of participating or membership within an Indigenous nonprofit/Professional and Learning Community Network. You could benefit this by allowing your voice to be heard about your experiences within AISES.

Confidentiality:

This information will not be distributed to any other agency and will be kept private and confidential. The only exception to this is if you tell us abuse or neglect that makes us seriously concerned for your immediate health and safety.

Right to Withdraw:

Your participation is greatly appreciated, but we acknowledge that the questions we are asking are personal in nature. You are free at any point to choose not to engage with or stop the study. You may skip any questions you do not wish to answer. This study is not required and there is no penalty for not participating. If at any time you experience a negative emotion from answering the questions, we will stop asking you questions.

Contact Information:

You will receive a copy of this consent form. If you have questions, you can talk to or write the principal investigator, Tyler Parisien at [redacted]. If you want to talk with a participant advocate other than the investigator, you can write or call the director of our institutional review board, Dr. OraLee Branch (email obranch@cu-portland.edu or call 503-493-6390).

Your Statement of Consent:

I have read the above information. I asked questions if I had them, and my questions were answered. I volunteer my consent for this study.

_____ _____

Participant Name Date

_____ _____

Participant Signature Date

_____ _____

Investigator Name Date

_____ _____

Investigator Signature Date

Investigator: Tyler Parisien email: [redacted]
c/o: Professor: Dr. Donna Graham
Concordia University–Portland
2811 NE Holman Street
Portland, Oregon 97221

[Qualtrics link redacted]

Appendix G: Questionnaire

1. Title:
   ( ) Mr.
   ( ) Mrs.
   ( ) Miss
   ( ) Ms.
   ( ) Dr.
   ( ) Other (please specify)

2. About you:

   Age_____
   Tribe_____
   Alma Mater_____
   Gender_____

3. Degree(s) obtained:

4. Current employment status:

5. Years in current position:

6. Other jobs since graduation:

7. Do you plan to continue your education?

8. How long have you been an AISES member?

9. Have you continued to participate in AISES beyond graduation?

10. Do you work or contribute to your tribal community in anyway?

[Qualtrics link redacted]

Appendix H: Study Participant Demographic Information

Participant	Tribal Affiliation	Gender Male (M) Female (F)	Age	Degrees	Years as AISES member
Focus Group Participant P1	Dine'/Navajo	M	25–34	B.S.	8
Focus Group Participant P2	Dine'/Navajo	F	25–34	B.S.	8
Focus Group Participant P3	Choctaw	F	35–44	PhD, M.S.	10
Focus Group Participant P4	United Keetoowah Bank of Cherokee	F	18–24	B.S.	4
Focus Group Participant P5	Cherokee Nation	F	25–34	PhD, M.S., B.S.	8
Focus Group Participant P6	Three Affiliated Tribes	F	18–24	B.S.	6
Focus Group Participant P7	Nimiipuu (Nez Perce)	F	25–34	M.S., B.S.	13
Interview Participant P8	Yurok Tribe	M	45–54	M.S., B.S., A.S.	7
Interview Participant P9	Laguna Pueblo	F	25–34	PhD, MESM, B.S.	16
Interview Participant P10	Crow Creek Sioux Tribe	F	25–34	B.S.	2
Interview Participant P11	Dine'/Navajo	F	35–44	PhD, M.S., B.S.	20+
Interview Participant P12	Seneca Nation	M	25–34	B.S.	2
Interview Participant P13	Cherokee Nation	F	25–34	B.S.	8
Interview Participant P14	Native Village of Kotzebue	F	25–34	B.S.	4
Interview Participant P15	Seneca Nation	M	25–34	M.S., B.S.	7
Interview Participant P16	Lac Courte Oreilles Chippewa	F	25–34	PhD, M.S., B.S.	4
Interview Participant P17	White Earth Ojibwe	F	18–24	B.S.	3

Appendix I: Statement of Original Work

The Concordia University Doctorate of Education Program is a collaborative community of scholar-practitioners, who seek to transform society by pursuing ethically informed, rigorously researched, inquiry-based projects that benefit professional, institutional, and local educational contexts. Each member of the community affirms throughout their program of study, adherence to the principles and standards outlined in the Concordia University Academic Integrity Policy. This policy states the following:

Statement of academic integrity.

> As a member of the Concordia University community, I will neither engage in fraudulent or unauthorized behaviors in the presentation and completion of my work, nor will I provide unauthorized assistance to others.

Explanations:

> **What does "fraudulent" mean?**
>
> "Fraudulent" work is any material submitted for evaluation that is falsely or improperly presented as one's own. This includes, but is not limited to texts, graphics and other multi-media files appropriated from any source, including another individual, that are intentionally presented as all or part of a candidate's final work without full and complete documentation.
>
> **What is "unauthorized" assistance?**
>
> "Unauthorized assistance" refers to any support candidates solicit in the completion of their work, that has not been either explicitly specified as appropriate by the instructor, or any assistance that is understood in the class context as inappropriate. This can include, but is not limited to:
>
> - Use of unauthorized notes or another's work during an online test
> - Use of unauthorized notes or personal assistance in an online exam setting
> - Inappropriate collaboration in preparation and/or completion of a project
> - Unauthorized solicitation of professional resources for the completion of the work.

Statement of Original Work (Continued)

I attest that:

1. I have read, understood, and complied with all aspects of the Concordia University–Portland Academic Integrity Policy during the development and writing of this dissertation.

2. Where information and/or materials from outside sources has been used in the production of this dissertation, all information and/or materials from outside sources has been properly referenced and all permissions required for use of the information and/or materials have been obtained, in accordance with research standards outlined in the *Publication Manual of The American Psychological Association*.

Tyler J. Parisien

Digital Signature

Tyler J. Parisien

Name (Typed)

2/11/2020

Date