Connecting belongingness with institutional practices and academic outcomes: A mixed-methods approach

Xi Chen
chenximonica@gmail.com

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Connecting belongingness with institutional practices and academic outcomes: A mixed-methods approach

By

Xi Chen

Approved by:

Anastasia D. Elder (Major Professor)
Jianzhong Xu
Regina Y. Hyatt
Tianlan (Elaine) Wei (Committee Member/Graduate Coordinator)
Richard L. Blackbourn (Dean, College of Education)

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Higher education institutions are facing a major challenge in retaining 1st-year college students and engaging them in meaningful activities and programs to promote their sense of belonging (Strayhorn, 2012; Astin, 1993). Though a few belonging intervention practices have been studied (Perrell, 2018; Peck, 2011), there is a lack of understanding on the dynamic mechanisms of developing belongingness through a combination of belonging enhancement practices (Yob, 2014). Moreover, there is an urgent need to examine which belonging enhancement practice has the most impact on students’ academic performance (Slaten, Elison, Hughes, Youg, & Shemwell, 2015).

This study used convergent, parallel mixed-methods design to make meanings from both qualitative and quantitative data on the effect of the service-learning leadership program (SLLP) for 1st-year students at a large, public university on perceived sense of belonging and related academic performance, and the mechanism of the dynamic process. Quantitative data contained 2 parts: the 1st part is university student record data from 2007 to 2018 with total of 2,762 students, and the 2nd part of the data were collected through pre-and post-surveys from total of 262 students in treatment and control groups. Qualitative data were collected from 9 participants
through individual interviews, focus group and weekly journals. Quantitative datasets were analyzed through mixed-design MANOVA, mixed-design ANOVA and hierarchical (logistic) multiple regressions, and qualitative data was analyzed through spiral approach.

The findings demonstrated that the studied program protected against the decline of sense of belonging in the 1st semester of college year, and it brought more benefits to male and racial minority students as compared to female and racial majority students. Moreover, the findings indicated mentorship and living-learning community practices had the most impact on students’ sense of belonging and academic performance, and suggested further improvement for performance feedback, social media and service-learning practice. The results of the study have implications for future institutional interventions and provide comprehensive practical guidelines for belonging enhancement programs for 1st-year students. The conclusions provide recommendations for designing and implementing belonging intervention programs that bring maximum outcomes on students’ sense of belonging, retention and academic performance.
DEDICATION

To my dear husband, Dr. Jinchuan Shi and my two children, Katherine Chen Shi and Andrew JinSong Shi. Thank you for your support and love along the way. The past few years has been an amazing journey for all of us as a growing family, and I am grateful to have you all beside me every single day. To my parents, Qiang Chen and Xianling Meng. Thank you for giving me life and nurturing me with love and trust. To my parents-in-law, Xinya Shi and Yaqin Song. Thank you for providing resources for me and believing in me. To all the people with good hearts, the world needs all of us to make an equal, sustainable and justice learning and living environment for the upcoming generations. To the field of educational psychology and the two concepts: “motivation” and “sense of belonging”, you made me who I am today and in the years to come.
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CHAPTER I
INTRODUCTION

Retaining college students has become a major effort among higher education institutions; over 70% of campuses offer first-year seminars to ameliorate attrition rates (O’Keeffe, 2013; Skipper, 2002). However, the first-year college student attrition rate is still between 30-50% in the United States (Schneider, 2010, p.16). Researchers have pointed out several factors that make first-year students most vulnerable to attrition, which include “relocation for study, separation from family and friends, adjustment to academic life and expectations of faculty staff and the need to make new friends” (Lee, Olson, Locke, & Michelson, 2009, p. 306), and the combination of these stress factors makes an impact on students’ ability to adjust their lives in the higher education setting (Barr, 2007; Dyson & Renk, 2006). Moreover, Hurtado and Carter (1997) asserted that students’ perceptions of being both academically and socially integrated influence their decision to stay in college, and the perceived sense of belonging resulting from successful integration can “combat many barriers to persistence” (Vincent, 2016, p. 5). The feelings of mattering, sense of membership, and relationship-building that are reinforced through perceived sense of belonging allow students to make psychosocial connection to the institution (Elliott, Kao, & Grant, 2004; Schlossberg, 1989; Strayhorn, 2012).

This phenomenon led researchers to identify conditions and intervention programs to enhance students’ belonging, success, retention and persistence in higher education, and Kuh,
Kinzie, Schuh, Whitt, and Associates (2005) identified 10 promising high impact practices (HIPS) that promote learning in all college students. Two of the ten HIPS, service-learning and living-learning community (LLC), have been widely studied for their relationship with students’ perceived sense of belonging, retention, graduation rate and persistence (Yob, 2014). Bringle, Hatcher and Muthiah (2010) maintained that well-implemented service-learning meets most or all of the recommendations for a high-quality learning environment: student involvement in campus life, ongoing feedback, project-based work that have practical meaning and personal relevance, and is directly linked to student retention and persistence. In addition, institutional programs and practices like peer mentoring, performance feedback and social media interaction, also demonstrated its effectiveness in terms of students’ perceived sense of belonging, academic performance and achievement outcomes (Collings, Swanson, & Watkins, 2014; Holt & Berwise, 2012; Peck, 2011; Vincent, 2016).

Although research on university sense of belonging is still in its infancy, its critical role in students’ academic achievement, retention, and persistence in college has gained much attention in recent years (Booker, 2016; Rainey, Dancy, Michelson, Stearns, & Moller, 2018; Slaten, Elison, Hughes, Yough, & Shemwell, 2015; Strayhorn, 2012). Also, researchers have attempted to garner better understanding on cultural differences of belonging as several studies have demonstrated that underrepresented students struggled to develop a sense of connectedness in higher institutions, especially in predominately White campuses (Hurtado & Carter, 1997; Johnson et al., 2007; Strayhorn, 2012). As Hurtado and Carter (1997) argued it is important to understand the factors that are involved in the processes of persistence and academic performance among racially marginalized students. They further stated that although sense of belonging is viewed as a critical factor in terms of student retention and persistence, this
construct is significantly under studied at the college level, and more data-based evidence on the relations between student belonging and educational outcomes is needed to expand the current literature.

**Statement of Problems**

Although previous literature has suggested the effectiveness of various belonging interventions on perceived belongingness, there is still a lack of understanding on “how organizational or institutional attributes, conditions, ethos, or practices influence college students’ sense of belonging” (Strayhorn, 2012, p. 13). Moreover, scant studies have investigated an integrated program that combines several belonging interventions and practices (service-learning, living learning community, social media use, performance feedback and mentorship), and scholars have pointed out the importance of intervention combination as means to “positively affect persistence” (Upcraft et al., 2005, p. 44). As Tinto (1993) stated, institutions should involve students in campus activities and events, make sure that students are supported both socially and intellectually for their individual endeavors, and it is important to offer opportunities for students to have frequent and rewarding contact with faculty, staff, and peers in a variety of setting both inside and outside classroom. Though a few existing studies have attempted to study combined belonging and retention interventions (e.g. Clton, Conner, Schultz, & Easter, 1999; Fidler & Moore, 1996; Mangoald, Bean, Adams, Schwab, & Lynch, 2002-2003; Soldner, Lee, & Duby, 1999; Yockey & George, 1998), none of them included belonging and retention interventions/practices such as service-learning, social media and performance feedback. However, these three interventions/practices have demonstrated their effect on students’ perceived sense of belonging and subsequent performance outcomes, such as retention and GPA (Vincent, 2016; Yob, 2014).
In addition, there is an urgent call in the service-learning field to understand which implementation variations matter the most in terms of maximizing student benefits and to identify what factor mediates the changes in students (Celio et al., 2011; Yorio & Ye, 2012). The same issue applies to the living and learning community, mentorship programs and other existing belonging and retention interventions (peer feedback, social media interaction, normalizing concerns of fit, institutional communication) as previous literature neglected to investigate how and why these programs made an impact on students’ overall sense of belonging, psychological well-being, and academic performance (Perrell, 2018; Strayhorn, 2012). The belonging intervention literature also revealed the general concept of belonging has been examined through several related constructs (sense of community, relatedness, social integration, connectedness) across studies and disciplines, which made it difficult to compare findings across studies and build a knowledge base that is specific to belongingness. In their review, O’Farrell and Morrison (2003) made a call for the need for consensus on student bonding to school and related constructs to address lack of consistency in the field preventing scholars from making inferences across studies. Therefore, it is crucial to simultaneously examine how an integrated belonging intervention program with several combined intervention strategies influence students’ perception on belonging under a holistic and traditional theoretical framework of belongingness.

Furthermore, there is no existing study examining which belonging enhancement interventions has the most effect on students’ retention, years of degree attainment and GPA, and if these students’ performance indicators are crucial to institutions. It is important to make a comparison between these interventions and determine how institutional resources should be distributed for maximizing the outcomes (Slaten, Ferguson, Allen, Brodrick, & Waters, 2016; Strayhorn, 2012). As argued from previous literatures, more focus should be given to specific
programs or direct interventions that can reasonably enhance persistence of students (Pittman & Richmond, 2008; Strayhorn, 2012; Tinto, 2006-2007; Yob, 2014). Researchers have warned that almost all of the belonging interventions share some drawbacks and limitations in terms of its implementation, maintenance and effectiveness (Smith, 2015; Vincent, 2016), so it is necessary to compare the differences between these institutional practices in terms of their impact on students’ academic achievement (GPA, retention, graduation rate), and strategically allocate institutional resources. Moreover, Yob (2014) has urged more investigations should be conducted on the long-term impact of service-learning and other retention interventions, but scant study has examined the effect of belonging enhancement practices both longitudinally and cross-sectionally.

Although a large amount of literature has examined the effect of belonging interventions and practices on students’ perceived sense of belonging and its related constructs, researchers are reluctant to investigate the role of students’ characteristics on the effectiveness of belonging enhancement practices. With current understanding of how students’ characteristics play a role in their perceived sense of belonging (Carey, 2005; Johnson et al., 2007; Maestas, Vaquera, & Zehr, 2007; Walton & Cohen, 2007), it is important to know how students with different racial and gender backgrounds perceive sense of belonging before and after participating in an integrated belonging enhancement program at a large, predominately White, land-grant university. Another issue in the existing literature is that only a few studies have adopted well-developed and psychometrically sound instruments to measure sense of belonging and its related constructs, and most of the studies either used ad hoc surveys or instruments that do not have strong psychometric properties to measure these constructs. One of the possible reasons is the lack of reliable and well-accepted belonging instruments in an university setting (Slaten, Elison,
Deemer, Hughes, & Shemwell, 2017). After reviewing current belonging literature, Slaten et al., (2016) pointed out there is an urgent need to examine which interventions help enhance sense of belonging by adopting valid and reliable measure of university belonging, so higher education institutions will gain better understanding for whether or not their current intervention strategies have an impact on students’ levels of belonging.

**Significance of Study**

Though Tinto’s (1987) student attrition model has been widely adopted to understand student retention and persistence, scholars have criticized several aspects of the model. This is specially so because belongingness was only implicitly mentioned in the model and was only viewed as a consequence of social and academic integration instead of having an emphasis on the belongingness construct and examining it independently (Hurtado & Carter, 1997). Therefore, this study intends to bring out the hidden concept--belongingness-- to explicitly and systematically examine its role in the relations between belonging enhancement practices and student achievement (retention, graduation rate, and GPA). It is also important to examine which practices in terms of program implementation matter the most for enhancing perceived sense of belonging and improving student retention, graduation rate, and GPA. Also, this study fills the gap by examining how students’ characteristics affect their perceived sense of belonging after participating in an integrated, belonging intervention program, which is important to the increasing student diversity in higher education. As Hurtado and Carter (1997) stated it is important to understand “the achievement and persistence of students who have historically been excluded from education and are now part of the emerging racially and ethnically diverse groups in colleges and universities” (p. 324). By understanding the dynamic process of how belonging interventions affect freshman students’ sense of belonging, and which belonging enhancement
practices play a bigger role in terms of students’ academic achievement, the belonging enhancement practices can benefit by promoting the most effective and congruent practical guidance of implementation to maximize student’s behavioral, psychological and affective learning outcomes. This can also extend its critical role in terms of retaining freshman students in their college career and increasing their academic achievement. This study is uniquely valuable because it will comprehensively explore both the precedents that affect belonging and the educational outcomes that are associated with belonging by using a convergent parallel mixed-methods study design.

**Conceptual Framework**

The conceptual framework for the current study integrated previous theoretical frameworks and models, and it is also based on results from previous empirical studies. Specifically, Baumeister and Leary’s (1995) belongingness hypothesis provided foundational understanding for the importance of both the behavioral and psychological aspects of belongingness, and supported the crucial need to bring out the hidden concept of sense of belonging from Tinto’s (1993) model of institutional departure. Together, Strayhorn’s (2012) model of students’ sense of belonging and Tinto’s (1993) model of institutional departure provided foundation for the importance of belonging and its influence on students’ persistence and outcomes related to belongingness. These two models also highlighted the role of social identities (e.g. gender, race/ethnicity, class) and institutional contexts and practices (e.g. belonging enhancement practice, school environment and policy). Moreover, Lee and Robbin’s (1995) interpretation of the three main components of belonging (companionship, affiliation, connectedness) provide a way to integrate various conceptualizations with the traditional and understanding of the overarching belonging construct. Taking these supporting theories and
models together, the proposed conceptual model (see Figure 1) bridges the aforementioned research gaps in the existing literature on the role of belonging in retention. It provides a framework to simultaneously examine the predictors contributing to belonging and students’ outcomes related to belonging in the context of combined belonging enhancement practices, and also examines the role of students’ characteristics in their perceived level of sense of belonging.

![Conceptual model for the present study](image)

**Figure 1. Conceptual model for the present study**

**Research Questions**

RQ 1: Does a service-learning program with embedded belonging enhancement practices affect students’ sense of belonging, and students’ GPA, retention and years of degree attainment?

Sub-question 1: Do students from the treatment (a service-learning leadership program) and control (a first-year experience program) groups perceive sense of belonging differently before and after the program?
Sub-question 2: Do program participants perceive sense of belonging differently before and after the program based on their gender and race?

Sub-questions 3: Do different belonging enhancement practices play different roles on students’ GPA, retention and years of degree attainment?

RQ 2: How does a service-learning program with embedded belonging enhancement practices affect students’ sense of belonging?

**Summary**

Previous research has pointed out the crucial role of sense of belonging in student retention, academic success, and well-being (Strayhorn, 2012; Tinto, 1993); therefore, it is important for higher education institutions to engage in intentional programs and practices to support sense of belonging (Upcraft et al., 2005). Coupled with the evidence from empirical studies on the relations between various belonging interventions and students’ perceived sense of belonging and its related constructs, and the relations between belonging interventions with several key academic performance indicators, it is necessary to simultaneously and comprehensively examine both the precedents and outcomes of belongingness in the context of belonging enhancement intervention and practice. Moreover, with the complexity of the conceptualization and mixed use of several belonging related constructs appearing in the literature, it is crucial to systematically examine those constructs broadly. The information obtained in this study will analyze both the contributors and outcomes of belongingness in the context of a service-learning program with several embedded belonging enhancement practices that have existed for 12 years. By understanding which belonging enhancement practice brings most influence on students’ academic outcomes, higher education professionals are able to
distribute university resources more strategically and effectively to maximize student sense of belonging, especially for culturally underrepresented students.

Glossary of Terms

Service-learning

Service-learning is a teaching and learning approach that brings relevant community service into academic content and learning processes (Bowen, 2010). The root of service-learning can be traced back to three philosophers, John Dewey, Jean Piaget and Alexis de Tocqueville, as each argued that when the purpose of learning is precise and when students are actively involved in their own learning, then the best outcome of learning appears (Billig, 2000). Though service-learning as an important pedagogical tool has existed for decades, its definition has not reached congruence (Furco, 2011; Lambright & Lu, 2009). In recent years, Lim and Bloomquist (2015) defined service-learning as “a form of credit-bearing experiential learning in which students participate in service activities in a community setting with the intent to mutually benefit both the provider and recipient of service, while maintaining a balance between service and learning. In addition, students should regularly reflect upon how their service activities connect with course content as a means of achieving both academic and civic learning or developing critical thinking skills” (p. 203).

Living-Learning Community (LLC)

LLC can be defined as “residential hall-based undergraduate programs with a particular topical or academic theme” (Inkelas, Karen, & Soldner, 2011, p.1), or “structured programmatic interventions that bring students and faculty members together in meaningful ways and include students living together” (Dunn & Dean, 2013, p.12).
Mentoring

Crisp (2009) defines mentoring as “support provided to college students entails emotional and psychological guidance and support, help succeeding in academic coursework, assistance examining and selecting degree and career options, and the presence of a role model by which the student can learn from and copy their behaviors relative to college going” (p. 189).

Performance Feedback

Limon and Boster (2003) stated “performance feedback occurs when a person or group receives information regarding past performance” (p. 14). Performance feedback has two forms, which are positive feedback and negative feedback. Positive feedback indicates “to the person or group that the work they completed is adequate, above average, or exceptional” (p.14). Negative feedback indicates “to the person or group that the work completed is subpar, below average, or abysmal” (p.14).

Social Media

According to Kaplan and Haenlien (2010), social media platforms can be defined as technologies that “allow the creation and exchange of user-generated content” (p. 61), which include tools such as blogs, micro-blogs, videosharing, and video conferencing that all allow users to create and share new content. There is another form of social media, which is called social networking platforms that allow users to create profiles, facilitate social connections and establish virtual relationships with their contacts through webs of connection (Boyd & Ellison, 2007; Martinez-Aleman, 2014). Mastrodicasa and Metellus (2013) defined social networking platforms as “websites that allow users to connect to one another based on shard interests, activities, or characteristics” (p. 22).
Belonging

Belongingness constructs are grounded in various psychological and sociological theories, approaches, and paradigms; therefore, belongingness lacks a unified definition (Slaten et al., 2016). After a systematic review of existing empirical literatures and belonging instrument development studies by Slaten et al. (2016), it was revealed that the construct of belongingness has been dismembered and its’ elements were reassembled in countless ways, which resulted in several commonly interchangeably referred belongingness constructs, such as relatedness, sense of community, connectedness, sense of membership and social integration based on a set of theoretical groundings. In this study, belonging is defined as “students’ perceived social support on campus, a feeling or sensation of connectedness, the experience of mattering of feeling cared about, accepted, respected, valued by, and important to the group or others on campus. It is a cognitive evaluation that typically leads to an affective response or behavior” (Strayhorn, 2012, p. 17).

Retention Rate

Hagedorn (2005) defines retention as an institutional assessment of a students’ persistence of college from one year to the next until graduation. Retention rate is the “percentage of a school's first-time, first-year undergraduate students who continue at that school the next year. For example, a student who studies full-time in the fall semester and keeps on studying in the program in the next fall semester is counted in this rate” (https://studentaid.ed.gov/sa/fafsa ).
CHAPTER II
LITERATURE REVIEW

Traditional Theoretical View of Belongingness

Belonging was first noted by Maslow (1943) as a need in his hierarchy of needs model. Maslow proposed five fundamental needs that “drive behavior of individuals in hierarchical fashion” that apply to all human beings (Slaten et al., 2016). One of the five needs is labeled as love and belonging, which is ranked third in the hierarchy, which Maslow (1954) argued will only emerge after the satisfaction of the psychological and safety needs, and before an individual can pursue esteem and self-actualization. Moreover, he stated the motivation to belong relates to the connections built upon the genuine relationships with family, friends, community and social groups (Maslow, 1954). Later, Kohut’s (1984) psychology of the self-expanded Maslow’s (1968) understanding on belonging, and introduced three major self needs, which are the need for grandiosity, the need for idealization, and the need for alter ego or belongingness. Contrary to Maslow’s (1968) argument on there should be a sequence for the appearance of each need, Kohut argued belonging should be viewed as a “singular concept independent from other needs” (Vincent, 2016, p. 3). Therefore, belongingness was described as “people seek to confirm a subjective sense of belongingness or being a part of in order to avoid feelings of loneliness and alienation” (Lee & Robbins, 1995, p. 234).

Based on the groundwork of Kohut’s (1984) need for alter ego and belongingness, and further elaborations from other scholars (Detrick, 1985; Patton, Connor, & Scott, 1982; Wolf,
1988), Lee and Robbins (1995) proposed there are three components construed belongingness, which are companionship, affiliation and connectedness. They argued these three aspects are not only consistent with previous theoretical writings on belongingness, but also align with the developmental literature on belongingness and attachment (Lyddon, Bradford, & Nelson, 1993). Specifically, from early infancy to young childhood to adult life, companionship is developed through intimate contact, likeness and sense of security, and it serves as a foundation for self-esteem, skills and natural talents. However, companionship may not be properly developed in all instances, and “chronic or traumatic empathic failures early in life may disrupt the development of needs”. (Lee & Robbins, 1995, p. 233). This developmental disruption can later cause the difficulty to form close relationship with people, or preference of isolation to avoid possible rejection. More importantly, the lack of companionship in early life often leads to a low level of confidence and social skills which challenge children to maintain relationships and a stable sense of self. Affiliation, or twinship, on the other hand, plays a more important role in peer relationships during the transition time from childhood to adolescence. The need of affiliation focuses on seeking similarities among appearance, opinions, and values, and extends an individual beyond parent figure by joining in group activities and organizations (Lee & Robbins, 1995). Failure to establish this need through engagement in groups and reassurance from others can cause damage to the person, such as seeking superficial roles and relationships or join “deviant rebellious subcultures, such as gangs or cults”. The third need, connectedness, begins to emerge during adolescence and lasts throughout adulthood when people are established and satisfied with the need of companionship and affiliation, and become comfortable to be surrounded with people who are different than them (Kohut, 1984). The need for connectedness leads the person to take additional social roles in life, such as being marital partners and parents.
On the other hand, frustration and disappointment often result from the failure of getting connected with others, and lead the person to struggle with taking responsibilities or accept social roles (Lee & Robbins, 1995).

Self-determination theorists, Deci and Ryan (1985), also highlighted three innate psychological needs: competence, autonomy, and relatedness. Their understanding on the need for relatedness is grounded by attachment theory, which emphasizes on attachment to others and the desire for safety. Also, the need for relatedness described through Deci and Ryan (1985) matches with Maslow (1954), Kohut (1984), and Lee and Robbins’s (1995) arguments on the need to belong, in which relatedness is characterized as an innate psychological need and a desire to feel connected to, caring for and being cared for by valued others (Ryan & Deci, 2002). One unique contribution from Deci and Ryan (1985) theory is that psychological health will only be reached when all three needs are satisfied. Although self-determination theory is one of the theories that has often been cited in the belonging and relatedness education literatures, there are several earlier works also highlighted the concept of belonging in education settings, which include Dewey’s (1938) concept of supportive school environments, Vygotsky’s (1962) model of social environment in schools, and Erikson’s (1968) social identification model, and the most recent and one of the seminal conceptual frameworks on belonging was proposed by Baumeister and Leary (1995). Their belongingness hypothesis characterized two main aspects of belongingness: frequent one-on-one contact with others and perceived stable relationship through the connections. Their framework also provided a definition of the overall construct of belonging, which the need to belong as “a need to form and maintain at least a minimum quantity of interpersonal relationships” (Baumeister & Leary, 1995, p. 499).
Although the general construct of belongingness has been systematically and congruently discussed theoretically (Baumeister & Leary, 1995; Kohut, 1984; Lee and Robbins, 1995; Maslow, 1943), several inconsistent practices existed when applying the concept of belongingness to different fields and research settings. One of the major concerns is the lack of conformity in defining and operationalizing belonging (e.g. Finn, 1989; Mouton, Hawkins, McPherson, & Copley, 1996). Consequently, accurate comparison and interpretation across research studies is difficult. Moreover, belongingness lacks scientific clarity, and scholars use various terms to describe student belongingness, such as a sense of community, sense of school membership, relatedness, social integration and sense of connectedness (Slaten et al., 2016; Slaten et al., 2017). These terminologies have been used interchangeably in research studies, and often, an individual author determined how the term is used and what the meaning of the term is in a particular context (Anderman, 2002; Libbey, 2007; Rowe & Stewart, 2009). Consequently, this prevents scholars from fully understanding and adapting belongingness to more specific educational practices due to disparity in conceptualization, definition and terminology (Allen & Bowles, 2012). On the other hand, Slaten et al. (2016) argued essentially research on belonging in university settings targets the same thing: “how students feel in relation to their respective university campuses” (p. 2) based on various theories, different constructs, varying definitions and measurements. In a review work, O’Farrell and Morrison (2003) made a call for the need for consensus on student bonding to school and related constructs to address lack of consistency in the field preventing scholars from making inferences across studies.

In summary, though the concept of belongingness has been widely examined, and its vast literature has demonstrated significant and positive effects on students’ motivational, academic, psychological, developmental, and achievement outcomes (Slaten et al., 2016), the
operationalization and measurement of students’ belongingness and its related constructs varies greatly, largely due to varying theoretical conceptualizations of belongingness across multiple education-related disciplines. There are approximately a dozen approaches to defining belongingness with different philosophical foundations and applications to school belongingness (see Appendix A). The following section discusses the theoretical frameworks of various commonly studied belonging constructs.

**Theoretical Frameworks of Belonging Related Constructs**

The construct of psychological sense of community is derived from community psychology that holds a unique and detailed viewpoint on the complexity of individual experience. Specifically, the key concept of ecological model in community psychology emphasizes the important role the “system” plays in individuals’ thoughts, behaviors, and emotions. In other words, community psychology believes individuals’ own experiences should be considered within a larger system (Jason, Stevens, & Ram, 2015). The concept of psychological sense of community was first introduced by Sarason (1974) as “the perception of similarity to others, and acknowledged interdependence with others, a willingness to maintain this interdependence by giving to or doing for others what one expects from them, the feeling that one is part of a larger dependable and stable structure” (p. 157). Later, McMillan and Chavis’ (1986) expanded Sarson’ (1974) notion of psychological sense of community, and operationalized this multidimensional construct into four dimensions: membership, fulfillment of needs, shared emotional connection and influence. Moreover, they argued there are several elements influencing individuals’ experience with other community members and their sense of community, which include the mutual influence between the self and the larger community, individuals’ needs satisfied by the community, and perceived belongingness to the community
(McMillan & Chavis, 1986). Though McMillan and Chavis’s (1986) model resulting in a relatively cohesive sub-literature, and is widely accepted by the research community for studying and understanding the construct of sense of community, their theory does not specify a particular context or referent. Therefore, the concept of sense of community has been investigated in neighborhood (Obst, Smith & Zinkiewicz, 2001), workplace (Chipeur & Pretty, 1999), school (Pooley, Breen, Pike, Drew, & Cohen, 2008; Sayer, Beaven, Stringer, & Hermena, 2013), and classroom (Rovai, 2002) settings, and one of the sub-constructs, classroom sense of community has gained much attention in recent years (Sayer et al., 2013). Rovai (2002) theorized classroom sense of community as members of classroom community should feel they belong and are safe in class and have a sense of mutuality and connectedness among the peers (Rovai, 2002). The construct of classroom sense of community is characterized as “the feelings of learning community members regarding the degree to which they share group norms and values, and the extent to which their educational goals and expectations are satisfied by group membership” (Petrillo, Capone, & Donizzetti, 2016, p. 400).

The construct of relatedness is derived from Deci and Ryan’s model (1991), and they viewed relatedness as a sense of secure openness with others and a desire to feel connected. As a basic psychological need, relatedness is considered less important than autonomy and competence in their model, and was only conceptualized to the degree that belongingness affects autonomy and competence. As Ryan and La Guardia (1999) stated, it is necessary for relatedness to be coupled with autonomy and competence in order to transform learning from the internalization stage to the integration stage. On the other hand, there will be an adverse effect on self-determined motivation when there is a lack of the three innate needs. Ryan and La Guardia (2000), stated “relatedness reflects the desire to have others to respond with sensitivity and care
to one’s experience and who convey that one is significant and loved” (p. 150). This marginalization of relatedness within self-determination theory has led to a generalized definition of relatedness such as openness and connection. In other belongingness constructs, relatedness is only one component.

Sense of connectedness and sense of membership are two belongingness constructs derived from the same theoretical tradition of combining the work of Melvin Seeman and Hirschi. Seeman’s (1959) sociological work on alienation understands disconnection as a function of four factors: powerlessness, or lack of perceived control over events; meaninglessness, or lack of understanding events; normlessness, or lack of respecting and identifying with group rules; and self-estrangement, or engaging in behaviors untrue to oneself. Seeman evolved his understanding of alienation and later included dimensions of social isolation, or the sense of group exclusion, and cultural estrangement, or the rejections of values and standards (1975). Seeman’s work has been intertwined with Hirsh’s Social Bond Theory, together, these two theories viewed society as a whole, and conceptualized alienation and social bond as multidimensional global phenomenon and relationship developed between individual and society (Hirschi, 1969; Seeman, 1959). These two theories utilized the concept of connectedness to explain youth behavior, and studies have shown positive association between feeling of connection and prosocial outcomes, and the negative effect of connectedness on high-risk outcomes (Brown, Leigh, & Barton, 2000).

Moreover, recent literature on connectedness has been differentiated between different social contexts, such as school, work, family, or peers, and researchers have argued that these sub-constructs were conceptually and empirically distinct (Barber & Olsen, 1997; Hindelang, 1973; Krohn & Massey, 1980; Krohn, Massey, Skinner, & Lauer, 1983; Richmond, 1985). For
example, an individual’s perceived connectedness with family might differ greatly from perceived connectedness to school or peers (Brown et al., 2000). Particularly, two sub-constructs, school connectedness and social connectedness have gained much attention in recent years. School connectedness is theorized by Karcher and Lee (2002) as a multidimensional construct composed of “belongingness or social support, relatedness or specific relational support, and active involvement and value of social support received by the students” (Lohmeier & Lee, 2011, p. 85). Contrary to school connectedness, the sub-construct of social connectedness concerns individual’s behavior and affect in several contexts and relationships, and this construct is generally measured by multiple ecological dimensions, such as neighborhood, school, family, or friends, parents, and teachers (Townsend & McWhirther, 2005).

While connectedness constructs use varying configurations, Seeman (1959) and Hirschi’s (1969) dimensions of alienation and social bonds (respectively), sense of school membership constructs use Jeremy Finn and Wehlage’s interpretation of Seeman and Hirschi’s work. Finn (1989) developed the participation-identification model, which describes involvement as a function of commitment, participation in school, perception that one is part of the school, school is part of one’s experience, and one values both school and schooling. Moreover, Wehlage’s (1989) theory of school drop-out prevention proposed that students’ engagement and persistence were essentially determined their perceived sense of membership in school, and he conceptualized membership as a multidimensional construct that consisted of attachment, commitment, involvement and valuing school. Both Finn (1989) and Wehlage’s (1989) theories emphasized the reciprocal social interactions between the students and others in the school, and highlighted the importance of establishing social bond, developing sense of attachment and sense of belongingness for at-risk students that promotes commitment to and engagement in school.
While most connectedness and school membership constructs focus on K-12 belongingness, social integration was developed to address a specific post-secondary belongingness problem.

The social integration construct is grounded in Tinto’s student attrition model (1987). Unlike all other constructs of belongingness, social integration was formulated using a pragmatic paradigm to solve a specific problem in a specific socio-developmental population rather than from a philosophical orientation. Post-secondary attrition is a multi-faceted problem, and in modeling that problem, Tinto included the belongingness construct social integration to account for college student dropout due to social alienation. He leaned heavily on Durkheim’s (1897) theory of suicide, which understands suicide as an issue of social cohesion. Specifically, egoistic suicide was formed by Durkheim’s sociological observation of religious affiliation and suicide, finding that religions that necessitate strong social integration had lower rates of suicide; he confirmed this relation in other affiliations such as marriage and political societies. In translating these findings to post-secondary attrition, Tinto (1987) posited that weak social integration will lead to dropout.

In recent years, Tinto’s student attrition model (1987) has received some critiques although it is one of the most cited and adopted theories in student belonging and retention literature. One of the major critiques was that the attrition model mainly focused on traditional and white students, with less consideration on non-traditional and racial minority students (Bean & Metzner, 1985; Hurtado & Carter, 1997; Strayhorn, 2012). Other scholars also argued that there is no uniform measure on social integration, and the measures on the construct of social integration mainly focus on students’ behavioral aspects associated with involvement in campus life but ignore the psychological aspects on their involvement, which is one of the possible
causes for the de-emphasis on the concept of belongingness in majority of empirical studies (Hurtado & Carter, 1997).

**Belonging Enhancement Interventions**

A review of previous literature identified several belonging enhancement practices and intervention strategies, such as service-learning, peer and faculty mentorship, LLC, social media interaction, and performance feedback. Among the five belonging enhancement practices, performance feedback is the least studied intervention strategy, and the remaining interventions have been examined in relation to several aforementioned belonging related constructs, such as sense of community, sense of membership, relatedness, sense of belonging, and social integration. Although findings from previous studies are mixed, in general, researchers support the notion that these various types of belonging enhancement practices positively contribute to students’ perceived belongingness and other belonging related constructs (Collings, Swanson, & Watkins, 2014; Pak, 2016; Peck, 2011; Perrell, 2018). However, these studies hold some limitations in terms of study design, selection of measurement instruments, method of data collection and data analysis, and varied conceptualization and mixed-use of various belonging related constructs.

**Service-learning**

In recent years, service-learning has been supported for its positive effect on a diverse range of students’ learning outcomes through large amount of empirical studies and meta-analysis studies (Celio, Durlak, & Dymnicki, 2011; Conway, Amel, & Gerwien, 2009; Eyler & Giles, 1999; Novak, Markey, & Allen, 2007; Warren, 2012; Yorio & Ye, 2012). Specifically, robust research findings showed improvement on students’ personal, moral, social and civic
development as well as their motivation and cognitive skills for school work evidenced by increased academic performance through service-learning experience (Lovat & Celment, 2016). However, service-learning is not without its criticism; for example, service-learning implementation suffers from low quality and sustainability due to lack of standard framework in this multifaceted practice (Wu, Wang, Cao, Huang, & Yee, 2014). According to Lambright and Lu (2009), even though there is a general agreement on the positive effect of service-learning participation, it is less known which factors influence this educational impact. Moreover, previous literatures demonstrated the relationship between service-learning and retention, graduation rate and GPA, but less is known about which motivational and affective mechanisms promote this relationship. Scholars have urged future studies to understand the affective process that are involved in the service-learning process (Yob, 2014). Because service-learning pedagogy has its unique relevance to peer relationships, interaction between student and faculty, and extracurricular involvement (Bringle et al., 2010), scholars have been trying to examine the connection between sense of belonging and service-learning (Muses, Yi, & Saelua, 2017; Pak, 2016).

McKay and Estrella’s (2008) study first showed that service-learning provided opportunity for high quality faculty-student interaction, and this interaction positively associated with student academic and social integration. Since Hausmann, Schofield and Wood (2007) stated sense of belonging is often viewed as an outcome of academic and social integration, it is plausible service-learning participation may positively relate to sense of belonging. This relationship is further confirmed by a few existing studies, for example, Pak (2016) used self-developed questionnaire and student reflection writing to examine students’ perceived level of sense of belonging and the factors influence sense of belonging in service-learning setting. The
author reported many of the students revealed high level of sense of belonging after their service-learning experience, but a few students reported some level of isolation. His results also showed several variables associated with service-learning that influenced students’ perception on sense of belonging, such as engage in culturally relevant activity, develop meaningful interaction with people, and strengthen ties with classmates and professors. The author explained that other variables may also play key roles in sense of belonging and need to be further explored in the context of service-learning. Like most of the existing studies, the concept of sense of belonging was not explicitly defined, and it was used and interpreted interchangeably with the term social integration in this study, which increase the difficulty for interpretation and comparison between studies. Another study by Muses et al. (2017) was interested to investigate which types of culturally engaging campus environments influence student perceived sense of belonging, and results showed community service was one of the campus environments that significantly and positively impacted on sense of belonging for both white and non-white college students.

Similarly, Soria, Troisi and Stebleton (2003) investigated the effect of students’ involvement in community service on their sense of belonging on campus, and their results indicated that when holding classmate interactions and participation in student organization, community service is positively related to students’ sense of belonging on campus. In addition, they reported that students who had to find service opportunities on their own reported lower sense of belonging than students who attained service opportunities through a university department, Greek life organizations and student organizations. York and Fernandez (2018) conducted the first study that quantitatively and directly examined the relationship between service-learning participation and sense of belonging, and they found out that transfer students who took a service-learning course perceived a higher sense of belonging than those who did not.
More importantly, their results suggested the relationship between the number of service-learning course enrolled and level of sense of belonging was curvilinear, which students who took only one or more than five service-learning courses had strongest sense of belonging compared to those who took two to four service-learning courses.

Although the before mentioned studies have suggested that increased sense of belonging and social integration from service-learning experience, the construct of sense of belonging was not widely nor explicitly studied yet. One explanation is that most of the previous studies were investigated under Tinto’s (1987) model; therefore, the concept of sense of belonging was mainly seen as contributed by peer and faculty integration/interaction and interpersonal relationships. However, many scholars have argued that belonging should be viewed and measured as an independent construct relates persistence and commitment in university level (Nora & Cabrera, 1993). Another reason is the lack of congruent belongingness measurement due to the complexity of conceptualization and operationalization the general belonging construct (Slaten et al., 2017), which evidenced in the aforementioned two quantitative studies that examined the relations between service-learning and students’ perceived belongingness without adopting any existing validated belonging instruments.

**Living-learning Community**

According to a meta-analysis conducted by Inkelas, Karen and Soldner (2011), there is a range of benefits from participation in LLC, such as faculty and peer interaction, psychological wellbeing, academic learning and engagement, and persistence in college. Specifically, Schussler and Fierros (2008) found that living and learning community provided opportunity for students to integrate into “social and academic fabric”, thus the higher integration students were able to get from the LLC, the greater sense of belonging that students perceived from the experience
However, there are some discrepancies in terms of the relation between LLC participation and students’ sense of belonging. For example, three studies found that LLC students reported higher score on sense of belonging than non-LLC students (Hausmann, Schofiled & Woods, 2007; Hoffman, Richmond, Morrow & Salomone, 2002; Inkelas, Daver, Vogt & Leonard, 2007), but another study indicated LLC participation had no significant effect on freshman students’ sense of belonging (Johnson et al., 2007).

Based on the mixed-results from previous studies, Spanierman et al. (2013) conducted a mixed-method study to examine the effect of LLC experience on sense of community and two types of sense of belonging, which are sense of belonging to university and sense of belonging to residence hall. Their results showed that compared to non-LLC students, there were higher sense of community and belonging to residence hall for LLC students, but there was no difference on reported sense of belonging to university among these two groups of students. This is one of the few studies that examined sense of belonging and sense of community as two independent belonging-related constructs in one study, but the authors did not explicitly introduce the fundamental theoretical and conceptual differences between these two constructs. In addition to these quantitative results on the relationship between LLC and sense of belonging, a few qualitative studies focused on understanding how LLC foster students’ sense of belonging, and some most commonly discussed themes were informal peer interaction and access to important resources (Altimare & Sheridan, 2016; Spanierman et al., 2013). Interestingly, LLC students revealed some experiences that non-LLC students did not indicate, such as “overnight trips, educational programs, studying with hallmates and making friends from diverse backgrounds” (Spanierman et al., 2013, p. 321).
Scholars have warned some challenges and issues on implementing, maintaining and assessing LLC; for example, although most of LLCs share similar goals, they do not necessarily been implemented the same way (Smith, 2015). According to Altimare and Sheridan (2016), there are varied forms of programs derived from the original learning community model which was established back in 1920s, such as intensive learning community, living-learning community, and residential college. Different programs have different emphases in terms of students learning and wellbeing. The biggest struggle with LLC is the limited access for all students due to the cost of the program, lack of space, and other shortages on institutional resources. Therefore, some scholars urged for alternative strategies that hold simple structure, less faculty and staff involvement that could still bring benefits to students’ college experience (Stassen, 2003).

Co-residency or so-called living community has also been studied for its impact on several belongingness constructs. For example, Lounsbury and DeNeui (1996) conducted a multi-institutional study on the effect of students’ living environments on their sense of community and belonging, and the results showed that students who lived in residence halls had greater sense of community than those who lived off-campus. Other researchers also pointed out that students are able to develop peer relationship and establish the need for affiliation through communal living, and students view residence hall as the most important place to form connection and community (Astin, 1984; Berger, 1997; Cheng, 2005; Inkelas et al., 2007; Johnson et al., 2007; Schussler & Fierros, 2008). By using large scaled data from the 2004 National Study of Living-Learning Programs (NSLLP) collected from multiple institutions, Johnson et al. (2007) found out that students’ sense of belonging was significantly predicted by their perception of the residence hall, and this relation was the most significant for Asian Pacific
American students. Similarly, Inkelas et al. (2007) also used data from NSLLP to examine the relations between residence hall experience and first-generation college students’ transition issues. Though the authors labeled the two dependent variables as social transition and academic transition, the three items used to measure each of the two variables were essentially aligned with the conceptualization of social and academic integration. Their findings suggested that first-generation students who were able to use residence hall resources and have interaction with faculty members through Living-learning programs perceived higher social and academic integration than their counterparts living in a traditional residence hall setting. Through in-depth interviews with seven female undergraduate students, Wessel and Salisbury (2017) found these students felt more connected to their peers, faculty members and campus due to their living experience in residence halls.

**Mentorship**

Over the past 10 years, higher education spent lots of effort toward creating and maintaining mentor programs to support student engagement and the community aspect of learning (Kezar, 2006), but the quality of many the mentor programs is still the concern (Sanchez, Bauer, & Paronto, 2006). There is also a general concern on the format of mentorship program, especially, comparing the traditional didactic model to peer mentorship model (Waddell, Martin, Schwind & Lapum, 2016). According to Waddell et al. (2016), traditional mentoring is a “one-to-one, uni-directional, asymmetrical relationship in which a junior, or a less experienced person, is paired with a more experienced person who provides guidance and support” (p. 62). Angelique, Kyle and Taylor (2002) argued that the power dynamic generated from the traditional mentorship model can potentially cause harm to the mentee since the mentor was generally the one in control of the relationship. They further argued the importance for
mentee to have access to various mentors’ perspectives and eliminate one single mentor dominating the viewpoint of the mentee (Angelique et al., 2002). Beane-Katner (2014) also argued that peer and mutual mentorship can build a sense of community and shared understanding by grouping people by similar characteristics and experience.

In general, scholars have suggested the benefits students gained from mentor program, such as psychological well-being (Lu, You, Man, Loh & Young, 2014), social skill development, community engagement, and sense of belonging or social integration (Bierema & Merrian, 2002; Colivin & Ashman, 2010; Hixenbaugh, Dewart, Derees, & Williams, 2006; Jakubik, Eliades, Weese, & Huth, 2016; Kuh, Kinzie, Buckley, Bridges, & Hayek, 2006; Mangold et al., 2003; O’Brien et al., 2012; Rieske & Benjamin, 2015). As mentioned earlier, the literature revealed that there are generally two forms of mentorship: peer mentorship and traditional didactic mentorship. There are three studies that examined the effect of peer mentor program on mentees’ sense of belonging and sense of community, each of which are qualitative studies (Colvin and Ashman, 2010; Pidgeon, Archibald, & Hawkey, 2014; Waddell et al., 2016). Pidgeon et al. (2014) conducted six focus groups with 35 members who were part of a peer mentoring program that was focused on relationship building and reciprocity. Their findings suggested that the mentorship experience provided opportunities for mentees to connect with people who were not from their department or university, and this networking experience made them feel supported, safe and proud of themselves. Another study conducted by Waddell et al. (2016) identified similar benefits from peer mentor program that was designed for new faculty members, and their results indicated that new faculty members felt a stronger sense of community from the mentorship experience. They also pointed out that some mentees also informally created their
own small community of support since they felt safe to build relationship with their peer mentors.

Another belonging concept, social integration, has also been linked to peer mentor program, where Colvin and Ashman (2010) identified several benefits from peer mentor experience that lead social integration among first-year students in a large, public university. These benefits included building a trusting relationship with the mentor, receiving encouragement from the mentor inside and outside the classroom setting, and campus involvement. They also found that male and female students had different focus in terms of what they wanted to benefit from the mentorship experience. Female students placed more emphasis on relationship building and creating a support system, whereas male students focused more on getting help from their mentors (Colvin & Ashman, 2010). However, these investigations on the effect of mentoring program on students’ sense of belonging or social integration were primarily from case studies or qualitative studies with small sample size.

The effect of peer mentorship on sense of belonging has also been studied quantitatively. For example, Raymond and Sheppard (2018) conducted a quasi-experimental design and adopted an existing scale (The Sense of Belonging Instrument) to measure sense of belonging, and they found that by participating in peer mentorship, first year students reported lower level of perceived stress and loneliness, and higher level of sense of belonging and self-efficacy compared to their responses to a pre-survey. Although this study used quasi-experimental design, the researchers were not interested in examining the true causal effect of the peer mentorship participation; therefore, their results did not indicate if there is any significant difference between the pre- and post-survey response on sense of belonging among experimental and control groups. Therefore, more robust research design and data analysis procedure are crucially needed in terms
of understanding the true effect of peer mentorship on students’ perceived belonging. Nevertheless, Hawkins, Jones and Stanton (2014) conducted a mixed-method study to examine the benefit of peer mentor program on both the mentor and mentee, and this is the only existing study that simultaneously captured the perspectives of both involved parties. Their result indicated that there were several areas that mentee benefited the most from the mentorship, which were increased enjoyment, sense of belonging, improved confidence and academic support, where as mentors believed their teaching skills were improved from the mentoring experience (Hawkins et al., 2014).

As mentioned earlier, another format of mentorship is the traditional mentor-mentee relationship, in which the mentor, in general, is from a higher position than the mentee. Although studies focused on this type of mentorship program at higher education setting is sparse, one study (Jones, Kelsey, & Brown, 2014) explored the relationship between mentor and mentee and the factors contributing to the relationship. After pairing three pre-service teachers with three experienced teachers in to a 12-week long field experience, the researchers then interviewed and collected mentee’s weekly reflection journal to understand their experience from the traditional mentorship relationship. The result from this case study not only provided evidence on mentees perspectives on their increases sense of belonging from the traditional mentorship experience, but also demonstrated how to build strong mentoring relationship. The authors pointed out that there were three key steps determine successful mentoring relationships: personality, community and access, and trust and communication. Particularly, for community and access theme, the participants expressed the feeling of acceptance and emersion in the teaching site and larger community, and access they had to resources and opportunities that were provided from their mentors (Jones et al., 2014).
Social Media

According to Bicen and Cavus (2011), Facebook has 750 million registered users, and half of these users are active on Facebook on any given days. This is mainly due to the connection and subsequent enjoyment generated through social media use. In academic settings, college students’ lifestyle and overall experience have been substantially influenced by social media as well, and a few social networking sites, Facebook and Twitter, are particularly popular among college students (Junco, Heiberger & Loken, 2011; Mastrodicasa & Metellus, 2013). Therefore, in recent years, studies have connected social media use and college students’ social and academic experience, and researchers have suggested several positive effects from social media platforms, such as increased offline social interaction (Jacobsen & Forste, 2011), higher quantity and quality of relationships (Mihailidis, 2014). Moreover, several affective variables have also been related to social media use, which are increased life satisfaction (Bargh & McKenna, 2004), sense of community and psychosocial well-being (Henry, Molnar, & Henry, 2010; Wright, Khanfar, Harrington, & Kizer, 2010), and increased self-esteem (Gonzales & Hancock, 2011). However, some potential negative side effects have also been identified along with social media use, such as social isolation, academic procrastination, loneliness, lower perception of social skills and decreased academic performance (Junco & Cotton, 2012; Strayhorn, 2012; Vincent, 2016). Although social media holds several challenges and barriers to the success of students’ social and academic life, Vincent (2016) has argued that these outcomes are moderated by several behavior and psychological factors: “amount of time spent online, reasons for social media use, settings for social media use, and quality of online relationship established via social media” (p. 6).
The use of social media as a belonging intervention became a popular strategy in recent years, but studies on the impact of social media use in the classroom or school setting is still sparse. Munoz, Pellegrini-Lafont and Cramer (2014) compared three groups of students’ responses on several survey items after they experienced different instructional structures over a course of semester. Contrary to previous study findings, their results showed that the Twitter-online group (with the most Twitter interaction) had the lowest percentage in terms of agreeing with one of the survey items that reflect students’ opinion of feeling of connection with others compared to the percentage from the other two groups which had much less Twitter interaction but more face-to-face interaction during the semester. Also, most of the students enrolled in the Twitter online class revealed engaging in Twitter was time consuming, and they would rather to have face-to-face conversation with their peers in class, but some students argued that they enjoyed using Twitter to know other classmates’ experience (Munoz et al., 2014). Although this study adopted quasi-experimental study design, the method of measurement held some limitations, such as only collected post-survey, the instruments were developed by the authors without reliability and validity analysis, and several of the survey items did not directly reflect the construct of belonging that the authors intended to measure.

Two other studies conducted by the same group of researchers (Barczyk & Duncan, 2017; Duncan & Barczyk, 2016) concerned the impact of Facebook enhanced course on students’ sense of community, and both of these two studies adopted Rovai’s (2002) Classroom Community Scale (CCS), which is a validated instrument that has been widely accepted in terms of measuring the construct of sense of classroom community. Specifically, Duncan and Barczyk (2016) found that there was no significant difference between the Facebook enhanced course and the non-Facebook enhanced course in terms of students’ perceived sense of community.
However, the treatment group did have a significantly higher score on one of the 10 items which reflected on perceived sense of connectedness with classmate. These two researchers (Barczyk & Duncan, 2017) further investigated how demographic variables affect students’ sense of classroom community in the context of Facebook enhanced course. In terms of the relation between demographic variables and CCS, the results showed that younger students were more acceptable to Facebook enhanced intervention than older students, and they had significantly higher scores on CCS than their counterparts. However, gender did not play a significant role in the relationship with CCS. They suggested the instructor should consider how to form group and design classroom activities based on this finding that suggested personality and age plays an important role in students’ sense of classroom community (Barczyk & Duncan, 2017).

Researchers have also examined the effect of social media use outside of academic setting, and the findings suggested social media in general has positive correlation with various belonging related constructs, such as sense of community, relatedness, sense of membership and connectedness (Blight, Ruppel, & Schoenbauer, 2017; Chong, Zhang, Mak, & Pang, 2015; Lin, 2016; Sanchez-Franco & Roldan, 2015; Seidman, 2013). For example, Lin (2016) surveyed 938 undergraduate and graduate students at four large universities in Taiwan, and the results showed secure and anxious attachment style significantly and directly affected the amount of time they spent on Facebook, and in turn affected the level of satisfaction of relatedness needs and several psychological outcomes, such as sense of community, social life satisfaction and general well-being. However, avoidant attachment style did not significantly relate to amount of time spent on Facebook. Similarly, Chong et al.’s (2015) study demonstrated the intensity of social media use positively correlated with group members’ perceived community connectedness through providing various types of gratification.
Performance Feedback

Researchers have speculated the role of performance feedback on group members’ perception toward each other and the group as a whole. Though numerous studies demonstrated the relations between performance feedback and other important organizational variables (Cusella, 1987; Kluger & DeNisi, 1996), scant studies examined the direct relation between performance feedback and sense of belonging. Among the few existing studies, Limon and Boster (2003) identified a causal chain between the type of performance feedback and several perceived variables in group setting. Specifically, performance feedback affects perceived perceptions of group belonging through perception of prestige, and perception of task competency. Built on this study, the same group of researchers further conducted an experimental study (Limon & Boster, 2003), in which participants were randomly divided into three performance feedback conditions: positive, no feedback, or negative. Results indicated there was a significant difference between these three groups in terms of the four measured dependent variables (perceived task competence, perceived prestige, perceived group belonging, and perceived loafing). Specifically, students in the positive performance feedback group had a significantly higher score on perceived sense of belonging compared to students from the no feedback or negative feedback group. Moreover, result from the causal model showed a negative correlation between performance feedback and perceived group belonging when assigning positive feedback with number 3, no feedback with number 2, and negative feedback with number 1. The combination of these previous results supported the notion that positive performance feedback led to higher level of perceived group cohesion compared to both control and negative feedback conditions (Limon & Boster, 2003).
Relations Between Belonging Enhancement Practices and Achievement Outcomes

Service-learning

Over the past two decades, research on the relationship between service-learning and college students’ retention has emerged quickly (Yob, 2014). Among these studies (e.g. Bringle, Hatcher & Muthiah, 2010; Gallini & Moely, 2003; McKay & Estrella, 2008; Mungo, 2017; Sweat, Jones, Han, & Wolfgam, 2013; Yeh, 2010), two campuses exist in terms of examining the relationship between service-learning and retention. Some studies only focused on the direct effect of service-learning participation on student retention, persistence and graduation rate (Leimer, Yue, & Rogulkin, 2009; Lockeman & Pelco, 2013; Mungo, 2017; Reed, Rosenberg, Staham, & Rosing, 2015). For example, a large-scale study by Mungo (2017) found service-learning course enrollment had a positive effect on student retention, grade point average and graduation for first time in college students. Reed et al. (2010) showed for both part-time and full-time students, the service-learning course participation increased the likelihood of students returning back to the same college in the following terms, especially, for the first and third year. Moreover, another large-scale longitudinal study by Leimer et al. (2009) showed a higher four-year and five-year graduation rates for students who took a service-learning class after controlling variables like gender and ethnicity. The authors stated though service-learning participation had weaker influence on graduation rate comparing to student’s preparation for college, service-learning did have strong and immediate impact on the first year to second year retention even when controlling SAT and high school GPA scores.

Nevertheless, a few other studies focused more on understanding the causal mechanism of this relationship (Bringle et al., 2010; Gallini & Moely, 2003; Sweat et al., 2013; Yeh, 2010). For example, the often-cited study by Gallini and Moely (2003) used mediation model to explain
how academic engagement and academic challenge involved in service-learning experience predicted student retention. Bringle et al. (2010) stated service-learning class enrollment had positive relationship with fall-to-fall retention for freshman students, and students’ intention to stay on campus was positively related to service-learning experience and the quality of those experiences, which included peer and faculty interaction, course satisfaction, perceived learning, active learning and personal relevance. Subsequent studies (McKay & Estrella, 2008; Sweat et al., 2013; Yeh, 2010) also tried to identify mediating factors in service-learning that could impact student retention. The concepts of social and academic integration, or sometimes called engagement, from Tinto’s (1975) framework were the most studied and identified factors. For example, results from Yeh (2010) suggested students developed resilience as outcome of social and cultural integration from service-learning experience. Moreover, Yob (2014) reviewed previous literatures and commented that “the mediation model as a data analysis approach can identify the particular, salient factors in service-learning that are shown to impact retention” (p.46), such as interpersonal interaction, engagement and participation and personal meaningfulness, and he further asked for more studies to be conducted to identify other affective attributes of service-learning that could impact student retention. Though researchers have made a consensus that service-learning is a “powerful pedagogy” based on its impact on student retention, persistence, and graduation rate (Bringle et al., 2010, p. 45), the question of the quality of service-learning courses and their impact on student retention and persistent remains unsolved (Yob, 2014). Therefore, it is crucial to explore more affective mediating factors in the relationship of service-learning participation and student retention, and understand which specific practices in service-learning course lead to greater retention and persistence.
**Living-learning community**

Previous research has demonstrated the impact of living-learning community on several students’ performance indicators, such as overall GPA, course grades, graduation rates (Smith, 2015; Stassen, 2003). By comparing students participated in learning community with their non-learning community counterparts who shared similar demographic, socioeconomic and academic backgrounds, Gordon, Young and Kalianov (2001) found out freshman students enrolled in learning community had significantly higher GPA than those who were not. Moreover, research has shown academic at-risk students also benefited tremendously from and showed more appreciation to learning community (Tinto, Goodsell-Love, & Russo, 1994); for example, results from Hotchkiss, Moore and Pitts (2006) showed increased GPA for at-risk students who participated in learning community than students in a control group.

Moreover, studies also investigated the impact of learning community on students’ retention and graduation rate. Through a longitudinal study, Sommo, Mayer, Rudd, and Cullinan (2012) found that students who participated in a freshman learning community program had higher rates to earn degree than their counterparts after six years of finishing the program. Likewise, Yockey and George (1998) conducted a quasi-experimental study on the effect of learning community on freshman students, and their results showed students participated in the learning community had higher retention rates than students in the control group after two years of completing the program. Moreover, students were in the learning community also had higher GPA and higher grade in the course they enrolled. On the other hand, some studies demonstrated no significant impact of learning community on students’ academic achievement (Goldberg & Finkelstein, 2002; Logan, Salisbury-Glennon, & Spence, 2000; Visher & Teres, 2011; Weiss, Visher, & Wathington, 2010). However, scholars have argued some of these findings should be
viewed with caution; for example, participants who were part of the learning community in Logan et al.’s (2000) study also enrolled at least one academically advanced course in which non-learning community participants were not enrolled. Therefore, for the learning community participant to earn comparable grades as their counterparts represented a learning gain even though there was no significant difference on these two groups of students’ course grades.

**Mentorship**

Mentorship program has demonstrated its positive contribution to several student learning outcomes, such as retention (Bowling, Doyle, Taylor, & Antes, 2015; Collings et al., 2014; Crisp, & Cruz, 2009; Peck, 2011), and academic performance (Holt & Bersie, 2012; Leidenfrost, Strassnig, Schutz, Carbon, & Schabmann, 2014; Rodgers & Tremblay, 2003). For example, Budny, Paul and Bon (2006) compared students’ academic performance and retention over a nine-year period of a peer mentor program that focused on coaching freshman students to adjust academic, family and personal transition. Their results indicated since the inception of the mentor program, students’ GPA has increased by almost a half a point, the retention rate has increased, and the number of first semester honors students grew higher. More interestingly, almost half of the program participants from 2004 and 2005 cohorts attributed their success to the support they gained from their mentors, and they also believed that their mentors solved the majority of their college transition issues (academic, family and personal) during the first semester of their college year. With the critical concern of losing STEM majors students, Bowling et al. (2015) examined the effect of a STEM ambassador program on mentee’s retention outcomes. Their finding aligned with Budney et al.’s (2006) results in which program participants had significantly higher retention rate than non-program participants, and the
retained program participants also had greater involvement in social activities than the rest of the students in all the STEM majors.

Though very few studies investigated the effect of faculty mentor program on mentee’s academic outcomes, Mangold et al. (2002) used university longitudinal data from 1994 to 1998 to demonstrate that students who participated in a faculty mentor program had much higher retention rate than those who did not participate. They also found that the largest difference on the retention rate between the two groups happened at the start of the third year, which supported the notion that mentorship experience has a long-term impact on students’ academic performance. This study also uniquely examined the influence of self-selection bias that contribute to the overall effect of the studied program, and by conducting a series of sophisticated statistical techniques (discrete-time logit models, event history models), they still concluded that the program has a positive impact on participants’ graduation and persistence even considering self-selection bias. This practice is especially important to the belonging intervention literature since the majority of the existing studies did not examine the true causal effect of the studied belonging enhancement program on students’ academic outcomes and performance. Coupled with the phenomenon described by Mangold et al. (2002), which these program participants may not share similar characteristics and attributes as their counterparts, such as high school GPA, ACT scores and age, so without considering the self-selection bias, we cannot make accurate conclusion on the level of effectiveness of the studied program.

**Measurement Issues of Belongingness Related Constructs**

Another concern emerged from reviewing previous literature about belonging interventions and practices is that researchers adopted various instruments to measure sense of belonging and its related constructs (sense of community, social integration, relatedness, and
connectedness), and some researchers just created ad hoc scale for their studies. As Slaten et al. (2017) argued “although researchers often provide rationale for such measurement choices, including preliminary evidence of reliability and basic validity, questions remain as to the level of confidence that these scales are actually measuring the construct” as researchers intended to measure (p. 2). Moreover, a few aforementioned belonging intervention studies only used one or a few items to measure belonging and its related constructs, and made conclusion and interpretation based on simple parentage rate of responses between different groups of students for the outcomes of a specific intervention program. This inconsistent and problematic measurement practice led a review on 33 existing belongingness instruments and validation studies, and six themes were identified which included scale dimensionality, item construction, factor structure, psychometric methodology, developmental level and cultural context.

**Dimensionality of Scale**

Belongingness constructs are all conceptualized as multidimensional, and the majority of the instruments are multidimensional (see Appendix B). For example, sense of community has four components: membership, influence, reinforce of need, and a shared emotional connection (McMillian & Chavis, 1986), while school membership is comprised of four characteristics: attachment, commitment, involvement, and belief. Moreover, Hirschi (1969) proposed the four distinct contexts (family, school, peers and work) function differently in terms of the social bond develop between youth and society while relatedness is conceptualized as multidimensional with concepts of positivity, caring, mutuality and duration (Baumeister & Leary, 1995).

Though most belongingness scales are multi-dimensional, some issues exist when interpreting the dimensionality. For example, Psychological Sense of School Membership (PSSM) scale has been validated many times, but there is lack of consensus on the factor
structure. Abubakar et al. (2016) conducted a multi-factorial model study analyzing factor structures from previous studies, yet the dimensionality of the PSSM scale continues to be inconclusive because the unifactorial model resulted from a unique method of combining items per target, a method that was not used in other PSSM validation studies by using different samples, so there is a lack of comparison for the factor structure results. Similarly, the Sense of Community Index scale was widely used to measure sense of community, but Flaherty et al. (2014) found that no factor structure (one-factor, four-factor, and revised four-factor) suggested in previous studies fit the data; therefore, the researchers suggested moving away from this scale for measuring sense of community. Also, few instruments’ dimensions (e.g. Hoffman et al., 2002; You et al., 2011) have a distinct negatively worded dimension; this is problematic because mixing positively and negatively worded items, rather than introducing a separate dimension for negatively worded items, will introduce the method effects (Ye et al., 2014). A method effect leads to the question whether a multi-factors instrument has a substantive factor that is part of the construct or contains a factor with a systematic method effect (Ye et al., 2014). For example, several PSSM validation studies showed a factor called “rejection” (Cheung & Hui, 2003; Hagborg, 1994; You et al., 2011), which Ye and Wallace (2014) argued to be a method effect instead of a substantive factor that conceptually part of the sense of belonging construct.

Moreover, in scale development, it is generally accepted that an item should have a rotated factor loading of no less than 0.4 to be considered important (Rahn, n.d.). However, one limitation in the process of extracting and labeling factors is the subjectivity of the researchers (Morgadon et al., 2017); for example, researchers subjectively chose different factor loading criteria. Specifically, the comprehensive school connectedness scale (Chung-Do, 2015) used .50 as factor loading criterion, but the Doctoral Student Connectedness Scale (Terrell et al., 2009) used .60 as
criterion for factor loading, and most of the studies used .70 as the factor loading criterion. Therefore, with these inconsistent practice and lack of validation study on those newly developed scales, there would be some limitations on interpreting dimensionality.

**Item Construction**

According to Morgado et al. (2017), item generation is one of the three basic steps in scale development, which includes three approaches: deductive method, inductive method and the combination of the two methods. Deductively, researchers generate items through an extensive literature review and adapt pre-existing scales of related constructs. Conversely, focus groups, interviews, and expert panels are used to inductively generate items using the lived experiences of the target population. However, a combined inductive and deductive process is the recommended strategy for creation of new instrument (DeVellis, 2003; Slaten et al., 2017). Among all the reviewed studies, only four studies (see Brown et al., 2000; Hoffman et al., 2002; Petrillo et al., 2016; Slaten et al., 2017) followed the recommended approach of combined inductive and deductive processes for item generation to capture an accurate and holistic conceptualization on the measured construct derived from the target population’s experiences (Slaten et al., 2017). Amongst the original scale development studies that did not include an inductive method to generate the initial item pool, they adopted pre-existing survey items (e.g. Akar-Vural et al., 2013; Lohmeier & Lee, 2011; Sayer et al., 2013). For example, Sayer et al. (2013) added four more items to SCI-2, and changed the language of each item to suite primary school students’ cognitive level.

Due to the lack of theoretical framework and conceptualization consensus in belongingness literature, an inductive or combined method is necessary for better understanding the specific belongingness construct in a specific setting with a particular population. Otherwise,
several issues will arise, one of which is confusion about the similarities and differences between various constructs of belongingness (Aubbakar, et al., 2016). Once the initial item pool was generated, most scale development studies had expert panels and independent raters to review the initial item pool, but a few studies (Akar-Vural et al., 2013; Goodenow, 1993; Hoffman et al., 2002; Jason et al., 2015) did not address how their initial items were examined for content validity, which leads to concerns for their following factor analysis results. An expert panel review ensures content validity, readability, consistency with the operational definition, and redundancy in the initial item pool. Often times, items will also be revised to reach consensus among experts (Brown et al., 2000; Lee & Robbins, 1995; Petrillo et al., 2016; Terrell et al., 2009). However, the common practice of relying on expert panels and neglecting member checking procedures may cause items to be worded in cultural and developmentally inappropriate ways; thus scale development procedures would ideally include both expert and target population review of the item pool (Morgado et al., 2017).

**Factor Structure Analysis Approach**

Researchers adopted different factor structure analysis approaches, such like exploratory factor analysis (EFA), confirmatory factor analysis (CFA), or combination of the two to either develop new instruments, validate existing instruments, or test proposed factor structure models. Interestingly, the PSSM scale was proposed with a single factor solution to the final scale without factor analysis, which lead to numerous validation investigations. Among the seven PSSM validation studies, two studies (Ye & Wallace, 2014; You et al., 2011) conducted both EFA and CFA. You et al. (2011), was the first to use a CFA with independent subsample to test the derived solution from EFA, while Ye and Wallace (2014), did not have a second different sample for their CFA, but instead randomly split a sample to conduct EFA with a training sample
and CFA with a validation sample. However, the split-sample approach to conduct EFA and CFA is not recommended since it will result good model fit in the CFA; instead using different sample for doing EFA and CFA can bring the added strength of the CFA in testing a hypothesized model from EFA (Morgado et al., 2017).

Four sense of belonging measurement studies performed both EFA and CFA; however, only Slaten et al. (2017) used a new distinct sample from the sample used in EFA procedure for the CFA procedure. The remaining three studies (see appendix B) used random split-sample/subsample for their CFA procedures, which was not the ideal sample source for running a CFA because using a single sample in both EFA and CFA analysis is detrimental to the added strength of the CFA in testing hypothesized structure for a new data set (Khine, 2008). A good model fit in the CFA is expected when using data from the same sample for running both EFA and CFA (Zheng et al., 2010), thus, using a single sample for both EFA and CFA can result a good model fit in CFA. In response to this common problem, Tovar and Simon (2010) used both Principal Axis Factoring (PAF) and CFA to validate the Sense of Belongingness Scale, and this study was the only one of the two studies among all the reviewed article that used PAF rather than Principal Components Analysis (PCA) or Maximum Likelihood Analysis to perform EFA procedure. According to the authors (Tovar & Simon, 2010), in terms of reproduce population loadings more accurately, PAF shows much better result than PCA, and PCA has been criticized in the literature as being primarily a data reduction method rather than pure factor analysis.

In terms of sense of connectedness instrument development and validation studies, only Carroll et al. (2017) attempted to use two subsamples to perform a E/CFAs (conducting exploratory factor analyses in a confirmatory factor analysis framework) method as an intermediate step to confirm and improve item fit. Similar to the issue appeared from the sense of
connectedness scales, three initial instrument development studies on sense of community (Jason et al., 2015; Sayer et al., 2013; Rovai, 2002) did not perform a CFA to confirm the factor structure derived from EFA procedure. In terms of measuring sense of community, only the SoC-C (Classroom Sense of Community Scale) had both EFA and CFA performed. The factor analysis approaches for the relatedness and social integration scales were suitable for the study purpose (either validating existing instrument, or confirming hypothetical factor structure), except the Youth Relatedness Scale (D’Eloia & Sibthorp, 2012) did not run factor analysis. Therefore, the lack of CFA to confirm the factor structure derived from the EFA procedure is one of the most significant limitations in the factor analytic analysis of belongingness instrument development studies.

**Reliability**

A reliable scale is one that is relatively free of measurement error. There are three commonly accepted reliability methods: test-retest, parallel forms, and internal consistency. They each share some strengths and weaknesses in theory and practice (Kaplan & Saccuzzo, 2009). The test-retest method is only valuable when measuring “traits” or characteristics that do not change over time, and researchers should always be mindful with the carryover effect which could overestimate the true reliability of a test. The parallel form method is considered the one of the most rigorous assessments of reliability, but it is also the least desired method due to the burdensome work to develop two forms of the same test. On the other hand, the internal consistency method is the commonly used approach for assessing reliability because of the well-developed formula and advanced statistical package available.

Although there are three types of reliability test, the reviewed studies utilized internal consistency and test-retest reliability. Among the 33 studies, three used test-retest reliability test
with all demonstrating strong reliability. Specifically, Hagborg (1994) had test-retest correlation coefficient with .78; where Vlachopoulos and Michailidou (2006) had Intra Class correlation coefficient with .97, and Guiffrida et al. (2008) had correlation coefficient of .72. However, a study by Flaherty et al. (2014) found poor internal consistency for three out of four dimensions in the Sense of Community Index (SCI). The remaining 26 studies (except three studies did not have reliability test) used internal consistency methods and they all reported acceptable alpha levels. Specifically, for the sense of belonging scales, the rage of alpha level was .71 to .93; for sense of connectedness scales, the rage was .73 to .93; for sense of community scales, the range was .83 to .93; for the relatedness scales, the range was .80 to .86; and for the social integration scale, the alpha levels were .92 and .83 for the two different samples. Therefore, more studies should examine the test-retest reliability as another indicator for the reliability of instrument to signify the internal validity of a test and ensures that the measurements obtained in one sitting are both representative and stable over time (Lowe & Rabbitt, 1998). However, to note that test-retest reliability requires extra work on data collection (normally two phases of data collection) and data analysis, which may be one of the main reasons that previous researchers did not use this reliability test (Kaplan & Saccuzzo, 2009). Nevertheless, the researchers have been consistently reported internal consistency on subscales, total scale and each of the subsamples, which demonstrated a good practice.

**Validity**

Validity, or the agreement between a test score or measure and the quality it is believed to measure, is tested in belongingness literature using one of three methods: construct-related, criterion-related, or content-related. Content-validity has a valuable role in terms of considering the “adequacy of representation of the conceptual domain the test is designed to cover”, whereas
criterion validity provides information on “how well a test corresponds with a particular criterion” (Kaplan & Saccuzzo, 2009, p. 136-137). Since some hypothetical constructs have “no criterion or universe of content is accepted as entirely adequate to define the quality to be measured”, the construct-related validity then is required for demonstrating validity evidence (Cronbach & Meehl, 1995, p. 282).

Unlike the congruence practice of reporting internal consistency for instrument reliability, 16 studies did not examine the validity issue (see Appendix B). More importantly, seven newly developed scales did not follow the recommended standards to report validity (AERA, APA and NCME, 2014). One explanation could be a lack of trustworthy instruments for construct-related validity testing. For example, the Classroom Community Scale was the first instrument developed for measuring sense of community in classroom settings and no comparable instrument existed. Despite this, the authors should still aim to use other methods (criterion-related validity) to assess the validity issue (Morgado et al., 2017). According to DeVellis (2003), criterion-related and construct validity have different underlying implications, the criterion-related validity focuses on practical issues rather than a scientific one, whereas the construct validity directly focuses on the theoretical basis and relationship of two variables. Therefore, in subsequent validation studies, it would benefit the scale usability and generalizability to use a different type of validity test than what was used in the origination study; for example, You et al. (2011) conducted discriminant validity for PSSM, adding to the original PSSM study’s reporting of criterion-related validity test findings, to provide robust evidence of PSSM’s validity across testing methods.

Among all the reviewed studies, eight studies did criterion-related validity, 11 studies had construct validity, but only two studies did both of the criterion-related and construct validity
(see Appendix B). All the studies reported good validity results, except SSC-SC (Carroll et al., 2017) reported a poor discriminant validity. As previously mentioned, these two types of validity tests provide different underlying information for the scale, so future studies should aim to conduct both criterion-related and construct validity.

**Developmental Level**

According to Erikson’s eight stages of development (1968), elementary, middle, high schoolers and university students have different needs for belonging. Elementary students need a sense of pride in their accomplishments and abilities through encouragement from parents and teachers (Erikson, 1968) whereas middle and high schoolers have a need to belong to a group with peer approval, explore their independence and develop a sense of self (Scales, 2010). University students have need to be active in home and community to feel productive and involved and find the sense of personal identity (Erikson, 1968).

Specifically, elementary students who are encouraged by parents and teachers develop a sense of competence and belief in their skills. Contrary, those who receive little or no encouragement from others will question their ability to be successful. In this stage, teachers play an increased role in students’ development and well-being (Erikson, 1968). From the reviewed studies, four studies focused on measuring belonging in elementary school level, one study was about measuring sense of community, two studies developed scale on relatedness, but none of the studies developed scales for sense of connectedness and social integration in elementary level (see Appendix B).

In terms of readiness, comparing to the Sense of Belonging to School Scale (SEBES) developed by Akar-Vural et al. (2013) and the Youth Relatedness Scale (D’Eloia & Sibthorp, 2012), the Sense of Community Index-Primary (SCI-P, Sayer et al., 2013) may not fit the
elementary students developmental level well since the wordings of several items exceeded the reading level of primary school students (Tay & Jebb, 2017). On the other hand, the SEBES (Akar-Vural et al., 2013) has 10 items in the final scale and the average number of words for each of the items is less than 14, so the readiness of this scale is appropriate for this age group (DeVellis, 1991, p.58). Also, the two dimensions (contentment in school and obedience of school rules) are more appropriate for the developmental need in this age group as elementary school students are learning school rules for the first time that are different than family rules (Thornberg, 2008). Overall, the above-mentioned scales have at least one item that reflects on students’ pride of being part of his or her school; for example, items like “I am proud of my school”; “Being part of this school makes me feel good”; “I feel proud of belonging in this school”, and these items coincide with elementary students’ need of sense of pride (Erikson, 1968). However, the items appeared in the scales did not show much about encouragement from teacher and peers, which future scale development study in elementary level should contribute more to reflect this need of this age group (Erikson, 1968). Also, since teachers play a vital role for elementary students, more items should reflect on the teacher’s role and relationship with students.

Based on Erikson’s (1968) theory of psychological development and Eccles and Midgley (1989)’s stage–environment fit model, middle and high school students possess a special need for close relationships; specially, the relationships with peers become the center of their life (Rageliene, 2016). In order for middle and high school students to better adapt to the environment, the presence of normal peer relationship is necessary. Contrary, peer pressure, peer rejection and unhealthy romantic relationships are detrimental to their psychological well-being.
such as depression, alcohol use and psychosocial functioning problems (Heaven, Ciarrochi & Cechaviciute, 2005; Schad, Szwed, Antonishak, Hare & Allen, 2008).

For measuring belongingness in middle and high school levels, there are five studies focused on measuring belonging, six studies about sense of connectedness measurement, one study on sense of community and one study on relatedness (see Appendix B). In terms of measuring belongingness, the Psychological sense of School Membership (PSSM, Goodenow, 1993) is better than the five items derived from the Add Health Survey (Anderman, 2002) since the PSSM has two items explicitly about peer relationship. Except School Connection Scale (SCS, Brown, Leigh & Barton, 2000) and Furlong et al. (2011), the rest of five studies about the measurement of connectedness all have a subscale on peer relationship. The SCS (Brown et al., 2000) only has one item “I have friends at this school”, and other items are more about relationship with adults in the school, which is important to the middle and high schoolers but not as much salient as peer relationship to this particular age group of students (Eccles et al., 1993; Erikson, 1968).

The two scales measuring sense of community (Petrillo, Capone, & Donizzetii, 2016) and relatedness (D’Eloia & Sibthorp, 2012) are heavily focused on peer relationships as the majority of the items are about support from and emotional connection with peers. However, the Youth Relatedness Scale (D’Eloia & Sibthorp, 2012) should also add items about teacher-student relationship and school involvement as the CSCS (Chung-Do, 2015) and the Classroom Sense of Community Scale (SoC-C, Petrillo et al., 2016) since teachers play a big role in middle and high schoolers psychological development (Eccles et al., 1989; Erikson, 1968). Moreover, with transitioning to middle school and high school, students also face additional academic challenges, and they need a “reasonably safe, as well as an intellectually challenging,
environment to adapt to these shifts” (Eccles et al., 1993, pp. 94). Some of the scales contains items that reflect this need, such as the School Connectedness scale (Lohmeier & Leem 2011), CSCS (Chung-Do, 2015) and SoC-C (Petrillo et al., 2016). Therefore, when developing and selecting appropriate scales for measuring belongingness for middle and high schoolers, researchers should aim for scales that have items reflect on peer relationship since this is the most important psychological need for this age group, but also contain items that reflect other aspects of the students’ needs.

In the university level, students have the need to be active in home and community while feeling productive and involved (Erikson, 1968). Also, at this stage students have psychosocial, cognitive and biosocial needs, which include interpersonal and intrapersonal relationships, understanding and interpreting outside world and experience, development of critical thinking, reasoning and analysis, and moral and career development (Evans, Forney, Guido, Patton, & Renn, 2009; Sandoval-Lucero, 2014; Skipper, 2005). According to Sandoval-Lucero (2014), “career selection is an important milestone that usually occurs at college year” (pp. 48). Among the reviewed studies, four studies examined belonging in university level, four studies about sense of community, one study on social integration, two studies about sense of connectedness, and three studies on relatedness (see Appendix B).

The majority of the scales have items or factors specifically about interpersonal relationships and involvement in school, but lack of items on cognitive needs (academic aspect) that college students need for development (see exception, French & Oakes, 2004; Hoffman et al., 2002; Rovai, 2002; Slaten et al., 2017; Terrell et al., 2009). Moreover, only one scale includes items related to the needs of feeling productive and active in life (e.g. Vlachopoulos & Michailidou, 2006), but none of the instruments have items relate to career and moral
development, which are also important to college students. Therefore, there is a need for including more items about students being active and feeling productive in life and career and moral development that relate to college experience into future instruments for university level instead of heavily focusing on the relationship and involvement aspects of the students’ developmental needs.

Overall, this section reveals that there are some issues with the items that are included on the existing instruments, such as the level of readiness, coverage of all aspects of students’ developmental needs for each school level. Therefore, when developing instruments for measuring belongingness, researchers should intertwine students’ need for belonging and their developmental needs. According to Slaten et al. (2017), many researchers used PSSM scale (Goodenow, 1993) that was originally developed for middle school measure belonging in university level, and this section clearly demonstrates that there are many available instruments for measuring belongingness in university level, so researchers should move away from using PSSM (Goodenow, 1993) in the future.

Cultural Sensitivity of Belongingness

According to Abubakar et al. (2016), belongingness should function similarly across different cultural contexts. For example, studies in non-Western contexts show that school belonging and connectedness are associated with psychological outcomes (engagement, motivation and persistence) similar to what has been observed in Western contexts (Anderman & Freeman, 2004; Patrick, Ryan, & Kaplan, 2007). Nearly half of all PSSM validation studies were conducted in non-U.S. settings (see Appendix B), all of which demonstrate that PSSM functions similarly across different cultural contexts. For example, Abubakar et al. (2016) demonstrated that PSSM presented an adequate alpha across all countries, including Indonesia, Kenya,
Netherlands and Spain, with Cronbach’s alpha of .82, .73, .84 and .86, respectively. On the other hand, Murphy and Zirkel (2015) pointed out that, although sense of belonging has been viewed and studied as a universal construct that presented same meaning and impact on educational experiences for all students, students experience and perceive the nature and meaning of belonging in school differently based on their social and cultural backgrounds.

Relevant social and cultural background demographics include gender, race, ethnicity, and grade level. Across various studies, females have been found to perceive higher sense of belonging and connectedness than male students (e.g. Anderman, 2002; Goodenow, 1993; Hagborg, 1994; Karcher & Sass, 2010; Sayer et al., 2013), and African Americans perceived lower sense of belonging and connectedness than Caucasian students (e.g. Anderman, 2002; Karcher & Sass, 2010). Some studies showed that grade level also played a factor in terms of students’ perception on belongingness; for example, Anderman (2002) indicated that senior students perceived lower sense of belonging than students from 8th, 9th and 10th grades. Similarly, Sayer et al. (2013) showed older pupil had higher score on social support and valued membership factors when measured by the Sense of Community Index in Primary School scale. Another study also demonstrated Chinese mainland immigrant students who lived in Hong Kong for more than three years perceived a higher sense of belonging than Hong Kong students (Cheung & Hui, 2003).

Explanation on the differences in belongingness across these demographics would be that female students are better in interpersonal skills and have better academic performance, so they perceive higher of school membership (Hagborg, 1994). Similarly, white students receive more opportunities to be involved in the school community, and students from different grade levels may get different amount of attention from their teachers. These factors all contribute to
students’ perceived level of sense of belonging. However, unlike reporting the results of measurement invariance across culture, gender, ethnicity and grade level from scales that measure sense of belonging (Abubakar et al., 2016; Akar Vural et al., 2013; Slaten et al., 2017; Tovar & Simon, 2010) and sense of connectedness (Furlong et al., 2011; Karcher & Sass, 2010), the rest of the instruments on sense of community, relatedness, and social integration largely did not address whether these constructs and scales function similarly or not based on different students’ attributes. Future instrument development studies should also include this procedure to ensure newly developed measurement can be used across different culture, gender, ethnicity and grade level.

**Summary**

The importance of belonging enhancement interventions and practices as a means for contributing to students’ perceived belongingness and their academic outcomes has been established in this review of literature. Though ample studies examined belongingness in a university setting, there is lack of congruence on the conceptualization of belongingness constructs, and terminology and measures used across studies and fields since elements of general belonging have been dismembered and reassembled in various ways based on different theoretical frameworks. This practice created difficulty for researchers to compare study results and make accurate interpretations and conclusions on the relations between belongingness and other variables (Slaten et al., 2016). Furthermore, research demonstrates that specific belonging enhancement interventions and practices have shown positive influence on student outcomes, including perceived sense of belonging, persistence, and academic achievement. There are some weaknesses in the existing belongingness studies, such as lack of rigorous study designs and consistent and psychometrically sound belonging measures (Ingram, 2013; Singh, 2018). By
reviewing existing belonging measures, only a few instruments followed recommended scale development procedures, and most instruments had several pitfalls in their instrument development process. Moreover, previous research demonstrated student characteristics or social identities play a role in how they perceived sense of belonging, but sparse studies examined the effect of student characteristics on students’ perceived belongingness after experiencing a semester long service-learning program with combined several belonging enhancement practices.

The research reviewed in this chapter justifies the need for this study and outlines the gaps in the literature that the current study addressed. Within the conceptual framework presented, this study contributes to the growing body of literature related to belonging and provides additional evidence of a belonging focused service-learning program’s potential contribution to overall student success in college.

**Research Questions**

RQ 1: Does a service-learning program with embedded belonging enhancement practices affect students’ sense of belonging, and students’ GPA, retention and years of degree attainment?

Sub-question 1: Do students from the treatment (a service-learning leadership program) and control (a first-year experience program) groups perceive sense of belonging differently before and after the program?

Sub-question 2: Do program participants perceive sense of belonging differently before and after the program based on their gender and race?

Sub-questions 3: Do different belonging enhancement practices play different roles on students’ GPA, retention and years of degree attainment?

RQ 2: How does a service-learning program with embedded belonging enhancement practices affect students’ sense of belonging?
CHAPTER III
METHODOLOGY

The purpose of this convergent parallel mixed-method study is to investigate the impact of a service-learning leadership program with embedded belonging enhancement practices on freshman students’ perceived sense of belonging and subsequent academic performance outcomes. This chapter discusses the background of the studied program, research design, sampling method, data collection procedures, and data analysis plan.

Setting

The study was conducted on the main campus of a land-grant public 4-year institution located in the Southern U.S.A. The freshman class of the 2018 cohort was 71.3% white, 19.8% black, 3.1% Hispanic, 0.9% Asian, and 4.2% others. Forty-seven percent were male, and 53% were female. By assessing the Common Data Sets available from the studied institution and its ten peer institutions’ websites, the retention rate for freshman students of the 2016 cohort was 79.2%, which was lower than the retention rate of freshman students in the same cohort from all the 10 peer institutions (see Table 1). Additionally, according to the statistical comparison between the studied institution and NSSE overall results from the 2014 National Survey of Student Engagement report, the studied institution had a lower percentage of freshman students who gave responses of “very often” to all the items associated with the frequency of peer and faculty interaction compared to the overall NSSE freshman students’ responses. In regard to the area on quality of interaction, the studied institution had a lower percentage of freshman students
who gave responses of “excellent” to all the items compared to the overall NSSE freshman students’ responses except on the item concerning quality interaction with students. The studied institution also had a lower percentage of freshman students who gave responses of “very much” to all the items associated with supportive campus environment than the overall NSSE freshman students’ responses except on two items: “providing support for your overall well-being”, and “attending campus activities and events”. Moreover, the studied institution had a higher percentage of freshman students who gave responses of “none” to the item “how many of your courses at this institution have included as community-based project” than the overall NSSE freshman students’ responses.
Table 1

*First-time, First year Student Enrollment by Racial and Ethnic Category for 2017 Cohort, and Retention Rate for 2016 Cohort of First-time, first year Student among the Studied Intuitions and its Ten Peer Institutions*

<table>
<thead>
<tr>
<th></th>
<th>White</th>
<th>Black</th>
<th>Hispanic</th>
<th>Asian</th>
<th>Others</th>
<th>Retention Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Studied Institution</td>
<td>71.1%</td>
<td>21.3%</td>
<td>2.6%</td>
<td>1.3%</td>
<td>3.7%</td>
<td>79.2%</td>
</tr>
<tr>
<td>Peer 1</td>
<td>84.5%</td>
<td>4.8%</td>
<td>3.6%</td>
<td>2.2%</td>
<td>4.9%</td>
<td>91.5%</td>
</tr>
<tr>
<td>Peer 2</td>
<td>83.6%</td>
<td>7.5%</td>
<td>3.6%</td>
<td>2.4%</td>
<td>2.9%</td>
<td>93%</td>
</tr>
<tr>
<td>Peer 3</td>
<td>73.0%</td>
<td>11.9%</td>
<td>6.4%</td>
<td>4.0%</td>
<td>4.7%</td>
<td>82.9%</td>
</tr>
<tr>
<td>Peer 4</td>
<td>70.3%</td>
<td>6.0%</td>
<td>5.3%</td>
<td>7.0%</td>
<td>11.4%</td>
<td>93.7%</td>
</tr>
<tr>
<td>Peer 5</td>
<td>69.6%</td>
<td>4.6%</td>
<td>8.3%</td>
<td>1.4%</td>
<td>16.1%</td>
<td>81.2%</td>
</tr>
<tr>
<td>Peer 6</td>
<td>58.7%</td>
<td>2.7%</td>
<td>25.6%</td>
<td>8.6%</td>
<td>4.4%</td>
<td>91.7%</td>
</tr>
<tr>
<td>Peer 7</td>
<td>78.5%</td>
<td>3.9%</td>
<td>8.8%</td>
<td>2.1%</td>
<td>6.7%</td>
<td>82.2%</td>
</tr>
<tr>
<td>Peer 8</td>
<td>68%</td>
<td>8.0%</td>
<td>6.7%</td>
<td>11.0%</td>
<td>6.3%</td>
<td>95.5%</td>
</tr>
<tr>
<td>Peer 9</td>
<td>78.2%</td>
<td>6.6%</td>
<td>4.5%</td>
<td>4.1%</td>
<td>6.6%</td>
<td>85.5%</td>
</tr>
<tr>
<td>Peer 10</td>
<td>66.3%</td>
<td>3.9%</td>
<td>6.1%</td>
<td>9.1%</td>
<td>14.6%</td>
<td>93%</td>
</tr>
</tbody>
</table>

**Description of the Service-Learning Leadership Program**

This service-learning leadership program (SLLP) is a two-academic-hour program whose primary constituencies include (in approximation): 220 first-year students, 35 community partners, 40 faculty/staff mentors, 40 upperclassmen peer-mentors, and 14 part-time staff (7 upperclassmen ambassadors, 2 graduate assistant coordinators, 1 faculty coordinator, and 4
student affairs professionals). Students enrolled in this program through voluntarily after they received program promotional materials which were sent to the entire freshman cohort. Given the diversity, size, and scope of the program, this program uses an inclusive leadership philosophy focused on mutually beneficial collaboration between all stakeholder groups.

In comparing the student enrollment information between all cohorts of freshman students and students in the studied program in the past four years, the studied program enrolled a much higher percentage of black students than the percentage in all freshman cohorts. Specifically, in SLLP, about 53.3% of students identify as a racial minority and 48.5% receive Pell Grant, compared to 30% racial minority and 32.3% Pell Grant status for the entire first-year cohort (see Table 2). Unlike other selective freshman programs and organizations (Greek Life, Honors College, Living-Learning Community), the studied program is an open-access program that recruited all incoming freshman students regardless of their academic and social standings since its inception. This program has provided underrepresented and minority freshman students a valuable opportunity to get involved and engaged in a community to which they normally would not have access.

The program places students into five to seven member teams who develop and deliver a semester-long community-engaged learning project to a specifically assigned community partner. Using a MWF schedule, teams meet on Mondays and Wednesdays with their faculty/staff mentor and/or upperclassmen peer mentor. All students meet collectively in a Friday seminar to learn leadership content from the instructor and guest speakers. Students complete weekly reflections and in-class activities designed to deepen their understanding of their values and beliefs; critically assess their service experience and course content; evaluate how to more
effectively influence a positive outcome in their service, academic, and social lives; and build a deeper connection with their team members.

Table 2

*Demographic Information for Students in the Studied Program and Entire First-semester Freshman Students in the Studied Institution*

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Program</td>
<td>All</td>
<td>Program</td>
<td>All</td>
<td>Program</td>
</tr>
<tr>
<td>Pell Grant Eligible</td>
<td>52%</td>
<td>33%</td>
<td>48%</td>
<td>32%</td>
<td>51%</td>
</tr>
<tr>
<td>Underrepresented</td>
<td>55%</td>
<td>31%</td>
<td>54%</td>
<td>31%</td>
<td>54%</td>
</tr>
<tr>
<td>First Generation</td>
<td>38%</td>
<td>30%</td>
<td>37%</td>
<td>29%</td>
<td>45%</td>
</tr>
<tr>
<td>Out-of-State</td>
<td>39%</td>
<td>40%</td>
<td>44%</td>
<td>41%</td>
<td>34%</td>
</tr>
<tr>
<td>Average ACT</td>
<td>22</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>23</td>
</tr>
</tbody>
</table>

**Belonging Enhancement Practices in the Program**

Since inception, the program has implemented a variety of student success and belonging enhancement practices, such as service-learning, peer and faculty mentoring, living and learning community, social media interaction, performance evaluation feedback, and large scale social events. Over the past 12 years, the program has strived to promote a sense of community and increase students’ engagement in the program and campus by continuously restructuring belonging enhancement practices; therefore, the implemented belonging enhancement practices have changed over the past 12 years as presented in Table 3.
Table 3

Program Changes from 2007 to 2018

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Social media</td>
<td>minimal Facebook</td>
<td>minimal Facebook</td>
<td>minimal Facebook</td>
<td>minimal Facebook</td>
<td>minimal Facebook</td>
<td>Instagram &amp; developing Facebook</td>
<td>Instagram &amp; matured Facebook group</td>
<td>matured</td>
<td>matured</td>
<td>matured</td>
<td>matured</td>
<td>matured</td>
</tr>
<tr>
<td>Housing (living-learning community)</td>
<td>Creswell</td>
<td>Creswell</td>
<td>Creswell</td>
<td>Moseley, Creswell, Rice</td>
<td>Moseley, Creswell, Rice</td>
<td>Moseley, Creswell, Rice</td>
<td>Moseley, Creswell, Rice</td>
<td>All halls with preference for Moseley,</td>
<td>All halls with preference for Moseley,</td>
<td>All halls with preference for Moseley,</td>
<td>All halls with preference for Moseley,</td>
<td></td>
</tr>
<tr>
<td>Staff/faculty mentor</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Peer mentor</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Evaluation feedback</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Feedback in group setting in class</td>
<td>Feedback in group setting in class</td>
<td>Feedback individual with mentor and fellow</td>
<td>Feedback in group setting in class</td>
<td>Feedback in group setting in class</td>
<td>Feedback in group setting in class</td>
<td></td>
</tr>
</tbody>
</table>
The service-learning practice requires all students to serve at least 20 hours during the entire semester in an assigned local community agency located near the institution consistent in the previous 12 years. The service experiences include volunteering service, drafting a service project proposal, collaborate with a team of five to six peers who are also part of the program on implementing the service project, writing service reflection journals, and disseminating service project to the university and the community. For the purpose of this study, and answering the sub-question three under the first main research question, an ordinal variable named service hours was created based on the change of the service-learning practice in the past 12 years, and the number of this service hours variable represents the average service hours that students completed in the semester.

The peer and faculty mentor practice provides each student a peer mentor (senior level undergraduate student enrolled in a leadership program) and a faculty mentor (who have been trained to be a mentor before the program started) to guide their service project, support their team collaboration and provide advice and resources that students needed in terms of adjusting academic and social aspect of college life. Each student meets his/her peer mentor twice a week during class time to develop and advance proposed service project, and they also meet during their on-site service hours occasionally. Some of the peer mentor also provide outside-classroom support to students depend on their relationship formation. The faculty mentors meet the students once a week during class time, and some faculty mentors also provide out-of-class support to help students to solve problems and better adjust to college life. Faculty mentors are also responsible for providing prompt feedback to students’ weekly reflection journals concerning their service experience, challenges in college life, and personal well-being as freshman students. For the purpose of this study, and answering the sub-question three under the first main research
question, a categorical variable named mentor was created based on the change of the peer and faculty mentor practice in the past 12 years, and there are two levels of this variable, which are one mentor and two mentors. Specifically, one mentor means students were only assigned with one faculty mentor, and two mentors means students were assigned with two mentors composed by one faculty mentor plus one peer mentor.

The LLC practice went through some alternations based on the lesson learned from the students’ feedbacks and behavioral outcomes of this practice, and some structural changes of the agreement with other department. During the first three years (2007-2009) of the existence of this program, students in this program were all mandated to live in the same residence hall; during the next five years (2010-2014), all students were assigned to live in three different residence halls with close physical distance between each residence hall, and in the recent three years (2015-2017), students are allowed to pick any residence hall as they preferred to live in, but the program reserved three residence halls with close physical distance for students who preferred to live in designated residence hall in order to get more connections with students from the same program. For the purpose of this study, and answering the sub-question three under the first main research question, a categorical variable named type of LLC was created based on the change of the LLC practice in the past 12 years, and there are three levels of this variable, which are live in all halls, live in three halls, and live in one hall. Specifically, live in all hall means students had the option to live whichever residence hall they wanted, live in three halls means students can only select one hall to live in from total of three residence halls offered by the program, live in one hall means students were mandatorily asked to live in the same residence hall.
The performance evaluation feedback practice also went through some changes over the past 12 years of the existence of the program. For the first five years (2007-2011), this practice was not implemented; from 2012 to 2013, performance evaluation feedback was briefly provided in a group setting during class time during the mid-term of the semester; and from 2014 to 2018, performance evaluation feedback was provided to individual student by both peer and faculty mentors out-side the classroom during the mid-term of the semester. The changes were made because the staff members realized the needs from students to hear constructive feedbacks on their performance in a team setting, and to provide this feedback during the mid-term of the semester allowed students to reflect their behaviors, perspectives, strengths and weaknesses in a team setting and improve their performance throughout the rest of the semester. By changing the setting and format of this practice from giving feedback in group settings during class time to giving feedback to individual students outside the classroom setting, this allowed students to hear more honest feedback in a private environment where students and mentors could exchange their information more comfortably. For the purpose of this study, and answering the sub-question three under the first main research question, a categorical variable named feedback was created based on the change of the performance evaluation feedback practice in the past 12 years, and there are three levels of this variable, which are no feedback, in-group feedback, and individual feedback. Specifically, no feedback means no feedback was given to students, in-group feedback means feedback was given in a group setting with all group members attended, individual feedback means feedback was given in an individual and private setting.

The social media practice has been implemented since 2013 with the intention to build an online community for the students in this program. This is done by posting resources and pictures on Facebook and Instagram of students at service sites and meaningful on-campus
events. This practice has matured since 2015 with more frequent, systematic and structured information posted on the social media platforms. Compared to year 2013 and 2014, the recent three years (2015 to 2018), the program put more effort on building this online community by using various ways to promote individual students in the program and connect all students together, such as frequent spotlight story of individual student before and after the program started, sharing birthday wishes to students, and highlighting all students’ service projects. For the purpose of this study, and answering the sub-question three under the first main research question, an ordinal variable named social media was created based on the change of the social media practice in the past 12 years, and there are three levels of this variable, which are no social media, low level, and high level. Specifically, no social media means no social media implemented in the program, low level means social media intervention was only implemented in a low level, high level means social media intervention was implemented in a high level.

This program is selected because it is a university program with embedded belonging enhancement practices that are based on research evidence and high-quality practice, and the program has continuously existed for 12 years. Also, there are some changes and readjustments on several of the belonging enhancement practices over the years, and the program serves a large number of racially diverse first-year students at a large land-grant public institution. By using this program as the studied program, the main research question and the sub research questions can be thoroughly answered.

**Research Design**

This study adopts convergent parallel mixed-methods study design. This specific mixed-methods design allows researchers to integrate both quantitative and qualitative methods, collect each set of data at the same time, analyze them separately, and then compare or relate the results
to see if the findings support or disagree with each other. Mixed method design is selected to
develop a stronger understanding of the research problem since both qualitative and quantitative
studies share some limitations (Creswell, 2014). Campbell and Fiske (1959) also believed this
method of gathering different forms of data is most appropriate for understanding a
psychological trait. The convergent parallel mixed-method study design is appropriate for this
study because both the qualitative and quantitative data were collected at the same time, and the
collection of both forms of data used the same or parallel variable and construct, which is sense
of belonging. Moreover, since both of the qualitative and quantitative data are planned to be
integrated together to answer the research questions based on the convergence and divergence of
the data (Creswell, 2014), this convergent parallel mixed-methods design is the most appropriate
design for this study.

This convergent parallel mixed-methods study design has three parts: the first part of this
convergent parallel mixed-methods is a quantitative method quasi-experimental design using
students’ self-report survey data to examine the change in students’ perceived level of sense of
belonging between the control and treatment groups, and the difference of perceived level of
sense of belonging based on gender and race. Specifically, students from control (a first-year
experience program) and treatment (service-learning leadership program, SLLP) groups were
surveyed at the beginning and the end of a semester as a way to capture the change on their
perceived sense of belonging over a semester. This design is appropriate for the first sub-
question under the first main research question because it can produce cause-effect relation
between participation in the studied program and the change in students’ perceived level of sense
of belonging.
The second part of this convergent parallel mixed-methods is a quantitative method causal-comparative design using university students’ record data from 2007 to 2018 to examine whether the embedded belonging enhancement practices affect students’ academic performance (GPA, retention and years of degree attainment), and which practice has the most impact on students’ academic performance. Causal-comparative design or ex post facto design attempts to investigate the case, or reason for behaviors or status of groups that already occurred. Unlike experimental design, the alleged cause cannot be manipulated anymore in causal comparatives study since it has already happened. Also, the studied groups are already formed and divided based on the independent variables. This design is appropriate for the third sub-research question under the first main research question because the interested dependent (GPA, retention, years to degree attainment) and independent variables (belonging enhancement practices) are already occurred, and the study intends to examine the causal effect of different belonging enhancement practices on academic performance. Although a causal comparative study cannot produce true cause-effect relationships, such as experimental studies, it is a reasonable approach when variables cannot be manipulated by researchers (Gay, Mills & Airasian, 2006).

The third part of this study is a qualitative phenomenological approach with nine individual semi-structured interviews, one focus group interview, and participants’ weekly journals. It addresses how first-year college students perceive sense of belonging through their lived experience from the studied program. A phenomenological approach focuses on using storytelling techniques to collect, document and investigate multiple participants’ knowledge and experience, and describe “what” they experience and “how” they experience it (Moustakas, 1994). According to Creswell (2014), studies that adopt phenomenological approach focus on describing what all participants have in common as they experience a phenomenon. Since sense
of belonging is perceived differently by different individuals, it is important to make sense of this construct through a phenomenological lens, so individual experiences can be reduced to a description of the universal essence. In relation to the pragmatic paradigm and the phenomenological approach, the data sources for this study will include interviews, focus group and journaling, and the details of each of them are discussed in the data collection section.

Validity

Creswell (2014) pointed out that for convergent parallel research study, validity should be based on establishing both quantitative validity and qualitative validity. One of the concerns for a quasi-experimental design is the participants are not randomly assigned to groups, so effort should be made to equate the groups as much as possible. As Gay, Mills and Airasian (2005) suggested if differences among any major extraneous variables are identified between the groups, analysis of covariance can be used to statistically equate the groups. For a causal-comparative study, lack of randomization, manipulation and control are the threats to its validity, and there are three approaches to reduce the threats: matching, comparing homogeneous groups or subgroups, and analysis of covariance (Gay et al., 2005). Therefore, for the second part of this study, the analysis of covariance approach will be used to adjust the initial group differences on variables used in the causal-comparative study.

For the qualitative part of the study, treatment of validity was based on credibility, transferability, dependability and confirmability (Lincoln & Guba, 1985). To ensure credibility, data sources were triangulated by collecting three sources of data, including interviews, focus group and students’ weekly journals. To ensure confirmability, subjective statement will be included throughout the discussion of the qualitative findings to prevent bias derived from the researcher. For the purpose of ensuring dependability, the researchers kept thick descriptions on
all the interviews and focus group sessions, such as interviewees’ gesture, tone and eye contact. Transferability will be ensured by an audit trail in which researchers will keep track of all the steps completed in this study.

**General, Target and Accessible Population**

The general population for this study is first-year college students in the United States. According to Bartlett, Kotrlik, and Higgins (2001) and Creswell (2003), at least a single attribute of interest should be shared among participants in the general population, and for this study the attributes include: being first-year college students, and attending colleges in the United State. First-year college students are selected because research has shown this group of students are facing many obstacles in terms of transitioning to college life and connecting with others on campus (Barr, 2007; Dyson & Renk, 2006), and this group of students has the highest drop-out rate compared to sophomore, junior and senior groups (Tinto, 1993). Also, the study is not concerned with students outside of the United States since Strayhorn (2012) argued that belongingness should be understood in certain spaces, contexts, and among specific populations. Since the higher education system and university environment vary drastically among different countries, this study will only focus on understanding the belongingness in the United States.

The target population is underserved, first-year college students at a predominantly White institution in the southern United States. According to Asiamah, Mensah, and Oteng-Abayie (2017), general population oftentimes contains participants who should not be included in the study based on the research goal, assumptions, and/or contexts. Therefore, the refinement of the general population based on a set of criteria is necessary, and it resulted the target population for this study. Underserved first-year college students at large predominantly White institute were selected for the target population because previous research demonstrated minority students,
especially African American students at large predominantly White institute, had lower levels of perceived sense of belonging than White and Asian students (Ingram, 2012; Johnson et al., 2007), which will impact on their decision to remain enrolled in college. As Maestas, Vaquera, and Zehr (2007) argued university environment has a major impact on the perceived belongingness among students of color, since the majority of colleges remain predominantly white. This causes students of color to feel marginalized and isolated. Moreover, students from low-income families and first-generation college students tend to report a lower sense of belonging than students from affluent families and non-first-generation students (Maestas et al., 2007; Ostrove & Long, 2007). Ingram (2012) further pointed out since college campuses have become increasingly diverse, it is important to understand each group of students’ perspectives on belongingness as it “has real consequences for the individuals, potentially affecting satisfaction, effort, achievement, retention, and graduation” (p.9).

The accessible population for this study is first-year college students in the studied program at the studied institution. According to Asiamah et al. (2017) accessible population is reached “after taking out all individuals of the target population who will or may not participate or who cannot be accessed at the study period”. Also, after a thorough investigation based on the list of peer institutions that is published on the studied institution’s website, no similar program like the studied program exists in the southern part of the United States.

**Sampling Method**

The first part of the quantitative study used voluntary response sampling methods since the participants were the ones voluntarily to be part of the study, and the researcher did not select or assign the participants in either the treatment or control group. The second part of the quantitative study used the university record data, the accessible population is refined narrowly
enough to be the sample of the study, which means all members in the accessible population were sampled.

For the qualitative part of this study, convenient sampling method was used. This sampling method also “referred to as accidental sampling and haphazard sampling, is the process of using as the sample whoever happens to be available at the time” (Gay et al., 2005, p. 112). The use of an existing group is one of the examples of convenient sampling method, and for this qualitative study, the nine participants were all selected because they enrolled in the studied program and were available at the time of the study. Participation in qualitative studies is often perceived more burdensome by participants, so it is less likely for members of the target and accessible population to agree to participate (Creswell, 2003; Williams, 2007). According to Gay et al. (2005), there are no standard rules for determining the correct number of participants for qualitative study, and the range of number of participants in a qualitative study can range from a single participant to the researchers’ defined number of participants. However, it is rare for a qualitative study to have more than 20 participants (Creswell, 2003). One of the indicators of having enough participants is called data saturation, at which information shared by different participants reaches to the point of redundancy, and no new information is gathered from the new participant (Gay et al., 2005). For this study, with the nine participants, no new information or experience was shared by the participant based on what have heard and observed from the previous eight participants, so the researcher decided the data has reached to data saturation.

**Study Participants**

This study has three separate groups of participants as shown in Table 4. The quantitative part of the study has two sets of participants: the first set of participants for the quantitative part of this study is used to answer the first and second sub-questions of the first main research
question. The participants are the 2019 cohort of students in the studied program (treatment group) and a first-year experience program (control group). Since the sample was not collected through randomized sampling method, matching method was used to match the students in the control group with the students in the treatment group based on their gender and race variables.

There are 262 participants (each group had 131 participants) after the matching procedure based on students’ gender and race, 186 (71%) are female, 76 (29%) are male, 66 (25.2%) are nonwhite, and 196 (74.8%) are white students.

Table 4

<table>
<thead>
<tr>
<th>Research Questions</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do students from the treatment and control groups perceive sense of belonging</td>
<td>Students from treatment and control groups in the 2019 cohort (N=262)</td>
</tr>
<tr>
<td>differently before and after the program?</td>
<td></td>
</tr>
<tr>
<td>Do program participants perceive sense of belonging differently before and after</td>
<td>Students from treatment group in the 2019 cohort (N= 150)</td>
</tr>
<tr>
<td>the program based on their gender and race?</td>
<td></td>
</tr>
<tr>
<td>Do different belonging enhancement practices play different roles on students’</td>
<td>Students from 2007 to 2018 cohorts of the studied program (N= 2,762)</td>
</tr>
<tr>
<td>GPA, retention and years of degree attainment?</td>
<td></td>
</tr>
<tr>
<td>How does a service-learning program with embedded belonging enhancement</td>
<td>Students from the treatment group (N=9)</td>
</tr>
<tr>
<td>practices affect students’ sense of belonging?</td>
<td></td>
</tr>
</tbody>
</table>

The second set of participants is used to answer the third sub-question of the first main question. The participants are 2,762 first-year students enrolled in the studied program from 2007 to 2018, and their student record data was obtained from the university Registrar’s office since the studied program was established in 2007 and it has been existing until present. Among
these students, 1,836 (66.5%) are female, 926 (33.5%) are male; and 1,341 (48.6%) are Caucasian, 1,234 (44.7%) are African American, 105 (3.8%) are classified as others, and 19 (0.7%) did not share their racial information. The third set of participant is for the qualitative part of the study, and it contains a total of nine first-year college students. Their demographic information is presented in Table 5.

Table 5

Demographic Information of Participants

<table>
<thead>
<tr>
<th>Participant</th>
<th>Age</th>
<th>Classification</th>
<th>Gender</th>
<th>Race</th>
<th>Major</th>
<th>Housing</th>
<th>Campus Involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abbie</td>
<td>18</td>
<td>Freshman</td>
<td>Female</td>
<td>AA</td>
<td>BS</td>
<td>Rice</td>
<td>1</td>
</tr>
<tr>
<td>Alan</td>
<td>22</td>
<td>Freshman</td>
<td>Male</td>
<td>Asian</td>
<td>CS</td>
<td>Moseley</td>
<td>4</td>
</tr>
<tr>
<td>Alex</td>
<td>19</td>
<td>Freshman</td>
<td>Male</td>
<td>PI</td>
<td>ME</td>
<td>Ruby</td>
<td>2</td>
</tr>
<tr>
<td>Dana</td>
<td>18</td>
<td>Freshman</td>
<td>Female</td>
<td>AA</td>
<td>ID</td>
<td>Moseley</td>
<td>3</td>
</tr>
<tr>
<td>Ella</td>
<td>18</td>
<td>Freshman</td>
<td>Female</td>
<td>White</td>
<td>BS</td>
<td>Griffins</td>
<td>5</td>
</tr>
<tr>
<td>KK</td>
<td>19</td>
<td>Freshman</td>
<td>Male</td>
<td>White</td>
<td>Wildlife</td>
<td>Moseley</td>
<td>4</td>
</tr>
<tr>
<td>Kebi</td>
<td>19</td>
<td>Freshman</td>
<td>Male</td>
<td>AA</td>
<td>Biology</td>
<td>Moseley</td>
<td>2</td>
</tr>
<tr>
<td>Sandy</td>
<td>N/A</td>
<td>Freshman</td>
<td>Female</td>
<td>AA</td>
<td>BS</td>
<td>Ruby</td>
<td>3</td>
</tr>
<tr>
<td>Tina</td>
<td>18</td>
<td>Freshman</td>
<td>Female</td>
<td>AA</td>
<td>N/A</td>
<td>Oak</td>
<td>3</td>
</tr>
</tbody>
</table>

Note. All names are pseudonyms. AA: African American, PI: Pacific Islanders, BS: Biological Science, CS: Computer Science, ME: Mechanical Engineering, ID: Interior Design. Campus involvement: number of campus organizations involved.

Instruments

Interview Protocols

An individual interview protocol was created to answer the qualitative question, which is how does a service-learning program with embedded belonging enhancement practices affect students’ sense of belonging. The protocol includes a demographic sheet, and a list of interview questions were developed based on qualitative interview guidelines proposed by Creswell

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The individual interview protocol contains 13 demographic items, an introduction of the interviewer, one opening question and one transition question in order to build rapport with the interviewees. There are seven main interview questions, and each of them has two to five sub-questions. The focus interview protocol includes a welcome speech from the facilitator, an introduction of each of the participants, a short description of the focus group discussion topic, and a description of the rules to be followed during the focus group interview in order to set a friendly environment for all the participants. There are total of five main interview questions based on shared information from participants through individual interviews, and all of them targets on students’ experience and perception about the belonging interventions embedded in the program. Detailed individual and focus group interview protocol are in Appendix C and D.

Survey Measures

The pre- and post-survey (see Appendix E) used the University Belonging Questionnaire (UBQ) which was developed by Slaten et al. (2017). By using this instrument, the sub-question 1 and 2 under the first main research question can be answered, which are “Do students from the treatment and control groups perceive sense of belonging differently before and after the program?” and “Do program participants perceive sense of belonging differently before and after the program based on their gender and race?” There are total of 24 items in the survey, and there are three subscales in the survey, which are university affiliation, university support and acceptance, and faculty and staff relations. For the university affiliation subscale, sample items include “I am proud to be a student at my university”, “I feel like I belong to my university when I represent my school off campus”. For the university support and acceptance subscale, sample items include “My university provides opportunity to engage in meaningful activities”, “I believe there are supportive resources available to me on campus”. For the faculty and staff relations
subscale, sample items include “I feel connected to a faculty/staff member at my university”, “I feel that a faculty member has valued my contributions in class”. The response ranges from 1 (strongly disagree) to 4 (strongly agree). This UBQ scale was developed based on rigorous scale development procedures, which included both qualitative and quantitative studies to generate initial items, conduct factor analysis, and evaluate the psychometric properties of the total scale and each of the three subscales. The total scale has an internal consistency of Cronbach’s alpha level of .94, and the three scales has Cronbach’s alpha level of .92, .85, and .88 for university affiliation, university support and acceptance, and faculty and staff relations, respectively. Moreover, the total scale, and each of the three subscales also demonstrated high convergent and divergent validity (Slaten et al., 2017).

Data Collection

The study has been approved by the Internal Review Board of the studied institution (see Appendix F for approval notification). Both quantitative and qualitative data were collected for this study, and will be discussed in detail. Quantitative data were collected through two data collection procedures. The first quantitative data collection procedure addressed the first and second sub-research questions of the first main research questions (to find out if SLLP participants’ perceived sense of belonging differ from those who are not in the program, and whether there are any gender and race differences in terms of perceived sense of belonging). The pre-survey was given out in the first week of fall 2019 semester, and post-survey was collected in the last class of the program for both SLLP participants and control group participants. Both of the surveys were given out as paper-based format, and participation was entirely voluntary. The second procedure addressed the third sub-research question of the first main research question (to find out the different impact of each of the five belonging practices on students’
performance). Student record data from 2007 to 2018 were requested and obtained from the Registrar’s Office. This dataset contains all the previously enrolled students’ demographic information (gender, race, state, Pell grant status, high school core GPA, ACT score), and their academic record data (semester GPA, enrollment status and graduation status for each semester). In order to only retrieve students’ data from fall 2007 to fall 2018 who were enrolled in the program, one additional variable was requested to be included in the dataset to indicate each individual’s enrollment status in the program. Therefore, the actual dataset used in this study only contains students from fall 2007 to fall 2018 who enrolled in the program. This dataset should be considered as existing data, and based on the steps taken to preserve participants’ anonymity, consent was not required. The qualitative data were collected through individual interview, focus group interview, students’ journaling, and social media activities to answer the second main research question (to find out how the SLLP affect students’ perceived sense of belonging).

**Recruitment**

The recruitment procedure is designed and implemented for three main goals: accessing population, convincing people to participate, and getting quality data from potential participants. For the first goal: an initial recruitment email was sent out by the SLLP program manager. He is one of the direct contact people to all of the students from applying this SLLP program to the time enrolling in this SLLP program. This person regularly sends a variety of emails to all the students, so a recruitment email sent from his email address will most likely catch students’ attention. Following the initial recruitment email, the principal investigator went to the Friday class to talk to the students and encourage them to participate in this study. A week later, a second email was sent out by the program manager again. The initial email was drafted by the
principal investigator to meet the other two goals: encouraging people to participate and getting quality data. For the visit to the Friday class to promote this study, the principal investigator used a pre-drafted script to articulate all of the previously mentioned benefits and potential impacts to the program effectiveness from this study. The detailed recruitment email and the verbal recruitment script are in Appendix G and H.

Consenting Process

Though all potential participants are freshman students at the studied institution who are at least 18 years old, and this study involves almost no potential risk to any of the participants, the study used an informed consent form and required all participants to sign the form. Before starting each of the individual interviews and the focus group interview, the principal investigator or interviewer read the consent. After reading the consent form and obtaining the signature from participant, the interview and focus group interview started. The detailed consent form is in Appendix I.

Interview

All nine participants were interviewed once, and the interviews lasted around 45 minutes to an hour. All of the interviews were audio recorded, and during the interview, the interviewers took field notes on most of the detailed information, such as interviewee’s gestures, facial expressions, subtle behaviors, tone, eye contact, appearance, etc. The interviews were formed as semi-structured interviews and took place at a comfortable and private space to allow the participant to share personal experiences and perspectives. The interview questions were formed based on interview question guidelines (Creswell, 2014), and are listed in Appendix C.
Focus Group

The focus group interview was conducted to mainly serve as a way to triangulate the data by having data sources come from different ways. The information collected through focus group interview can add validity to the qualitative part of the study. A total of seven participants from the individual interviews participated in the focus group interview, and the other two participants had schedule conflicts, so they were not able to attend the focus group interview. The focus group interview lasted one hour and forty minutes, and the interview was video recorded. During the interview, the interviewer took field notes about any detailed information, such as participants’ gestures, facial expressions, subtle behaviors, tone, eye contact, appearance, etc. The focus group interview was hosted in a large space area, and all of the participants faced each other, so they were able to see each other's facial expression and behaviors. During the focus group interview, the principal investigator served as a conversation facilitator who posted questions and mediated the conversation, but with no leading questions. The main role of the facilitator was to encourage all participants to be involved in the conversation, and to make sure everyone was comfortable while sharing personal opinions and experiences. The focus group interview questions were formed based on recommended guidelines (Creswell, 2014), and are listed in Appendix D.

Journaling

For the purpose of triangulating data sources, students’ journals were collected from the program coordinator. Based on the program requirement, the students need to write reflection every week to describe their service experience, team work, group dynamic, and relationship with peers and mentors. For the purpose of this study, the researchers asked the program coordinator to retrieve students’ journal entries for the entire semester.
Data Analysis

For this convergent parallel mixed-method study, a side-by-side comparison data analysis approach was used, which means quantitative and qualitative data were analyzed, reported and discussed separately, and then the quantitative and qualitative results were compared or related for interpretation. In analyzing the quantitative data, the researcher used different approaches for answering the three quantitative sub-research questions (see Table 6 summarizing research questions, variables of interest, data sources, and analyses). For quantitative data from the students’ survey response and answering sub-question one of the first main research question, the researcher first conducted mixed-design analysis of variance (ANOVA) to test the differences on the total score of sense of belonging across time and program. Then a mixed-design multivariate analysis of variance (MANOVA) was conducted to test the differences on the overall sense of belonging across time and program for the three dependent variables: subscale 1, 2, and 3 because the multidimensional nature of the belongingness construct. Then three separate mixed-design ANOVA analyses were conducted since the independent variables have both within- and between-subject variables, and there is only one dependent variable (each of the three subscores of perceived level of sense of belonging). The within-subject variable is the timing (first week and last week of class) of taking the surveys, and the between-subject variables are students’ group (treatment and control). For answering the sub-question two of the first main research question, a mixed-design ANOVA analysis was conducted since the independent variables have both within- and between-subject variables, and there is only one dependent variable (total score of the perceived level of sense of belonging). The within-subject variable is timing (first week and last week of class), and the between-subject variables are students’ gender and race. For analyzing quantitative data from the secondary university student record data to answer the sub-
question three of the first main research question, “do different belonging enhancement practices play different roles on students’ GPA, retention and years of degree attainment”, the researcher used hierarchical regression analysis to examine how different belonging enhancement practices (as independent variables, see Table 7) affect students’ GPA (as dependent variables, see Table 8) when controlling the covariate variables (see Table 9). Since the status of student’s retention and whether or not students graduate in six years are dichotomous variables, hierarchical logistic regression analyses were performed to examine how different belonging enhancement practices (as independent variables, see Table 7) affect students’ retention (as dependent variables, see Table 8) and years of degree attainment (as dependent variables, see Table 8) when controlling the covariate variables (see Table 9).

For analyzing the qualitative data, the researcher adopted the data analysis spiral approach recommended by Creswell (2014), and steps of analyzing the data included: organizing the data, reading and memoing, describing, classifying, interpreting data into codes and themes, interpreting the data, and representing and visualizing the data. Specifically, for phenomenological qualitative data analysis, the researcher adopted Moustakas’s (1994) approach, which included: describing personal experience with the phenomenon under study; developing a list of significant statements; grouping the statements into larger units of information (meaning units or themes); writing description on what participants experienced with the phenomenon; describing how the experience happened; and writing a composite description of the phenomenon incorporating both the textural and structural descriptions. NVivo 12 software was used to guide the data analysis process, which means all the preexisting and new emergent codes, annotations and memos were conducted and organized through this software to generate common themes and significant statements derived from the qualitative data.
Interview data were transcribed into Microsoft Word document, and participants’ weekly journals were screened and selected based on relevance to the study purpose. The criteria used to screen journals was journal had direct description on at least one of the belonging interventions. Unfortunately, only a small number of participants’ journals included narratives related to the belonging interventions. Both the interview data and journals were transferred to the NVivo 12 software, and followed with data coding and analyzing based on the selected theoretical frameworks.
### Table 6

**Research Questions, Variables, Data Source and Data Analysis Procedures**

<table>
<thead>
<tr>
<th>Research Questions</th>
<th>Variables</th>
<th>Source</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do students from the treatment and control groups perceive sense of belonging differently before and after the program?</td>
<td>Independent Variables: program and time; Dependent Variables (DVs): total score of sense of belonging, and three subscores of sense of belonging</td>
<td>Sense of Belonging Survey Data</td>
<td>Mixed-design ANOVA (2<em>2) for DV as total score of sense of belonging. Mixed-design MANOVA (2</em>2) for DVs as sense of belonging subscore 1, subscore 2, and subscore 3, and followed by three separate ANOVAs</td>
</tr>
<tr>
<td>Do program participants perceive sense of belonging differently before and after the program based on their gender and race?</td>
<td>Independent Variables: gender, race, and time; Dependent Variable: total score of sense of belonging</td>
<td>Sense of Belonging Survey Data</td>
<td>Mixed-design ANOVA (2<em>2</em>2)</td>
</tr>
<tr>
<td>Do different belonging enhancement practices play different roles on students’ GPA, retention and years of degree attainment?</td>
<td>Predictor Variables: service hours, mentor, social media, feedback, LLC; Control Variables: gender, race, ACT, high school core GPA, Pell grant; Dependent Variables (DVs): first year GPA, retention, years of degree attainment</td>
<td>University Student Record Data</td>
<td>Hierarchical multiple regression analysis; for any outcomes measures (retention and years of degree attainment) that have been dichotomized, the regression analysis takes the form of a hierarchical logistic regression analysis</td>
</tr>
<tr>
<td>How does a service-learning program with embedded belonging enhancement practices affect students’ sense of belonging?</td>
<td>Three aspects of sense of belonging: affiliation, companionship and connectedness</td>
<td>Interview, focus group, reflection journal</td>
<td>Spiral approach (Qualitative)</td>
</tr>
</tbody>
</table>
Table 7

List of Independent Variables

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Level of Measurement</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service hours</td>
<td>Ordinal</td>
<td>20-25</td>
</tr>
<tr>
<td>Mentor</td>
<td>Categorical</td>
<td>One mentor = 1, Two mentors = 2</td>
</tr>
<tr>
<td>Type of LLC</td>
<td>Categorical</td>
<td>Live in all hall = 1, Live in three halls = 2, Live in one hall = 3</td>
</tr>
<tr>
<td>Feedback</td>
<td>Categorical</td>
<td>No feedback = 0, In-group feedback = 1, Individual feedback = 2</td>
</tr>
<tr>
<td>Social Media</td>
<td>Ordinal</td>
<td>No = 0, Low level = 1, High level = 2</td>
</tr>
</tbody>
</table>

Note. In mentor variable, “one mentor” means students were only assigned with one faculty mentor, “two mentors” means students were assigned with two mentors composed by one faculty mentor plus one peer mentor. In type of LLC variable, “live in all hall” means students had the option to live whichever residence hall they wanted, “live in three halls” means students can only select one hall to live in from total of three residence halls offered by the program, “live in one hall” means students were mandatorily asked to live in the same residence hall. In feedback variable, “no feedback” means no feedback was given to students, “in-group feedback” means feedback was given in a group setting with all group members attended, “individual feedback” means feedback was given in an individual and private setting. In social media variable, “no social media” means no social media was implemented in the program, “low level” means social media intervention was only implemented in a low level, “high level” means social media intervention was implemented in a high level. In service hours variable, the number represents the average service hour students completed in one semester.
Table 8

**List of Dependent Variables**

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>Level of Measurement</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>First-year GPA</td>
<td>Interval</td>
<td>0.0 -- 4.0</td>
</tr>
<tr>
<td>Retention</td>
<td>Categorical</td>
<td>Yes= 1 or No= 0</td>
</tr>
<tr>
<td>Graduate in 6 years</td>
<td>Categorical</td>
<td>Yes= 1 or No= 0</td>
</tr>
</tbody>
</table>

Table 9

**List of Control Variables**

<table>
<thead>
<tr>
<th>Control Variables</th>
<th>Level of Measurement</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Categorical</td>
<td>Male= 1, Female= 2</td>
</tr>
<tr>
<td>Race</td>
<td>Categorical</td>
<td>White= 1, Nonwhite= 2</td>
</tr>
<tr>
<td>ACT</td>
<td>Ordinal</td>
<td>1 -- 36</td>
</tr>
<tr>
<td>High school core GPA</td>
<td>Interval</td>
<td>0.0 -- 4.0</td>
</tr>
<tr>
<td>Pell Grant</td>
<td>Categorical</td>
<td>No= 1 or Yes= 2</td>
</tr>
</tbody>
</table>

**Assumption Test**

**Univariate normality.**

First, for sub-question one under the first main research question which to answer if there is a difference on the change of sense of belonging score between the treatment and control groups, multivariate normality should be assumed for running MANOVA test. Since SPSS does
not test multivariate normality, Field (2009) notes that univariate normality can be done for each of the dependent variables. Histograms and Normal Q-Q Plots showed that the pre- and post-score for all the three dependent variables (university affiliation, university support and acceptance, and faculty and staff relations) were normally distributed. Also, histograms and Normal Q-Q Plots showed that the pre-score of sense of belonging for both of the treatment and control groups, and post-score of sense of belonging for control group were normally distributed, but the post-score of sense of belonging for the treatment group was positively skewed. Second, univariate normality assumption test was conducted for the subquestion two under main research question one to answer if there is a difference on the change of sense of belonging score based on gender and race. With regard normality, histograms and Normal Q-Q Plots showed that both of the pre-score and post-score of sense of belonging for all the four groups (White female, White male, non-White female, and non-White male) were normally distributed.

**Homogeneity of variance.**

For sub-question one under the first main research question, the assumption of homogeneity of variance was tested through Levene’s test. (Field, 2009; Pallant, 2010). The results showed that both of the pre- and post-scores of the three dependent variables (university affiliation, university support and acceptance, and faculty and staff relations) had non-significant p value from the Levene’s test, except for only the post faculty and staff relations variable; therefore, the assumption of homogeneity of variance was assumed for majority of the dependent variables. Also, the results showed that both of the pre- and post-scores of sense of belonging had non-significant p value from the Levene’s test, so the homogeneity of variance was assumed. For sub-question two under the first main research question, the results showed that both of the
pre- and post-score of sense of belonging had non-significant $p$ value from the Levene’s test, so the homogeneity of variance was assumed.

**Assumption test for hierarchical multiple regression (DV is first-year GPA).**

This assumption test was conducted for the sub-question three under main research question one to answer if different belonging enhancement practices play different roles on students’ GPA. Assumption tests with all five predictors and all levels of each predictor were performed. Normality: based on the graph of histogram plot of the residuals, it appeared the residuals are normally distributed. Homoscedasticity: Based on the scatter plot of the standardized residuals and the standardized predicted scores, the homoscedasticity assumption is fulfilled since the variance of the standardized residual on Y-axis appeared constant over the range of values of standardized predicted value on the X-axis. Linearity: Since the five independent variables are either categorical or ordinal variables, the linearity of the independent variables and dependent variables should be assumed, and the scatterplot matrix of the five predictor variables and the dependent variable (GPA) supported the assumption as well. Multicollinearity: The assumption of multicollinearity requires that for any two observations the residual terms are independent of each other and uncorrelated. The Durbin-Watson statistic tests whether the criteria for the assumption of independence of errors is met. Field (2013) suggested that a measure of .5 to 2.5 is acceptable to demonstrate this independence. The Durbin-Watson value is 2.04 when entered all five predictors in the model, so the assumption of independent errors is met. The tolerance and variance inflation factor (VIF) for an HMR analysis requires that the tolerance measure is .10 or greater and the VIF is less than 10.00 (Myers, 1990; Pituch & Stevens, 2016). The results showed that all the predictor variables met these criteria except for
social media variable, and the level of live in all halls under type of LLC, and the level of individual feedback under feedback. Therefore, it suggested there may be some collinearity issues with these three predictors, and it is better to drop these three predictors in the model.

Multivariate outliers: The Cook’s distance should be less than 1 for all the cases in order to meet this assumption, and the result showed that the dataset met this assumption since the maximum value of Cook’s distance is 0.01 which is less than 1.

Assumption tests were performed again after dropping off social media, all halls and individual feedback from the original model. All previously mentioned assumptions still met, and the tolerance value of all predictors are larger than .10, and VIF value are less than 10. Durbin-Watson value is still 2.04. Therefore, the analysis of the data indicated that it complied with the statistical assumptions for use of HMR procedures. The predictor variables in the final model are mentor with two levels (one mentor and two mentors), feedback with two levels (no feedback and group feedback), LLC with two levels (live in one hall and live in three halls), and service hours (with average service hours for each year). Control variables are gender (female and male), race/ethnicity (white and non-white), Pell grant status (Yes or No), High school core GPA, and ACT score. Dependent variable is first-year GPA.

Assumption test for hierarchical logistic regression (DV is retention).

This assumption test was conducted for the sub-question three under main research question one to answer if different belonging enhancement practices play different roles on students’ retention. The data did not have multivariate outlier issue since the maximum value of Cook’s distance was less than 1. The data did not have over-dispersion problem since the dispersion parameter was 1.72 for model 1, and .69 for model 2, which were both less than 2.
Since both of the assumptions were met, the data is appropriate for hierarchical logistic regression. Model 1 contained control variables, namely, gender, ethnicity, Pell grant status, high school core GPA, and ACT. Model 2 included five predictor variables, which were mentor (two levels), social media (three levels), feedback (three levels), service hour, and living-learning community (three levels). The feedback and LLC variables were dummy coded for the purpose of running hierarchical logistic regression.

Assumption test for hierarchical logistic regression (DV is years of degree attainment).

This assumption test was conducted for the sub-question three under main research question one to answer if different belonging enhancement practices play different roles on students’ years of degree attainment. The data did not have multivariate outlier issue since the maximum value of Cook’s distance was less than 1. The data did not have over-dispersion problem since the dispersion parameter was 1.43 for model 1, and 1.07 for model 2, which were both less than 2. Since both of the assumptions were met, the data is appropriate for hierarchical logistic regression. Model 1 contained control variables, namely, gender, ethnicity, Pell grant status, high school core GPA, and ACT. Model 2 included four predictor variables, which were mentor (two levels), feedback (two levels), service hours, and living-learning community (two levels). Social media was not entered as predictor variable since this practice was not implemented to the program until the year of 2013, which is beyond the scope of this dataset to answer the relations between the five practices and years of degree attainment.
CHAPTER IV

RESULTS

Research question 1: Does a service-learning program with embedded belonging enhancement practices affect students’ sense of belonging, and students’ GPA, retention and years of degree attainment?

Sub-question 1: Do students perceive sense of belonging differently among the treatment and control group before and after the program?

A 2 * 2 (time: pretest vs. posttest; program: treatment vs. control) mixed-design ANOVA was performed to examine the effect of time and program on the total score of sense of belonging. Frequency of participants demographic information is listed in Table 10. Results showed that there was a significant program main effect (see Figure 2) on the total score of sense of belonging, $F(1, 260) = 5.590, p = .019, \eta_p^2 = .021$. However, there was no time main effect, $F(1, 260) = 4.174, p = .042, \eta_p^2 = .016$; or interaction effect between time and program, $F(1, 260) = .204, p = .652, \eta_p^2 = .001$. Though the $p$ value of the $F$ test of time was .042, we need to consider that the main effect of time and the interaction effect shared the same error variance, so the alpha level should be adjusted as $0.05/2= .025$; therefore, the main effect of time should be interpreted as non-significant. The non-significant interaction effect between time and program means the change on the total score of sense of belonging from pre- to post- test followed the same pattern for the control and treatment group. Result from the descriptive statistics (see Table
showed that students from the treatment group \((M_{pre} = 3.380, SD_{pre} = .404; M_{post} = 3.326, SD_{post} = .579)\) had statistically significant higher score on sense of belonging than the students from control group \((M_{pre} = 3.285, SD_{pre} = .375; M_{post} = 3.320, SD_{post} = .484)\). Since there was no significant time main effect, which means although students from both of the groups had decreased score on the total score of sense of belonging from pre-test \((M = 3.33, SD = .02)\) to post-test \((M = 3.26, SD = .03)\), the decrease of score was not statistically significant.

Table 10

*Frequency Table for Participant Demographics*

<table>
<thead>
<tr>
<th>Gender</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>186</td>
<td>71</td>
</tr>
<tr>
<td>Male</td>
<td>76</td>
<td>29</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonwhite</td>
<td>66</td>
<td>25.2</td>
</tr>
<tr>
<td>White</td>
<td>196</td>
<td>74.8</td>
</tr>
<tr>
<td>Total</td>
<td>262</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 11

*Descriptive Statistics for Total Sense of Belonging Score*

<table>
<thead>
<tr>
<th>Program</th>
<th>(M (SD))</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre Sense of belonging</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>3.38 (0.40)</td>
<td>131</td>
</tr>
<tr>
<td>Control</td>
<td>3.29 (0.37)</td>
<td>131</td>
</tr>
<tr>
<td>Post Sense of belonging</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>3.33 (0.58)</td>
<td>131</td>
</tr>
<tr>
<td>Control</td>
<td>3.20 (0.48)</td>
<td>131</td>
</tr>
</tbody>
</table>

\(N=262\)
Table 12

Marginal Means for Total Sense of Belonging Score

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th>M (SE)</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program</td>
<td>Treatment</td>
<td>3.35 (0.03)</td>
<td>131</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>3.24 (0.03)</td>
<td>131</td>
</tr>
<tr>
<td>Time</td>
<td>Pretest</td>
<td>3.33 (0.02)</td>
<td>131</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>3.26 (0.03)</td>
<td>131</td>
</tr>
</tbody>
</table>

N= 262

Figure 2. Sense of belonging score for treatment and control group in pre- and post-test

Because the multidimensional nature of the belongingness construct, a 2* 2 (time: pretest vs. posttest; program: treatment vs. control) mixed-design MANOVA was conducted to test the differences on the overall sense of belonging across time and program. There are four types of
test statistics from MANOVA result, and this study will interpret the Wilks’ Lambda ($L$) statistic since all the assumptions are met and this is the most widely used and reported test statistic (Field, 2009). Results showed that there was a significant main effect of program on the linear combination of the three subscales of sense of belonging, which are university affiliation, university support and acceptance, and faculty and staff relations, Wilks’ Lambda = .955, $F(3, 258) = 4.066$, $p = .008$, $\eta^2 = .045$. Also, there was a significant main effect of time on the linear combination of the three subscales, Wilks’ Lambda = .810, $F(3, 258) = 20.128$, $p < .001$, $\eta^2 = .190$. However, there was no significant interaction effect of time and program on the linear combination of the three subscales, Wilks’ lambda = 1.747, $F(3, 258) = 1.747$, $p = .158$, $\eta^2 = .020$. 

Table 13

*Descriptive Statistics for Three Sense of Belonging Sub-scores*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Program</th>
<th>$M$ (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre University affiliation</td>
<td>Treatment</td>
<td>3.43 (0.42)</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>3.33 (0.44)</td>
</tr>
<tr>
<td>Post University affiliation</td>
<td>Treatment</td>
<td>3.38 (0.53)</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>3.16 (0.51)</td>
</tr>
<tr>
<td>Pre University support and acceptance</td>
<td>Treatment</td>
<td>3.72 (0.32)</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>3.62 (0.34)</td>
</tr>
<tr>
<td>Post University support and acceptance</td>
<td>Treatment</td>
<td>3.54 (0.53)</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>3.45 (0.41)</td>
</tr>
<tr>
<td>Pre Faculty and staff relations</td>
<td>Treatment</td>
<td>2.99 (0.72)</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>2.90 (0.59)</td>
</tr>
<tr>
<td>Post Faculty and staff relations</td>
<td>Treatment</td>
<td>3.06 (0.93)</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>2.99 (0.76)</td>
</tr>
</tbody>
</table>

$N=262$

Table 14

*Marginal Means for Three Sense of Belonging Sub-scores*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th>$M$ (SE)</th>
<th>$n$</th>
</tr>
</thead>
<tbody>
<tr>
<td>University affiliation</td>
<td>Treatment</td>
<td>3.40 (0.03)</td>
<td>131</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>3.23 (0.03)</td>
<td>131</td>
</tr>
<tr>
<td></td>
<td>Pretest</td>
<td>3.38 (0.03)</td>
<td>262</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>3.27 (0.03)</td>
<td>262</td>
</tr>
<tr>
<td>University support and acceptance</td>
<td>Treatment</td>
<td>3.63 (0.03)</td>
<td>131</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>3.54 (0.03)</td>
<td>131</td>
</tr>
<tr>
<td></td>
<td>Pretest</td>
<td>3.67 (0.02)</td>
<td>262</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>3.50 (0.03)</td>
<td>262</td>
</tr>
<tr>
<td>Faculty and staff relations</td>
<td>Treatment</td>
<td>3.02 (0.05)</td>
<td>131</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>2.94 (0.05)</td>
<td>131</td>
</tr>
<tr>
<td></td>
<td>Pretest</td>
<td>2.95 (0.04)</td>
<td>262</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>3.02 (0.05)</td>
<td>262</td>
</tr>
</tbody>
</table>
Subsequently, three separate univariate ANOVAs for each of the three subscales were conducted. The results (see Figure 3) showed that for the dependent variable of university affiliation, there was a significant main effect of program, $F(1, 260) = 10.867, p = .001, \eta_p^2 = .040$. There was also a significant main effect of time for university affiliation, $F(1, 260) = 9.300, p = .003, \eta_p^2 = .035$. However, there was no time and program interaction effect, $F(1, 260) = 92.810, p = .095, \eta_p^2 = .011$. The non-significant interaction effect between time and program means the change on the university affiliation score from pre- to post-test followed the same pattern for the control and treatment group. From the marginal means (Table 1), it was clear that students from the treatment group had significantly higher score on university affiliation than students from the control group, and students from both of the groups had significantly decreased score on university affiliation from pre-test to post-test.

For the dependent variable of university support and acceptance, results (see Figure 4) showed there was a significant main effect of program, $F(1, 260) = 5.708, p = .018, \eta_p^2 = .021$. There was also a significant main effect of time for university support and acceptance, $F(1, 260) = 33.362, p < .001, \eta_p^2 = .114$. However, there was no time and program interaction effect, $F(1, 260) = .007, p = .932, \eta_p^2 < .001$. The non-significant interaction effect between time and program means the change on the university support and acceptance score from pre- to post-test followed the same pattern for the control and treatment group. From the marginal means (Table 14), it was clear that students from the treatment group had significantly higher score on university support and acceptance than students from the control group, and students from both of the groups had significantly decreased score on university support and acceptance from pre-test to post-test.
For the dependent variable of faculty and staff relations, results (see Figure 5) showed there was no main effect of program, $F(1, 260) = 1.155, p = .284, \eta^2_p = .004$, and no main effect of time either, $F(1, 260) = 1.872, p = .172, \eta^2_p = .007$. Also, there was no time and program interaction effect, $F(1, 260) = .038, p = .854, \eta^2_p < .001$. The non-significant interaction effect between time and program means the change on the faculty and staff relations score from pre- to post-test followed the same pattern for the control and treatment group. From the marginal means (Table 14), it was clear that though the score on faculty and staff relations from pre-test post-test was higher for students from both of the treatment and control groups, the increase was not statistically significant. Also, students from the treatment group had higher score on faculty and staff relations than students from the control group, but the difference was not statistically significant.
Figure 3. University affiliation score for treatment and control group in pre- and post-test
Figure 4. University support and acceptance score for treatment and control group in pre- and post-test
Sub-question 2: Do program participants perceive sense of belonging differently before and after the program based on their gender and race?

A $2 \times 2 \times 2$ (time: pretest vs. posttest) (gender: female vs. male) (race: white vs. non-white) mixed-design ANOVA was performed to examine the effect of time, gender and race on the total score of sense of belonging. Frequency of participants demographic information is shown in Table 15, and Table 16 and Table 17 depict the descriptive statistic and marginal mean results. There was no significant interaction effect between time, gender and race as shown in Table 18, which means male and female, white and nonwhite students’ total score on sense of belonging changed in the same pattern from pre- to post-test. Also, there was no significant main
effect of time, gender or race as shown in Table 18, which means there was no statistically significant difference between the pre- and post- sense of belonging total score between women and men nor between white and nonwhite students. However, descriptive statistics showed that male students had slightly higher mean scores than female students on both pre- and post-tests (see Table 16 and Figure 6), and nonwhite students had slightly higher mean scores than white students on both pre- and post-test (see Table 16 and Figure 7).

Table 15

*Frequency Table of Participant Demographics*

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>112</td>
<td>74.7</td>
</tr>
<tr>
<td>Male</td>
<td>38</td>
<td>25.3</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonwhite</td>
<td>52</td>
<td>34.7</td>
</tr>
<tr>
<td>White</td>
<td>98</td>
<td>65.3</td>
</tr>
<tr>
<td>Total</td>
<td>150</td>
<td>100</td>
</tr>
</tbody>
</table>
Table 16

Descriptive Statistics for Total Sense of Belonging Score

<table>
<thead>
<tr>
<th></th>
<th>Group</th>
<th>M (SD)</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre Sense of belonging</td>
<td>Female</td>
<td>3.37 (0.41)</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>Nonwhite</td>
<td>3.37 (0.42)</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>White</td>
<td>3.55 (0.43)</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>3.38 (0.32)</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Nonwhite</td>
<td>3.38 (0.44)</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>White</td>
<td>3.28 (0.65)</td>
<td>70</td>
</tr>
<tr>
<td>Post Sense of belonging</td>
<td>Female</td>
<td>3.38 (0.60)</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Nonwhite</td>
<td>3.43 (0.51)</td>
<td>28</td>
</tr>
</tbody>
</table>

N= 150

Table 17

Marginal Means for Total Sense of Belonging Score

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th>M (SE)</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Female</td>
<td>3.35 (0.04)</td>
<td>112</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>3.44 (0.08)</td>
<td>38</td>
</tr>
<tr>
<td>Race</td>
<td>Nonwhite</td>
<td>3.42 (0.08)</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>White</td>
<td>3.36 (0.05)</td>
<td>98</td>
</tr>
<tr>
<td>Time</td>
<td>Pretest</td>
<td>3.42 (0.04)</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>3.37 (0.06)</td>
<td>150</td>
</tr>
</tbody>
</table>
Table 18

Univariate Analysis Results for Total Sense of Belonging Score

<table>
<thead>
<tr>
<th>Effect</th>
<th>df(_1)</th>
<th>df(_2)</th>
<th>(F)</th>
<th>(p)</th>
<th>(\eta^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>1</td>
<td>148</td>
<td>1.174</td>
<td>0.280</td>
<td>0.008</td>
</tr>
<tr>
<td>Time*Race</td>
<td>1</td>
<td>148</td>
<td>0.036</td>
<td>0.850</td>
<td>0.000</td>
</tr>
<tr>
<td>Time*Gender</td>
<td>1</td>
<td>148</td>
<td>0.356</td>
<td>0.552</td>
<td>0.002</td>
</tr>
<tr>
<td>Time<em>Race</em>Gender</td>
<td>1</td>
<td>148</td>
<td>2.991</td>
<td>0.086</td>
<td>0.020</td>
</tr>
<tr>
<td>Race</td>
<td>1</td>
<td>148</td>
<td>0.898</td>
<td>0.345</td>
<td>0.006</td>
</tr>
<tr>
<td>Gender</td>
<td>1</td>
<td>148</td>
<td>0.396</td>
<td>0.530</td>
<td>0.003</td>
</tr>
<tr>
<td>Race*Gender</td>
<td>1</td>
<td>148</td>
<td>0.015</td>
<td>0.904</td>
<td>0.000</td>
</tr>
</tbody>
</table>

\(N=150\)
Figure 6.  Sense of belonging score for female and male group in pre- and post-test
Sub-questions 3: Do different belonging enhancement practices play different roles on students’ GPA, retention and years of degree attainment?

**Dependent variable is first-year GPA.**

For the dependent variable of first-year GPA, a hierarchical linear regression was conducted. The first block consisted of covariates that were found significant in previous research, namely, gender, ethnicity, ACT score, high school core GPA and Pell grant status. The second block consisted with four predictor variables, namely, service hours, mentor, feedback, and type of LLC. The social media variable was not entered in the block since it had multicollinearity issue as mentioned in the previous assumption test section. Two regression
models were generated to evaluate the prediction of the four sense of belonging enhancement practices (mentor, service-learning, LLC, and feedback). Model 1 had five control variables (pell grant status, gender, ethnicity, high school core GPA, and ACT). This model was statistically significant: \( F(5, 2513) = 335.43, p < .001 \), and the \( R^2 \) accounted for 40% of the variance in student GPA. Model 2 added the four predictors, which were mentor with two levels, service hours, type of LLC (with one hall as reference category), feedback (with no feedback as reference category). The model was statistically significant: \( F(9, 2509) = 187.61, p < .001 \), and the \( R^2 \) accounted for 40.2% of the variance in student GPA. However, the \( R^2 \) change statistic indicated that only 0.2% of unique variance was attributed to the four predictors above and beyond the covariates, and \( F_{\text{change}}(4, 2509) = 2.10, p =.08 \), which was larger than .05. Therefore, by adding the four predictors, the predictive capacity was not significantly increased from Model 1 to Model 2. However, feedback was significant predictor to first year GPA as shown in Table 21. This should be interpreted as compared to having no feedback from the program, the students who had feedback in group setting, had .10 lower first year GPA.
Table 19

Descriptive Statistics for Predictors, Control Variables, and Dependent Variable (GPA)

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACT</td>
<td>22.93</td>
<td>4.03</td>
</tr>
<tr>
<td>HS Core GPA</td>
<td>3.28</td>
<td>0.53</td>
</tr>
<tr>
<td>First year GPA</td>
<td>2.82</td>
<td>0.82</td>
</tr>
<tr>
<td>Service hours</td>
<td>21.59</td>
<td>1.45</td>
</tr>
</tbody>
</table>

N=2520
Table 20

*Frequency Table for Student Characteristics, Control Variables, and Predictor Variables*

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male= 1</td>
<td>839</td>
<td>33.30</td>
</tr>
<tr>
<td>Female= 2</td>
<td>1681</td>
<td>66.70</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White= 1</td>
<td>1238</td>
<td>49.10</td>
</tr>
<tr>
<td>Nonwhite= 2</td>
<td>1282</td>
<td>50.90</td>
</tr>
<tr>
<td>Pell Grant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No= 1</td>
<td>1364</td>
<td>54.10</td>
</tr>
<tr>
<td>Yes= 2</td>
<td>1156</td>
<td>45.90</td>
</tr>
<tr>
<td>Mentor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1= One mentor</td>
<td>207</td>
<td>8.20</td>
</tr>
<tr>
<td>2= Two mentors</td>
<td>2313</td>
<td>91.80</td>
</tr>
<tr>
<td>Type of LLC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1= Live in all halls</td>
<td>739</td>
<td>29.30</td>
</tr>
<tr>
<td>2= Live in three halls</td>
<td>1108</td>
<td>44.00</td>
</tr>
<tr>
<td>3= Live in one hall</td>
<td>673</td>
<td>26.70</td>
</tr>
<tr>
<td>Feedback</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0= No feedback</td>
<td>1143</td>
<td>45.40</td>
</tr>
<tr>
<td>1= In-group feedback</td>
<td>426</td>
<td>16.90</td>
</tr>
<tr>
<td>2= Individual feedback</td>
<td>951</td>
<td>37.70</td>
</tr>
<tr>
<td>Social media</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0= No social media</td>
<td>1373</td>
<td>54.50</td>
</tr>
<tr>
<td>1= Low level implementation</td>
<td>408</td>
<td>16.20</td>
</tr>
<tr>
<td>2= High level implementation</td>
<td>739</td>
<td>29.30</td>
</tr>
<tr>
<td>Total</td>
<td>2520</td>
<td>100.00</td>
</tr>
<tr>
<td>Model</td>
<td>B</td>
<td>S.E.B</td>
</tr>
<tr>
<td>-------</td>
<td>-----</td>
<td>-------</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0.123</td>
<td>0.132</td>
</tr>
<tr>
<td>(Constant)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>0.088**</td>
<td>0.027</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>-0.046</td>
<td>0.032</td>
</tr>
<tr>
<td>ACT</td>
<td>0.05**</td>
<td>0.004</td>
</tr>
<tr>
<td>HS Core GPA</td>
<td>0.623**</td>
<td>0.028</td>
</tr>
<tr>
<td>Pell</td>
<td>-0.217**</td>
<td>0.03</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>0.089**</td>
<td>0.027</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>-0.047</td>
<td>0.032</td>
</tr>
</tbody>
</table>
Table 21 (continued)

<table>
<thead>
<tr>
<th>Model</th>
<th>B</th>
<th>S.E.B</th>
<th>β</th>
<th>$R^2$</th>
<th>Adjusted $R^2$ change</th>
<th>$F_{\text{change}}$</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACT</td>
<td>0.049**</td>
<td>0.004</td>
<td>0.245</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HS Core GPA</td>
<td>0.622**</td>
<td>0.028</td>
<td>0.403</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pell</td>
<td>-0.222**</td>
<td>0.030</td>
<td>-0.136</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mentor</td>
<td>0.054</td>
<td>0.049</td>
<td>0.018</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service hours</td>
<td>-0.001</td>
<td>0.009</td>
<td>-0.002</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Live in three halls</td>
<td>0.039</td>
<td>0.031</td>
<td>0.024</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group feedback</td>
<td>-0.102*</td>
<td>0.041</td>
<td>-0.047</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .05, **p < .001
Dependent variable is first-year retention.

For the dependent variable of retention from first to second year (dichotomous variable with two levels), a hierarchical logistic regression was conducted. The first block consisted of covariates that were found significant in previous research, namely, gender, ethnicity, ACT score, high school core GPA and Pell grant status. The second block consisted with five predictor variables, namely, service hours, mentor, feedback, social media and type of LLC. Two regression models were generated to evaluate the prediction of the five sense of belonging enhancement practices (mentor, service-learning, social media, LLC, and feedback). Model 1 had five control variables (Pell grant status, gender, ethnicity, high school core GPA, and ACT). This model was statistically significant: $$\chi^2 (5, N = 2761) = 134.83, p < .001.$$ Model 2 added the five predictors, which were mentor with two levels, service hours, type of LLC with three levels (one hall as reference category), feedback with three levels (no feedback as reference category), and social media with three levels. This model was statistically significant: $$\chi^2 (12, N = 2761) = 153.77, p < .001.$$

The result from Omnibus tests of model coefficient show that Chi-square change from model 1 to model 2 was significant, which means the model fit of model 2 improves significantly over the model 1 by adding the five predictor variables. Based on the classification table result, the overall accuracy of the prediction of the first-year retention was 81.8%. Since the Hosmer and Lemeshow test was non-significant, the prediction accuracy was endorsed. The Cox and Snell R$^2$, or measure of effect size, of model 2 of the hierarchical logistic regression model was .054, which indicated a low effect size, meaning that all the five predictor variables/sense of belonging enhancement practices (mentor, feedback, social media, service hours, and LLC)
explained a variance of only 5.4% to predict first year retention after controlling all the characteristic variables, which are gender, ethnicity, Pell grant status, ACT and high school GPA. The Nagelkerke $R^2$ of model 2 of the hierarchical logistic regression model was .008, which indicated a low effect size as well, meaning that all the five predictor variables/ sense of belonging enhancement practices (mentor, feedback, social media, service hours, and LLC) explained a variance of only 0.8% to predict first year retention after controlling all the characteristic variables, which are gender, ethnicity, Pell grant status, ACT and high school GPA. The investigation of the individual predictive relationship in the hierarchical logistic regression model in Table 24 showed that only the group feedback Wald (1) =6.94, $p$ =.008 was significantly associated or have a significant predictive relationship with first-year retention after controlling all the characteristic variables. The examination of $\text{Exp} (\beta)$ showed that the odd ratio of group feedback was .583, which implied that compared to having no feedback, students who had feedback in group setting were less likely to retain in the university from first to second year.

Table 22

*Descriptive Statistics for Predictor and Control Variables*

<table>
<thead>
<tr>
<th></th>
<th>$M$</th>
<th>$SD$</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACT</td>
<td>22.78</td>
<td>4.04</td>
</tr>
<tr>
<td>HS Core GPA</td>
<td>3.26</td>
<td>0.54</td>
</tr>
<tr>
<td>Service hours</td>
<td>21.6</td>
<td>1.45</td>
</tr>
</tbody>
</table>

*N=2761*
Table 23

*Frequency Table for Student Characteristic, Control, Predictor and Dependent (retention)*

**Variables**

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male= 1</td>
<td>926</td>
<td>33.50</td>
</tr>
<tr>
<td>Female= 2</td>
<td>1835</td>
<td>66.50</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White= 1</td>
<td>1341</td>
<td>48.60</td>
</tr>
<tr>
<td>Nonwhite= 2</td>
<td>1420</td>
<td>51.40</td>
</tr>
<tr>
<td>Pell Grant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No=1</td>
<td>1478</td>
<td>53.50</td>
</tr>
<tr>
<td>Yes=2</td>
<td>1283</td>
<td>46.50</td>
</tr>
<tr>
<td>Return in next fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes= 1</td>
<td>2256</td>
<td>81.70</td>
</tr>
<tr>
<td>No= 0</td>
<td>505</td>
<td>18.30</td>
</tr>
<tr>
<td>Mentor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1= One mentor</td>
<td>222</td>
<td>8.00</td>
</tr>
<tr>
<td>2= Two mentors</td>
<td>2539</td>
<td>92.00</td>
</tr>
<tr>
<td>LLC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1= Live in all halls</td>
<td>808</td>
<td>29.30</td>
</tr>
<tr>
<td>2= Live in three halls</td>
<td>1215</td>
<td>44.00</td>
</tr>
<tr>
<td>3= Live in same hall</td>
<td>738</td>
<td>26.70</td>
</tr>
<tr>
<td>Feedback</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0= No feedback</td>
<td>1245</td>
<td>45.10</td>
</tr>
<tr>
<td>1= In-group feedback</td>
<td>476</td>
<td>17.20</td>
</tr>
<tr>
<td>2= Individual feedback</td>
<td>1040</td>
<td>37.70</td>
</tr>
<tr>
<td>Social media</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0= No social media</td>
<td>1500</td>
<td>54.30</td>
</tr>
<tr>
<td>1= Low level implementation</td>
<td>453</td>
<td>16.40</td>
</tr>
<tr>
<td>2= High level implementation</td>
<td>808</td>
<td>29.30</td>
</tr>
<tr>
<td>Total</td>
<td>2761</td>
<td>100.00</td>
</tr>
</tbody>
</table>
Table 24

Hierarchical Logistic Regression Results of Five Predictors, Dependent Variable is Fall to Fall Retention, and Control Variables

<table>
<thead>
<tr>
<th>Model</th>
<th>b(s.e.)</th>
<th>Wald</th>
<th>Odds Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-2.550** (0.424)</td>
<td>36.191</td>
<td>0.078</td>
</tr>
<tr>
<td>Gender (Female)</td>
<td>-0.017 (0.108)</td>
<td>0.025</td>
<td>0.983 (0.795, 1.215)</td>
</tr>
<tr>
<td>Race (Nonwhite)</td>
<td>0.534** (0.13)</td>
<td>16.789</td>
<td>1.706 (1.322, 2.204)</td>
</tr>
<tr>
<td>ACT</td>
<td>0.055* (0.017)</td>
<td>9.996</td>
<td>1.057 (1.021, 1.093)</td>
</tr>
<tr>
<td>HS Core GPA</td>
<td>0.857** (0.108)</td>
<td>63.127</td>
<td>2.356 (1.907, 2.910)</td>
</tr>
<tr>
<td>Pell (Yes)</td>
<td>-0.333* (0.120)</td>
<td>7.665</td>
<td>0.717 (0.566, 0.907)</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-0.826 (1.250)</td>
<td>0.437</td>
<td>0.438</td>
</tr>
<tr>
<td>Gender (Female)</td>
<td>-0.001 (0.109)</td>
<td>0.000</td>
<td>0.999 (0.806, 1.237)</td>
</tr>
<tr>
<td>Race (Nonwhite)</td>
<td>0.572** (0.132)</td>
<td>18.628</td>
<td>1.771 (1.366, 2.296)</td>
</tr>
<tr>
<td>ACT</td>
<td>0.056** (0.017)</td>
<td>10.275</td>
<td>1.057 (1.022, 1.094)</td>
</tr>
<tr>
<td>HS Core GPA</td>
<td>0.904** (0.111)</td>
<td>66.750</td>
<td>2.470 (1.988, 3.069)</td>
</tr>
<tr>
<td>Pell (Yes)</td>
<td>-0.327* (0.122)</td>
<td>7.236</td>
<td>0.721 (0.568, 0.915)</td>
</tr>
<tr>
<td>Mentor</td>
<td>0.090 (0.293)</td>
<td>0.095</td>
<td>1.094 (0.616, 1.942)</td>
</tr>
<tr>
<td>Service hours</td>
<td>-0.104 (0.068)</td>
<td>2.318</td>
<td>0.901 (0.788, 1.030)</td>
</tr>
</tbody>
</table>
Table 24 (continued)

<table>
<thead>
<tr>
<th>Model</th>
<th>b(s.e.)</th>
<th>Wald</th>
<th>Odds Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social media</td>
<td>0.182 (0.242)</td>
<td>0.568</td>
<td>1.200 (0.747, 1.928)</td>
</tr>
<tr>
<td>Type of LLC (Three halls)</td>
<td>0.447 (0.314)</td>
<td>2.023</td>
<td>1.562 (0.845, 2.892)</td>
</tr>
<tr>
<td>Type of LLC (All halls)</td>
<td>0.420 (0.405)</td>
<td>1.074</td>
<td>1.522 (0.688, 3.367)</td>
</tr>
<tr>
<td>Feedback (No): Reference category</td>
<td></td>
<td></td>
<td>6.991</td>
</tr>
<tr>
<td>Feedback (In-group)</td>
<td>-0.540* (0.205)</td>
<td>6.943</td>
<td>0.583 (0.390, 0.871)</td>
</tr>
<tr>
<td>Feedback (Individual)</td>
<td>-0.518 (0.366)</td>
<td>2.004</td>
<td>0.595 (0.291, 1.221)</td>
</tr>
</tbody>
</table>

*Note. $\chi^2_{\text{change}} (7, N=2761) = 18.942, p = .008$, Cox & Snell $R^2 = .054$, Nagelkerke $R^2 = .088$*
**Dependent variable is years of degree attainment.**

For the dependent variable of years of degree attainment (dichotomous variable with two levels), a hierarchical logistic regression was conducted. The first block consisted of covariates that were found significant in previous research, namely, gender, ethnicity, ACT score, high school core GPA and Pell grant status. The second block consisted with four predictor variables, namely, service hours, mentor, feedback, and type of LLC. Two regression models were generated to evaluate the prediction of the four sense of belonging enhancement practices (mentor, service-learning, LLC, and feedback). Model 1 had five control variables (Pell grant status, gender, ethnicity, high school core GPA, and ACT). This model was statistically significant: $\chi^2 (5, N = 1412) = 137.17, p < .001$. Model 2 added the four predictors, which were mentor with two levels, service hours, LLC with two levels (one hall as reference category), and feedback with two levels (no feedback as reference category). This model was statistically significant: $\chi^2 (9, N = 1412) = 183.77, p < .001$.

The result from Omnibus tests of model coefficient show that Chi-square change from model 1 to model 2 was significant, which means the model fit of model 2 improves significantly over the model 1 by adding the four predictor variables. Based on the classification table result, the overall accuracy of the prediction of the first-year retention was 65.6%. Since the Hosmer and Lemeshow test was non-significant, the prediction accuracy was endorsed. The Cox and Snell $R^2$, or measure of effect size, of model 2 of the hierarchical logistic regression model was .122, which indicated a low effect size, meaning that all the five predictor variables/ sense of belonging enhancement practices (mentor, feedback, social media, service hours, and LLC) explained a variance of only 12.2% to predict first year retention after controlling all the
characteristic variables, which are gender, ethnicity, Pell grant status, ACT and high school GPA. The Nagelkerke $R^2$ of model 2 of the hierarchical logistic regression model was .164, which indicated a low effect size as well, meaning that all the five predictor variables/sense of belonging enhancement practices (mentor, feedback, social media, service hours, and LLC) explained a variance of only 16.4% to predict first year retention after controlling all the characteristic variables, which are gender, ethnicity, Pell grant status, ACT and high school GPA.

The investigation of the individual predictive relationship in the hierarchical logistic regression model in Table 27 showed that three out of the four predictors had significant predictive relationship with the years of degree attainment, which were mentor, type of LLC and service hours. Therefore, for null hypothesis was rejected since there was a significant difference among the five sense of belonging enhancement practices in terms of their impact on the first-year retention. The mentor Wald (1) =28.07, $p < .001$ was significantly associated or have a significant predictive relationship with years of degree attainment after controlling all the characteristic variables. The examination of Exp ($\beta$) showed that the odd ratio of mentor was 5.22, which implied that compared to having only one faculty mentor, students who had one faculty mentor and one peer mentor (total of two mentors) were 5.22 times more likely to graduate in six years from the studied institution. The LLC Wald (1) =32.92, $p < .001$ was significantly associated or have a significant predictive relationship with years of degree attainment after controlling all the characteristic variables. The examination of Exp ($\beta$) showed that the odd ratio of LLC was .23, which implied that compared to living in the same residence halls students who lived in three different residence halls were .23 time less likely to graduate in six years from the studied institution. The service hours Wald (1) =29.50, $p < .001$ was
significantly associated or have a significant predictive relationship with years of degree attainment after controlling all the characteristic variables. The examination of Exp (β) showed that the odd ratio of service hours was .66, which implied that with one unit increase in service hours, students were .66 time less likely to graduate in six years from the studied institution.

Table 25

*Descriptive Statistics for Predictor and Control Variables*

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACT</td>
<td>22.51</td>
<td>3.84</td>
</tr>
<tr>
<td>HS Core GPA</td>
<td>3.17</td>
<td>0.55</td>
</tr>
<tr>
<td>Service hours</td>
<td>22.26</td>
<td>1.45</td>
</tr>
</tbody>
</table>

N=1412
Table 26

*Frequency Table for Student Characteristic, Control, Predictor and Dependent (years of degree attainment) Variables*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>539</td>
<td>38.20</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>873</td>
<td>61.80</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>White</td>
<td>703</td>
<td>49.80</td>
</tr>
<tr>
<td></td>
<td>Nonwhite</td>
<td>709</td>
<td>50.20</td>
</tr>
<tr>
<td>Pell Grant</td>
<td>No</td>
<td>795</td>
<td>56.30</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>617</td>
<td>43.70</td>
</tr>
<tr>
<td>Mentor</td>
<td>1= One mentor</td>
<td>222</td>
<td>15.70</td>
</tr>
<tr>
<td></td>
<td>2= Two mentors</td>
<td>1190</td>
<td>84.30</td>
</tr>
<tr>
<td>Type of LLC</td>
<td>2= Live in three halls</td>
<td>764</td>
<td>54.10</td>
</tr>
<tr>
<td></td>
<td>3= Live in same hall</td>
<td>648</td>
<td>45.90</td>
</tr>
<tr>
<td>Feedback</td>
<td>0= No feedback</td>
<td>1155</td>
<td>81.80</td>
</tr>
<tr>
<td></td>
<td>1= In-group feedback</td>
<td>257</td>
<td>18.20</td>
</tr>
<tr>
<td>Graduate in six years</td>
<td>No</td>
<td>585</td>
<td>41.40</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>827</td>
<td>58.60</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>1412</td>
<td>100.00</td>
</tr>
</tbody>
</table>
Table 27
Hierarchical Logistic Regression Results of Five Predictors, Dependent Variable is Years of Degree Attainment, and Control Variables

<table>
<thead>
<tr>
<th>Model</th>
<th>b(s.e.)</th>
<th>Wald</th>
<th>Odds Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-3.695** (0.485)</td>
<td>58.095</td>
<td>0.025</td>
</tr>
<tr>
<td>Gender (Female)</td>
<td>0.085 (0.120)</td>
<td>0.505</td>
<td>1.089 (0.861, 1.377)</td>
</tr>
<tr>
<td>Race (Nonwhite)</td>
<td>0.294* (0.143)</td>
<td>4.248</td>
<td>1.342 (1.015, 1.774)</td>
</tr>
<tr>
<td>ACT</td>
<td>0.048* (0.019)</td>
<td>6.187</td>
<td>1.049 (1.010, 1.089)</td>
</tr>
<tr>
<td>HS Core GPA</td>
<td>0.95** (0.120)</td>
<td>62.577</td>
<td>2.586 (2.044, 3.273)</td>
</tr>
<tr>
<td>Pell (Yes)</td>
<td>-0.512** (0.133)</td>
<td>14.814</td>
<td>0.600 (0.462, 0.778)</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>1.585* (1.286)</td>
<td>1.518</td>
<td>4.878</td>
</tr>
<tr>
<td>Gender (Female)</td>
<td>0.115 (0.122)</td>
<td>0.885</td>
<td>1.122 (0.883, 1.424)</td>
</tr>
<tr>
<td>Race (Nonwhite)</td>
<td>0.262 (0.147)</td>
<td>3.173</td>
<td>1.299 (0.974, 1.733)</td>
</tr>
<tr>
<td>ACT</td>
<td>0.051* (0.020)</td>
<td>6.659</td>
<td>1.052 (1.012, 1.093)</td>
</tr>
<tr>
<td>HS Core GPA</td>
<td>1.020** (0.124)</td>
<td>67.880</td>
<td>2.772 (2.175, 3.533)</td>
</tr>
<tr>
<td>Pell (Yes)</td>
<td>-0.503** (0.136)</td>
<td>13.734</td>
<td>0.605 (0.463, 0.789)</td>
</tr>
<tr>
<td>Mentors (Two mentors)</td>
<td>1.653** (0.312)</td>
<td>28.066</td>
<td>5.221 (2.833, 9.622)</td>
</tr>
<tr>
<td>Type of LLC (Three halls)</td>
<td>-1.484** (0.259)</td>
<td>32.918</td>
<td>0.227 (0.137, 0.376)</td>
</tr>
<tr>
<td>Feedback (No)</td>
<td>0.028 (0.168)</td>
<td>0.028</td>
<td>1.028 (0.739, 1.430)</td>
</tr>
<tr>
<td>Service hours</td>
<td>-0.416** (0.077)</td>
<td>29.496</td>
<td>0.659 (0.567, 0.766)</td>
</tr>
</tbody>
</table>

Note. \( \chi^2 \) change \( (4, N = 1412) = 46.595, p < .001, \) Cox & Snell \( R^2 = .122, \) Nagelkerke \( R^2 = .164 \)
Research question 2: How Does a Service-learning Program with Embedded Belonging Enhancement Practices Affect Students’ Sense of Belonging?

In this section, findings from qualitative analysis will be discussed for each of the five belonging interventions independently and collectively, the relations between students’ characteristics and their perceived sense of belonging will also be highlighted. Uniquely, this section also emphasized on understanding the dynamic process of how a combined belonging intervention program impacted on sense of belonging, so result will also be shared from this perspective. Also, by adopting Lee and Robbins’ (1995) interpretation on sense of belonging, qualitative data from individual interview, focus group and reflection journals will be analyzed and interpreted from three aspects: companionship, affiliation and connectedness in the following section.

Framework for Qualitative Data Interpretation

Lee and Robbins’ (1995) proposed there are three components construed belongingness, which are companionship, affiliation and connectedness. Specifically, college students can achieve companionship by identifying peers with shared interests. It is easier for students who are seeking companionship to develop friendships with others based on shared personal characteristics (Lee & Robbins, 1995). These similarities can be related to any aspect of the college student identity or experience such as values, beliefs, family background, and cultural identity. While alikeness is the basis for companionship, there is also an emphasis on social skill development. College students who struggle to find companionship have been found to possess low self-confidence, as well as under-developed social skills. This can create challenges when students reach out to peers for companionship because their method of interacting may not be
seen as compatible. Affiliation, described as “identifying or aligning oneself in a group or association, is important in adolescence when peer relationships become a central focus of individual development” (Vincent, 2016, p. 4). Once individuals have achieved companionship and pursue affiliation, they are slightly more comfortable with the differences that exist in all relationships. However, during affiliation, the friendship development process is linked to the shared identity within group membership. Seeking for group activities such as clubs, sports, and religious organizations is the sign that individuals pursuing affiliation. Individuals who struggle with affiliation may find it uncomfortable and difficult to participate in group activities without familiar people’s support and presence. The third need, connectedness begins to emerge during adolescence and lasts throughout the adulthood when people has established and satisfied with the need of companionship and affiliation and become comfortable to be surrounded with people who are different than them (Kohut, 1984). The need for connectedness lead to the person to take additional social roles in life, such like being marital partners and parents.

Creating Coding Structures

Before the coding process, five major categories were created to reflect the five belonging practices that were embedded in the studied program, which are service-learning, faculty and peer mentor, LLC, performance feedback and social media. An advantage of NVivo is providing option to integrate the use of a deductive and inductive approach to coding and analyzing the data (Brandao, & Miguez, 2016); especially, it is helpful to link theoretical frameworks with the iterative process of coding and data analysis. In the initial exploratory process, deductive approach was used to create the first layer themes based on Lee and Robbins’s (1995) interpretation on belongingness, so the first layer themes were composed by affiliation, companionship and connectedness under each of the five major categories. Therefore,
at this stage, the project contained five major categories (the five practices of the studied program), and each category had three first layer themes, which was helpful to organize the data and subsequent second layer themes more effectively.

The next step of data analysis used inductive approach, where the coding process was grounded in the data instead of driven by theories. Since the NVivo software allows researchers to create a coding structure with multiple layers, researchers are able to visually display a hierarchical structure of codes on the analysis interface. In the context of the current study, by creating second layer themes, the qualitative question (how does the SLLP program impact on students’ perceived sense of belonging) can be answered because the second layer themes contained codes that reflected the participants’ views and experience about how each of the five practices impacted their sense of companionship, affiliation and connectedness. Therefore, in this phase, a set of codes was created that reflected the different ideas and perspective in the data, and these codes were assigned to the second layer themes under first layer themes of each practice category that were created earlier. The creation of the second layer themes can be done by clicking the “+” button on the left side of each first layer theme on the NVivo interface. For example, a theme “feel being valued by others” was frequently appeared in individual interviews and focus group interview data about how participants’ perceived belonging through the service-learning experience they obtained from the studied program, and based on the description of the construct of affiliation in the selected interpretive framework by Lee and Robbins (1995), this theme was assigned as a second layer theme under the first layer theme, “affiliation”, in the service-learning category. Therefore, this coding structure informed the mechanism of the impact of service-learning practice on the affiliation aspect of belongingness.
Searching for Patterns Among Different Layers of Themes

According to Brandao and Miguez (2017), it takes researchers’ creativity and ability to recognize patterns in the data, and NVivo provides interactive ways for researchers to use concept map, project map, and query to connect codes and themes together and address its scope, frequency and intensity. A concept map is a free-form visualization made up of different shapes and connectors. Shapes represent concepts (ideas, people, or data), and the connectors between the shapes articulate links “such as this causes..., this requires... or this contributes to...” (p. 224). Project map is a graphic representation of the different items in a project. Creating a project map help to explore and present the connections in data. Query provides a flexible way to gather and explore subsets of qualitative data to answer specific questions (Adu, 2019). In terms of understanding the scope of the codes based on the selected interpretation framework by Lee and Robbins (1995), a concept map (see Figure 8) was created at this stage to understand the impact of different belonging interventions embedded in studied program on the three aspects of belongingness. This concept map not only was supported by theoretical frameworks (e.g. Strayhorn, 2012, Kuh, 1995) but also reflected the relations between the five categories and the first layer themes. In terms of the frequency of the codes, a table (Table 28) was created to illustrate which intervention has most impact on the three aspects of belongingness by counting the reference number for each first layer theme under each practice category.

Making Connections between Themes

Since the main purpose of the qualitative analysis is to find out how each practice impact on each aspect of sense of belonging, the first layer themes and second layer themes were connected through the creation of five project maps. Therefore, each project map represented the relations between the two layers of themes under each intervention. The creation of the five
project maps was necessary and helpful for the following steps of reporting the findings since by clicking each area of the project map, all the data that was coded under a certain theme can be populated on the NVivo interface. Through connecting the second layer themes with first layer themes and creating the project maps, the detailed mechanisms of how each intervention influenced different aspects of belonging were displayed on the NVivo interface. For example, figure 9 demonstrated the relations between the second layer themes and each of the first layer themes, and it helped to understand how exactly service-learning influenced each aspect of belongingness. Specifically, service-learning experience satisfied the need of affiliation through making students feel being valued by others (service recipient and community partner), allowing student to learn new perspectives from others and understanding their own value and self through service project and experience.

**Understanding Cultural Differences of Belongingness through Matrix Query**

According to Adu (2019), matrix query enables researcher to see coding intersections between two lists of items, and it can be used to ask a wide range of questions about patterns in the data and gain access to the content that shows those patterns. Several main purposes to use matrix query include compare what different demographic groups have said about an experience, an attitude or an issue, and compare terms used in different contexts (Adu, 2019). In this analysis step, three matrix queries were conducted, and figures were created to show the mediating relations between students’ characteristics (gender and race) and the first and second layer themes and the five practices. These relations are very important to be examined thoroughly since previous literature has demonstrated the concept of cultural differences in perceived sense of belonging, and majority of the studies showed that minority students were often felt less connected to their campus than white students (Ingram, 2013; Johnson et al., 2007). However,
there is still lack of understanding on how exactly students’ characteristics influence different aspect of sense of belonging. This study and the three queries filled the gap in the previous literature by illustrating the relations between students’ characteristics and various kinds of influential factors that each intervention brought to belonging.

Table 28

*Number of References for First Layer Themes*

<table>
<thead>
<tr>
<th></th>
<th>Companionship</th>
<th>Affiliation</th>
<th>Connectedness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service-learning</td>
<td>9</td>
<td>28</td>
<td>23</td>
</tr>
<tr>
<td>Mentor</td>
<td>3</td>
<td>1</td>
<td>45</td>
</tr>
<tr>
<td>Social media</td>
<td>4</td>
<td>28</td>
<td>8</td>
</tr>
<tr>
<td>LLC</td>
<td>7</td>
<td>0</td>
<td>18</td>
</tr>
<tr>
<td>Performance feedback</td>
<td>0</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>23</strong></td>
<td><strong>82</strong></td>
<td><strong>94</strong></td>
</tr>
</tbody>
</table>

Note. Each intervention element had three first layer themes, but theme was not retained in the iterative process if the number of reference was zero for the theme.
Figure 8. *Relations between belonging practices and three aspects of belongingness*

Notes. The width of each line represents the volume of number of references for the first layer themes (connectedness, companionship and affiliation)

**Mechanism for Change of Belongingness through Service-learning**

Themes and codes revealed that the service-learning intervention embedded in the studied program affected all three aspects (companionship, affiliation and connectedness) of belongingness (see Figure 9). Also, by counting the frequency of the codes (see Table 28), service-learning intervention made much more contribution to the affiliation and connectedness aspects than to the companionship aspect of belongingness. By adopting Lee and Robbins’ (1995) interpretation on belongingness, the dynamic process for the change in each aspect of
belongingness through each of the five belonging interventions will be explained through the second layer themes that derived from participants’ shared experiences through individual interview, focus group interview and their reflection journals.

Moreover, this project map (see Figure 9) showed service-learning experience made participants realized that they shared same value (helping others, improving community) as their peers, and this commonality as explained by Lee and Robbins (1995) satisfied the need of

**Companionship.**

Figure 9. *Mechanism of the impact of service-learning practice on belongingnes*
companionship. College students can achieve companionship by identifying peers with shared interests. It is easier for students who are seeking companionship to develop friendships with others based on shared personal characteristics (Lee & Robbins, 1995). For example, Alex noted in the individual interview “back home not a lot of people really volunteer to help. Most people I been known of is that they had to volunteer for something. So it kind of singled me out like I am the only one cared about volunteer work, and here is Day One I can feel most and almost everyone in my team wants”. He further stated the reason why he thought he felt more related to his group “because the issue with other groups is that people don’t care so I got lucky that everyone in my group does care”. During focus group interview, one participant noted “I guess that’s kind of a common thing that we can talk about and that the service we have is what we do because we’re all there to help”. Therefore, it is obvious the common interest of volunteering shared among group members contributed to the need of companionship.

**Affiliation.**

The project map (see Figure 9) showed participants’ need of affiliation was satisfied through feeling being valued by others, learning new perspectives and understanding own value and self. Specifically, service-learning experience led students to feel being valued by others (service recipient and community partner). In the focus group interview, one participant noted “education is important, but it’s like I’m making a difference for other people and for me”. Another participant stated, “like it gives us meaning, it makes me feel that what I’m doing is purposeful and I’m not just doing it to receive credit for but I’m doing it to help the community”. Also, participants in the study revealed that learning different perspectives and understanding themselves through service experience satisfied their need of affiliation. In the individual
interview, Alan (all names mentioned in the study are pseudonyms) stated “I think we have a good group. We all agree and disagree and we all compromised to each other”. In KK’s journal, he wrote “I’m not that excited for the project, but that’s because I dislike the thought of working on the drill field all day. I’d rather build something at the Humane Society itself but I still think out project will provide the Humane Society with much needed help”.

**Connectedness.**

Participants also expressed that service-learning provided many opportunities to interact with peers out-side-classroom setting, and it also pushed students to communicate with each other in order to accomplish their service group project; and these experiences made them better connected to their peers, service recipients and community partners. Students appreciated the unique opportunity to work with peers off-campus in community service site, which they normally did not have the chance to do it in other regular academic courses. For example, Alex noted “it’s different than hanging out with friends on campus or off campus”. Alan also mentioned in his interview “I know some people may not want to be there or may not be super enthusiastic about going and pulling weeds, but after getting to talk with them individually, they all have cool hobbies and personalities”. Interestingly, almost all of the participants noticed the importance of communication to form connection with their teams and community partners, but the reality was that they were facing challenges to have effective communication among different parties who were involved in their service project. As Sandy noted “we were struggling because they wanted us to build these shelves under the desk and it’s difficult because we were having trouble knowing how to make them and when we ask for more detail they just repeat the same thing”. Similarly, KK also mentioned the negative communication experience his team had
with their community partner. The struggle of having effective communication was not only with their community partner, but also appeared among group members. Two male participants mentioned their teams either lack of communication toward their project, or the communication was not effective enough to make every team member agree on the same page.

**Mechanism for Change of Belongingness through Mentorship**

Themes and codes revealed that the mentorship intervention embedded in the studied program affected all three aspects (companionship, affiliation and connectedness) of belongingness (see Figure 10). Also, by counting the frequency of the codes (see Table 28), mentorship intervention made much more impact on the connectedness aspect than on the companionship and affiliation aspects of belongingness. However, it appeared that only one participant briefly mentioned that his faculty mentor emphasized on the importance of group value (affiliation). Similarly, only three participants mentioned their peer mentors instead of faculty mentors shared some commonality (companionship) with the students since peer mentors are also college students and went through service-learning projects. However, the intensity of their narratives indicated the importance of having a peer mentor for the three participants. As Kebi noted:

> Well them since they are like students I feel like we can relate more and you know they can say I have more to learn from them but they can teach me not just like a subject but they’re teaching me how to get through college and stuff…..For someone who’s older than you to tell you like what they’ve been through, and when you get it from like different perspectives and you can kinda like shape your own perspective.
Contrary to the little evidence of the impact of mentorship on affiliation and companionship, all participants mentioned in the individual interviews, focus group interview and their weekly journals that the support they obtained from their mentors; especially, their faculty and peer mentors contributed to their need of connectedness by giving directions to their academic study, being relatable to them, influence their decision making, and providing ample support to their academic life. Moreover, among all these common themes, the theme of support...
was mentioned most frequently. This result is supported by Hoffman, Richmond, Morrow and Slaomone (2002), which the social and academic support that first-year college students obtained from peers and faculty members were crucially important to their perceived sense of belonging.

Almost all of the participants agreed they received lots of support from both of the mentors ranging from support to service project, academic life, college transition and psychological well-being, and some of them even considered their mentor as the most reachable person to talk to when they were away from home. Tina mentioned in her interview:

Sometimes when you are away from home a long time, you are like, on I need to go home. Yeah, but then I do have people around you and they really cares so you have some sense of like calmness I guess. And so I guess it you know doesn’t give you anxiety about…… I think that goes back to your parents not being around. So you always have somebody to go to talk to you when you are like dying.

Moreover, the different contribution of peer and faculty mentors to the companionship aspect that was revealed by the participants aligned with previous literature. Based on the narratives provided by participants, it seems like only peer mentors were mentioned in the theme of “give more directions” to their service project, and both peer and faculty mentors were mentioned in the themes “influence” and “relatable”. However, peer mentors were mentioned more frequently in these two themes. One possible explanation is peer mentors had more frequent and quality in- and out-off classroom interaction with these students than faculty mentors had. The intensity of the narratives from the “influence” theme revealed students have built deep connections with their mentors because of the influence their mentors made to their academic and social life. For example, Ella wrote in her journal:
I look up to both of my fellows as I wish to someday possess a combination of their qualities. With Bethany’s compassion, encouragement, and caring qualities, and Kerei’s organization, discipline, and goal orientated mindset they make a great team.

During focus group interview, a female participant noted “my mentor is one of the people that is over the freshman navigators, so I am close with my navigator, so I would like to be one, and he can help me know when it opens and help me know that I am doing what I need to be doing and maybe I’ll have a chance of becoming one next year”. Colvin and Ashman (2010) identified several benefits from peer mentor experience that lead social integration among first-year students in a large, public university. These benefits included building a trusting relationship with the mentor, receiving encouragement from the mentor inside and outside the classroom setting, and campus involvement.

**Mechanism for Change of Belongingness through Social Media**

Themes and codes revealed that the social media intervention embedded in the studied program contributed to all three aspects (companionship, affiliation and connectedness) of belongingness (see Figure 1). Also, by counting the frequency of the codes (see Table 2), social media intervention made more contribution to the affiliation aspect than on the companionship and connectedness aspect of belongingness. For companionship aspect, only three participants perceived those pictures posted by the program staff member as their peers shared same values and interest like themselves to help the community and others. This result is not surprising since previous studies showed students preferred to have more in person interaction that could generated from online connection, and some students even felt social
isolation, loneliness and lower perception of social skills along with using social media (Junco & Cotten, 2012; Munoz, Pellegrini-Lafont, & Cramer, 2014; Strayhorn, 2012; Vincent, 2016).

Figure 11. Mechanism of the impact of social media practice on belongingness

Affiliation.

Most of the participants revealed the main purpose of engaging in the social media intervention is to get updates on other groups’ project and campus events, and the information, events posted by the program staff members on Facebook and Instagram page made them feel they were staying in touch with the entire program not only just their own team. Some participants also mentioned those updates posted on social media kept them informed with the program even though they missed one or few classes. Moreover, participants addressed the
showcasing strategy (periodically posting personal stories of individual students to highlight their achievement and background) used in social media intervention provided students a sense of affiliation. In the focus group interview, a female participant noted “in a simple sense, it is good to see other students’ faces on the Day One page, so we see the same people in class, so it is good to see what other students are doing, so we wouldn’t get that exposure without them posting the way they do”. Other participants also noted in the focus group that by seeing other students’ faces on the social media, they got reminded that they were part of a large group, and those commonly mentioned terms were: part of something, togetherness, and inclusiveness.

*Connectedness.*

Participants revealed that social media intervention provided an outlet to physically connect with their peers. However, it seems like only two students really took action to connect with their peers offline. Kebi noted “I actually found some of my peer members Instagram’s through the Day One Instagram, and we got connect that way”. Sandy also mentioned “like over the summer when they did the roll call, you can see if you knew any of the people or when you got in a group you could be like Oh, I remember seeing you on Instagram over the summer”. Contrary to Kebi and Sandy, other participants only acknowledged the potential benefit of getting physical connection with others through social media interaction, but they did not put effort to reach out to people. One Abbie even mentioned “social is there thing, but I’m not really the social media type person so I don’t really go on a lot”. Therefore, it is not surprised to see social media made more impact on affiliation than on connectedness since most of the social media interaction did not result to physical and in person interaction.
Mechanism for Change of Belongingness through Living-learning Community

Themes and codes revealed that the LLC intervention embedded in the studied program contributed only two aspects (companionship and connectedness) of belongingness, but not on the affiliation aspect (see Figure 12). Also, by counting the frequency of the codes (see Table 28), LLC intervention had more impact on the connectedness aspect than on the companionship aspect of belongingness. The communal living experience did provide students a sense of companionship, and they felt the shared experience of living in the same residence hall and participate in the program allowed them to initiate conversations and relationships with peers.

Figure 12. Mechanism of the impact of living-learning community practice on belongingness
Connectedness.

Data revealed that living in the same residence hall provided convenience to the students, such as carpooling to service sites, form study group in residence hall, go to class together, and they saw the potentials of forming stronger relationship and accountability through these unique interactions. For example, Dana noted in focus group “if we need to go to our community partner or volunteer, we can meet in the lobby or meet here and then go there together. But for those who don’t live close, we have to go wherever they are”. Some students thought just by seeing their peers more often in residence hall created opportunities to build stronger relationship. Nevertheless, two female participants who did not live in the program designated residence hall complained the inconvenience it caused, such as walk long distance for group meeting and lack of opportunity to connect to group members. As Sandy mentioned in focus group “it just makes getting together harder and we would meet at the library, so it was a middle point and we did not have to go opposite directions”. However, KK who lived in the program designated hall felt the structure of the living arrangement was different than what he expected originally, he mentioned in individual interview:

I thought that everyone in the same group, that guys were in this wing and girls in that wing, but that the group would be close to each other and that what I thought it was. That wasn’t what it was at all, but it’s fine.

Mechanism for Change of Belongingness through Performance Feedback

Themes and codes revealed that the performance feedback intervention embedded in the studied program only contributed to the affiliation aspect of belongingness through feeling being accepted by group members, valuing group improvement and understanding
self (see Figure 13). These three contributing factors also aligned with Lee and Robbins’ (1995) interpretation on affiliation which individual should identify or align oneself in a group or association. Among participants’ reflection journals, focus group interview and individual interviews, several participants mentioned they were very pleased that their teammates gave positive feedbacks on their performance. By seeing and hearing these positive feedbacks, participants felt they have been valued and accepted into a group, which aligned with previous findings that positive feedback contributed to sense of group cohesion (Limon and Boster, 2003). One unique finding in this performance feedback intervention was that several participants also viewed those suggestions and minor critiques from their peers and mentors as a way to improve themselves and their team performance. In an individual interview, Alex noted “it made me think about what other people think about me, so it shows me how I can help them and how they can help me”. Since participant cared about their team work and team cohesion, so they perceived those neutral feedbacks and minor suggestions as sources to better their team, and reciprocally this perspective reinforced their sense of affiliation with their team. However, this perception on feedback only applied to a few of the participants but not to all of the participants. Especially, a male student shared his unpleasant experience from the performance feedback evaluation process including the written feedback he received from his teammates and the oral feedback from his two mentors. In addition, a few participants also critiqued the quality of the feedback and the structure of the performance feedback procedure, such like the timeline was not suitable and the evaluation rubric was ambiguous.
The Relations between Combined Practices and Belongingness

When collectively examining all the five practices together and compare their contributions to each aspect of belongingness by using Table 28 and Figure 8, it appeared that the studied program contributed the most on the connectedness aspect (code frequency count as 94) of belongingness, followed by on the affiliation aspect (code frequency count as 82), and the program had least contribution on the companionship aspect (code frequency count as 23) of belongingness. In terms of the connectedness aspect of belongingness, the mentorship practice (code frequency count as 45) made the most contribution, followed by the service-learning, LLC and social media practices (code frequency count as 23, 18 and 8, respectively), and performance feedback made no contribution to the connectedness aspect. In terms of the affiliation aspect, three practices (service-learning, social media and performance feedback) made almost the same
contributions (code frequency count as 28, 28 and 25, respectively), and the mentorship and LLC practices made almost no contribution (mentorship only had 1 code frequency count) to the affiliation aspect of belongingness. For companionship aspect of belongingness, all of the five practices except the performance feedback practice made almost similar contribution to it (with similar code frequency count).

Beyond the frequency count dimension of the codes, the intensity dimensions of the codes and narratives revealed that comparing to service-learning and LLC practices, the mentorship practice provided more powerful contribution to participants’ need of connectedness (see Table 29). Almost all of the narratives shared by the participants for the second layer themes (give direction, relatable, influence and support) under the connectedness theme in the mentorship practice were more about the actual benefits participants received from their peer and faculty mentors (especially for the code of support), but the narratives for the theme of communication in service-learning focused more on the potential of effective communication on their perceived level of connectedness. Similarly, comparing to the intensity of the narratives for the second layer themes under connectedness in mentorship and LLC, though both of the second layer themes were described by participants as actual benefits they received from those experience, the narratives in the mentorship practices had more intensity than the narratives in the LLC practice. Therefore, the findings suggest the connectedness aspect was most contributed by the mentorship practice.
Table 29

*Examples on Intensity of Narratives on Connectedness Aspect of Belongingness*

<table>
<thead>
<tr>
<th>Service-learning</th>
<th>My favorite memory is working on the bench because that is where most of us got to connect and do stupid things together.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mentor</td>
<td>I think I have a lot of support from my mentor. She really cares like she wants the best for us and she always want us to be our best selves. They have also given me personal some really knowledgeable advice about college and how to be successful.</td>
</tr>
<tr>
<td>LLC</td>
<td>I think that would be better because if they were in your same group and in the same building because that would make it easier to be friends.</td>
</tr>
</tbody>
</table>

In terms of the affiliation aspect of belongingness, though the code frequency count showed not much difference between the contribution made through service-learning, social media and performance feedback practices, the intensity of participants’ narratives showed different story (see Table 30). Social media provided more direct contribution to students’ need of affiliation through informed updates in the program and showcasing strategy, whereas the service-learning practice provided more indirect contributions through learning new perspectives and understanding own value and self. As Lee and Robbin’s (1995) stated individuals are more comfortable with the differences among group members once they achieved the companionship and ready to pursue affiliation. Since the performance feedback practice happened at the middle of the semester when students had already established certain level of affiliation, which resulted a reciprocal relation between the feedback practice and students’ perceived affiliation in
group setting. Therefore, the affiliation aspect was contributed the most through social media practice.

Table 30

*Examples on Intensity of Narratives on Affiliation Aspect of Belongingness*

<table>
<thead>
<tr>
<th>Service-learning</th>
<th>Day One is a way to be part of something, that’s great, but I feel like an asset to the community and that’s really nice.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social media</td>
<td>It’s good to know that like I am glad that I joined Day One and that I am related to all of that stuff. I guess because you have that inclusiveness and younger people use social media a lot, so that’s where you turn to get their focus and attention.</td>
</tr>
<tr>
<td>Performance feedback</td>
<td>Sometimes I feel like I am not doing enough for the group, and hearing their feedback was very rewarding.</td>
</tr>
</tbody>
</table>

Unlike the wide range of narratives for the connectedness and affiliation aspects, almost all of the narratives for the companionship aspect from the four practices focused on the similarity and commonality among group members (see Table 31). Specifically, the service-learning experience and social media practice made participants felt their peers shared same values to help others and the community, the mentorship experience made participants felt their peer mentors shared similar college experience as themselves, and the communal living experience through living learning community also added the level of companionship to participants. Although the mentorship intervention only had three code frequency counts, the intensity of those narratives made it contribute to companionship in the similar level as the other three interventions.
Table 31

*Examples on Intensity of Narratives on Companionship Aspect of Belongingness*

| Service-learning | We all realized that we’re trying to help people out, so I guess that’s kind of a common thing. |
| Mentor           | Since they are like students I feel like we can relate more and you know I have more to learn from them. He has given me more confidence and drive to get through my endeavors and my life, both in college and in general. |
| Social media     | I guess it is just like everyone just wants to help the community. |
| LLC              | Like my roommate being in my group and we would have something in common to work on. |

**The Role of Student Characteristics on Perceived Sense of Belonging**

Results from matrix query (see Figure 14) showed that students’ gender and race played a role in the relations between the five interventions and sense of belonging. Specifically, female students viewed mentorship and social media intervention played more important role in their perceive sense of belonging, whereas service-learning, performance feedback and LLC interventions were more important to male students in terms of enhancing their sense of belonging. Comparing to the mediating role of students’ gender characteristic, students’ racial characteristic played even a more salient role in the relations between the five interventions and sense of belonging. African American students viewed the contribution of all of the five interventions to their sense of belonging at a higher level than Asian students, and at a much higher level than white students, with the most contribution from social media, service-learning and mentorship practices.
When examining the role of students’ characteristics to the dynamic process and mechanism of the five practices (see Figure 15), it was clear that receiving support was most important to female students in terms of developing a sense of belonging through the program, but male students put more emphasis on the shared commonality and the opportunity to connect to others. For African American students, showcasing students’ work in social media, feeling being valued by peers, getting enough support from mentors, and the convenience they obtained through living with peers in same residence hall were more influential to their sense of belonging. On the other hand, Asian American students focused more on opportunity to connect to others, having outlet for communication and getting enough support. Surprisingly, none of the white student participants revealed any salient factors that contributed by different practices to
their perceived sense of belonging. Most importantly, when examining how the studied program impact on each aspects of sense of belonging across different gender and ethnicity groups, matrix query results from Figure 16 suggests that male students may have benefited more than female students, and non-white students may have benefited more than white students on their overall sense of belonging.

Figure 15. Relations between combined practices and student characteristics

Notes. X-axis represents elements of practice, Y-axis represents frequency of codes on sense of belonging, Z-axis represents race and gender
Integrating the Quantitative and Qualitative Findings

In order to understand the impact of the studied program on students’ perceived sense of belonging in the unique context of the studied institution as suggested by Strayhorn (2012), it is essential to use the combined information from both quantitative and qualitative findings to make the meaning of the relation between the studied program and the complex concept of sense of belonging in a more holistic and inclusive way. Throughout the data analysis and interpretation process, the central tenets of the belonging framework proposed by Lee and Robin (1995) was applied where it is applicable. Coupled with the weaving approach, which quantitative and qualitative findings were presented together as either themes or concepts (Fetters, Curry, & Creswell, 2013). This approach allowed me to gain a fuller and richer understanding of the findings. From the integrated analysis, it appeared the qualitative findings
corroborated and provided evidence to the key findings from the quantitative data, except for two findings, which are the score change of the perceived university support and acceptance and university affiliation subscales (see Table 32).

Though quantitative data analysis results showed a significant decrease on the sub-scores of university affiliation and university support and acceptance score from pre-test to post-test, the qualitative data analysis results diverged from this result. Specifically, program participants shared their lived experience in the individual interviews, focus group interview and reflection journals, and the themes derived from the narratives revealed that students perceived the studied program made a relatively big impact on the affiliation and companionship aspects of sense of belonging, especially for the affiliation aspect (see Table 28). However, this result is not surprising given that previous studies presented similar findings (Strayhorn, 2012; Spainerman et al., 2013). Most importantly, merging the quantitative and qualitative findings entails that the three main aspects of sense of belonging changed differently over the course of the studied program. That the total sense of belonging score did not have a significant change may be due to the fact that the three aspects (subscales) of sense of belonging were influenced by the program in different ways. In addition, this finding suggests that the timing of collecting the qualitative and quantitative data is important, and the scope of the impact of the studied program on sense of belonging may hold some limitations. These aspects will be addressed in more detail in the discussion section.

Moreover, a particular strength of mixed-methods design is to provide deeper understanding on quantitative data points, and allow researchers to base their understanding of the quantitative data through the unique voices and lived knowledge of the participants (White, 2019). Thereby, in the context of this study, the studied program can be advanced in a way to
bring the most benefit to students through making the meanings from both of the quantitative and qualitative findings. Especially, given the quantitative results showed male students had higher sense of belonging score than female students (though not statistically significant) for both of the pre-test and post-test, and nonwhite students had higher score than white students (though not statistically significant) for both of the pre-test and post-test as shown in Table 16, which was divergent from most previous study results (Perrell, 2018). Therefore, it is important to combine the qualitative findings from program participants’ narratives to support the quantitative findings from the current study, and further understand the underlining cause for this phenomenon in the context of the studied program in the studied institution. Specifically, interview narratives from Alan (Asian, male), “I don’t think I will be able to know these many people if I am not in the program. I will be lost in some form of way. People I know in the program really make me feel I have a place in here and if I need them, they will help me” is an example of how a minority male students perceived the benefit of being in the studied program on his overall fit and wellbeing in the studied institution. By analyzing the narratives and interpreting the qualitative findings, we can understand how the studied program uniquely contributed to marginalized students, and which group of students should be the most target population of this sense of belonging enhancement program (Johnson, 2007; Strayhorn, 2012).
Table 32

*Paired Comparison of Quantitative and Qualitative Findings*

<table>
<thead>
<tr>
<th>Key findings (Quantitative)</th>
<th>Quantitative</th>
<th>Qualitative</th>
<th>Agreement, partial agreement, dissonance, no match</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retained SOB score</td>
<td>++</td>
<td>+</td>
<td>Partial (explanation)</td>
</tr>
<tr>
<td>(Mpre = 3.33, Mpost = 3.26)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decreased* score on university affiliation</td>
<td>++</td>
<td>-</td>
<td>Dissonance</td>
</tr>
<tr>
<td>(Mpre = 3.38, Mpost = 3.27)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decreased* score on university support and acceptance</td>
<td>++</td>
<td>-</td>
<td>Dissonance</td>
</tr>
<tr>
<td>(Mpre = 3.67, Mpost = 3.50)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retained score on faculty and staff relations</td>
<td>++</td>
<td>+</td>
<td>Partial (explanation)</td>
</tr>
<tr>
<td>(Mpre = 2.95, Mpost = 3.02)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No difference on SOB score for female and male</td>
<td>++</td>
<td>+</td>
<td>Partial (explanation)</td>
</tr>
<tr>
<td>(Mmale = 3.44, Mfemale = 3.35)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No difference on SOB score for white and nonwhite</td>
<td>++</td>
<td>+</td>
<td>Partial (explanation)</td>
</tr>
<tr>
<td>(Mnonwhite = 3.42, Mwhite = 3.36)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. If the exact information related to a particular finding was identified within the dataset, then a ++ was used as a symbol. If supporting/related information related to a particular finding was identified within the dataset, then a + was used as a symbol. If contrasting information related to a finding was identified within a dataset, then a – was used as a symbol. If no information was identified in the dataset, then no symbol was placed in the block. The symbol * represents statistical significance.
CHAPTER V
DISCUSSION

This section reviews the findings related to the conceptual model of the current study and provides discussion of the possible linkages to the existing literature related to sense of belonging enhancement practices and the concept of sense of belonging. Because this study is a mixed-methods study, the findings from the quantitative and qualitative analysis will be discussed jointly, and some of the qualitative findings will be used as supporting evidence to the quantitative findings. It is important to note that these findings are limited to students in the studied program at the studied institution as Strayhorn (2012) stated “sense of belonging changes and takes on heightened significance in certain contexts, at certain times, and with certain populations” (p. 56).

The Impact of the Service-learning Leadership Program on Sense of Belonging

The findings indicated there was no significant interaction effect of time and program found in this study, which means the score did not change from pre-test to post-test for students from the treatment and control group. This finding was contrary to previous findings by Hausmann et al. (2007), which in their study though there was significant decrease on sense of belonging score from pre-test to the two following post-tests, and the treatment group had less rapid decline than the two control groups. A plausible reason for this finding could be the control group in the current study had a few practices that may also benefited students’ sense of belonging, such as taking small class with a designated faculty member to talk about general
learning strategies, psychological well-being and university resources; assigning a senior student navigator served as teaching assistant in the classroom, and having guest speakers from different academic and student affairs offices to talk about student support services and available resources. These embedded practices in the control group program may also brought positive impact on students’ sense of belonging, so their perceived level of sense of belonging did not significantly decrease more than the students from treatment group as shown in Hausmann et al.’s (2007) study.

The findings also indicated that there was a significant main effect of program, which the treatment group showed overall a significantly higher level of sense of belonging than the control group. However, as there was no interaction effect of time and program, and students from the treatment groups started with a significant higher score on the pre-test, the results should not be directly interpreted as the treatment brought significant benefit to students’ sense of belonging as compared to the control condition. Instead, this finding may only suggest that the studied program was able to maintain the higher starting value of sense of belonging throughout the semester for the program participants as compared to those who were in the control group. Nevertheless, the practical significance may be limited as the effect size of the mean difference was small. One thing worth noting is that most of the previous studies which suggested a positive impact of sense of belonging practices compared to the control condition shared flaws in their study design, such as treatment and control groups were only tested on post-test without randomized sample selection. The other concern is some of the studies were carried out in the later semester of freshman year or in sophomore year (Marshall, Zhou, Gervan, & Wiebe, 2012; Walton & Cohen, 2011a, 2001b; Walton et al., 2017). Whereas, the current study has addressed
these issues by following a rigorous study design with matched sample from treatment and control group and participants were tested by both pre- and post-surveys.

Arguably, there are two possible reasons that the students from treatment group had significant higher score on the pre-test than the students from control group, which are self-selection bias and pre-semester practice embedded in the studied program. The students who were enrolled in the studied program had to apply to the program once they received university admission letter, and historically the studied program accepted all the students who applied to the program. However, for majority of the students in the control group, they also self-enrolled to the course by themselves. Since the studied program is named as learning community program (also a credit-based academic course) and the control group had students from 12 sections of first-year experience classes, the students who self-selected to enroll both of the courses may have no difference in terms of their preconceived notion toward the university or people associated with the university. Further, a study done by Mangold, Bean, Adams, Schwab, and Lynch (2002) used university longitudinal data from 1994 to 1998 to demonstrate that students who participated in a faculty mentor program had much higher retention rate than those who did not participate. This study also uniquely examined the influence of self-selection bias that contributed to the overall effect of the studied program when study participants were not randomly assigned to treatment and control groups. By conducting a series of sophisticated statistical techniques (discrete-time logit models and event history models), they still concluded that the program had a positive impact on participants’ graduation and persistence even considering self-selection bias. For the current study; therefore, the self-selection bias may not be the main reason contributed to the significant difference on the pre-score between treatment and control group.
The second plausible reason is the students in the treatment group experienced some practices provided from the studied program before the first day of class, such as welcome postcards with written notes from senior students mailed to their homes, highlighted stories of enrolled students posted on program social media, constant communication emails and reminders sent from program manager, group activities and gifts (T-shirt with program logo, sticky note, pen, cup, and etc.) offered to all program participants a few days before the fall semester started. In fact, some of these practices were used in Strayhorn’s (2012) study, and the results from his study showed that these practices may contribute to a slightly higher level of sense of belonging in the summer program.

Moreover, the findings from the qualitative analysis of this study support the second reason. During the individual and focus group interviews, almost all of the participants were asked if there are any other aspects of the program that made contribution to their sense of belonging. Most participants responded that the communication emails, social media posts, and the gifts they received from the program made them felt that they are being cared about by and affiliated with the program and the university. Especially, the large-scaled team bonding event which happened three days before the fall semester had made most of the students felt very proud to be in the studied program and had helped them to connect with their peers and program staff members in a very positive way. Moreover, Huasmann et al. (2007) stated the starting value of sense of belonging is not related to students’ background characteristics, but it is associated with peer interaction and parent support, so they recommend future belonging intervention program to start prior to the beginning of an academic year. Therefore, the findings suggest that the pre-semester intervention strategies embedded in the studied program may had some levels
of positive impact on the program participants’ perceived sense of belonging prior to officially starting their first week in the studied university.

The finding also showed that there was no significant time main effect, which means that overall there is no difference in sense of belonging pre- and post-score. This finding is not consistent with Hausmann et al. (2007), which indicates that students’ perceived sense of belonging had significant decrease over the academic year for both of the treatment and control groups. Similarly, Strayhorn’s (2012) study on a summer bridge program designed for freshman students also showed a significant decrease on students’ sense of belonging from pre-test to two future time points. The qualitative analysis results from the current study also supports this interpretation, as each individual participant shared that the studied program made positive impact on their overall sense of belonging. Therefore, it is logical to see that if there was no significant increase from prescore to postscore of sense of belonging, at least there should not be any significant decline from prescore to postscore as the quantitative results presented.

A plausible reason that the current study showed different findings from the two previous studies is the students from this study experienced a combined sense of belonging enhancement practices, and three out of the five sense of belonging enhancement practices are considered high-impact practices (Kuh et al., 2005). The two previous studies did not have the unique combination of practices in their studied program. Also, the duration of the program in the current study is the entire fall semester of the freshman year, whereas the students in the two previous studies only experienced the interventions for less than three or five weeks. This finding further suggests that the formation and duration of sense of belonging intervention is crucial for its effectiveness. One thing should note that these two studies (Hausmann et al., 2007; Strayhorn, 2012) shared the most similar study design with the current study, which involved both treatment
and control groups, and students were tested at least two times (beginning and the end of the studies) in the fall semester of freshman year, so the findings from these two studies can provide the most comparable and supporting results to the current study. Taken together, these findings suggest the studied program was beneficial to the program participants as it can protect against decline of students’ sense of belonging, and the program may contribute to a higher starting value of sense of belonging and to maintenance of this higher level of sense of belonging throughout the semester compared to those who were not part of the program.

Interestingly, the quantitative findings also showed different patterns of change on the three subscales of sense of belonging, namely, university affiliation, university support and acceptance, and faculty and staff relations. Specifically, there was significant time main effect decline for university affiliation, and university support and acceptance subscales, which means students from both of the control and treatment group had statistically significant lower post-score on these two subscales than pre-score. Nevertheless, the practical significance may be limited as the effect size of all mean differences were small. Moreover, the pre scores of these two subscales were already high (in the 3.4-3.7 range on a 1-4 likert scale). Therefore, there may be a ceiling effect as mentioned by Hausmann et al. (2007), where college students may come to a university with high expectation at first. However, there was no significant time main effect for the faculty and staff relations subscale, which means students’ pre-score and post-score remained the same level (about 3.0 level). In the current study, the items in the first two subscales (university affiliation, and university support and acceptance) of the university belonging questionnaire focused more on students’ sense of belonging to the university level instead of to the local level (program, course, residence hall), so the finding of significant decline on the scores of university affiliation, and university support and acceptance was partially consistent
with previous research finding. As Spainerman et al.’s (2013) study showed that residence hall type had positive effect on sense of belonging in residence, but not on sense of belonging on campus.

Similarly, Perrell (2018) found that although the program had positive impact on students’ overall level of social integration, students’ perceived involvement, peer connection and sense of belonging were affected in different ways after participating in a three-week long belonging intervention program. In particular, they found the program had most impact on involvement, followed by peer connection, but much less impact on sense of belonging (similar to the affiliation subscale in the current study). Therefore, these findings suggest the studied program had different impact on the three aspects of sense of belonging, and the qualitative findings from this study also support this notion. The qualitative findings indicated that although the studied program had positive impact on all of the three aspects of sense of belonging (affiliation, companionship and connectedness), the magnitude of impact was different among the three aspects (see Table 25). Collectively, the studied program contributed the most on the connectedness aspect, followed by on the affiliation aspect, and the program had least contribution on the companionship aspect. Since Lee and Robbins’ (1995) argued individuals will seek for connectedness once the need of companionship and affiliation have been achieved, it would be more logical that the program had more contribution to the companionship, followed by affiliation and connectedness. The opposite direction of the order of the contribution on the three aspects could due to participants had already established a strong sense of companionship before officially started the program, and the program did have many other strategies to build the sense of companionship and affiliation for the students during the summer recruitment and preparation phases as mentioned earlier (such as posting program students’ stories and photos on
social media, constant emails and reminders from program manager during the summer time, and hosting teambuilding events and distributing program logo T-shirt a few days before the semester started).

However, in terms of the direction of the score change on the university affiliation, and university support and acceptance subscales from pre-test to post-test, the qualitative analysis findings diverged from the quantitative findings. Specifically, as shown in table 32, the quantitative findings showed there was a significant decline on the score of these two subscales from pre-test to post-test. Whereas qualitative findings showed that the program made relatively big and positive impact on these two aspects of belongingness, so it is logical to see that if there was no significant increase on the scores of these two subscales from pre-test to post-test, at least there should not be a significant decrease on the scores as presented from the quantitative findings. The dissonance between the quantitative and qualitative finding could due to two reasons. First, the qualitative data (individual interview and focus group) were collected about three weeks earlier than the post-survey was administered, which was right after the students finished their mid-term exams. Whereas the post-survey was collected right before the final exam week, which most students were experiencing the most stressful time in their first semester. Since Reilly and Fitzpatrick (2008) stated there is an inverse relationship between the level of stress and perceived sense of belonging, it is reasonable that the individual interview and focus group participants held more positive views on their sense of belonging right after they finished the mid-term exam as compared to before they started the final exams. The second reason is the scope of the program impact, as the themes derived from the participants’ narratives from the individual interviews and focus group revealed that although the participants perceived the studied program did have positive impact on the companionship and affiliation aspects of
sense of belonging, most of the benefits were limited to the program level, which supports the aforementioned findings from Spainerman et al.’s (2013) study. Therefore, it is plausible that the significant decline of scores for the university affiliation, and university support and acceptance was due to the timing of the post-survey was distributed, and/or the studied program benefited these two aspects of sense of belonging only at the program level but not at the university level.

Interestingly, in the current study, score on faculty and staff relations subscale increased from pre-test to post-test though not statistically significant, which is consistent with the findings from qualitative analysis as connectedness aspect of belongingness had the highest frequency in participants’ narratives. This convergent finding is not surprising given that the studied program devoted lots of staffing resource to the students. Each year, there are 40 to 45 upperclassmen served as peer mentors, 40-45 faculty and staff members from various departments and divisions served as faculty mentors, 13-15 part-time program staff members, 40-45 community agency representatives, four graduated assistants, and four full-time program staff members work directly with the program participants. With this unique hierarchical structure of relationship, program participants would have ample opportunities to connect and establish long-lasting relationships with a diverse group of people across campus and department, which could drastically impact their perceived level of connectedness not only to the program level but to the entire university and local community. As stated by Perrell (2018), the emphasis on peer interaction and relationship building in a belonging intervention program will likely have large and positive impact on students’ perceived connections. This aligns with prior research on the relationship between perceived peer connection and peer mentoring in a group format (Colvin & Ashman, 2010; Crisp, 2009; Ender & Newton, 2000; Folger, Carter, & Chase, 2004; Kezar, 2006).
Collectively, these findings suggest the studied program had positive impact on students’ overall sense of belonging. Specifically, program participants started with a higher level of sense of belonging compared to the students in the control group, and the one-semester long set of enhancement practices maintained their perceived level of sense of belonging until the end of the semester. Considering all the stress factors involved in the first semester of college year, which could negatively impact their sense of fit to campus (Barr, 2007; Dyson & Renk, 2006), the studied program does bring a benefit to the participants as it helped the students keep their positive view on their belongingness to the university in general. Moreover, both of the quantitative and qualitative findings suggest the three aspects of sense of belonging, namely affiliation, companionship and connectedness changed in different ways. Specifically, the studied program made most impact on the connectedness aspect of sense of belonging as compared to affiliation and companionship. Also, the impact of the program to students’ perceived sense of belonging may only limit to the program level but not extend to the university level.

**The Mechanism of the Service-learning Leadership Program**

The ultimate goal of this study is to provide a comprehensive and holistic guideline on the design and implementation of effective sense of belonging intervention program in the context of the studied institution, so it is important to understand how and why the studied program contributed to students’ sense of belonging. As qualitative results showed when examining each of the five belonging practices independently, each of them contributed to the three aspects of sense of belonging in different ways, so program design teams should select the most appropriate practices that best suit their students’ needs based on the unique nature of their own institution.
The service-learning intervention contributed to all three aspects of belongingness, but it made strongest contribution to the affiliation and connectedness aspects. Specifically, affiliation was satisfied through feeling being valued by others, and this result aligned with Slaten, Young, Shemwell, Scalise, Elison and Hughes’s (2014) finding that college students have the need to feel valued within one’s major, valued group involvement and group work that was identified as having meaning. For the connectedness aspect, service-learning provided an opportunity for students to connect to their peers while working on service site. This result is consistent with Pak’s (2016) findings in which several variables associated with service-learning influenced students’ perceptions of sense of belonging such as engaging in culturally relevant activity, developing meaningful interaction with people and strengthening ties with classmates and professors. Though the service-learning practice presented the opportunity to foster deep connection with others (team members and community partners), and students attempted to take advantage of the opportunities presented, this practice is not without limitations (Butin, 2006). The reality is that students shared that the lack of communication and the negative experience students had with community partners and peers prevented them from feeling more connected to others. This is not surprising given that Lee and Robbins (1995) stated that the formation of the connectedness aspect of belongingness requires individuals to seek connections with others outside of their comfort zone and relate to peers who are different from themselves.

Mentorship intervention contributed to all three aspects of belongingness, but the level of impact to each aspect of belongingness is distinct. Specifically, mentorship made the most impact on the connectedness aspect, followed by the companionship aspect, and the least on the affiliation aspect. In terms of the intensity of the impact on the connectedness aspect, peer mentors made more salient impact than faculty mentors. As argued by Beane-Katner (2014),
peer and mutual mentorship can build a sense of community and shared understanding by grouping people with similar characteristics and experiences. According to Waddell et al. (2016), traditional mentoring is a “one-to-one, uni-directional, asymmetrical relationship in which a junior, or a less experienced person, is paired with a more experienced person who provides guidance and support” (p. 62). They further argued the importance of having a peer mentor due to the shared experience, same rank and hierarchal level that could foster sense of inclusiveness and well-being. The narratives from participants highlighted connectedness with mentors (getting direction from peer mentors, feeling relatable with mentors, being influenced by mentors and getting support and opportunities from mentors), which aligned with Jones, Kelsey and Brown’s (2014) finding in which personality, community and access, and trust and communication are crucially important to form beneficial mentorship experience.

Social media intervention made a greater contribution to the affiliation aspect compared to the other two aspects. The findings revealed most participants benefited the most from social media by getting updated program information and familiarizing themselves with other students. The social media intervention did not appear to have much contribution to students’ need of connectedness because as Vincent (2016) stated the associated positive and negative outcomes from social media are moderated by several behavior and psychological factors: “amount of time spent online, reasons for social media use, settings for social media use, and quality of online relationship established via social media” (p. 6). Only two students noted social media contributed to their sense of connectedness because they took further steps to have offline interaction with their peers. This finding is consistent with previous results in which social media increased offline social interaction, high quality and quantity of relationships (Jacobsen & Forste, 2011; Mihailidis, 2014). The combination of these results indicate social media serves as a tool
to foster in-person interaction that extends beyond online interaction. It is the physical interaction and relationships derived from initial social media interactions that will foster deeper relationships and satisfy the need of connectedness.

The LLC intervention only contributed to the connectedness and companionship aspects of belongingness, but not on the affiliation aspect. This result is contrary to previous findings as researchers pointed out students view residence halls as the most important place to form connections and community, and the communal living experience allowed student to establish the need of affiliation (Astin, 1993; Berger, 1997; Cheng, 2005; Inkelas et al., 2007; Johnson et al., 2007). However, as Smith (2015) stated though most of LLCs share similar goals, they have not necessarily implemented the same way and they have different emphases in terms of students learning and well-being. In the case of the studied program, the LLC intervention should be considered as the least well-developed program element since students who lived in the same residence hall did not receive any additional benefit besides allowing interactions with their program peers. The program did not organize any additional activities and events to connect students who lived in the same residence hall.

Performance feedback intervention contributed to the affiliation aspect of belongingness through feelings of being valued by group members, of caring about group improvement and of understanding self in a group setting. One unique finding in this intervention is that a few participants viewed neutral feedback and minor suggestions as a way to improve their team work, which is contrary to previous findings. Limon and Boster (2003) found that negative or neutral feedback made team members suspect a lack of ability to do task, and subsequently affected their sense of belonging. Another unique finding is the reciprocal relation between sense of affiliation and the value they held on their team dynamic performance. Because participants
have already been taught the importance of forming a positive team environment, and most of
them value their teamwork, they had more tolerance of accepting minor critiques and suggestions
from performance feedback. However, these assumptions rely on the interpretation among each
individual student.

Therefore, by analyzing each practice individually, the findings showed that there are
both strengths and weaknesses in terms of the implementation of each practice. Though each
practice demonstrated its unique contribution to belongingness, there were some aspects that the
program and each of the five practices did not take into consideration in terms of matching
program participants’ needs and learning goals. As Lee et al. (2009) pointed out that first-year
college students are facing many stressors, and they are the most vulnerable student population
for college withdrawal and misbehaviors. Therefore, the findings from this study suggest that the
complexity and variability of students’ needs should be emphasized when considering program
planning, implementation and iteration. Marrs and Helge (1978) also alluded that it is important
to conduct need assessments to fulfill the demands on the accountability of institutional practices
and programs, and increase the effectiveness and flexibility of program to match the rapidly
changing culture.

Collectively, the qualitative analysis findings revealed that the connectedness aspect of
belongingness was most influenced by the faculty and peer mentor practice, followed by service-
learning, LLC and social media practices. The affiliation aspect was influenced the most by
service-learning, followed by social media and performance feedback practices. The
companionship aspect of belongingness can be marginally influenced by all the five practices,
but none of them made large contributions to this aspect of belongingness. The unique impact of
peer mentor and LLC interventions was also highlighted in Perrell’s (2018) study, as she argued
that peer mentors had the highest correlation with the improvement of students’ perceived involvement, peer connection and overall social integration. Future program implementation should consider which practices need to be improved or restructured to enhance each of the three aspects of belongingness, and students’ overall sense of belonging. Overall, the faculty and peer mentor, LLC and service-learning practices were more impactful to the three aspects of sense of belonging as compared to the social media and performance feedback practices.

As mentioned by Upcraft et al. (2005), institutions should emphasize more on developing programs with combined belonging practices to maximize students’ learning and performance. The results from this study supports Upcraft et al.’s (2005) statement as the five practices compensated for each other in unique ways in terms of their impact on each aspect of belongingness. Specifically, the scope of the impact showed that service-learning, peer and faculty mentor, and social media practices made impact on all three aspects of belongingness, whereas performance feedback and LLC only made impact on one or two aspects of belongingness. The five practices varied in their magnitude of impact on each aspect of belongingness. Moreover, there may be some reciprocal relations between the five practices. This especially holds true for the performance feedback since it was implemented in the middle of the semester, the four other practices may have positively contributed to students’ perception toward the feedback they received during individual evaluation session. Therefore, the studied program was able to protect against the decline of sense of belonging from pre-test to post-test largely due to the advantage of combining the five belonging enhancement practices.
The Role of Gender and Race on the SLLP Program Impact

The lack of significant interaction effects for gender, race and time suggests that the studied program had the same impact on female and male students, and on White and non-White students in terms of the sense of belonging score changes from pre-test to post-test. However, an interesting finding is the non-significant main effect of gender and race, which means there was no significant difference on the mean score of sense of belonging between male and female, and between White and non-White students on both pre-test and post-test. This finding echoes Hausmann et al. (2007), in which students’ characteristics including gender, race, SAT scores, and financial difficulties played little effect on their starting value of sense of belonging. These similar findings could be due to the fact that both studies were conducted in racially diverse institutions with higher percentage of nonwhite students enrolled in the institutions compared to the national average enrollment. As Ingram (2012) stated the degree of diversity of an institution may partially explain the difference in belonging by ethic group. For example, studies that found members of the majority ethnic group with reported higher levels of sense of belonging were conducted in large, public and predominately white institutions (e.g. Davidson & Phelan, 1999; Goodenow, 1993; Johnson et al. 2007; Kester, 1994; Perrell, 2018).

As Ingram (2012) stated no matter the perception of ethic group differences is real or just imagined based on different demographic contexts, it does in turn influence students’ sense of belonging. Therefore, it is not surprising that the program participants had the same starting value on sense of belonging regardless of their gender and racial background. Similarly, as Strayhorn (2012) stated “sense of belonging changes and takes on heightened significance in certain contexts, at certain times, and with certain populations” (p. 56). In the studied program,
the enrollment rate of racial minority students has always been higher than the university enrollment rate; therefore, it is not surprising to see that the pre-score of sense of belonging was equal between White and non-White students in the studied program. In the context of the current study, this finding suggests that by forming a program with higher proportion of non-White and marginalized students, these groups of program participants’ level of sense of belonging can be elevated. Specifically, when marginalized students came to the program and observed a large number of peers and mentors who shared the same attributes as they are, they immediately built a high level of sense of belonging to the program because these students perceived that they were part of an inclusive and diverse program.

Also, other research indicates that racial minority students lack opportunity to integrate to campus life, and male and racial minority students are more reluctant in developing relationships with mentors, which results in a lower level of sense of belonging comparing to racial majority students and female students even after participating in a belonging intervention program (Perrell, 2018). However, the current study showed that there was no significant difference between female and male, and nonwhite and white students on their post-score sense of belonging. This finding can be partially explained by qualitative findings as shown in figure 15: racial minority and male students were able to gain opportunities to be involved in campus life and establish relationships with others as results of their participation in the studied program. In addition, several marginalized students mentioned in the individual interviews and focus group that if it was not for the studied program, they would never imagine that they could be in the same position as they were. This finding suggests that the program provided large benefits to marginalized students because they were offered with opportunities and resources that they may not have been able to typically acquire based on their social status or backgrounds in a
predominately white institution. Further, the findings suggest that the marginalized students did not need to take much effort to navigate those valuable and competitive opportunities and resources that were handed to them by the program. The qualitative findings also suggest racial minority students benefited the most from the program in several areas, such as getting support from mentors, showcasing their project work on social media, and getting connected to peers by living in the same residence hall, which is consistent with the findings from Johnson et al. (2007).

Moreover, qualitative findings suggest the program contributed to female and male students’ sense of belonging in different ways. The support that female students received from their mentors played a critical role in their perceived sense of belonging, whereas for male students, the shared commonality and opportunity to connect to others through service-learning, LLC were more important. This result can be partially explained by Colvin and Ashman’s (2010) findings in which female students placed more focus on relationship building and creating a support system while male students placed more emphasis on securing help from others.

Therefore, the program design team should consider which elements and mechanisms in each of the practices should be emphasized or improved to meet the specific needs of different groups of students. Marginalized students benefited more from participating in the program as compared to non-marginalized students. From the institutional practice standpoint, the findings suggest that it is important and necessary to establish and maintain such a program to bridge the gap between marginalized and non-marginalized students and meet the needs of ongoing changes in the higher education system.
Understanding the Impact of Each Practice on Students’ GPA, Retention and Years of Degree Attainment?

The Immediate Impact on GPA and Retention

The findings showed that among the five intervention practices, only the implementation variation of feedback had significant predictive capacity to first-year GPA and first year to second year retention. Interestingly, compared to giving no feedback to students, offering feedback in group setting significantly reduced students’ first-year GPA and the likelihood to return in the following year. By offering constructive feedback in group setting, the program design team wanted to provide opportunities for students to reflect on their team performance, and potentially change their attitude and behaviors for the rest of the semester. Specifically, most of the feedback that was given to the students included students’ performance in service project and team setting, their personality and soft skills (communication, multitasking, teambuilding, leadership and collaboration). The ultimate goal of adding this practice is to positively influence students’ performance, but the results showed the opposite direction of impact on students’ performance. Although the result was surprising to the program design team, it can be supported by prior literature. In Toit’s (2012) study, the majority of students were negative about the components of feedback they received, the process of assessment and if the information shared pertained to their learning. Similarly, results from a study done by Douglas, Salter, Iglesias, Dowlman, and Eri (2016) showed students did not perceive the feedback they received could benefit their learning, and they suggested that students were more likely to interpret formative and progress feedback they received in a negative way. Therefore, based on these findings it appeared that students in the studied program were likely to have negative perception on the feedback they received from their mentors and peers. In fact, participants from the individual
interview and focus group shared their negative experience and perception about the performance feedback process. The common themes they shared were unstructured evaluation and delivering procedure, inconsistent information among different resources, lack of accuracy and acceptability and feeling of uncomfortableness and anxiety.

Although the relations between feedback and sense of belonging has not been investigated much, two studies conducted by a team of scholars showed that students who received negative feedback had significantly lower levels of perceived sense of belonging, task competence and group prestige compared to those who had positive feedback (Limon & Boster, 2003). Moreover, previous studies have suggested that sense of belonging had significant and positive relationship with college students’ academic performance and retention (Hausmann et al., 2007; Hoffmann et al., 2003; Morrow & Ackermann 2012; Rainey et al., 2018; Walton & Cohen, 2011a). Combining these previous findings, it is possible that students in the studied program perceived the feedback they received in a negative way, which resulted in a lower level of sense of belonging and task competence. Subsequently, these students had lower GPA and lower retention rate than those who did not receive feedback.

The findings suggest performance feedback practice had significant but negative impact on students’ performance as measured by first-year GPA and fall to fall retention. Because the constructive feedback provided to freshman students may be perceived as a negative source to their sense of belonging and task competence, especially, when the feedback is not requested by the students, and it is given in relation to students’ soft skills (communication, team work, time management) and personality rather than actual objective performance (Toit, 2012). Particularly, from the developmental perspective, freshman students are not fully prepared to accept constructive feedbacks pertains to their soft skills and personality as compared to academic
performance (Erikson, 1968).

Findings from current study also showed that the implementation variation of service hours, LLC, mentorship and social media practices did not significantly predict first-year GPA and first to second year retention. These findings can be supported by previous research. For service hour variation, Conway et al. (2009) meta-analysis study showed that there is no significant relationship between service duration and intensity with students’ academic outcomes. In the context of this study, the difference in service hours did not contribute to the change on students’ perceived sense of belonging; especially, considering the variation in the service hours is relatively small across the past 12 years. Considering the significant positive relationship between sense of belonging and first-year GPA and retention (Hausmann et al., 2007; Hoffmann et al., 2003; Morrow & Ackermann 2012; Rainey et al., 2018; Walton & Cohen, 2011), it is logical to see there is no difference on students’ first-year GPA and likelihood to retain in the second year based on service hour variations.

For social media implementation, previous studies suggested that there is no significant relationship between social media enhanced course with students’ sense of belonging and sense of community (Barczyk & Duncan, 2017; Duncan & Barczyk, 2016; Munoz et al., 2014). Therefore, a possible reason for the non-significant relationship between social media implementation and student first-year GPA and retention is because the addition of social media did not make much change on students’ perceived level of sense of belonging. Students who were offered social media intervention may not engaged with it. For example, several of the participants in the individual and focus group interview stated that they knew the program had social media platform, but they were not interested to use it or connect with their peers through that outlet.
Similarly, for the LLC and peer and faculty mentor practice implementation, the findings from this study also aligned with previous studies (Morrow & Ackermann, 2012; Rainey et al., 2018) as the more frequent or intense interaction with faculty members and peers does not necessarily lead to high quality interaction. As Peck (2017) stated peer and faculty interaction does not significantly contribute to better performance and retention among first-year students, but high-quality interaction is a significant predictor for these two variables. Therefore, the implementation variation on LLC and peer and faculty mentor did not contribute to the increase on students’ sense of belonging, first-year GPA and retention. Qualitative data analysis results from current study also support these findings, as several participants revealed the social media, along with variables of performance feedback, LLC, service-learning and peer and faculty mentor practices, all shared some flaws in terms of their structure and implementation which prevented students from forming high quality interaction with others in short period of time during the first semester. For the LLC and peer and faculty mentor practices, students may have been able to more frequently interact with their peers and faculty members, but it did not warrant a high-quality interaction. In fact, a few interview participants revealed they had disconnection and disagreement with their mentors and argument with their roommates.

Therefore, the most important finding is that although the implementation variation for many of these practices may offered more opportunities and resources for students to connect and interact with their peers and faculty members, students may not feel those interactions were high-quality. As scholars have argued to build sense of belonging, one should not only be focusing on the quantity of interpersonal relationship, but also be seeking high-quality and meaningful interaction derived from the relationship (Baumeister & Leary, 1995; Strayhorn, 2012). Students from the studied program were fortunate to gain opportunities to interact and
connect with others, but the quality of those relationships and interactions may be pivotal for developing their sense of belonging. Also, the performance feedback practice may need the most revision as the focus should be providing quality, constructive feedback that has been well-structured, and more positive and frequent feedback could be provided pertaining to students’ task performance instead of neutral or negative feedback about students’ soft skills and personality (Murphy & Cornell, 2010).

Another finding worth discussing is social media was not a significant predictor for the two dependent variables (first-year GPA and retention). One possible reason could be not all of the program participants were actively engaged with the program’s social media platforms (Facebook page and Instagram). In the individual and focus group interviews, more than half of the participants revealed that they were not interested in using social media, and a few of them even had negative view on social media, which means they barely got any benefit from the social media practice that the studied program put effort for. Instead, most of the participants gave high praise to the GroupMe text messaging system that was suggested by their peer and faculty mentors. They felt this messaging system allowed them to have better communication with their teammates throughout the semester, and kept each other informed about important events and deadlines. Therefore, this finding suggests the social media practice embedded in the studied program need more improvement and revision, such as require all of the program participants to engage in the program’s social media platforms at least a few times, or the program may need to consider using other social media platforms if students have certain social bias toward Facebook and Instagram. Several interview participants shared their opinions on these two commonly used social media platforms, and they thought these two platforms are more for entertainment purpose, which may play a negative role in their academic trajectory. Previous studies also
showed that students felt that they rather to spend more time with their peers in face-to-face format instead of online format (Munoz et al., 2014). In the context of the studied program, students were assigned to a small team with 4-6 peer students, and the most interaction they had throughout the semester was with their teammates instead of with the entire program participants, so the focus of building effective communication chain should be narrowed to the team level but not to the program level.

The Long-term Impact on Degree Attainment

As defined by Astin (1984) and Tinto (1987), persistence refers to the continual pursuit of the completion of a college degree. Scholars also pointed out that actual persistence, intention to persist and institutional commitment are highly correlated (Bean, 1980; Cabrera, Castaneda, Nora, & Hengstler, 1992; Pascarella, Duby, & Iverson, 1983). Another interesting finding is that of the intervention practices, the implementation variations of service hour, LLC and peer and faculty mentor practices were significant predictors for years of degree attainment. Performance feedback was not a significant predictor for years of degree attainment. As mentioned earlier, social media was not included in this prediction model because this practice was only embedded to the studied program in the recent four years, and the cutoff value for years of degree attainment variable for the current study is six years. In the current study, the majority of students who did not attain their degree in the six years duration were the ones dropped off from the studied university at any point of their college journey, and only a very small percentage (less than 3%) of students completed their degree between six to nine years. Therefore, to understand the relations between the four intervention practices and years of degree attainment (attained degree in six years or not), the variable of persistence, institutional commitment and intention to
persist should be the focal point of the discussion.

Surprisingly, service hours significantly and negatively predicted years of degree attainment, which means the more service hours students had in the first semester, the less likelihood that these students completed their degree in six years. A possible reason could be indirectly through students’ lesser satisfaction with campus life. Students who had more service hours in the first semester may have established positive and sustainable relationships with off-campus community agencies they served for, and these students were more likely to engage with these off-campus entities after they completed the studied program. This possibility can be supported by the qualitative data analysis result of the current study, as several interview participants revealed that they will return to the community agencies they worked with because they really enjoyed the experience to work with diverse population outside university setting. Because these students with more service hours had higher tendency to work more off-campus, their satisfaction toward the university may be significantly decreased (Peck, 2017). Hence, the more hours these students spent on off-campus activities, the less time and effort these students put forth to on-campus involvement. Also, several existing literatures supported the notion that sense of belonging mediates the positive relationship between satisfaction, involvement and persistence, intention to persist and institutional commitment (Huasmann et al., 2007; Long, 2016; Snider & Dovidio, 1996; Spady, 1971; Tovar, 2013). Therefore, it is logical that the more service hours students completed in the studied program, the lower level of involvement, satisfaction and perceived sense of belonging to campus life they may had in the following years, which resulted in less likelihood they persisted and graduated from the university.

The implementation variation of LLC and peer and faculty mentor positively and significantly predicted years of degree attainment is not surprising based on previous research
findings. Studies have shown that LLCs provide students opportunities to informally interact with peers and access to valuable resources (Altimare & Sheridan, 2016; Spanierman et al., 2013). Similarly, studies have shown that peer mentor programs allow participants to connect with others from different departments, network with diverse population, and potentially create ample resources and opportunities to engage in other activities (Pidgeon, Archibald, & Hawkey, 2014; Waddell et al., 2016). Therefore, in the context of this study, by adding a peer mentor in addition to faculty mentor, and assigning all the program participants to live in the same residence hall, students had more opportunities to interact with peers from diverse backgrounds and received more resources that potentially allowed them to engage in campus activities in their later semesters. When students are more involved with the university life, they have higher levels of sense of belonging, in turn they have higher likelihood to persist to get their degree completed (Hausmann et al., 2007; Long, 2016; Snider & Dovidio, 1996; Spady, 1971; Tovar, 2013).

Service-learning practices had a long-term but negative impact on sense of belonging could due to the potential connections that students made with off-campus organizations, which prevent them to spend more time and effort on campus life. However, this assumption may only be applicable in terms of the variation of service hours aspect in the service-learning practice. In the practical sense, this finding aligns with the general practice in service-learning field, which students are typically required to complete 20 hours of service per semester (Wu, Wang, Cao, Huang, & Ng, 2014). One thing worth discussing is that the LLC and peer and faculty mentor practices did not significantly predict first-year GPA and fall to fall retention, but significantly predicted years of degree attainment. These findings suggest that LLC and peer and faculty mentor practices may have long-term and positive impact on students’ behavioral, cognitive and affective well-beings and academic performance. Although the interaction that program
participants experienced may not be high-quality during a single semester, this does not prevent those students from taking advantage of the connections they made through their peers and mentors and from further exploring opportunities to engage in campus life in the following semesters. Qualitative results from this study showed several participants revealed that they may have been able to be involved in student organizations and competitive programs, get on-campus working positions and other opportunities through the connections they made with their peers and mentors across various departments and units.

On the other hand, even though the performance feedback practice was a significant negative predictor for first-year GPA and fall to fall retention, it did not significantly predict years of degree attainment. This finding suggests performance feedback practice may have immediate and negative impact but not long-term impact on students’ psychological well-being. Senior students are more appreciated for feedback as compared to junior students, and they believe feedback can benefit their learning and performance (Ansari & Usmani, 2018). As the negative view on performance feedback students received in the studied program gradually diminished in the following academic years, their sense of belonging and self-competency may rise back. Also, as students enter the sophomore and junior year, they are more used to receiving feedback, and they may give more attention to other aspects of their academic and social life, so performance feedback may not be a key factor that impact their sense of belonging any more.

**Summary of immediate and long-term impacts**

In summary, having peer and faculty mentors, being part of a LLC and engaging in service hours had significant long-term impact on students’ year of degree attainment, whereas
performance feedback had significant immediate impact on students’ first-year GPA and fall to fall retention. Social media did not have significant impact on any of the performance indicators. Specifically, the findings suggest it is better to have two mentors as compared to have one mentor because the more mentors that students have, the more connections and opportunities they will have in the future, which will positively impact their persistence in college. The same applies to the LLC practice: living in same residence hall provided more opportunities for students to form long-term relationships. Since service hours had a negative impact on students’ persistence, it would be logical to not encourage students to go above and beyond the required service hours per semester. Although it is laudable for students to help in the community, it may be better for their graduation prospects for them to focus more on campus life in their earlier semesters, and try to develop and establish connections with faculty and their peers. In terms of performance feedback, the feedback effects were negative but may have different impacts if the program provided it based on research evidence and recommendation (e.g. Murphy & Cornell, 2010). Social media was the least impactful practice among all five practices, and the major flaw was that students were not required to engage in it. These findings are uniquely important as there is lack of standardized implementation guideline in the field of belonging and retention intervention (Billig, 2000; Yob, 2014). With the wide variety of program implementation strategies, these findings do provide a way to consider how to develop a comprehensive framework and directions for future belonging enhancement program endeavors.
CHAPTER VI

CONCLUSION, LIMITATIONS AND FUTURE DIRECTIONS

The conclusion section emphasizes the unique contribution of this study to the existing literature and practice of the belonging intervention field through the side-by-side interpretation of the quantitative and qualitative findings. In addition, limitations are discussed in relation to the interpretation and generalizability of the findings. Lastly, recommendations for future practice and research are provided to advance the field of belonging intervention.

Conclusion

This study sought to investigate the effectiveness of the studied program in a large, public land grant institution of higher education by using a mixed-methods design. Combining both of the qualitative and quantitative findings, this study suggests the service-learning leadership program does bring benefit to first-year college student as it can protect against the decline of sense of belonging in the first semester of college year. This finding is both unique and encouraging as previous studies shown significant decline on students’ sense of belonging even after participating in belonging intervention program (Hausmann et al., 2007; Strayhorn, 2012).

One unique contribution of this study is the program made different impact on the three aspects of sense of belonging, with the most impact on connectedness, followed by university affiliation, and the least on companionship. This finding suggests the program excelled in providing opportunities for students to make connections and build sustainable relationships with others, but it should focus more on providing opportunities for students to engage and involve in
more campus-wide activities and events in addition to program level involvement.

Moreover, findings suggest the program may have benefited male students and non-White students more compared to female and White students. It provided unique resources, platforms and outlets to allow marginalized students to engage and involve in campus life and interact with people who they would never had the chance to encounter. This finding is important for large, predominately white institutions as research has shown that racial minority students often feel isolated or marginalized and have difficulties in becoming involved in campus activities and student organizations (Maestas et al., 2007). Furthermore, another contribution of this study was the finding that a pre-semester intervention seemed to positively contribute to students’ perceived sense of belonging; this is consistent with other work (Hausmann et al., 2007).

In addition, by analyzing student record data from the past 12 years, this study is the first study that identified the most effective belonging intervention practices, and the relations between implementation variation and student academic performance, which is one of the most critical issues in the belonging intervention field (Slaten et al., 2016). First, the two intervention practices that contributed the most to students’ sense of belonging and academic performance were mentorship and LLC, and the findings further suggests that having two mentors (a faculty mentor and a peer mentor) and assigning all program participants to a single resident hall are the effective implementation strategies. This is likely due to the frequent and intensive interaction students had with their peers and faculty and staff members. Second, the findings suggest performance feedback, service-learning and social media practices may need further revisions and iterations to improve its utility and effectiveness.

The qualitative findings of this study demonstrated the dynamic processes and
mechanisms of how each intervention practice contributed to each aspect of belongingness, and highlighted the negative aspects of each practice that required the most improvement. Collectively, the results not only showed the studied program was beneficial to the program participants, especially for marginalized students, but also suggested practical guidelines for future program implementation and improvement.

**Limitations**

Several issues limit the interpretation and generalizability of the findings. First, exploratory findings from one institution may not be representative of student experiences and perceptions in other university contexts. Each institution has its unique mission and structure, and these differences may influence students’ experiences and perspectives. As Strayhorn (2012) indicates sense of belonging varies based on time, population and context, so it is important to consider these environmental factors when interpreting the results. Second, the extent to which some of the intervention practices were implemented was another limitation of this study. Though this study investigated implementation variations that occurred in the past 12 years of the program, there may be some other implementation factors (e.g. the service reflection journal and/or communication system) that could be related to students’ sense of belonging that were not examined in the study. Third, this study only analyzed gender and race as student background variables, but there are other variables to be considered in future studies, such as first-generation status, state residency and student organization involvement since these variables potentially contribute to perceived level of sense of belonging, too (Perrell, 2018).

Furthermore, there are some limitations in terms of the data collection procedure of this study. The pre-survey was collected after the pre-semester intervention of the treatment group, so
the pre-score may not reflect program participants’ initial level of sense of belonging as compared to the students in the control group. Qualitative data were collected three weeks earlier than the quantitative data, and because levels of perceived sense of belonging fluctuate over time (Strayhorn, 2012), the shared narratives from participants during interviews and focus groups may vary from their responses to the post-survey. The students in the control group had some unintended interventions, which may positively influence their perceived sense of belonging to the university. Ideally, students in the control group should not experience any interventions that may potentially affect their sense of belonging, but in reality, most first-year college students will have some level of experience that could positively or negatively contribute to their sense of belonging (Perrell, 2018). Also, the relations between each of the five intervention practices, sense of belonging, and achievement outcomes (first-year GPA, retention and persistence) can only be speculated in this study because sense of belonging was only measured for the cohort of 2019, but not for the previous cohorts from 2007 to 2018. Moreover, two important variables, (quality and quantity of interaction with peers and faculty members, and campus involvement) were not collected in the study, which prevented the researcher from best exploring a causal link between the intervention practices and the student performance indicators. Similarly, other psychological variables, such as self-efficacy, critical thinking skill, self-regulation and cognitive engagement may also have played important roles in the relations between the belonging practices and achievement outcomes (Slaten et al., 2014; Slaten et al., 2016), but were not examined in this study. Future studies can collect data through self-reported surveys and interviews, or use existing university data, such as the National Survey of Student Engagement, to draw more explicit connections between these variables.
In terms of specific limitations regarding the qualitative data analysis and interpretation of this study, the researcher had directly and indirectly worked with the studied program for almost five years. The researcher was involved in some of the planning and implementation stages of the program, so the researcher had full knowledge about the multidimensional structure, and elements associated with the program which may have biased her interpretation of the results. The researcher had some direct interactions with the program participants in the year of 2017 when the researcher served as the program mentor, and the researcher also had informal interaction with program participants; therefore she may hold several presumptions about the effectiveness of the program based on former program participants’ feedbacks and personal involvement with the design and evaluation of the program. However, the researcher does acknowledge the program had several flaws in terms of the planning and implementation process, and the researcher has made efforts to improve the validity of the qualitative part of the study through credibility, transferability, dependability and confirmability.

**Recommendation for Future Research**

Additional research is needed to further understand the influence of belonging intervention on students’ sense of belonging and academic performance. Since the studied program requires ongoing iterations, continued research is necessary to understand if the changes recommended would influence students in a different way or increase the overall effectiveness of the program. In a practical sense, researchers should work on collecting both qualitative and quantitative data from the next cohort of students in the studied program especially if program changes have been implemented based on the recommendations from this study. Specifically, future research should aim to find out if positive changes to students’ perceived sense of
belonging and academic performance will appear after eliminating the feedback practice or changing the current structure, content and focus area of the feedback practice. As mentioned earlier, qualitative research (Douglas et al., 2016) showed that college students prefer summative feedback pertaining to their task performance instead of formative feedback about their personality and soft skills, so a future quantitative study can validate and extend this line of inquiry. Moreover, programmatic changes can be investigated to see whether the studied program makes different impact on each aspect of belongingness as compared to the findings from the current study. For example, programs that mandate each student engage in the program’s social media platforms, and programs that create more residence hall activities and events, may result in program participants with higher level of affiliation as compared to students in this study.

In addition, researchers should consider revising and augmenting the university belonging questionnaire. One issue is to better capture students’ perceived level of belongingness at the program level since the current study suggests the studied program may have more impact on students’ sense of belonging to the program as compared to the entire university. Moreover, the current university belonging questionnaire may need to add more items on the staff and faculty relations subscale because results from the qualitative part of this study showed that program participants shared much more in-depth experience and unique perception on this aspect of belongingness as compared to the other two aspects. Also, the questionnaire should consider the inclusion of a fourth subscale to capture the intrapersonal factors (intrinsic motivation to seek out relationships, self-awareness and mindset, and balancing social and academic lives) related to belongingness (Slaten et al., 2017). In addition, there are a few items in the university affiliation subscale may need to be taken out or reworded to ensure the content validity. Lastly, this
instrument may have measurement invariance issue based on the findings from this study, and belongingness can be impacted by students’ gender and race, so future study also need to further examine the measurement invariance of the instrument. Therefore, more effort should be put forth for improving the psychometric properties of the university belonging questionnaire for future use.

Future study should also consider examining the effectiveness of other types of belonging intervention or other forms of combination of belonging interventions that are different from the combination of practices implemented in the current study. As Slaten et al. (2016) argued that the field of belonging intervention lacks robust study to understand which intervention works well to enhance students’ sense of belonging, and he also encouraged researchers and practitioners to design more effective belonging interventions. Particularly, two belonging interventions worth further study based on current literature include: institutional communications and gifts, and social belonging strategies focus on eliminating stereotype threat and normalizing lack of fit (Hausmann et al., 2007; Perrell, 2018; Walton & Cohen, 2007, 2011a). Moreover, researchers could conduct more qualitative studies with marginalized students as target population, and use an inductive approach to understand their unmet needs for maintaining and increasing students’ perceived sense of belonging in specific institutional and cultural contexts.

Future research should also consider Strayhorn’s (2012) interpretation of sense of belonging, which involves the ideas that belongingness takes on heightened importance in certain space and contexts, at certain times and among certain populations. Such consideration can impact decisions on when and where to conduct the study and collect data. Specifically, researchers should draw a clear timeline on when to collect the true baseline score because
students’ perceived sense of belonging not only fluctuates over time but also can be easily changed as a result of a particular event or activity. Also, there should be more exclusion and inclusion criteria in terms of the selection of the control group in future study to make sure that the only major difference between the treatment and control group is the treatment variable as manipulated (Gay et al., 2006). In addition, with the majority of belonging research focus on understanding the role of students’ gender and race in relations to their perceived sense of belonging, more research should focus on how factors like major of study, personality and other student characteristic variables may play a role in developing their sense of belonging to the university. Researchers should also seek a way to track students’ sense of belonging multiple times throughout their enrollment in the university, especially in the first year of college life when students are experiencing the most challenges and their level of sense of belonging is in the most vulnerable phase (Barr, 2007; Dyson & Renk, 2006). When longitudinal data on students’ perceived level of sense of belonging is available, researchers should focus on understanding the trend of the change on sense of belonging, which can inform the belonging intervention practitioners on when is the most crucial time to implement such an intervention.

Moreover, it is necessary to understand the impact of belonging interventions for various institutional types -- public institutions, private institutions, or two-year colleges -- and how the student composition of these institutions may also contribute to the relationship. Though the studied program was beneficial to the students in the studied institute (a public, land-grant institution), it is important to conduct pilot work before largely implementing this program in other institutions. As Ingram (2012) stated it is the degree of diversity of an institution that plays a pivotal role for students’ initial level of sense of belonging. Therefore, future research should investigate potential differences in marginalized students’ level of sense of belonging across
different types of institutions. This is especially important given that the composition of the student body at institutions of higher education is drastically changing in a modernized society, and predominately white college campuses may require substantial changes to provide a support community in which all students feel they belong.

Another direction for future research is to integrate the NSSE (National Survey of Student Engagement) data to understand the relations between the four NSSE themes, sense of belonging and student performance indicators. As Peck (2017) mentioned it is important to understand how each of the four NSSE themes (academic challenge, learning with peers, experiences with faculty, and campus environment) contributed to student learning performance, retention and satisfaction. One of the limitations in the current study is lack of data to draw explicit relations between the program implementation variation, student involvement, quantity and quality of interaction with peers and faculty, and sense of belonging. Therefore, future research can fill this gap by taking advantage of the NSSE data.

Moreover, in the field of educational psychology, self-determination theory (SDT) is viewed as one of the most contemporary frameworks for understanding the factors that promote human motivation and flourishing. In SDT, competence, autonomy and relatedness are viewed as the basic psychological needs which all play a critical role in promoting academic motivation (Ryan & Deci, 2000). However, compared to the needs of competence and autonomy, the need of relatedness (similar to sense of belonging) has been found to play a more distal role in learning process (Ryan & Deci, 2002; Yu & Levesque-Bristol, 2020). Yet, future research could test out the SDT model and its basic psychological needs sub-theory in the context of higher education to see if relatedness may play a more important role for students’ academic decisions and long-term academic trajectory (Davidson & Beck, 2019), given that the contributors to
college attrition and graduation are more complex than the contributors to academic performance (grade and GPA). In other words, the complex issue of institutional commitment may be explained better by the need of relatedness as compared to the other two basic needs in the SDT model.

Future research in the field of sense of belonging should strive to understand if the three aspects of belongingness play different roles in different phases and situations during college years. Theoretically, the development of belongingness may follow human beings’ developmental needs and processes, in that companionship may develop at first during childhood period, followed by affiliation which can be developed during adolescent period, and connectedness which may be formed and serve as a salient factor for healthy living during adulthood (Lee & Robbins, 1995). Researchers should investigate which aspect of belongingness is most important for first-year college students through individual interview, focus group and survey measures, so institutions can make the most suitable program to meet students’ developmental and psychological needs. Another direction worth exploring is to understand the role of social support system in relation to student’s sense of belonging. According to Bronfenbrenners (1974) ecological theory and Erikson’s (1968) eight stages of human development theory, factors like family dynamic, location of residence, relationship status, change in social circle are particularly important during the transition period from adolescence to young adulthood. Carroll, Bower and Muspratt (2017) also pointed out that the four relational aspects (family, school, friend and community) are all essential parts to meet the developmental need of belongingness for adolescent and young adult. Therefore, future work can explore the relative importance of support systems for college students’ perceived sense of belonging.
Recommendation for Future Practice

Overall, these findings provide many valuable practical suggestions for future program development and revision in the belonging intervention field. One, results indicated that providing two mentors (one faculty mentor and one peer mentor) is beneficial to students in the long-term as more interaction and connection first-year students have, the more opportunities they will have to become involved in campus life in the future semesters. However, the quality of the interaction between students and their mentors should be improved. This recommendation is supported by prior research that has highlighted the benefits of mentorship (Crisp, 2009; Crisp et al., 2017; D’Abate, 2009; Ender & Newton, 2000; Hill & Reddy, 2007; Kuh et al., 2006; Perrell, 2018). The studied program provided one training session to mentors during summer, and program staff members met with mentors a few times during the semester to emphasize the importance of their role and communicate about students’ development. Findings here suggest that not all of the mentors were following the recommended practice in terms of forming interaction with their mentees and providing constant support and guidance to mentees. The faculty mentors were volunteer based, and may have lacked adequate reward structures and incentives to optimally participate. Therefore, the program may need to consider ways to recruit and incentivize high-quality faculty mentors to serve in the program.

Two, the LLC practice had long-term impact on students’ persistence to graduation, yet it was not without flaws. The most common complaint that students had was there was not enough activities or events in the shared residence hall as they expected at the beginning of the semester. As Stassen (2003) stated there are unlimited formats of LLC programs, but the shared living and learning space and structured programming in residence hall should be the key components in any high-quality LLC program. Therefore, the studied program should devote more resources to
improve the quality practice of the LLC aspect of the program. Some recommended improvements based on students’ interviews and focus groups include: hosting regular events in residence hall, providing additional learning spaces in the residence halls for group discussions and activities, assigning roommates based on interest and background assessments, and establishing rules and standards of behaviors.

Three, since the performance feedback practice seemed to have adverse and immediate impact on students’ performance, the studied program should consider ways to restructure this practice, or remove this practice from the program. As prior research (Douglas et al., 2016; Toit, 2012) established college students view feedback in general as a negative source, and students have various needs in terms of changing their perspectives toward the feedback they received (Murphy & Cornell, 2010). Therefore, if utilizing this practice, programs should consider ways to provide effective implementation of this practice, such as providing systematic training to peer and faculty mentors on how to provide constructive and receptive feedback, and offering growth-mindset seminars to participants to emphasize how to use constructive feedback to improve oneself.

Four, with regard to social media practice, the program could embed some strategies to encourage more students to take advantage of the social media platforms. A major concern was lack of engagement on the platforms; findings showed that social media practice was not a significant contributor to any of the three performance indicators, and prior research illustrated mixed results on the benefits of engaging in social media on students’ sense of belonging and performance (Junco & Cotten, 2012; Strayhorn, 2012; Vincent, 2016). It is difficult to speculate whether enhancing this practice will bring positive or negative impact on the desired outcomes. However, the qualitative narratives shared by some of the participants indicated that the social
media platforms was beneficial in forming social connections with peers and showcasing their community service project to others. Subsequently, I would recommend keeping this practice in the program if it does not require too much effort or resources to maintain it.

Five, the service-learning practice as the key component of the studied program was only examined through one of its elements, the number of service hours completed by program participants. Findings suggest this practice to have negative effects on persistence as the more hours completed by the students, the less likelihood they persisted to degree completion. This phenomenon could be due to the lack of on-campus involvement and lower levels of satisfaction toward the university because students devoted much time and effort to off-campus activities and work. Some of the students complained that they did not have as much time to devote to campus activities because they were focusing on their community service project by either going to the service site or spending time with peers to prepare their projects. This suggests some recommendations that can be considered with respect to how students engage in service learning: Programs should make sure students not go beyond the recommended 20 hours of community service (Wu et al, 2014) especially in the first semester of college, should offer more on-campus partners. In doing so, program participants can have easy access to partners and may be involved with campus organizations and activities while completing their service projects. Inevitably program students need to spend time and effort in community service, but they should also get equal exposure and opportunity to engage and involve in campus life. Therefore, it is important that the program participants should at least be informed with campus activities and resources even though they may not have time to engage with them in the first semester.

Overall, the benefits brought from the SSLP on students’ sense of belonging and academic performance supports Upcraft et al.’s (2005) statement that institutions should use
combined interventions to maximize students’ learning and performance. Based on results of this study, it is recommended that mentorship and LLC practices should be implemented as they had the most impact on students’ sense of belonging and academic performance. The selection of effective and suitable interventions, as well as their timing and duration should be based on research findings and institutional context and resource capacity. In selecting implementation practices, practitioners should also consider which provide the most potential benefit to the student populations they serve.
REFERENCES


RMC Research Corporation.


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APPENDIX A

SUMMARY OF BELONGINGNESS CONSTRUCTS
<table>
<thead>
<tr>
<th>Primary Need</th>
<th>Philosophical Orientation</th>
<th>Defining Belongingness</th>
<th>Belongingness in Schools</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rogers (1939): Unconditional positive regard is warmth, empathy, and support from others; Dewey (1988): school environments need to be supportive.</td>
<td>Maslow (1954): belonging is a hierarchical need for affection within others.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rogers, et al. (2017): school belonging is perceived as positive peer interaction and care.</td>
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</tr>
</tbody>
</table>

**Figure A1. Summary of belongingness constructs**
APPENDIX B

SUMMARY OF STUDIES
Table B1

*Summary of studies*

<table>
<thead>
<tr>
<th>Author and Year</th>
<th>Scale Name</th>
<th>Developmental Level</th>
<th>Cultural Context</th>
<th>Grounded Theory</th>
<th>Factor Structure Analysis Approach</th>
<th>Dimensionality</th>
<th>Psychometric Property</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Wehlage (1989)</td>
<td></td>
<td></td>
<td>Criterion-related validity</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Tinto (1987)</td>
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<td></td>
<td></td>
<td></td>
<td>No validity test</td>
</tr>
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<td>A Cheung (2004)</td>
<td>Validate PSSM</td>
<td>Elementary school</td>
<td>China</td>
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<td>PCA</td>
<td>School belonging, feeling of rejection</td>
<td>No and no</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Finn (1989)</td>
<td></td>
<td></td>
<td>No validity test</td>
</tr>
<tr>
<td>Author and Year</td>
<td>Scale Name</td>
<td>Developmental Level</td>
<td>Cultural Context</td>
<td>Grounded Theory</td>
<td>Factor Structure Analysis Approach</td>
<td>Dimensionality</td>
<td>Psychometric Property</td>
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</tr>
<tr>
<td>A</td>
<td>You et al. (2011)</td>
<td>Validate PSSM</td>
<td>High school</td>
<td>Australia</td>
<td>Finn (1989)</td>
<td>Wehlage (1989)</td>
<td>EFA and CFA</td>
</tr>
<tr>
<td>A</td>
<td>Ye and Wallace (2014)</td>
<td>Validate PSSM</td>
<td>High school</td>
<td>U.S.</td>
<td>Finn (1989)</td>
<td>EFA and CFA</td>
<td>Identification and participation in school, perception of fitting in among peers, generalized connection to teachers</td>
</tr>
<tr>
<td>A</td>
<td>Abubakar et al (2016)</td>
<td>Validate PSSM</td>
<td>Middle and high school</td>
<td>4 foreign countries</td>
<td>No</td>
<td>Series of CFA</td>
<td>Unidimensional</td>
</tr>
<tr>
<td>Author and Year</td>
<td>Scale Name</td>
<td>Developmental Level</td>
<td>Cultural Context</td>
<td>Grounded Theory</td>
<td>Factor Structure Analysis Approach</td>
<td>Dimensionality</td>
<td>Psychometric Property</td>
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<tr>
<td>A’ Hoffman et al. (2002)</td>
<td>Sense of Belonging scale (SOB)</td>
<td>University</td>
<td>U.S.</td>
<td>Tinto (1987)</td>
<td>PCA</td>
<td>Peer support, faculty support/comfort, classroom comfort, isolation, empathetic faculty understanding</td>
<td>Internal consistency</td>
</tr>
<tr>
<td>A’ Tovar and Simon (2010)</td>
<td>Validate SOB</td>
<td>University</td>
<td>U.S.</td>
<td>Tinto (1987)</td>
<td>PAF and CFA with same sample</td>
<td>Faculty understanding/comfort, peer support, classroom comfort</td>
<td>Internal consistency</td>
</tr>
<tr>
<td>A’ Akar-Vural et al. (2013)</td>
<td>SEBES</td>
<td>Elementary school</td>
<td>Turkey</td>
<td>Maslow (1954)</td>
<td>PCA and CFA with same sample</td>
<td>Contentment in school, obedience of school rules</td>
<td>Internal consistency</td>
</tr>
<tr>
<td>A’ Slaten et al. (2017)</td>
<td>UBQ</td>
<td>University</td>
<td>U.S.</td>
<td>Baumeister and Leary (1995), Maslow (1954)</td>
<td>EFA and CFA with different sample</td>
<td>University affiliation, university support and acceptance, faculty and staff relations</td>
<td>Internal consistency</td>
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<tr>
<td>Bsch Terrell et al. (2009)</td>
<td>Doctoral Student Connectedness Scale</td>
<td>Doctoral student</td>
<td>U.S.</td>
<td>Lovitts (2001), Rovai (2002)</td>
<td>PCA</td>
<td>Faculty to student, student to student</td>
<td>Internal consistency</td>
</tr>
</tbody>
</table>
Table B1 Continued

<table>
<thead>
<tr>
<th>Author and Year</th>
<th>Scale Name</th>
<th>Developmental Level</th>
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<th>Factor Structure Analysis Approach</th>
<th>Dimensionality</th>
<th>Psychometric Property</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bsch Furlong et al. (2011)</td>
<td>Validate Add Health scale</td>
<td>Middle and high school</td>
<td>U.S.</td>
<td>No</td>
<td>CFA</td>
<td>Unidimensional</td>
<td>Internal consistency Concurrent validity</td>
</tr>
<tr>
<td>Bso Karcher and Sass (2010)</td>
<td>Validate Hemingway Scale</td>
<td>Middle school</td>
<td>U.S.</td>
<td>Townsend and McWhirter (2005)</td>
<td>CFA</td>
<td>10 factors</td>
<td>No reliability test No validity</td>
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<td>Bso Carroll et al. (2017)</td>
<td>SCS-SC</td>
<td>High school</td>
<td>Australia</td>
<td>Townsend &amp; McWhirter (2005)</td>
<td>EFA and E/CFA with same sample</td>
<td>Family, school, friends, community</td>
<td>Internal consistency Poor discriminant validity</td>
</tr>
<tr>
<td>Author and Year</td>
<td>Scale Name</td>
<td>Developmental Level</td>
<td>Cultural Context</td>
<td>Grounded Theory</td>
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<td>Psychometric Property</td>
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<tr>
<td>C Flaherty et al. (2014)</td>
<td>Validate Sense of Community Index (SCI)</td>
<td>University</td>
<td>U.S.</td>
<td>McMillan and Chavis (1986)</td>
<td>CFAs</td>
<td>No</td>
<td>Poor internal consistency for 3 out 4 dimensions</td>
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<tr>
<td>Cc Petrillo et al. (2016)</td>
<td>Adapted SoC-A to SoC-C</td>
<td>High school</td>
<td>Italy</td>
<td>McMillan and Chavis</td>
<td>EFA and CFA</td>
<td>Sense of belong and emotional connection with peers, satisfaction of needs and opportunities for involvement, support and emotional connection with peers and teachers, peer support, opportunity for influence</td>
<td>Internal consistency Concurrent validity</td>
</tr>
<tr>
<td>D D’Eloia and Sibthorp (2012)</td>
<td>Youth Relatedness scale</td>
<td>Elementary, middle and high school</td>
<td>U.S.</td>
<td>Ryan and Deci (1991)</td>
<td>No EFA nor CFA</td>
<td>Cared for by others, caring for others, durability</td>
<td>Internal consistency Both criterion and discriminant validity</td>
</tr>
<tr>
<td>Author and Year</td>
<td>Scale Name</td>
<td>Developmental Level</td>
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<td>Grounded Theory</td>
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<tr>
<td>D</td>
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<td>University</td>
<td>U.S.</td>
<td>Ryan and Deci (1991)</td>
<td>EFA and CFA with different sample</td>
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<td>Ryan and Deci (1991)</td>
<td>CFA</td>
<td>Relatedness inside classroom, relatedness outside classroom</td>
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<tr>
<td>D</td>
<td>Sevari (2017)</td>
<td>Validate Main Psychological Needs scale</td>
<td>University</td>
<td>Iran</td>
<td>Ryan and Deci (1991)</td>
<td>EFA and CFA with different sample</td>
<td>Autonomy, competence, relatedness</td>
</tr>
<tr>
<td>E</td>
<td>French and Oakes (2004)</td>
<td>Institution Integration Scale</td>
<td>University</td>
<td>U.S.</td>
<td>Tinto (1987)</td>
<td>CFA</td>
<td>Academic and intellectual development, peer-group interaction, interaction with faculty, faculty concern for student, institutional and goal commitment</td>
</tr>
</tbody>
</table>

Note. A represents PSSM scale and all validation studies on PSSM; A’ represents sense of belonging scales; B represents sense of connectedness scales (Bsch for school connectedness scales, Bso for social connectedness scales); C represents sense of community scales; Cc refers to classroom sense of community scales; D refers to sense of relatedness scales; E refers to social integration scale.
APPENDIX C

INDIVIDUAL INTERVIEW PROTOCOL
Demographic Questions

1. Age:

2. Classification: please circle one
   - Freshman
   - Sophomore
   - Junior
   - Senior

3. Self-identified gender: please circle one
   - Male
   - Female
   - Others (please specify) __________

4. Race: please circle one
   - White
   - Black or African American
   - Asian
   - American Indian or Alaska Native
   - Native Hawaiian or other Pacific Islander
   - Some other race (please specify) __________

5. Major:

6. Current housing arrangement (name of residence hall):

7. Hometown and state:

8. Mother’s education level:

9. Father’s education level:

10. Scholarship (Y/N):

11. Type of Scholarship:

12. Involvement in campus organization (organization name)

13. Your MLP fellow name:

14. Your Day One mentor name:

15. Your Day One community partner name:
Individual Interview Questions

Introduction:

My name is Xi Chen, and I am a GA for the student leadership office. I have been working with Day One program for a few years, and really enjoyed my interactions and experiences with Day One students. I am also a PhD student in Educational Psychology. I really appreciate for this opportunity to talk with you and hear about your experience and story at MSU. This study intends to understand freshman students’ perceived sense of belonging through their lived experience from service-learning course/program, and finds out the specific factors associated with service-learning course/program that affect students’ sense of belonging. Also, this study intends to discover the relationship between freshman students’ sense of belonging and their intention to stay or leave the university. Please understand that your participation is voluntary. Your refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled. You may discontinue your participation at any time without penalty or loss of benefits. The information you share with us will be kept confidential. Your privacy will be protect throughout your involvement in this study. This study involves almost no risk to any participants. There may be some potential benefits to the participants, such like get interaction with professional researchers, understanding basic knowledge and step about conducting research activity, make connection with people involved in this study.

Do you want to proceed with further questions?

Opening questions:

Have you built any good relationship with your peers, instructors or MSU staff members by far?

Transition questions:
Which aspect of MSU campus life you like/dislike the most?

RQ: How does Day One program impact freshman students’ sense of belonging?

Main question 1: How does your current housing arrangement make you feel connected to the university?

1.1 Can you share some of your experience about living with Day One peers in the same residence house?

1.2 Do you prefer to live with your Day One peers in same residence house or not? Why?

1.3 How does living with Day One peers in same residence house benefit/detrimental to your connection with the university?

1.4 Would you recommend future Day One student to live in same residence house or not? Why?

Main question 2: How does Day One social media make you feel related to others in the university?

2.1 Can you describe your experience with Day One social media?

2.2 Would you recommend other Day One students to engage with Day One social media?

2.3 What is the main purpose for you to engaging with Day One social media?

2.4 Is Day One social media helpful for you to connect with others?

2.5 What are some central messages you get from Day One social media?

Main question 3: How does the support and interaction you receive from Day One make you feel connected to the university?

3.1 Can you describe the support and interaction you have had with people involved in Day One?

3.2 What is your experience with Day One peers different than the experience you have with your non-Day One peers?
3.3 Can you describe the support and interaction you have had with your MLP fellow, Day One mentor and Day One staff members?

3.4 Have you had any individual meeting with Kinya or other Day One staff members?

3.5 Have you experienced any support or interaction in Day One that you were not able to get from other classes?

**Main question 4: How did the service experience and group project you have had in Day One make you feel related to others in this university?**

4.1 Can you describe your service experience?

4.2 Can you describe your experience with your Day One group project?

4.3 How is your experience so far with your team members?

4.4 What is the best/worst experience/interaction you have had so far with your community partner?

4.5 What would you tell other students about your service experience in Day One?

**Main question 5: How did the instruction you have received from Day One make you feel connected to others in this university?**

5.1 Can you describe your experience with the Monday, Wednesday and Friday Day One classes?

5.2 How do you perceive the instruction you have from Day One different that other classes you are currently taking?

5.3 How is the relationship/interaction you have with Day One instructor, MLP fellow, Day One mentor different than the relationship/interaction you have in other classes?

**Main question 6: How did the group social events you have had in Day One make you feel related to others in this university?**
6.1 Can you describe your experience with Day One social events (color reveal, tailgating, and etc.)?

6.2 What are the differences between Day One social events and other social events you have attended?

6.3 Which Day One social event you like the most so far? Why?

6.4 Which Day One social event you dislike the most so far? Why?

Main question 7: How did the group evaluation you have had in Day One impact your sense of closeness?

7.1 Can you describe the Day One group evaluation you have had?
APPENDIX D

FOCUS GROUP INTERVIEW PROTOCOL
Introduction:

I am very glad to see you all again, and really appreciate for your time devoted to this study. There are two students are not able to make it today due to schedule conflict. First, can we introduce each other about your name, where you from, and your studied major? So today we will extend our conversation on sense of belonging, and basically you will share your experience in the DayOne program, and tell us how you feel your experience make you feel connected to people in here. There are some rules that everyone needs to follow in this focus group meeting: first, please do not use your cell phone during the meeting, so our conversation will not be interrupted. Second, please allow one person to speak at a time, and try to not make comment before the person finish talking. Also, please remember my role is just a conversation facilitator during this meeting, and I will not control or direct any part of the conversation. Please just see me as a moderator instead of an interviewer, so your conversation should be carried out as a group conversation. Moreover, I just want to remind you all that there is really no right or answer to the topic we are discussing today since we are just sharing experience and different perspectives. Therefore, please respect other people’s viewpoints and try to express your viewpoint honestly.

Question 1: Can we talk about how those mentors affect how you relate to others or how you belong to the group or how you feel like you are included by others?
Question 2: Some of you told me you do not use social media much, but if you guys engage with Day One Facebook or Instagram or twitter. So, what about thinking about this holistically, those social media tools, how do they make you feel accepted, connected, or like you belong to Day One or MSU?
Question 3: Can we talk about your experience about living with DayOne student together, or going to other classes together?
Question 4: About the performance evaluation feedback, do you all have any opinions about it?
Question 5: Can we discuss how the service part make you connected to people?
APPENDIX E

PRE- AND POST-SURVEY
Pre-survey

Name: ___________________________                                      NetID: ____________

Please be honest with your opinion; your information will be kept confidential. There is no right or wrong answer. Please use the rating scale to respond to each of the items. **You must be at least 18 years old to complete this survey.**

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
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<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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</table>

_____ 1. I take pride in wearing my university’s colors.

_____ 2. I tend to associate myself with my school.

_____ 3. One of the things I like to tell people is about my university.

_____ 4. I feel a sense of pride when I meet someone from my university off campus.

_____ 5. I would be proud to support my university in any way I can in the future.

_____ 6. I have university-branded material that others can see (pens, notebooks, bumper sticker, etc.).

_____ 7. I am proud to be a student at my university.

_____ 8. I attend university sporting events to support my university.

_____ 9. I feel “at home” on campus.

_____ 10. I feel like I belong to my university when I represent my school off campus.

_____ 11. I have found it easy to establish relationships at my university.
12. I feel similar to other people in my major.
13. My university provides opportunities to engage in meaningful activities.
14. I believe there are supportive resources available to me on campus.
15. My university environment provides me an opportunity to grow.
16. My university provides opportunities to have diverse experiences.
17. My cultural customs are accepted at my university.
18. I believe I have enough academic support to get me through college.
19. I am satisfied with the academic opportunities at my university.
20. The university I attend values individual differences.
21. I believe that a faculty/staff member at my university cares about me.
22. I feel connected to a faculty/staff member at my university.
23. I feel that a faculty/staff member has appreciated me.
24. I feel that a faculty/staff member has valued my contributions in class.
25. I am satisfied with the connections I have made with fellow students.
26. I appreciate others who come from different backgrounds as me.
27. I understand what services are available at The Learning Center.
28. I understand what services are available at the Student Health Center.
29. I understand what services are available at Mitchell Memorial Library.
30. I understand what services are available at The Career Center.
31. I know how to be successful academically in college.
32. I believe I have good skills to succeed in my coursework and studying.
Demographic information: (Your information will be kept confidential!)

1. Self-identified gender: please circle one
   Male             Female        Other (please specify) _____________

2. Race: please circle which describes you
   Asian           White or Caucasian          Black or African American
   American Indian or Alaska Native         Native Hawaiian or other Pacific Islander
   Latino/Hispanic          Other (please specify) _________________

3. Current housing arrangement (name of residence hall):
Post-survey

Please be honest with your opinion; your information will be kept confidential. There is no right or wrong answer. Please use the rating scale to respond to each of the items. **You must be at least 18 years old to complete this survey.**

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
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APPENDIX F

APPROVAL NOTIFICATION FOR IRB PROTOCOL
Figure F1. Approval notice for IRB protocol
APPENDIX G

RECRUITMENT EMAIL SCRIPT
Hello Day One Student,

You are receiving this email because all of the Day One program students are welcomed to participate in the research study about freshman students’ perceived sense of belonging and their intention to stay in college or not. The study purpose is trying to understand freshman students’ perceived sense of belonging through their service experience in Mississippi State University, and also identify factors that affect their sense of belonging.

By participating in this study, you will expect to be interviewed for two times, and each interview should last around 40 minutes. You will also involve in focus group interview, where you will sharing your experience and perspective with several Day One students about how Day One program impact your sense of belonging at Mississippi State University, and how this perceived sense of belonging relate to your intention to stay at MSU or not. In addition, some of your reflection entries and your activities and comments on Day One social media platforms (Day One Facebook page, and Day One Instagram page) may also be retrieved.

Your participation in this study will help us to make improvement on the overall Day One Program effectiveness, and help us to better understand what are the program factors work well or not work well for making freshman students fell connected and supported at MSU. Being interviewed by a group of graduate students will also help yourself to better reflect and understand how you perceive the relationships, interactions and supports you have had so far in Day One program and at MSU. These interview and focus group experience may even help you to know basic steps for conducting research project that maybe useful for your future academic career and activity.
Further, for students who participate in both the interview and focus group interview, you will have a chance to win a $20 Starbucks gift card at the end of the semester after the research group complete the data collection stage.

Again, your participation in this study will make huge impact on the future Day One program design and the new cohort of Day One students. Your involvement and engagement in a series of interview processes, and interaction you will have with a group of profession researchers can benefit your future undergraduate academic career.

We really appreciate for your consideration to participate in this research study. If you are interested to involve in this study, please send an email to Xi Chen at xc132@msstate.edu

Sincerely,

Xi Chen

September, 2018
APPENDIX H

RECRUITMENT SPEECH SCRIPT
Hello everyone, my name is Xi Chen, and I am a 4th year PhD student in Educational Psychology. I am also a graduate assistant in the student leadership and community engagement office. You probably saw my name from a previous email that Stephen sent to you all a few days ago about participating in a research study. I am the principal investigator for this study.

I am here today to recruit some Day One program to participate in the research study about freshman students’ perceived sense of belonging and their intention to stay in college or not. The study purpose is trying to understand freshman students’ perceived sense of belonging through their service experience in Mississippi State University, and also identify factors that affect their sense of belonging.

By participating in this study, you will expect to be interviewed for two times, and each interview should last around 40 minutes. You will also involve in focus group interview, where you will sharing your experience and perspective with several Day One students about how Day One program impact your sense of belonging at Mississippi State University, and how this perceived sense of belonging relate to your intention to stay at MSU or not. In addition, some of your reflection entries and your activities and comments on Day One social media platforms (Day One Facebook page, and Day One Instagram page) may also be retried.

Your participation in this study will help us to make improvement on the overall Day One Program effectiveness, and help us to better understand what are the program factors work well or not work well for making freshman students fell connected and supported at MSU. Being interviewed by a group of graduate students will also help yourself to better reflect and understand how you perceive the relationships, interactions and supports you have had so far in Day One program and at MSU. These interview and focus group experience may even help you
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Again, your participation in this study will make huge impact on the future Day One program design and the new cohort of Day One students. Your involvement and engagement in a series of interview processes, and interaction you will have with a group of profession researchers can benefit your future undergraduate academic career.

We really appreciate for your consideration to participate in this research study. If you are interested to involve in this study, please send an email to Xi Chen at xc132@msstate.edu
APPENDIX I

CONSENT
Hello I am here to ask you to participate in a brief research survey.

Please listen as I verbally inform you of the consent process.

The purpose of this research survey is to better understand your perceived sense of belonging as a freshman student. The results of this survey will be used to improve the program for future students, and to understand the impact of the program on student development.

If you agree, you will complete a pre-survey at the beginning of the semester, and a post-survey at the end of the semester. Each survey will take you about 5 minutes to complete. Your student’s record data (including academic progress and enrollment status) may be retrieved from the MSU Registrar’s office.

Please understand that your participation is voluntary. Your refusal to participate will involve no penalty or loss of benefits. You may discontinue your participation at any time without penalty or loss of benefits.

The information you share with us will be kept confidentially. Your privacy will be protected throughout your involvement in this study. Your survey responses will be seen by research personnel and will only be shared in the aggregate.

This study involves almost no risk to you as a participant.
Questions: If you have any questions in regard of your participation of this survey, please contact
Stephen Williams, stephen@saffairs.msstate.edu, 662-325-0244; or Xi Chen at
xc132@saffairs.msstate.edu

If you choose to participate and complete both the survey at the beginning and end of the term,
your NetID will be entered into a random drawing to win a gift-card worth $25. The winner will
be notified by their MSU email account at the end of Fall 2019 semester.

If you decide to participate, please complete the survey. You must be at least 18 years old to
participant in this study.