EXPERIENTIAL LEARNING THEORY, TRANSFORMATIONAL LEADERSHIP, AND THE SUPPLEMENTAL INSTRUCTION LEADER: AN EXPLORATION OF THEIR RELATIONSHIP AND INFLUENCE ON RECURRING ATTENDANCE TO SUPPLEMENTAL INSTRUCTION SESSIONS

A Dissertation

by

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ABSTRACT

The purpose of this study was to explore the learning preferences and leadership behaviors of Supplemental Instruction (SI) leaders at Texas A&M University, and the impact of those preferences on recurring attendance to their sessions. The Learning Style Inventory (LSI) 3.1, the Multifactor Leadership Questionnaire (MLQ), and a demographic instrument were administered to 34 SI leaders employed in the fall 2013 semester.

A majority of participants preferred a diverging or accommodating learning style and perceived themselves to display transformational leadership behaviors the most. Analysis of variance and Pearson product-moment correlations revealed that learning preferences and leadership behaviors did not have a significant relationship with recurring attendance. Significant relationships for variables on the LSI and MLQ were found for transformational and transactional leadership behaviors and learning preferences. Most of these relationships were found for preference for transforming information.

Literature concerning the SI leader is narrow. Supplementary studies exploring their characteristics, preferences, and personality are needed. The relationship between leadership and learning is an area that can benefit from further research.

DEDICATION

This dissertation is dedicated to Dr. Carol Cowles, Dr. Basil Lister, and Dr. Gina Hicks. I am forever thankful for their personal and professional mentorship during my graduate school years at Northwest Missouri State University. They guided and supported me at a crucial point in my life and showed me that I could do whatever I put my mind to. Their belief in my abilities many years ago helped to get me where I am today and will never be forgotten.

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CHAPTER I

INTRODUCTION

Background of the Study

In an effort to support the learning needs of students in higher education, institutions have implemented academic support programs (Martin & Arendale, 1993). One successful program that is being applied in colleges and universities across the globe is Supplemental Instruction (SI; Martin & Arendale, 1993). One of the elements central to the success of the program lies in the leadership of a currently enrolled student, known as the SI leader, to facilitate group study sessions for courses that have been identified as high risk (Arendale, 1994). These group study sessions are available to all students enrolled in the courses. They are held three to four times a week beginning with the first week of class, and attendance is voluntary (Arendale, 1994; Blanc, DeBuhr, & Martin, 1983).

Participation in SI sessions has been shown to increase student performance across various disciplines and in multiple universities (Blanc & Martin, 1994). This claim has been validated by the U.S. Department of Education (Congos, 2001). Data provided by Peer Academic Services (PAS; formerly called the Student Learning Center) at Texas A&M University (TAMU) spanning 10 semesters revealed that attending SI sessions regularly resulted in better performance than attending only a few times (PAS, 2006-2011).

SI proposes a framework for a learner-centered approach to education (McGuire, 2006) with foundations in constructivism. Proponents of constructivism claim that

"students must construct their own knowledge in order to be able to understand and use it" (Martin, Arendale, & Associates, 1992, p. 43). SI leaders are trained to deliver sessions that engage attendees with each other and with the material. Through this, "students are required to examine what they know and understand when they come to the session, and are challenged to build new knowledge in collaboration with their peers" (McGuire, 2006, p. 6).

The SI leader is responsible for guiding attendees through this process while helping them to form a bond related to the goal of improving course performance (Hurley, Jacobs, & Gilbert, 2006; Martin et al., 1992). The SI leader serves as a role model for successful students while simultaneously motivating attendees to take responsibility for their own learning (Arendale, 1994; Hurley et al., 2006).

Problem Statement

It has been reported that attending at least one SI session positively affects course performance (Arendale, 1997; Blanc et al., 1983; Blanc & Martin, 1994; Congos & Schoeps, 1993; Hensen & Shelley, 2003). Further, it has been shown that attending on a regular basis results in a greater impact on performance (Arendale, 1997; Kochenour et al., 1997; McGuire, 2006). However, many still choose not to attend or go to only a few sessions (Kochenour et al., 1997; McGuire, 2006).

Researchers have explored the characteristics of students who attend SI sessions (McGee, 2005; Visor, Johnson, & Cole, 1992; Warren, 1997). However, even though the SI leader is considered one of the personnel key to the success of the program (Arendale, 1997), few researchers have explored the characteristics of the leader. The SI leader is at

the forefront of the program, and further exploration of the leader's impact on the program is justified.

One characteristic that warrants further investigation is the learning style of the SI leader. Even though SI sessions follow a set of guidelines provided by the program, session design and implementation can differ by individual SI leader. Adams (2011) found that SI session designs exhibited characteristics of the SI leader's learning style identified by D. A. Kolb's (1984) Learning Style Inventory (LSI). This is supported by the assertion that instructors teach based on their own learning style preferences (Hawk & Shah, 2007; Marshall, 1991; Wolfe, Bates, Manikowske, & Amundsen, 2005). The LSI identifies learning styles suggested by D. A. Kolb's (1984) experiential learning theory (ELT). As with SI, ELT proposes a framework for learner-centered education with foundations in constructivism (Kolb, A. Y., & Kolb, 2005b).

The leadership style of the SI leader should not be overlooked. The title alone suggests that further investigation of behavior preferences for approaching the leadership of group study sessions is necessary. In addition, the SI model asserts that SI leaders are supposed to create a collaborative learning environment in which student attendees feel bonded by a common purpose and motivated to learn (Martin et al., 1992; McGuire, 2006). Northouse (2007) asserted that this ability to motivate and create a common bond and purpose is encompassing of a transformational leader.

Additional responsibilities of the SI leader also appear to overlap with transformational leadership behaviors identified by Bass (1988), a well-known scholar of transformational leadership. However, research about the leadership of SI leaders is

generally limited to the skills that they gain in the role (Congos & Stout, 2003; Etter, Burmeister, & Elder, 2000; Lockie & Van Lanen, 2008; Stout & McDaniel, 2006; Zaritsky & Toce, 2006). Research that investigates transformational leadership behaviors of the SI leader is needed to determine the reliability of the perceived overlap.

The responsibilities of the SI leader require the integration of leadership and learning. An abundance of research on transformational leadership behavior preferences and learning preferences defined by ELT can be found in the literature. However, literature examining the relationship between the two could not be found. In a program where both are prevalent, an understanding of relationship between the two is desirable.

Purpose and Objectives

The purpose of this study was to explore the demographics, learning styles, and leadership styles of current SI leaders. In addition, learning styles and leadership styles were explored to determine whether there was a relationship among the variables. Also, the relationship between learning and leadership styles and recurring attendance to SI sessions was investigated. The study was designed to meet five specific objectives:

1. Explore the relationship between SI leader demographic variables and the leader's learning style.

2. Explore the relationship between SI leader demographic variables and the leader's leadership style.

3. Explore the relationship between learning style and leadership style of the SI leader.

4. Explore the relationship between SI leader learning styles and recurring attendance to SI.

5. Explore the relationship between SI leader leadership styles and recurring attendance to SI.

Significance of the Study

SI leaders have been shown to be essential to the success of the SI program, but little research can be found about them. This study provides significance to practitioners and researchers by identifying learning preferences, leadership preferences, and demographic characteristics of SI leaders. Further, relationships between demographic characteristics and learning and leadership preferences were explored to understand the SI leader. An awareness of SI leaders' characteristics, preferences, and relationships can inform training, recruitment, and evaluation practices. Findings can be used to establish the importance of administering learning and leadership instruments to SI leaders as part of training. When an SI leader completes the instruments, the program administrators and the SI leader gain an understanding of the leader's unique approach to learning and leadership. An awareness of unique approaches allows for individualized guidance related to the complexities of planning and leading sessions that appeal to all students.

An additional contribution of this study stems from the exploration of the relationship between learning preferences and leadership preferences. Research can be found on the relationship of these preferences with personality characteristics, but a gap exists regarding their relationship to one another. In a program that requires both for success, reported relationships between them can inform best practices.

Definition of Terms

Leadership: "A process whereby an individual influences a group of individuals to achieve a common goal" (Northouse, 2007, p. 3).

Leadership style: The identification of behavior preferences displayed when interacting with followers. Leadership styles can be further defined as transformational, transactional, and passive/avoidant.

Learning: A four-stage process of grasping and transforming information in which "immediate concrete experience is the basis for observation and reflection" (Kolb, D. A., 1981, p. 235). These observations are then used to build an idea or theory "from which new implications for action can be deduced" (Kolb, D. A., 1981, p. 235). These implications then guide the creation of new experiences.

Learning modes: The four stages in D. A. Kolb's experiential learning theory that identify the process of learning: concrete experience, reflective observation, abstract conceptualization, and active experimentation.

Learning style: The identification of preferences for approaching learning in D. A. Kolb's four-stage learning process: diverging, assimilating, converging, and accommodating.

Passive/Avoidant leadership style: This style is essentially the lack of leadership and includes the factors management-by-exception (passive) and laissez-faire.

Peer Academic Services (PAS): An academic assistance center at TAMU that houses the SI program and personnel (formerly known as the Student Learning Center).

SI leader: A currently enrolled undergraduate student who has been hired to lead weekly group study sessions for a course in which the leader has excelled.

Transactional leadership style: Behaviors associated with this style involve transactions between the leader and follower. Contingent reward and management-by-exception (active) are the factors inclusive of this style.

Transformational leadership style: This style includes idealized influence (attributes and behavior), inspirational motivation, intellectual stimulation, and individual or individualized consideration. Leaders with this style are proactive and seek to motivate and inspire followers beyond the norm.

Basic Assumptions and Limitations of the Study

The researcher assumed that all SI leaders participating in this study had received training and that the training was consistent with the SI program guidelines outlined by the University of Missouri, Kansas City. The researcher also assumed that attendance data provided by PAS were accurate. Also, the researcher assumed that participants were honest when completing the online survey instruments.

Due to Family Educational and Privacy Act (FERPA) regulations, the researcher was not allowed to obtain email information for all students employed as SI leaders at TAMU in the fall 2013 semester. Therefore, the program coordinator for SI sent a recruitment email to the SI leaders. The scope of the investigation was limited to the SI leaders who responded to the recruitment email. Further, information for students enrolled in a course with SI was received only for the courses led by an SI leader who responded.

Since the data were collected at only one university, they may not be representative of information about students at other universities. The small sample size prohibited analysis to determine whether a significant relationship existed between learning styles and certain demographic variables.

Chapter Summary

SI is an academic assistance program that has been demonstrated to be effective in increasing performance of students participating in the group study sessions. The study sessions are led by an undergraduate student known as an SI leader. The leader is directly involved in the learning process and leadership process. These leaders are key personnel and essential to the success of the program. Even with emphasis on their importance, little research can be found regarding their characteristics and preferences for learning and leading.

This study was designed to contribute to the literature and best practices by examining the demographic characteristics, learning preferences, and leadership preferences of the SI leader. D. A. Kolb's ELT was used as a foundation for learning preferences and transformational leadership was used as a foundation for leadership preferences. Preferences of SI leaders were examined in relation to recurring attendance at SI sessions. In a program where learning and leadership are emphasized, the researcher examined possible relationships among variables associated with learning and leadership.

CHAPTER II

LITERATURE REVIEW

The purpose of this study was to explore the demographics, learning styles, and leadership styles of current SI leaders at one university. Learning styles and leadership styles were explored to determine whether there were relationships among the variables. The relationship between learning and leadership styles and recurring attendance to SI sessions was investigated. The study was designed to meet five specific objectives:

1. Explore the relationship between SI leader demographic variables and the leader's learning style.

2. Explore the relationship between SI leader demographic variables and the leader's leadership style.

3. Explore the relationship between learning style and leadership style of the SI leader.

4. Explore the relationship between SI leader learning styles and recurring attendance to SI.

5. Explore the relationship between SI leader leadership styles and recurring attendance to SI.

This chapter reviews the literature relevant to the purpose and objectives of the study. The chapter is divided into four sections. The first section presents literature about the SI program, the SI leader, and the impact of attending SI sessions. Literature relevant to ELT and the learning modes and learning styles associated with it is presented in the second section. This section also includes a review of the relationship of demographic

variables and learning modes and styles. The third section presents a review of the literature relevant to transformational, transactional, and passive/avoidant leadership styles and factors associated with those styles. This section includes a review of the impact of demographic variables on leadership styles and factors. The fourth section presents a review of the overlap of SI leader responsibilities with ELT and transformational leadership.

Supplemental Instruction

SI is an academic support program developed in 1973 by Deanna Martin at the University of Missouri, Kansas City (Arendale, 1997). The program is implemented in higher education institutions and utilizes currently enrolled students to facilitate group study sessions for select courses. The creation of the program was an effort to improve on traditional one-on-one peer tutoring, which labels students as at high risk (Martin & Arendale, 1993). Instead of labeling the student, the SI program identifies and targets high-risk courses (Blanc et al., 1983; Martin et al., 1992), that is, entry-level courses in which at least 30% of the students commonly receive a grade of D or F or withdraw from the course (Blanc et al., 1983). These courses are traditionally thought to be difficult, to demand higher levels of learning, to require large amounts of difficult reading, and to offer little opportunity for interaction with the instructor (Arendale, 1994).

Once a course has been identified as high risk, a student, known as the SI leader, is assigned to the course. The SI leader facilitates group study sessions to help students to learn and apply effective study strategies to achieve the higher levels of learning that

are required at the collegiate level (Hurley et al., 2006). “SI is an important mechanism for introducing students to the learning process, engaging them in collaborative learning activities, and providing a collegial environment that increases motivation to engage in learning” (McGuire, 2006, p. 4).

SI was also designed to provide a proactive approach to academic assistance. Unlike traditional tutoring in which students receive assistance after they have already fallen behind with the material, students enrolled in a course with SI are made aware of and encouraged to attend group study sessions from the first week of classes (Arendale, 1994). The group study sessions are open to all students who are enrolled in the course, and attendance is voluntary (Arendale, 1994; Blanc et al., 1983). SI sessions are held three or four times a week, each lasting 50 minutes (Blanc et al., 1983). During the sessions, the SI leader helps participants to learn effective strategies to succeed in the course (Blanc et al., 1983; Hurley et al., 2006).

The knowledge that participants gain is intended to be transferable to courses that do not have SI (Hurley et al., 2006). In other words, students who participate in SI sessions and adopt the strategies should develop into independent learners capable of taking responsibility for their own learning. Etter et al. (2000) found this to be true and reported students in their study formed their own study groups when SI was not available.

The SI Leader

The SI leader is one of the three key personnel of the SI program (Martin et al., 1992). The leader is a currently enrolled college student who has excelled in the

identified high-risk course (Martin & Arendale, 1994). The student leader is are typically similar in age and experiences to the students enrolled in the high-risk course.

To be hired as an SI leader, a student must meet the following minimum requirements: (a) at least a 3.0 grade point average (GPA) on a 4.0 scale, (b) demonstrated interpersonal communication skills, (c) a recorded A or B in the targeted course, and (d) availability to attend training (Congos, 2001; PAS, 2014). In addition, the SI leader must be available to attend the class lectures of the targeted class, take notes, and do the homework and readings (Congos, 1998). Doing so allows the leader to be aware of what concepts were presented in class and how those concepts were presented, which is useful in planning sessions (Etter et al., 2000). This requirement allows the leader to interact with the students in the course and to encourage them to attend SI sessions (Hurley et al., 2006).

Before being allowed to facilitate a group study session, the SI leader must attend training provided by the program's supervisor, who is also one of the key personnel for SI (Hurley et al., 2006). During this training, the leader is given information on learning strategies, facilitation methods, and techniques to engage students with each other and with the material (Martin et el., 1992). The leader uses this knowledge and previous experience with the course to plan the study sessions. The plan serves as a guide to give the session structure; it should include specific objectives based on key concepts from class lecture, the content that will be covered, and learning strategies that will be used (Arendale, 1997; Hurley et al., 2006). Hurley et al. (2006) identified some of the learning strategies used by SI leaders in the sessions. First, the SI leader breaks complex

tasks into parts that students can understand. The leader can help participants to organize and integrate new information and help students to relate prior knowledge to the new information. Finally, participants are encouraged to think critically about concepts.

In following these guidelines, the SI leader is not re-lecturing the material from class; rather, the leader incorporates strategies that help participants with *how* to learn, as well as *what* to learn (Arendale, 1997; Martin et al., 1992). During the sessions, the SI leader may share and model strategies that made the leader successful in the course; more important, the leader should provide an environment that engages students with the material, with other participants, and with their own learning (Arendale, 1994; Hurley et al., 2006).

SI leaders are charged not only with providing an opportunity for learning but also with providing an environment that allows for social and academic integration (Martin et al., 1992). The SI leader is crucial in ensuring that students who attend the sessions consider themselves to be a part of a group bonded by a common purpose and concern (Martin et al., 1992). The SI leader must ensure that the environment is one in which students feel comfortable to ask questions, voice opinions, and work with other participants (Hurley et al., 2006).

Literature concerning SI leaders beyond the responsibilities of their role within the program is generally limited to what the leaders gain during their time in the position. It has been reported that they gain increased understanding of course material, effective study skills, and diverse approaches to learning (Hurley et al., 2006; Lockie & Van Lanen, 2008). In addition, many authors have asserted that leadership skills are

gained and improved (Congos & Stout, 2003; Etter et al., 2000; Lockie & Van Lanen, 2008; Stout & McDaniel, 2006; Zaritsky & Toce, 2006).

In a study by Zaritsky and Toce (2006), 98% of SI leaders indicated that the position had strengthened their leadership and communication skills. Congos and Stout (2003) found that serving as a SI leader "provides excellent experience in developing and refining the elements that make good leaders" (p. 38). Etter et al. (2000) found that SI leaders reported developing and improving their leadership skills through SI training and facilitating sessions. Stout and McDaniel (2006) reported that SI leaders gained valuable opportunities to facilitate sessions comprised of students with diverse backgrounds and thus increased their cultural competency. They also reported improved communication and interpersonal and leadership skills. However, these authors failed to include literature on the complexity of leadership.

Skalicky and Caney (2010) conducted a qualitative study to examine what SI leaders (called PASS at their institution) considered to be the leadership aspects of their role. The most frequently reported aspects were organization (session planning), facilitation (questioning and value of self-directed learning), communication (clarity and confidence), and attitude (managing expectations, respect and enthusiasm). The authors contended that there is not a universal definition or theory of leadership.

One scholar went beyond what the SI leader learns and examined how the leader's learning style influenced the program. In a small qualitative study of 20 SI leaders, Adams (2011) found that SI session designs exhibited characteristics of the SI leader's learning style as measured and defined by D. A. Kolb's LSI. Multiple

participants in the study reported designing sessions based on what seemed natural to their own learning needs. This is supported by the assertion that most instructors teach based on their own learning style preference (Hawk & Shah, 2007; Marshall, 1991; Wolfe et al., 2005).

Impact of Attending SI Sessions

Attendance at SI sessions is open to any student enrolled in the target course and is voluntary (Arendale, 1997). Substantial research spanning various course subjects has shown that students who attended at least one SI session had higher course performance than those who did not attend (Arendale, 1997; Blanc et al., 1983; Blanc & Martin, 1994; Congos & Schoeps, 1993; Hensen & Shelley, 2003; Kochenour et al., 1997). Further, there is evidence that attending SI sessions on a regular basis has a greater impact on course performance (Arendale, 1997; Kochenour et al., 1997; McGuire, 2006). Data reported by PAS at TAMU spanning 10 semesters support this claim (PAS, 2006-2011). In addition, the U.S. Department of Education has validated the following claims of the effectiveness of attending SI (Arendale, 1997, p. 4):

> Claim 1: Students participating in SI within the targeted historically difficult courses earn higher mean final course grades than students who do not participate in SI. This is still true when differences are analyzed, despite ethnicity and prior academic achievement.
>
> Claim 2: Despite ethnicity and prior academic achievement, students participating in SI within targeted historically difficult courses succeed at a

higher rate (withdrawal at a lower rate and receive a lower percentage of D or F final course grades) than those who do not participate in SI.

Claim 3: Students participating in SI persist at the institution (reenrolling and graduating) at higher rates than students who do not participate in SI.

Students who are enrolled in a course with SI are made aware of the program and its effectiveness on the first day of class (Arendale, 1994). This information is provided in a speech by the SI leader. Because it is clear that attendance at SI session is beneficial, marketing strategies by program personnel are ongoing, including writing the session times on the board before each class, providing students with data that compare grades of attendees and nonattendees, advertising concepts that will be covered in the SI sessions, and providing information about SI sessions to academic advisors (Hurley et al., 2006). SI leaders are also instructed to sit in different locations during each class period and interact with nearby students to encourage them to attend the SI sessions.

Even with an awareness of its demonstrated effectiveness and the ongoing marketing strategies, many students choose not to attend SI sessions (McGuire, 2006). To understand this, researchers have investigated characteristics of students who attend SI sessions (McGee, 2005; Visor et al., 1992; Warren, 1997). However, with the exception of Adams's (2001) research on learning styles and session design, literature investigating the SI leader's characteristics cannot be found.

Experiential Learning Theory

Student learning in higher education is a complex structure that has undergone much research. No two students are alike as they enter college. They vary

demographically by gender, ethnicity, socioeconomic status, and race. They also enter college with different motivations, problem-solving abilities, and learning preferences (Felder & Brent, 2005). Scholars have acknowledged the importance of understanding the impact of individual learning preferences and have developed instruments to identify those preferences (Cassidy, 2004). When an individual is aware of unique learning preferences, strategies can be identified and applied to improve learning effectiveness and optimize outcomes (Heffler, 2001; Kolb, A. Y., & Kolb, 2009).

One approach to learning and the identification of preferences that has been the focus of plentiful research is D. A. Kolb's (1984) ELT, a theory that "has been widely accepted as a useful framework for learning-centered educational innovation, including instructional design, curriculum development, and life-long learning" (Kolb, A. Y., & Kolb, 2005a, p. 21). ELT is derived from models of experiential learning defined by Piaget, Lewin, and Dewey. D. A. Kolb (1984) suggested six propositions shared by the three scholars that characterize experiential learning (Kolb, A. Y., & Kolb, 2005b, p. 194):

> Learning is best conceived as a process, not in terms of outcomes. To improve learning in higher education, the primary focus should be on engaging students in a process that best enhances their learning—a process that includes feedback on the effectiveness of their learning efforts.
>
> All learning is relearning. Learning is best facilitated by a process that draws out the student's beliefs and ideas about a topic so they can be examined, tested, and integrated with new, more refined, ideas.

Learning requires the resolution of conflicts between dialectically opposed modes of adaptation to the world. Conflict, differences, and disagreement are what drive the learning process. In the process of learning one is called upon to move back and forth between opposing modes of reflection and action and feeling and thinking.

Learning is a holistic process of adaptation to the world. Not just the result of cognition, learning involves the integrated functioning of the total person– thinking, feeling, perceiving, and behaving.

Learning results from the synergetic transactions between the person and the environment. In Piaget's terms, learning occurs through equilibration of the dialectic processes of assimilating new experiences into existing concepts and accommodating existing concepts to new experiences.

Learning is the process of creating knowledge. ELT proposes a constructivist theory of learning whereby social knowledge is created and recreated in the personal knowledge of the learner.

Building on the work of these scholars, D. A. Kolb (1984) developed a model (Figure 1) of the learning cycle with four stages, or learning modes, that emphasize the importance of previous knowledge and active engagement in the learning situation. The four modes—concrete experience (CE), reflective observation (RO), abstract conceptualization (AC), and active experimentation (AE)—form a cycle of grasping and transforming knowledge (Kolb, A. Y., & Kolb, 2009). CE and AC involve grasping knowledge and RO and AE involve transforming knowledge. The four stages are said to

be fully encompassing of the learning process, and individuals can prefer one mode of the cycle over others (Kolb, D. A., 1984).

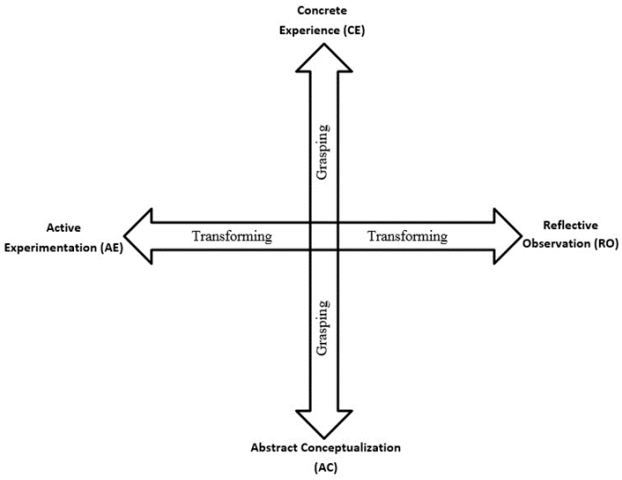

Figure 1. Kolb's experiential learning theory model. Kolb, David A., EXPERIENTIAL LEARNING: Experience as the Source of Learning and Development, (c) 1984, p.42. Reprinted by permission of Pearson Education Inc., Upper Saddle River, New Jersey.

Persons who have a preference for CE enjoy being personally involved in situations when grasping knowledge. They are intuitive in their decision making and problem solving and prefer feeling over thinking. They value relating to people and emphasize current realities over theories. They are open minded and tend not to use a scientific approach to problems (Kolb, D. A., 1984).

Persons with an orientation toward RO prefer to observe a situation carefully and reflect on it without taking action when transforming knowledge. They are neutral in their descriptions and can appreciate differing approaches and solutions to the problem.

They are more concerned with understanding what is true rather than with practical application and action (Kolb, D. A., 1984).

Persons with an orientation toward AC emphasize thinking and building theories rather than feeling and intuitive discovery when grasping knowledge. They prefer the scientific method and value precision. They are generally good at quantitative analysis and systematic planning (Kolb, D. A., 1984).

Persons with a preference for the AE mode of transforming knowledge prefer to be actively involved in influencing and changing situations. They are concerned with results, and therefore want to focus on what works and put it into action. They enjoy getting things done and are willing to take risks to achieve their goals (Kolb, D. A., 1984).

In this four-stage approach to learning, "immediate concrete experience is the basis for observation and reflection" (Kolb, D. A., 1981, p. 235). The learner then uses this observation to construct an idea or theory "from which new implications for action can be deduced" (p. 235). These implications are then put into action to create new experiences. Learners should utilize all four modes to be effective. They should involve themselves in new experiences with an open mind and then reflect on that experience from a neutral standpoint. They then should form logical theories that they can use to solve problems or make decisions (Kolb, D. A., 1981).

Learning Styles

As a result of hereditary factors, past experiences, and present environment, people develop preferences about how they prefer to grasp and transform knowledge

(Kolb, D. A., 1981, 1984), known as learning styles. D. A. Kolb (1984) identified four learning styles based on his ELT: converging, diverging, assimilating, and accommodating (Figure 2). The four styles are identified by assessing a person's preference for modes in the experiential learning cycle (Kolb, A. Y., & Kolb, 2005b).

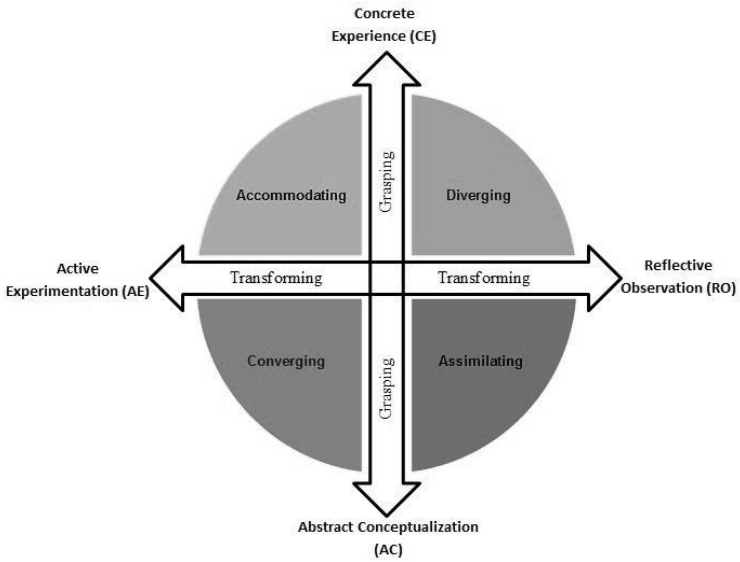

Figure 2. Kolb's experiential learning theory model with learning styles. Kolb, David A., EXPERIENTIAL LEARNING: Experience as the Source of Learning and Development, (c) 1984, p.42. Reprinted by permission of Pearson Education Inc., Upper Saddle River, New Jersey.

People with a converging learning style have a stronger preference for AE and AC in their learning. They have strong problem-solving and decision-making abilities. They are best at practical application of ideas. They prefer to deal with technical tasks rather than interpersonal issues. In formal learning situations, they prefer experimenting with new ideas (Kolb, A. Y., & Kolb, 2005b; Kolb, D. A., 1984).

People with a diverging style emphasize CE and RO, the opposite of converging. They excel at brainstorming and creating new ideas and implications. They are oriented

toward feelings and are able to view situations from many perspectives. They prefer to work in groups to gather information and they desire individualized feedback (Kolb, A. Y., & Kolb, 2005b; Kolb, D. A., 1984).

People with an assimilating style are dominant in AC and RO. Their strengths lie in taking a wide range of information and putting it into logical form. They are concerned with the creation of theories that are logical rather than practical. They are more focused on ideas and concepts than on people. In formal learning situations, they prefer readings and lectures and having time to think things through (Kolb, A. Y., & Kolb, 2005b; Kolb, D. A., 1984).

The fourth style identified by D. A. Kolb (1984), accommodating, is dominant in CE and AE. People with this style have strengths in completing tasks and getting involved in new and challenging experiences. They rely on intuition more than on logical analysis and they prefer information from people rather than technical analysis when solving problems. They prefer learning situations in which they can set goals, work with others, and test various approaches to task completion (Kolb, A. Y., & Kolb, 2005b; Kolb, D. A., 1984).

Measurement of Kolb's Learning Styles and Modes

To help people to understand their unique approach to the process of learning from experience, D. A. Kolb developed the LSI (Kolb, A. Y., & Kolb, 2005b). The creation of the instrument was guided by four objectives (Kolb, D. A., 1984). First, the construct of the test parallels how individuals would respond in a learning situation. Second, it utilizes a self-description format because formation of stable patterns between

a person and his/her environment relies heavily on conscious choice and decision. Third, the LSI was constructed in such a way that the results would predict behavior consistent with ELT. Fourth, the instrument is useable not only in research but also in the assessment and education of learning styles at an individualized level (Kolb, D. A., 1984).

Since its creation in 1969, the LSI has been used in hundreds of published research studies inclusive of thousands of participants (Kolb, A. Y., & Kolb, 2005b). As a result of those studies, the instrument has been revised and improved. The initial inventory, the LSI 1, consisted of nine items that asked participants to rank four words in a way that best described how they learn. The four words corresponded with the four learning modes of ELT: CE, RO, AC, and AE (Kolb, A. Y., & Kolb, 2005b; Kolb, D. A., 1984). The words used in the inventory originated from a longer list developed by four behavioral scientists familiar with experiential learning (Kolb, A. Y., & Kolb, 2005b). The longer list was presented to 20 graduate students to rate for social desirability. Based on those ratings, 12 items were chosen, but 3 items were removed because they produced too much random response (Kolb, A. Y., & Kolb, 2005b).

The instrument was developed as an experiential education exercise, but from 1971 through 1985 the original version was used in more than 350 published research studies (Kolb, A. Y., & Kolb, 2005b). In 1985 the instrument was revised to improve low reliability coefficients and address other concerns (Kolb, A. Y., & Kolb, 2005b). First, three items from the LSI 1 were removed after item-whole correlation analysis was performed. The format was revised, and the LSI 2 resulted in a format that asked

participants to rank the endings of four sentences instead of ranking four words. The sentence endings represented the four learning modes. Six new items were added to with this revision, resulting in 12 scored items (Kolb, A. Y., & Kolb, 2005b).

The 12 items have remained unchanged since the LSI 2. However, to improve test-retest reliability, sentence endings were randomized for the LSI 3 version, which was adopted in 1999. The current version of the inventory, the LSI 3.1, includes the same structure as the LSI 3 but includes normative data from 6,977 users. The normative group is 50.4% women and 49.4% men ranging from 17 to 75 years in age, with various educational levels. The sample includes college students and working professionals in various fields and disciplines. The normative data are used to define cut points for the learning styles (Kolb, A. Y., & Kolb, 2005b).

The forced-choice ranking format was chosen to provide a process similar to that of the learning process. ELT claims that learning involves resolving creative tension among the four interdependent learning modes: AC, CE, AE, and RO. The requirement to choose and rank sentence endings requires a similar process (Kolb, A. Y., & Kolb, 2005b). Styles are defined by a preference toward the resolution of those conflicts.

Once an individual completes the survey, the score for each learning mode is used to determine preferences for grasping and transforming information and thus a learning style. Scores for each mode can range from 12 to 48, with a higher score indicating more preference for that learning mode. To identify an individual's preference for grasping information, the CE score is subtracted from the AC score (AC-CE). A higher score indicates more preference for grasping information in an abstract manner.

Preference for transforming information is identified by subtracting the RO score from the AE score (AE-RO). A higher score indicates more preference for transforming information in an active manner.

These scores are then used to identify the learning style preference based on D. A. Kolb's (1984) ELT: diverging, assimilating, converging, or accommodating. To determine the learning style, the AC-CE and AE-RO scores are plotted on the Learning Style Type Grid provided by the instrument publisher, Hay Group. The AC-CE score is plotted along the vertical axis (the grasping information continuum) and the AE-RO score is plotted along the horizontal axis (the transforming continuum; Kolb, A. Y., & Kolb, 2005b).

The instrument is not intended for purposes of selection or placement. Instead, it was developed to provide a language that can be used to assist learner in identifying the most effective learning environments for themselves and others with whom they are involved. A booklet containing information on how to interpret and apply the styles to the learning process is included with the LSI 3.1 (Kolb, A. Y., & Kolb, 2005b).

Demographics and Kolb's Learning Styles and Modes

Research utilizing the LSI has been plentiful and has revealed contradicting results for the relationships in learning styles, learning modes, and demographic characteristics, further emphasizing the diversity of individuals. Although demographic relationships reveal inconsistencies, researchers have agreed that an awareness of learning styles is an effective tool for both instructors and students when approaching

tasks, learning, and problem solving (Demirbas & Demirkan, 2007; Healey, Kneale, & Bradbeer, 2005; Wolfe et al., 2005).

Gender. Gender and its relationship to learning is perhaps the most reported demographic characteristic in research using the LSI. In their technical manual, A. Y. Kolb and Kolb (2005b) reported significant gender differences for preference for grasping information (AC-CE). From the normative data from the LSI 1 and LSI 2, males reported more preference for grasping information by abstract methods than did females. The LSI 3.1 normative sample revealed the same results, as well as a significant difference for preference for transforming information (AE-RO). It was reported that females were more active and males were more reflective in transforming information. However, A. Y. Kolb and Kolb (2005b) cautioned that gender difference could be a result of an interaction of more than one variable.

Consistent with the normative samples, Heffler (2001) found a significant difference in gender and preference for grasping information (AC-CE) when administering the LSI 1 to 85 college students. Males in that study reported a higher mean for AC-CE, indicating that they preferred abstract methods more than did females in the study. Heffler also found that females had significantly higher scores than males for the CE learning mode.

Wolfe et al. (2005) concluded that males were significantly more likely to prefer more AC and AE, a converging style, than were females. They used the LSI-Semantic Differential to collect data from 531 college students.

When considering the four learning styles, Peters (2012) reported a significant difference between male and female students completing the LSI 3.1 regarding learning style preferences. The difference was found in the accommodating style consisting of 70% females and 30% males. In a study by Philbin, Meier, Huffman, and Boverie (1995) of 45 females and 25 males, a significant difference was found in learning style preferences using the LSI 2. It was reported that the assimilator style was most preferred by males and least preferred by females.

Demirbas and Demirkan (2007) did not find a significant difference in learning styles in a 3-year sample of 140 female and 133 male freshmen students in an architecture and design department. Healey et al. (2005) did not find a significant difference in learning styles by gender in a study of more than 900 students. In a study administering the LSI to 58 female and 47 male students at a Midwestern community college, Jones, Reichard, and Mokhtari (2003) did not find significant differences by gender for any of the learning modes.

Ethnicity. In an investigation of learning styles using the LSI with 108 students attending SI sessions, Warren (1997) reported that two thirds of students with an accommodating style were White. Participants with a diverging or converging learning style were almost equally divided between White and non-White. White participants represented the majority, 83.33%, of the converging learners.

Peters (2012) did not find a significant difference in ethnicity and learning styles but noted that no Black students scored in the diverging learning style. Further analysis showed the relationship between learning styles and race/ethnicity by gender to be

statistically significant. A significant difference was found for the accommodating style between White males and females, with more White females preferring the accommodating learning style.

Academic discipline. The relationship between academic discipline and learning style has been investigated since the initial use of the LSI. When D. A. Kolb (1981) surveyed 800 management professionals and graduate students, he found that undergraduate education shaped learning styles preferences. When grouping academic disciplines into four fields—social professions, science-based professions, natural science and mathematics, and humanities and social science—Kolb associated each with a learning style. Social professions such as education were classified as having the accommodating learning style, science-based professions such as medicine and engineering were classified with the converging learning style, natural science and mathematics were classified with the assimilating learning style, and humanities and social sciences were classified with the diverging learning style (Kolb, A. Y., & Kolb, 2005b; Kolb, D. A., 1981).

Since then, it has been noted that preferences classified by a chosen field of study should be considered carefully because there can be interaction between variables. It should also be noted that education institutions themselves can vary on delivery methods and curricular models, providing different methods for the same discipline per university (Kolb, A. Y., & Kolb, 2005b). Teaching strategies that are not a typical representation of the discipline could be utilized. Also, it should be taken into consideration that some

academic fields are multidisciplinary and those disciplines could emphasize different learning styles (Kolb, D. A., 1981).

Jones et al. (2003) distributed the LSI IIa instrument four times to 105 students at a community college. Each instrument was altered slightly to reflect subject-specific learning for English, social studies, science, and mathematics. For example, "When I learn" was changed to "When I learn English" (p. 367). They found significant differences in learning mode across subject areas: Students were most likely to prefer AE in science and least likely to prefer it in English and social studies.

In a study of 900 geography students across four countries, Healey et al. (2005) reported that an assimilator style was preferred by 45% of the students and was significantly different from the other learning styles. This is consistent with D. A. Kolb's (1984) placement of geography. Hargrove, Wheatland, Ding, and Brown (2008) revealed in their study of 232 freshmen engineering students that an assimilator style was the most preferred, with 44.40% of students reporting this preference. This is consistent with the results reported for the LSI 3.1 online user norm sample.

Age. In their assessment of external validity, A. Y. Kolb and Kolb (2005b) found that a preference for AC over CE increased with age, as indicated by the LSI 3.1 and LSI 1. Preference for AE increased through middle age; however, people showed a preference for RO later in life (Kolb, A. Y., & Kolb, 2005b).

The results of a study of more than 900 geography students by Healey et al. (2005) revealed evidence for more preference for diverging and accommodating styles by participants over the age of 21 compared to younger students. Contradicting this,

Heffler (2001) did not find a significant difference in learning modes derived by the LSI and age in his study of 85 students at Stockholm University ranging in age from 19 to 37 years. Similarly, Wolfe et al. (2005) did not find in learning style by age among students 18 to 25 and those who were older.

In a meta-analysis of 19 studies using the LSI, Severiens and Ten Dam (1994) found that older men were significantly more likely than older women to prefer AC. Also, younger women in the college environment reported higher scores for AC than did younger men.

Academic performance. Jones et al. (2003) reported that participants in their study with an assimilating learning style had the highest GPA, significantly higher than those with a diverging or accommodating learning style. Also, converging learners had significantly higher GPAs than participants with an accommodating learning style. This is consistent with assertions that the assimilating style fits most traditional education in its lecture approach to teaching (Jones et al., 2003; Philbin et al., 1995).

However, using a survey based on the LSI, Wolfe et al. (2005) found that persons with a converging style had the highest GPA. They concluded that it was a result of the characteristics of higher education faculty encouraging application of concepts in an abstract manner. Participants were students from one department that included apparel and textiles, interior design, facility management, and hospitality and tourism management. Demirbas and Demirkan (2007) also found that converging learners had higher performance scores in a basic design course. They asserted that design is

considered a problem-solving activity, which coincides with the characteristics of the converging style.

In a study of 252 community college students enrolled in various general education courses, Peters (2012) reported that students with a converging learning style had the highest average GPA. However, no statistical significance was found between learning style and GPA.

Hargrove et al. (2008) reported a significant difference in learning style and GPA in their study of 232 freshmen engineering students. The GPA of accommodating learners was higher than that of diverging learners. Also, assimilating learners had a higher GPA than did diverging learners. They reported differences in gender, GPA, and learning styles. Females with an accommodating learning style performed better than their female counterparts who preferred the other three learning styles, but no significant difference was found. However, males with a converging style had significantly higher GPAs than males with a diverging learning style.

The Full Range of Leadership

Leadership is a complex concept that has been approached, conceptualized, described, and defined in many ways. One definition, which encompasses concepts central to this study is that "leadership is a process whereby an individual influences a group of individuals to achieve a common goal" (Northouse, 2007, p. 3). This process is an interactive event between the leader and the follower(s) and can be approached in various ways (Northouse, 2007). In early years, Burns (1978) asserted that this interaction takes two independent forms: transactional leadership and transforming

leadership. Transactional leadership was said to have occurred when there was an exchange of valued things without a purpose that connected the leader and follower (Burns, 1978). An example of this is a teacher giving a student a grade for completed work (Northouse, 2007). In contrast, Burns (1978) said that transforming leadership occurred when people engaged with each other in such a way that they were bound together and higher levels of motivation were achieved.

Expanding on Burns's work, Bass (1985) proposed that transformational and transactional leadership occurred along a continuum and were not independent of each other. He identified the two as conceptually distinct but asserted that behaviors associated with them could be displayed by the same person, just in different intensities (Bass, 1985). This full range of leadership model was developed to explain leadership behaviors. The model identifies factors that help to identify transformational and transactional leadership, and the current model includes a third component: passive/avoidant leadership (Avolio & Bass, 2004).

Passive/Avoidant Leadership

Passive/avoidant leadership was originally labeled as *laissez-faire leadership* (Bass, 1985). Laissez-faire leaders do not exhibit leadership behaviors, they make no effort toward transactional or transformational behaviors, they do not set goals or attempt to satisfy needs, and they make little contact with employees (Northouse, 2007).

The new full range of leadership model categorizes laissez-faire as one of the two factors associated with passive/avoidant leadership style. The second factor, management-by-exception (passive), emerged through quantitative measurement of

behaviors displayed in the full range of leadership. Leaders displaying management-by-exception (passive) behaviors wait for problems to arise before taking corrective action in the form of job loss, reprimands, or information regarding what needs to be corrected. Laissez-faire leadership is defined as the absence of leadership. Decisions are avoided, the leader is absent when needed, and there is a delay responding to important issues (Avolio & Bass, 2004).

Transactional Leadership

A transactional approach to leadership involves exchanges between the leader and group members. In interactions with followers, a transactional leader exchanges rewards for effort and is more concerned with processes than with ideas (Bass, 1985). Leaders with this approach use constructive and corrective behaviors to attain goals. Two factors are associated with transactional leadership: contingent reward and management-by-exception (active; Avolio & Bass, 2004).

Contingent reward is a constructive transaction and is demonstrated when a leader rewards a member for his or her effort. This reward can come in the form of a promotion, raise, or recognition. The outline of task or goal is agreed on in advance and rewards are given only if the agreement is met (Avolio & Bass, 2004).

Management-by-exception (active) is a corrective transaction and is displayed when a leader intervenes to give negative reinforcement or corrective criticism. Active management-by-exception is demonstrated when a leader proactively seeks to identify mistakes made by members. The leader watches the members closely and seeks immediate correction (Avolio & Bass, 2004).

Transformational Leadership

The third approach, transformational leadership, is said to be the most effective approach to leadership (Avolio & Bass, 2004). A meta-analysis by Lowe, Kroeck, and Sivasubramaniam (1996) revealed stronger associations between transformational leadership and unit effectiveness than between transactional leadership and unit effectiveness. A leader with a transformational approach to the leadership process goes beyond an interaction that is based on identifying rewards and punishments related to goal attainment. Transformational leaders act as role models, provide motivation, and instill confidence toward performance (Bass, 1985). Motivation to go above and beyond what is expected is achieved by any one of the following interrelated ways (Bass, 1985, p. 20):

> 1. By raising our level of awareness, our level of consciousness about the importance and value of designated outcomes, and ways of reaching them.
> 2. By getting us to transcend out our own self-interest for the sake of the team, or larger polity.
> 3. By altering our need level on Maslow's (or Alderfer's) hierarchy or expanding our portfolio of needs and wants.

The most recent full range of leadership model identifies five factors inclusive of transformational leadership: idealized influence (attributed), idealized influence (behavior), inspirational motivation, intellectual stimulation, and individualized consideration.

A transformational leader who possesses idealized influence has followers who idealize the leader and wants to emulate the leader. Followers have a great deal of trust for the leader and see the leader as a role model. The trust by the followers gives the leader powerful influence; however, the transformational leader refrains from abusing this power and instead inspires followers to develop autonomy. Leaders with idealized influence help others to achieve their full potential, to contribute fully, and to modify goals (Avolio & Bass, 2004; Northouse, 2007).

The attributes associated with idealized influence are displaying confidence, acting in a way that fosters respect from others, and putting the group's interest before self. Idealized influence behaviors emphasize the importance of a collective mission, specify importance of strong sense of purpose, and consider moral and ethical consequences of decisions (Avolio & Bass, 2004).

Inspirational motivation is demonstrated by leaders when they provide a clear understanding of shared goals. The leaders' expectations are typically high; however, they provide visions of what is possible and promote the importance of their role within the team. They exhibit enthusiasm, optimism, and confidence in what is to be accomplished (Avolio & Bass, 2004; Northouse, 2007).

A leader who utilizes intellectual stimulation encourages group members to challenge their ideas and beliefs. The leader also encourages members to think of problems in new and creative ways and even question assumptions of the leader if appropriate. This allows for innovation in solving current problems and innovation in creating methods to accomplish goals (Avolio & Bass, 2004; Northouse, 2007).

Individualized consideration is displayed when a transformational leader listens to the individual needs and concerns of the group members. Each individual is treated uniquely, and the leader strives to create a climate that supports individual growth. The leader tries to elevate the needs and concerns of each group member so the member's full potential can be reached (Avolio & Bass, 2004; Northouse, 2007).

Measurement of Leadership Styles and Scales

In an effort to measure and identify transformational, transactional, and passive/avoidant styles quantitatively, Bass developed the Multifactor Leadership Questionnaire (MLQ). The questionnaire has been used in numerous studies across the globe and is the most widely used measurement of transformational leadership (Avolio & Bass, 2004; Northouse, 2007). The questionnaire can be used for research, selection, training, and development purposes (Avolio & Bass, 2004). The MLQ 5X contains 45 statements that assess perceptions of frequency of leadership behaviors associated with transformational, transactional, and passive/avoidant leadership. Scores from the MLQ can help to account for the impact of each type of leader on the organization (Avolio & Bass, 2004).

The MLQ 5X has two forms: rater and leader. The MLQ 5X rater form is administered to followers, peers, or supervisors to rate the frequency of leadership behaviors associated with transformational, transactional, and passive/avoidant leadership that is observed in the identified leader. The MLQ 5X leader form asks the leader to rate the frequency with which the leader engages in the specified leadership behaviors (Avolio & Bass, 2004). Statements on both forms are the same, with the

exception of the first part of the statement. The rater form statements begin with "the person I am rating" and the leader form begins with "I."

To develop the instrument, Bass created 142 statements based on a review of the literature addressing transformational and transactional leadership and responses to open-ended interviews by 70 male senior industrial executives. These 142 statements were presented to 11 MBA and graduate social science students for placement in one of three categories: *transformational, transactional*, or *can't say*. The set was reduced to 73 items by keeping transformational items that were selected by at least 8 of the students and keeping transactional items that were selected by at least 9 of the students (Avolio & Bass, 2004).

Through factor analysis of results from initial studies administering the MLQ, five factors were identified to describe transformational and transactional leadership: charisma, intellectual stimulation, individualized consideration, contingent reward, and management-by-exception (Avolio & Bass, 2004). However, the questionnaire has been revised to address criticisms. The current form measures and identifies nine factors relevant to transformational, transactional, and passive/avoidant leadership.

Five of the factors are associated with and used to identify a preference for transformational leadership style: idealized influence (attributed), idealized influence (behavior), inspirational motivation, intellectual stimulation, and individual consideration. Two of the factors are associated with and used to measure transactional leadership: contingent reward and management-by-exception (active). The final two

factors are representative of passive-avoidant leaders: management-by-exception (passive) and laissez-faire (Avolio & Bass, 2004).

Demographics and Leadership Style

Through measurement of transformational, transactional, and passive/ avoidant leadership, relationships between demographics and leadership have emerged. As with learning style, results from the studies reveal both significant relationships and lack of relationships.

Gender. One variable that has received a great deal of attention in research conducted on leadership style is gender. Results indicating and denying gender as a correlate to leadership styles have been reported. These differences exist in both the self-rating of leadership behavior and ratings by followers or subordinates.

In a meta-analysis, Eagly, Johannesen-Schmidt, and van Engen (2003) found significant differences in transformational and transactional leadership behaviors of men and women. Females scored significantly higher than males on idealized influence (attributed), inspirational motivation, intellectual stimulation, and individualized consideration. Females also scored higher on contingent reward. Males scored significantly higher on management by exception (passive and active) attributes and the laissez-faire style.

In a study of 74 hall directors employed at one of seven public universities, Komives (1991) found that men and women were similar in their leadership styles as measured by the MLQ self-rater form on all but one subscale: intellectual stimulation. Men scored significantly higher than women on this subscale.

In a study of 47 cooperative extension service leaders, Moore (2003) reported that females had a higher mean score than males for the three leadership styles and eight of the nine leadership scales identified by the MLQ. Management-by-exception (active) was the only scale on which males scored higher than females. However, the only scale with significant difference by gender was idealized influence (attributed).

Carless (1998) found, in a study of 345 branch managers at a large international bank in Australia, that females rated themselves significantly higher than did males on the individualized consideration scale of transformational leadership as measured by the MLQ. Their mean scores were also shown to be higher (but not significantly) than scores by males for charisma and intellectual stimulation. However, when results from 588 of their subordinates were examined, no significant differences were found by gender on the three scales associated with transformational leadership reported in the study. Also utilizing the MLQ rater form, Maher (1997) asked 262 undergraduate students to rate a current or former manager. No significant differences were found in leadership style for the 163 male and 99 female supervisors who were rated.

In an effort to analyze the differences in research outcomes, researchers have begun to include the influence of additional variables on these contradictions (Barbuto, Fritz, Matkin, & Marx, 2007; van Engen & Willemsen, 2004). Barbuto et al. found that gender alone did not affect transformational or transactional leadership style; however, when correlated with level of education, significant differences were found in the high school education level, where males had significantly higher mean scores for transformational leadership.

A meta-analysis of gender and leadership style by van Engen and Willemsen (2004) sought to incorporate additional characteristics that could explain the contradictions in the literature. In their analysis they found that the type of organization influenced gender difference outcomes in leadership style, with the finding of females being more transformational than males was stronger in business than in educational settings. In educational settings, male leaders were generally more transactional.

Ethnicity. One variable that has received little attention in leadership style research is ethnicity. Results related to this variable have revealed differences that were not statistically significant. In her assessment of 47 cooperative extension service leaders, Moore (2003) found no significant differences in leadership styles or leadership scales for White and Black participants completing the MLQ self-rater form. White participants had higher mean scores for all scales except contingent reward and laissez-faire leadership, but the differences were not significant.

In an analysis of 138 urban school principals, Marin (2013) reported that White participants scored higher than Latino, African American, or Asian participants on transformational leadership practices measured by the MLQ, but the differences were not statistically significant. Similar to this, in a study of 610 Corps of Cadet students at TAMU rating their unit leaders, White leaders were rated higher on transformational leadership than Hispanic, African American, Asian, Pacific Islander, American Indian, or Alaskan Native leaders, but the differences were not significant. No difference was found between dichotomous White and non-White leaders (Ekeland, 2005).

Age. Age has received little attention in leadership style research. Reported studies have involved people age 29 and above. The influence of this variable has shown contradictory results. Barbuto et al. (2007) found that age was significantly associated with leadership style on the MLQ rater form. Leaders above age 46 were rated as having a more transformational style, with significantly higher scores for the scales idealized influence, intellectual stimulation, and individualized consideration. The lowest scores were reported in the 36-45 age group for intellectual stimulation and individualized consideration.

Moore (2003) did not find a significant association between age and leadership style on any of the leadership scales for participants ranging from 44 to 66 years old. However, Howell (2013) found that participants over age 40 scored significantly higher for transformational leadership than did those 40 and younger. Contrary to this, Marin (2013) reported that participants who were younger demonstrated significantly higher transformational leadership behaviors as measured by the MLQ. Participants in that study ranged from 29 to 59 years old.

Academic performance. Research addressing academic variables and leadership has received little attention. Ekeland (2005) revealed that student Corps of Cadet unit leaders who were freshmen and seniors in college were rated to have significantly higher transformational leadership style mean scores than sophomore and junior unit leaders. This was the only study found that reported on transformational leadership measured by the MLQ and year in college.

Grandzol, Perlis, and Draina (2010) utilizing the Student Leadership Practices Inventory (LPI)-Self, which is similar to the MLQ 5X self-rater in that both measure frequency of leadership behaviors. The Student LPI-Self is based on work by Kouzes and Posner that has contributed to the understanding of transformational leadership (Northouse, 2007). Grandzol et al. found that leadership behaviors did not differ by year in school. This is consistent with Posner's (2004) study using the LPI-Self, in which no significant association between leadership behaviors and GPA and major was found.

Learning, Leadership, and the SI leader

When reviewed separately, an abundance of literature can be found on ELT and transformational leadership. However, the literature linking the two concepts is sparse. Further, literature exploring the general relationship between leadership and learning is limited. Brown and Posner (2001) considered the relationship as it relates to learning effectiveness and leadership effectiveness by administering the learning tactics inventory (LTI) and the LPI to 312 participants. The LTI measures learning effectiveness and the LPI measures frequency of behaviors related to effective leadership. The results supported that learning is related to leadership in that better learners display more effective leadership behaviors.

An exploration of the literature on the SI program and ELT revealed that they share foundations in constructivism and both propose a framework of a learner-centered approach to education (Kolb, A. Y., & Kolb, 2005a; McGuire, 2006). Proponents of constructivism claim that "students must construct their own knowledge in order to be able to understand and use it" (Martin et al., 1992, p. 43). In D. A. Kolb's six

propositions of ELT he affirmed that learning is best facilitated when the student's ideas are examined and tested and integrated into new, more refined ideas. (Kolb, A. Y., & Kolb, 2005b). The SI leader shows evidence of constructivism when designing sessions that engage attendees with each other and with the material. Through this design, "students are required to examine what they know and understand when they come to the session, and are challenged to build new knowledge in collaboration with their peers" (McGuire, 2006, p. 6).

Revisiting Adams's (2011) study of SI leader learning style as measured by the LSI, characteristics associated with the learning styles were evident in SI session plans. SI leaders in that study with an assimilating style reported engaging in extensive talking and lecturing during their sessions. Participants with a converging style reported incorporating a systematic application of tasks. For example, each part of a concept was explained so students understood it from beginning to end. The diverging learners demonstrated brainstorming and gathering information by creating learning games to get the students involved with each other in small groups. Accommodating learners reported designing sessions that relied heavily on student involvement. These SI leaders developed goals for the students but allowed the attendees to determine how best to achieve the goal.

Research pertaining to leadership by the SI leader is limited to scholars examining what leadership skills are gained or improved while serving as an SI leader and is not grounded in specific leadership theories or models (Congos & Stout, 2003; Lockie & Van Lanen, 2008; Zaritsky & Toce, 2006). When examining the factors

associated with transformational leadership style and the responsibilities of the SI leader, comparisons can be formed. However, there is a lack of research investigating the validity of the comparisons.

Chapter Summary

This chapter reviewed literature relevant to SI, ELT, and transformational leadership. SI is an academic support program implemented with proven effectiveness in higher education institutions. A key element to that effectiveness is the SI leader who leads group study sessions that engage attendees with the material and with each other. When exploring responsibilities of their role, comparisons can be made with ELT and transformational leadership theory.

CHAPTER III

METHODS

The purpose of this study was to explore the demographics, learning styles, and leadership styles of current SI leaders. Learning styles and leadership styles were explored to determine whether there were relationships among the variables. Also, the relationship between learning and leadership styles and recurring attendance at SI sessions was investigated. The study was designed to meet five specific objectives:

1. Explore the relationship between SI leader demographic variables and the leader's learning style.

2. Explore the relationship between SI leader demographic variables and the leader's leadership style.

3. Explore the relationship between learning style and leadership style of the SI leader.

4. Explore the relationship between SI leader learning styles and recurring attendance to SI.

5. Explore the relationship between SI leader leadership styles and recurring attendance to SI.

This chapter explains the methods used to address the purpose of the study and accomplish the objectives. It outlines the research design, population, sample, and data collection and analysis procedures used to meet the objectives.

Design

To accomplish the research objectives, this study employed quantitative research. Survey research was used for data collection. Three online surveys were distributed to one group of participants and relationships among variables associated with learning style and leadership style were investigated and analyzed.

A causal-comparative or ex post facto design was used to meet Objectives 1, 2, 4, and 5, to determine whether a difference in groups existed for variables that the researcher did not manipulate but occurred prior to the research (Fraenkel & Wallen, 2009). Correlational research methods were also used to determine whether relationships existed among continuous variables, as well as the strength of those relationships.

For Objectives 1 and 2, the dependent variables were the scores provided on the MLQ and LSI and the independent variables were participant demographics. For Objective 3, variables from the MLQ and LSI were analyzed to determine whether relationships existed. For Objectives 4 and 5, the dependent variable was average attendance and the independent variables were the scores on the MLQ and LSI.

Descriptive statistics included frequencies, means, and standard deviations for the variables. Data analyses included independent *t* tests, Pearson product-moment correlations, and one-way analyses of variance.

Population and Sample

The target population of this study was the 51 students employed as SI leaders by PAS at TAMU in the fall 2013 semester. These SI leaders were undergraduate students enrolled at TAMU at the time of data collection. To adhere to FERPA regulations, SI

leader participants were recruited by the Program Coordinator for SI for PAS at TAMU. To solicit interest in the study, the Program Coordinator emailed information regarding the study to all SI leaders employed in the fall 2013 semester. Those interested in receiving more information were instructed to email the researcher. Of the 51 SI leaders, 40 responded to the email, providing the potential sample.

Fraenkel and Wallen (2009) stated that, "when it is possible, researchers would prefer to study the entire population of interest" (p. 90). Taking accessibility into consideration, all 40 potential respondents were contacted; 35 responses were received. One respondent completed only the MLQ and did not provide useable data for the survey, and so was removed from the study. This resulted in a sample consisting of 34 SI leaders.

Instrumentation

Three data collection instruments were used in this study: the LSI Version 3.1, the MLQ 5X self-rater short form, and a researcher-designed demographic instrument. All instruments were delivered online. In addition to the instruments, data for students attending the 35 courses led by the SI leaders, including their attendance to the SI sessions, were obtained from PAS at TAMU.

Learning Style Inventory

The online LSI Version 3.1 was used to collect information about each SI leader's learning style, learning mode preference, and preference for grasping and transforming information. Based on D. A. Kolb's (1984) ELT, the LSI "is designed to

help individuals identify the way they learn from experience" (Kolb, A. Y., & Kolb, 2005a, p. 1).

The instrument consists of 12 items asking participants to rank sentence endings that correspond with the four learning modes of ELT: CE, RO, AC, and AE (Kolb, A. Y., & Kolb, 2005b). A score of 4 is assigned to the sentence ending that best describes how the participant prefers to learn and a score of 1 indicates the least preferred way to learn.

Scores for the learning modes can range from 12 to 48, with higher scores indicating the learning mode that the participant prefers. The learning mode scores are used to determine the participant's preference for grasping and transforming information. To determine preference for grasping information, the CE score is subtracted from the AC score (AC-CE). This score indicates the learner's preference for grasping information in an abstract manner over a concrete manner. To determine preference for transforming information, the RO score is subtracted from the AE score (AE-RO). This score indicates the learner's preference for transforming information actively instead of reflectively.

These preference scores are used to determine which learning style the participant prefers and the strength of that preference. The four learning styles, also derived from D. A. Kolb's ELT are diverging, assimilating, converging, and accommodating. To determine the learning style, the AC-CE and AE-RO scores are plotted on the Learning Style Type Grid provided by the publisher. The AC-CE and AE-RO scores can range from -36 to +36.

The technical specifications document (Kolb, A. Y., & Kolb, 2005a) provided evidence of reliability and validity of the LSI 3.1. Good internal consistency a(Fraenkel & Wallen, 2009) was indicated by a Cronbach's alpha ranging from .77 to .84 for the normative online subsample (N = 5,023) provided by the online studies. In a study of 221 students, Kayes (2005) reported alphas from .77 to .84 for the learning mode scores..

Validity of the LSI has been both supported and criticized by researchers. Validity is important to ensure that meaningful inferences can be made from collected data (Fraenkel & Wallen, 2009). A. Y. Kolb and Kolb (2005a) found that, in 17 published studies employing factor analysis to validate the internal structure of the LSI, 7 supported it, 4 reported mixed support, and 6 reported no support. Internal validity was also examined by determining the correlations among variables. The AC-CE (grasping information) and AE-RO (transforming information) scores represent independent learning preferences and should thus not be correlated. Further, AC and CE should not correlate with AE-RO scores and AE and RO scores should not correlate with the AC-CE score.

The total normative data from the LSI 3.1 (N = 6,977) revealed low correlations between some of these scores. A low correlation of r = .21 was found between AC-CE and AE-RO scores. Low correlations were revealed between RO and AC-CE (r = .10) and AE and AC-CE (r = -.26). Further, a low correlation was identified between CE and AE-RO (r = .24) and between AC and AE-RO (r = -.14). Data analysis for scores in the present study revealed a low correlation between CE and AE-RO (r = .34). Although

correlations were noted, the strength was weak and had almost no value (Coolidge, 2006; Fraenkel & Wallen, 2009).

The online LSI 3.1 was purchased from the publisher, Hay Group, which provided a link to the survey to be used by the researcher. The researcher was also provided an online account that allowed her to see who had completed the instrument but not the individual survey results. When it was time to receive the results, the researcher contacted Hay Group.

The online instrument did not allow participants to place two of the same numbers in one item. It also required that a score be given to all sentence endings. Raw data detailing the preference sequence for the 12 items for each participant were provided to the researcher by Hay Group. The researcher placed the scores on the paper score sheet provided by Hay Group to calculate the learning mode scores for each participant. Once this was completed, the AC-CE and AE-RO scores were calculated and plotted on the Learning Style Type Grid, also provided by Hay Group.

Multifactor Leadership Questionnaire

The MLQ 5X leader short form Appendix A) was used to collect data about the leadership behaviors of the SI leaders. The MLQ is the most widely used measurement of transformational leadership (Northouse, 2007); scores obtained from the MLQ can help to account for the impact of different types of leaders on the organization (Avolio & Bass, 2004). The MLQ 5X leader short form asks participants to rank, on a Likert-type scale (0 = *not at all* to 4 *frequently if not always*) how frequently they exhibit the behavior described in each of the 45 statements. The MLQ also has a rater form in which

the participant is asked to rank how frequently a superior or peer exhibits the behavior identified in the statement. Both versions consist of the same 45 statements, with the self-rate statements beginning with "I" and the rater form beginning with, "The person I am rating." Unlike the LSI 3.1, participants are not required to complete all statements. The instructions request that questions be left blank if the respondent considers them to be irrelevant, is unsure, or does not know the answer (Avolio & Bass, 2004).

The MLQ measures frequency of behavior for transformational, transactional, and passive/avoidant leadership styles and scales associated with them. The scales—idealized influence (attributed), idealized influence (behavior), inspirational motivation, intellectual stimulation, and individual consideration—are scales of transformational leadership style. Contingent reward and management-by-exception (active) are scales of transactional leadership style. Management-by-exception (passive) and laissez-fair are scales of passive/avoidant leadership style (Avolio & Bass, 2004).

Each of the nine leadership scales is associated with four statements on the instrument, for a total of 36 statements. The remaining nine statements on the instrument measure outcomes of leadership behaviors related to frequency of extra effort, effectiveness, and satisfaction of leadership. A score is derived for a leadership scale by averaging the scores for the four statements associated with the scale. If a participant failed to rank one of the statements for the scale, the score was obtained by averaging the responses for the other three statements. However, staff employed by the publishing company advised that, if the participant failed to complete two or more statements for a

scale, the data would not be useable for that scale (Hay Group, personal communication, February 10, 2014).

The three leadership style scores are derived by averaging the scores of the statements associated with the specified style. For this, 20 statements are used to obtain the transformational leadership style score, 8 statements for the transactional leadership style score, and 8 statements for the passive/avoidant leadership style score. A lower score on a leadership scale or leadership style indicates less behavior associated with that particular scale or style.

The MLQ has been revised since it was originally used in 1985. The original and subsequent versions utilized a six-factor model. In this model, idealized influence (attributed and behavior) and inspirational motivation were identified as charisma. In addition, management-by-exception was identified as active for only six factors. The original six-factor model has been expanded to the current nine factors in an attempt to more precisely define constructs and behaviors associated with leadership style in the full range of leadership (Avolio & Bass, 2004). The most recent revision (5X) allows for identification of passive/avoidant leadership style by the management-by-exception (passive) and laissez-faire leadership scales. Previously, management-by-exception (passive) was associated with transactional leadership style and laissez-faire was an independent scale representing absence of leadership.

The MLQ is published and available for purchase by Mind Garden Inc. In the technical report, Avolio and Bass (2004) provided evidence of construct validity. Initially, to address criticisms related to construct validity for the six-factor model,

results found in the literature, as well as results from the Mind Garden database up to the year 1999, were examined and reexamined thoroughly, using confirmatory factor analysis. Reliabilities for each of the six leadership factor scales ranged from .63 to .92. Avolio and Bass (2004) then employed the same analysis procedures utilizing data from the 2003 normative samples from Mind Garden to test the nine-factor model against the six-factor model. The nine-factor model was superior in the comparison.

Once the instrument was purchased, the researcher was provided an online password-protected account. The researcher created a campaign for the research study within the online account. Once this was done, a link to the survey was generated for placement in an email. When a participant completes the instrument, the data are saved and stored in the campaign connected with the link that was provided. When the researcher is ready to retrieve the data, it can be downloaded in .csv format. The document includes a row listing the 45 statements on the MLQ and what score, if any, was provided for the statement. If a statement was left blank, the cell is blank.

Demographic Instrument

The instrument used to collect data on the demographic characteristics of the participants (Appendix B) was developed by the researcher. A panel of experts was consulted to establish content and face validity before the instrument was distributed to ensure that the instrument was formatted properly and that content was appropriate for the study (Fraenkel & Wallen, 2009). The demographic survey obtained information about the SI leader's gender, ethnicity, major, age, year in school, number of semesters

serving as an SI leader, and overall GPA. Qualtrics™, an online survey software, was used to collect demographic information.

Attendance Data

During every SI session, the SI leader is required to distribute a sheet to collect first and last names of students attending the session. The students are also asked to provide the last four digits of their student identification number to ensure accuracy of attendance records. Staff at PAS compiles these data to generate the total attendance report for the semester for each participating student. PAS is provided information from the university for all students enrolled in the SI courses. This includes the student's name, email, gender, GPA, year in school, major, college, and the course in which the student is enrolled. Staff from PAS adds attendance data for those who attended and places a zero next to those who did not attend SI sessions.

With approval from the Institutional Review Board (IRB) and FERPA, the SI Director at PAS provided the researcher the course data for the courses associated with the respondent SI leaders. The researcher sent the list of names of the 35 respondents to the Director so that only information for those courses was received. Before the information was sent, the Director removed the names and email addresses of the students enrolled in the courses so they could not be identified. The Director placed the SI leader's name next to the data for those enrolled in the course to which they were assigned. Data were received on all students enrolled in the course, but data for only those attending at least one SI session were used in the study.

Data Collection

The tailored design method (Dillman, Smyth, & Christian, 2009) was used to guide data collection once TAMU IRB approval was received. The tailored design method allowed for high-quantity results by tailoring collection procedures to the sample being surveyed (Dillman et al., 2009). The three-contact strategy was used when communicating with participants.

Data were collected in November and December 2013. A waiver of consent was approved by IRB so consent was not documented in writing. The initial email to the 40 SI leaders who responded to the recruitment email was sent on a Monday. The email included information about the study and links for all three surveys. Participants were encouraged to complete all three surveys in one session.

The first reminder email was sent 4 days later, since students may have free time on the weekend. Since the initial contact and first reminder were sent in close proximity, the second reminder was sent 10 days later. Dillman et al. (2009) asserted that optimal timing for web surveys has not yet been determined, and the survey and population should be considered when timing reminder emails. The second and third emails thanked those who had completed the survey and reminded and encouraged nonrespondents to complete the surveys (Dillman et al., 2009). Participants were not able to see their results after they completed the surveys.

All three surveys requested the SI leader name and email so data from all three surveys could be matched and combined with attendance data. Once data collection was

complete, participants were coded so that names could be removed. Data were stored on a password-protected computer.

Data Analysis

The data were compiled and imported into SPSS™ for analysis. Nonresponse analysis was not performed because the survey response rate was at or above 80% (Office of Management and Budget, 2006). The response rate was 87.50% ($N = 35$) and the useable response rate was 85% ($N = 34$) for the LSI and 80% ($N = 32$) for the MLQ.

The alpha level was set a priori at $p < .05$. Raw scores for the total score reported by the participant on the four learning modes and preference for grasping and transforming information reported on the LSI were used for data analysis. Learning styles identified by plotting the preference for grasping and transforming information scores on the Learning Style Grid were also used. Mean scores were calculated for the MLQ leadership styles and scales for use in data analysis.

Missing data were addressed for the MLQ but not needed for the LSI 3.1 or demographic instrument because all items were completed. If a participant failed to complete a statement on the MLQ, the mean score for the associated scale was calculated based on the items that were completed. For example, four statements measured each leadership scale. To calculate the score for the scale, the total of the statements is divided by 4. If a respondent failed to complete a statement for the scale, the total score was divided by 3. If the participant failed to complete two or more of the statements for the scale, the data were not used for that scale. This followed advice from staff at Mind Garden, Inc. (personal communication, February 10, 2014).

Analysis for Objective 1

The dependent variables for Objective 1 were learning styles, learning modes and learner preference for grasping and transforming information. Learning style was a categorical variable with four categories: accommodating, diverging, assimilating, and converging. The four learning modes—CE, RO, AC, and AE—were continuous quantitative variables. Preference for grasping information and preference for transforming information were also continuous quantitative variables.

The independent variables were gender, ethnicity, major, age, year in school, number of semesters serving as a SI leader, and overall GPA. The variables age, GPA, semesters of experience as a SI leader, and attendance were continuous quantitative variables. Gender was a dichotomous categorical variable. Ethnicity and major were categorical variables but were collapsed and coded as dichotomous. The majority of the participants were White and placed in one category; the remainder were combined and placed in the second category. Major was also collapsed into two categories: science and non-science. The independent variable year in school was a categorical variable: sophomore, junior, and senior.

Frequencies were reported for learning styles and the dichotomous independent variables gender, ethnicity, and major, and the categorical variable year in school. Further analysis was not completed because $n < 5$ in some of the cells (Coolidge, 2006). One-way analysis of variance was used to analyze learning style with the continuous independent variables semesters of experience as an SI leader, age, and GPA.

When analyzing learning modes and preference for grasping and transforming information with the dichotomous independent variables gender, major, and ethnicity, independent *t* tests were performed to determine whether there was a significant difference in mean scores of the groups. One-way analysis of variance was used to determine whether there was a relationship between the categorical independent variable year in school and learning mode and preferences for grasping and transforming information. Pearson product-moment correlation was used to determine whether a relationship existed between learning modes and preferences and the continuous independent variables semesters of experience as an SI leader, age, and GPA.

Analysis for Objective 2

The dependent variables for Objective 2 were continuous quantitative variables. They were the mean scores for the three leadership styles—transformational, transactional, and passive/avoidant—and the nine scale variables associated with those styles—idealized influence (attributed), idealized influence (behavior), inspirational motivation, intellectual stimulation, individual consideration, contingent reward, management by exception (active), management by exception (passive), and laissez-faire—were continuous quantitative variables.

The independent variables remained the same for as Objective 1: gender, ethnicity, major, age, year in school, number of semesters serving as a SI leader, and overall GPA.

Pearson product-moment correlation was used to determine whether there was a relationship between the dependent variables and the continuous independent variables

semesters of experience as an SI leader, age, and GPA. For the dichotomous independent variables gender, ethnicity, and major, independent *t* tests were performed to determine whether the groups were significantly different. One-way analysis of variance was used to analyze the relationship between the categorical independent variable year in school and the leadership styles and scales.

SPSS was used to calculate a mean score for each of the three leadership styles and the nine attributes provided by the MLQ. Mean scores could range from 0 to 4 (Avolio & Bass, 2004). If one of the four statements associated with a scale was left blank, the mean was derived from the three useable scores. Two respondents were removed from analysis for this objective because they failed to complete more than 15% of the survey (Mertler & Vannatta, 2010).

Analysis for Objective 3

Correlational research methods were used to determine the relationship of variables on the LSI 3.1 and MLQ for Objective 3. Correlation is used to measure the degree of relationship between two continuous variables and the strength of the relationship; dependent and independent variables are not defined (Coolidge, 2006). Pearson product-moment correlation was used to determine whether if any of the three leadership styles and the nine scales associated with them measured by the MLQ were related to any of the four learning modes and two preferences measured by the LSI. One-way analysis of variance was used to determine whether leadership styles and scales differed by learning style.

Mean scores for the variables were used for the analysis. As stated, a leadership scale score was not useable if two or more of the statements were not completed. One participant failed to complete at least three of the statements for idealized influence (attributed). The same participant and another participant failed to complete at least three items for the idealized influence (behavior) scale. Due to the missing data on the MLQ for these two participants, the *N* was adjusted accordingly for those correlations.

Analysis for Objectives 4 and 5

For Objectives 4 and 5, the dependent variable was attendance. Only students who attended at least one SI session were included in data analysis because the researcher was not interested in the absence of behavior. "Absenteeism is a nonevent in that no behavior can be observed" (Latham & Pursell, 1975, p. 369).

Attendance was reported for the course to which the SI leader was assigned. This variable was computed by dividing the number of times a student attended SI session(s) by the number of SI sessions offered for that student's course. This produced the percentage of SI sessions that a student attended. This was done to standardize the data because not all SI leaders held the same number of SI sessions. Next, an average of the percentages for the students attending the course was calculated. Doing so provided a continuous quantitative variable that represented attendance for each SI leader's course.

The independent variables were the learning styles, learning modes, learning preferences, leadership styles and leadership scales. One-way analysis of variance was used to determine whether attendance differed by learning style. Pearson product-

moment correlation was used to determine the relationship between attendance and learning modes, learning preferences, leadership styles, and leadership scales.

Chapter Summary

This chapter described the research design, sample population, variables, and data analysis methods used to analyze the variables. Causal-comparative and correlational research were utilized to analyze data provided by SI leaders at TAMU.

Three survey instruments were used in the study: the MLQ, LSI 3.1, and a researcher-created demographics survey. Attendance data provided by the PAS for students enrolled in the courses led by SI leaders were also used in the analyses.

Variables were dichotomous, continuous, or categorical. One-way analysis of variance, Pearson product-moment correlation, and independent *t* tests were used to analyze the data. Descriptive statistics such as means, frequencies, and ranges were also used.

CHAPTER IV

RESULTS

The purpose of this study was to explore the demographics, learning styles, and leadership styles of current SI leaders. Learning styles and leadership styles were explored to determine whether there were relationships among the variables. Also, the relationship between learning and leadership styles and recurring attendance at SI sessions was investigated. The study was designed to meet five specific objectives:

1. Explore the relationship between SI leader demographic variables and the leader's learning style.

2. Explore the relationship between SI leader demographic variables and the leader's leadership style.

3. Explore the relationship between learning style and leadership style of the SI leader.

4. Explore the relationship between SI leader learning styles and recurring attendance to SI.

5. Explore the relationship between SI leader leadership styles and recurring attendance to SI.

This chapter presents the results of data analysis for the responses on the surveys and the attendance data.

Preliminary Analysis

Descriptive Information for SI Leaders

The three survey instruments were sent to 40 SI leaders, and 35 leaders responded to at least one instrument. Of the 35 respondents, 34 responded to all three instruments. The participant who responded to only one instrument responded to the MLQ. This participant was removed from the data analysis because demographic data were not provided and the MLQ had more than 15% of the data missing (Mertler & Vannatta, 2010).

Of the 34 participants, 64.71% (n = 22) were female and 35.29% (n = 12) were male. In terms of ethnicity, 64.71% (n = 22) of participants were White, 14.71% (n = 5) were Hispanic, 5.88% (n = 2) were Asian, 2.94% (n = 1) were Pacific Islander, and 11.76% (n = 4) reported other ethnicities. Table 1 shows the gender of the participants by ethnicity.

Age of the participants ranged from 19 to 23 years, with a mean age of 20.47 years. Semesters of experience as an SI leader ranged from 1 to 6, with a mean of 2.38 years. GPA of the SI leaders ranged from 3.0 to 4.0, with a mean of 3.65. The age, semesters of experience, and GPA of participants are displayed in Table 2.

In terms of years in school, 47.06% (n = 16) were seniors, 35.29% (n = 12) were juniors, and 17.65% (n = 6) were sophomores. Participants reported 21 distinct majors. These were collapsed and classified as non-science or science for data analysis procedures; 18 participants reported a science major and 16 reported a non-science major. Data for SI leader year in school by major are presented in Table 3.

Table 1

Gender of Participants by Ethnicity (*N* = 34)

Ethnicity	Female *n*	Female % of total	Male *n*	Male % of total	Total *n*	Total %
White	15	44.10	7	20.59	22	64.71
Hispanic	3	8.82	2	5.88	5	14.71
Asian	1	2.94	1	2.94	2	5.88
Pacific Islander	0	0.00	1	2.94	1	2.94
Other	3	8.82	1	2.94	4	11.76
Total	22	64.71	12	35.29	34	100.00

Table 2

Age, Semesters of Experience, and Grade Point Average of Participating Supplemental Instruction Leaders (*N* = 34)

Variable	*M*	*SD*	Minimum	Maximum
Age	20.47	1.08	19	23
Semesters of experience	2.38	1.44	1	6
Grade point average	3.65	0.25	3	4

Table 3

Supplemental Instruction Leaders' Majors by Year in School (*N* = 34)

Year	Science *n*	Science % of total	Non-science *n*	Non-science % of total	Total *n*	Total %
Senior	9	26.47	7	20.59	16	47.06
Junior	7	20.59	5	14.71	12	35.29
Sophomore	2	5.88	4	11.76	6	17.65
Total	18	52.94	16	47.06	34	100.00

Descriptive Data for SI Courses and Attendees

Each SI leader is paired with a unique class; therefore, 34 courses were used in the study. The courses were in biology, chemistry, economics, geography, geology, mathematics, physics, and political science. The number of sessions held by an SI leader ranged from 15 to 41. The total number of students attending at least one SI session per course ranged from 15 to 302. Total attendance per course ranged from 33 to 1,217 Table 4 presents course and session data.

This study included students who attended one or more SI sessions in the fall 2013 semester. The maximum number of sessions attended by a student was 35 for BIOL113. However, not all SI leaders held the same number of sessions, so maximum attendance was converted to percentages. The highest percentage of attendance was for the SI leader who led CHEM227b sessions at 93.55%, or 29 of 31 sessions.

This percentage was calculated for all attendees in a class, and that percentage was averaged. The overall average attendance for SI leaders ranged from 5.44% to 34.02%. The range of attendance and overall average attendance per class of the SI leaders are shown in Table 5.

Descriptive Information for Students Attending at Least One SI Session

A total of 3,638 students attended at least one SI session in the 34 courses. Of the students attending at least once, 57.12% (n = 2,078) were female and 42.88% (n = 1,560) were male. In terms of year in school, 40.32% (n = 1467) were sophomores, 31.25% (n = 1,137) were freshmen, 19.85% (n = 722) were juniors, 8.44% (n = 307) were seniors, and 0.14% (n = 5) were graduate students. Table 6 shows the gender of attendees by year

Table 4

Supplemental Instruction Class Data

Course	Number enrolled	Attended at least once	Sections offered	Total attendance
BIOL111a	230	72	34	280
BIOL111b	95	93	22	496
BIOL112a	330	93	37	696
BIOL112b	95	24	41	91
BIOL113	178	81	38	604
BIOL319	381	155	28	614
BIOL320	214	58	40	374
CHEM107a	499	189	38	747
CHEM107b	474	187	36	1,055
CHEM227a	81	55	37	506
CHEM227b	305	172	31	1,162
ECON202	376	89	35	262
GEOG202a	613	240	38	1,090
GEOG202b	590	207	35	861
GEOG202c	276	191	40	928
GEOG203a	109	62	41	382
GEOG203b	150	65	38	292
GEOG203c	155	45	26	164
GEOL101a	233	78	39	310
GEOL101b	118	34	35	118
GEOL101c	88	54	38	304
GEOL101d	113	15	35	33
GEOL101e	118	60	34	338
MATH151	185	20	29	127
PHYS208	104	29	38	60
PHYS218	155	25	31	93
PHYS221	93	41	15	80
POLS206a	380	72	38	255
POLS206b	466	105	35	277
POLS206c	514	199	35	519
POLS207a	775	289	39	763
POLS207b	750	152	33	353
POLS207c	506	302	34	1,217
POLS207d	242	86	39	506

Table 5

Supplemental Instruction Attendance Data

Year	Minimum		Maximum		Average attendance	
	n	% of total	*n*	% of total	*n*	% of total
BIOL111a	1	2.94	23	67.65	8.24	11.44
BIOL111b	1	4.55	15	68.18	22.55	14.41
BIOL112a	1	2.70	31	83.78	18.81	34.02
BIOL112b	1	2.44	17	41.46	2.22	9.25
BIOL113	1	2.63	35	92.11	15.89	19.62
BIOL319	1	3.57	19	67.86	21.93	14.15
BIOL320	1	2.50	35	87.50	9.35	16.12
CHEM107a	1	2.63	22	57.89	19.66	10.40
CHEM107b	1	2.78	32	88.89	29.31	15.67
CHEM227a	1	2.70	31	83.78	13.68	24.86
CHEM227b	1	3.23	29	93.55	37.48	21.79
ECON202	1	2.86	26	74.29	7.49	8.41
GEOG202a	1	2.63	22	57.89	28.68	11.95
GEOG202b	1	2.85	24	68.57	24.60	11.88
GEOG202c	1	2.50	31	77.50	23.20	12.15
GEOG203a	1	2.44	28	68.29	9.32	15.03
GEOG203b	1	2.63	22	57.89	7.68	11.82
GEOG203c	1	3.85	13	50.00	6.31	14.02
GEOL101a	1	2.56	33	84.62	7.95	10.19
GEOL101b	1	2.86	25	71.43	3.37	9.92
GEOL101c	1	2.63	26	68.42	8.00	14.81
GEOL101d	1	2.86	8	22.86	0.94	6.29
GEOL101e	1	2.94	21	61.76	9.94	16.57
MATH151	1	3.45	26	89.66	4.37	22.87
PHYS208	1	2.63	8	21.05	1.58	5.44
PHYS218	1	3.22	23	74.19	3.00	12.00
PHYS221	1	6.67	12	80.00	2.33	13.01
POLS206a	1	2.63	28	73.68	6.71	9.32
POLS206b	1	2.86	19	54.29	7.91	7.54
POLS206c	1	2.86	13	37.14	14.82	7.45
POLS207a	1	2.56	24	61.54	19.56	6.77
POLS207b	1	3.03	23	69.70	10.70	7.04
POLS207c	1	2.94	27	79.41	35.79	11.85
POLS207d	1	2.56	30	76.92	12.97	15.09

Table 6

Supplemental Instruction Attendee Gender by Year in School

School year	Female		Male		Total	
	n	% of total	*n*	% of total	*n*	%
Freshman	631	17.34	506	13.91	1,137	31.25
Sophomore	818	22.48	649	17.84	1,467	40.32
Junior	436	11.98	286	7.86	722	19.85
Senior	191	5.25	116	3.19	307	8.44
Graduate	2	0.05	3	0.08	5	0.14
Total	2,078	57.12	1,560	42.88	3,638	100.00

in school. It should be noted that participants might have been enrolled in more than one course with SI. However, data provided to the researcher did not allow for this to be identified.

Objective 1

Objective 1 was to explore the relationship between SI leader demographic variables and the leader's learning style.

SI Leaders and Learning Style, Learning Modes

Of the 34 participants, almost half (47.06%, $n = 16$) had a diverging learning style, 26.47% ($n = 9$) had an accommodating learning style, 14.71% ($n = 5$) had an assimilating style, and 11.76% ($n = 4$) had a converging style. Learning style results for the participants are shown in Table 7.

Learning mode mean scores are shown in Table 8. The highest mean reported was 31.94 ($SD = 31.94$) and was for AE; the range of scores for that variable was 25 to

Table 7

Learning Styles of Supplemental Instruction Leaders (*N* = 34)

Learning style	*n*	%
Accommodating	9	26.47
Diverging	16	47.06
Assimilating	5	14.71
Converging	4	11.76

Table 8

Learning Mode Scores of Supplemental Instruction Leaders (*N* = 34)

Construct	*M*	*SD*	Minimum	Maximum
Concrete Experience (CE)	28.26	2.27	24	33
Reflective Observation (RO)	28.09	4.27	18	41
Abstract Conceptualization (AC)	31.88	2.80	27	37
Active Experimentation (AE)	31.94	3.20	25	35
Grasping Information (AC-CE)	3.62	4.10	-3	13
Transforming Information (AE-RO)	3.85	6.85	-15	19

35. AC ranged from 27 to 37, with a mean of 31.88 (*SD* = 31.94). The mean for CE was 28.26 (*SD* = 2.27), with a range from 24 to 33. RO scores ranged from 18 to 41, with a mean of 28.09 (*SD* = 4.27). Transforming preference scores ranged from -15 to 19, with a mean of 3.85 (*SD* = 6.85), and grasping information preference scores ranged from -3 to 13, with a mean of 3.62 (*SD* = 4.10). (Learning mode scores could range from 12 to 48 on the LSI 3.1; grasping and transforming preferences scores could range from -36 to 36.

Gender and Learning Styles and Learning Modes

Of the nine accommodating learners, 77.78% (n = 7) were female and 22.22% (n = 2) were male. For the assimilating learners, 100% were female (n = 5). Males and females represented 50% of both diverging (n = 8) and converging (n = 2) learning styles. Learning style by gender is displayed in Table 9.

Table 9

Learning Styles of Supplemental Instruction Leaders by Gender (N = 34)

	Female		Male		Total	
Learning style	*n*	% of total	*n*	% of total	*n*	%
Accommodating	7	77.78	2	22.22	9	100.00
Diverging	8	50.00	8	50.00	16	100.00
Assimilating	5	100.00	0	0.00	5	100.00
Converging	2	50.00	2	50.00	4	100.00
Total	22	64.71	12	35.29	34	100.00

As shown in Table 10, 20.59% (n = 7) of the 34 participants were female accommodating learners and 5.88% (n = 2) were males. Diverging females accounted for 23.53% (n = 8) and diverging males also accounted for 23.53% (n = 8) of total participants. No males showed a preference for the assimilating learning style, and 14.71% (n = 5) of the females reported a preference for assimilating. Female converging learners accounted for 5.88% (n = 2) of the total participants; this was the same for male converging learners, 5.88% (n = 2).

Table 10

Frequencies of Learning Styles of Supplemental Instruction Leaders by Gender ($N = 34$)

Learning style	Female		Male		Total	
	n	% of total	*n*	% of total	*n*	%
Accommodating	7	20.59	2	5.88	9	26.47
Diverging	8	23.53	8	23.53	16	47.06
Assimilating	5	14.71	0	0.00	5	14.71
Converging	2	5.88	2	5.88	4	11.76
Total	22	64.71	12	35.29	34	100.00

When examining learning modes, the mean for females was higher on all modes except RO. The mean was lower for preference for grasping and transforming information for males ($M = 3.08$, $SD = 4.52$; $M = 0.92$, $SD = 7.27$) than for females ($M = 3.91$, $SD = 3.93$; $M = 5.45$, $SD = 6.21$).

A large effect (Mertler & Vannatta, 2010) was found for RO ($d = 0.88$) and a medium effect was found for AC ($d = 0.52$). Small effects were found for CE ($d = 0.29$), AE ($d = 0.26$), grasping information ($d = 0.20$) and transforming information ($d = 0.23$). Mean scores and effect sizes are reported in Table 11. Independent *t* tests revealed that gender had a significant effect on only the RO learning mode, $t(32) = 2.53$, $p < .05$ (Table 12).

Ethnicity and Learning Styles and Learning Modes

The ethnicity variable was collapsed into two categories for data analysis. A majority of the participants were White ($n = 22$); all others were collapsed into the non-White group ($n = 12$). Of the 9 accommodating learners, 88.89% ($n = 8$) were White and

Table 11

Mean Learning Mode and Preference Scores of Supplemental Instruction Leaders by Gender ($N = 34$)

Construct	Gender	*n*	*M*	*SD*	*d*
Concrete Experience (CE)	Female	22	28.50	2.28	0.29
	Male	12	27.83	2.29	
Reflective Observation (RO)	Female	22	26.82	3.62	0.88
	Male	12	30.42	4.54	
Abstract Conceptualization (AC)	Female	22	32.41	2.46	0.52
	Male	12	30.92	3.23	
Active Experimentation (AE)	Female	22	32.27	3.12	0.26
	Male	12	31.33	3.93	
Grasping Information (AC-CE)	Female	22	3.91	3.93	0.20
	Male	12	3.08	4.52	
Transforming Information (AE-RO)	Female	22	5.45	6.21	0.23
	Male	12	0.92	7.27	

Table 12

Results of Independent t *Test for Supplemental Instruction Leader Learning Mode and Preference Scores by Gender* ($N = 34$)

Construct	*t*	*df*	*p*
Concrete Experience (CE)	-.81	32	.42
Reflective Observation (RO)	2.53	32	.02*
Abstract Conceptualization (AC)	-1.51	32	.14
Active Experimentation (AE)	.81	32	.42
Grasping Information (AC-CE)	-.56	32	.58
Transforming Information (AE-RO)	-1.92	32	.06

*$p < .05$ (two-tailed).

11.11% (*n* = 9) were non-White. Of the 16 diverging learners, 62.50% (*n* = 10) were White and 37.50% (*n* = 6) were non-White. The five assimilating learners were split: 60.00% (*n* = 3) were White and 40.00% (*n* = 2) were non-White. The non-White students represented most of the converging learners, 75.00% (*n* = 3), with the White participants representing 25.00% (*n* = 1). Table 13 displays learning styles by ethnicity.

Table 13

Learning Styles of Supplemental Instruction Leaders by Ethnicity (*N* = 34)

Learning style	White		Non-White		Total	
	n	% of total	*n*	% of total	*n*	%
Accommodating	8	88.89	1	11.11	9	100.00
Diverging	10	62.50	6	37.50	16	100.00
Assimilating	3	60.00	2	40.00	5	100.00
Converging	1	25.00	3	75.00	4	100.00
Total	22	64.71	12	35.29	34	100.00

As shown in Table 14, of the 34 participants, diverging learners who were White represented the largest proportion (29.41%, *n* = 10). The non-White diverging group had 17.65% (*n* = 6) of the total participants. The White accommodating learners represented 23.53% (*n* = 8) of the participants and 2.94% (*n* = 1) of the non-White participants. Assimilating learners who were White represented 8.82% (*n* = 3) of the participants, and assimilating non-White participants were 5.88% (*n* = 2). Converging learners in the White group represented 2.94% (*n* = 1) and converging learners in the non-White group represented 8.82% (*n* = 3) of the participants.

Table 14

Frequencies of Learning Styles of Supplemental Instruction Leaders by Ethnicity (*N* = 34)

Learning style	White *n*	White % of total	Non-White *n*	Non-White % of total	Total *n*	Total %
Accommodating	8	23.53	1	2.94	9	26.47
Diverging	10	29.41	6	17.65	16	47.06
Assimilating	3	8.82	2	5.88	5	14.71
Converging	1	2.94	3	8.82	4	11.76
Total	22	64.71	12	35.29	34	100.00

Participants who were White had higher scores than non-White participants for CE, AC, AE, and preference for transforming information. RO was the only learning more in which the non-White group (*M* = 28.50, *SD* = 3.21) scored higher than the White group (*M* = 27.86, *SD* = 4.81; Table 15).

A small effect was found for CE (*d* = 0.23) and for preference for grasping information (*d* = 0.22). Mean scores and effect sizes are shown in Table 15. Independent *t* tests revealed that ethnicity had no significant effect on learning modes or preferences (Table 16).

Year in School and Learning Styles and Learning Modes

Learning styles by year in school are shown in Table 17. Of the 9 accommodating learners, 44.44% (*n* = 4) were seniors, 44.44% (*n* = 4) were juniors, and 11.11% (*n* = 1) were sophomores. Of the 16 diverging learners, 50.00% (*n* = 16) were seniors, 31.25% (*n* = 5) were juniors, and 18.75% (*n* = 3) were sophomores. Of the 5

Table 15

Mean Learning Mode Scores of Supplemental Instruction Leaders by Ethnicity (*N* = 34)

Construct	Ethnicity	*n*	*M*	*SD*	*d*
Concrete Experience (CE)	White	22	28.45	2.30	0.23
	Non-White	12	27.92	2.28	
Reflective Observation (RO)	White	22	27.86	4.81	0.16
	Non-White	12	28.50	3.21	
Abstract Conceptualization (AC)	White	22	31.73	2.66	0.19
	Non-White	12	31.17	3.16	
Active Experimentation (AE)	White	22	31.95	3.05	0.01
	Non-White	12	31.92	3.61	
Grasping Information (AC-CE)	White	22	3.27	3.58	0.22
	Non-White	12	4.25	5.03	
Transforming Information (AE-RO)	White	22	4.09	7.28	0.10
	Non-White	12	3.42	6.29	

Table 16

Results of Independent t *Test for Supplemental Instruction Leader Learning Mode Scores by Ethnicity* (*N* = 34)

Construct	*t*	*df*	*p*
Concrete Experience (CE)	.65	32	.52
Reflective Observation (RO)	-.41	32	.69
Abstract Conceptualization (AC)	-.43	32	.67
Active Experimentation (AE)	.03	32	.97
Grasping Information (AC-CE)	-.66	32	.52
Transforming Information (AE-RO)	.27	32	.79

Table 17

Learning Styles of Supplemental Instruction Leaders by Year in School (*N* = 34)

Learning style	Senior		Junior		Sophomore		Total	
	n	%	*n*	%	*n*	%	*n*	%
Accommodating	4	44.44	4	44.44	1	11.11	9	100.00
Diverging	8	50.00	5	31.25	3	18.75	16	100.00
Assimilating	3	60.00	1	20.00	1	20.00	5	100.00
Converging	1	25.00	2	50.00	1	25.00	4	100.00
Total	16	47.06	12	35.29	6	17.65	34	100.00

assimilating learners, 60.00% (*n* = 3) were seniors, 20.00% (*n* = 1) were juniors, and 20.00% (*n* = 1) were sophomores. Of the 4 converging learners, 50.00% (*n* = 2) were juniors, 25.00% (*n* = 1) were seniors, and 25.00% (*n* = 1) were sophomores.

Overall, 11.76% (*n* = 4) of the 34 participants were senior accommodating learners, 11.76% (*n* = 4) were junior accommodating learners, and 2.94% (*n* = 1) were sophomore accommodating learners. In addition, 23.53% (*n* = 8) were senior diverging learners, 14.71% (*n* = 5) were junior diverging learners, and 8.82% (*n* = 3) were sophomore diverging learners. There were 8.82% (*n* = 3) senior assimilating learners, 2.94% (*n* = 1) junior assimilating learners, and 2.94% (*n* = 1) sophomore assimilating learners. Of all participants, 2.94% (*n* = 1) were senior converging learners, 5.88% (*n* = 2) were junior converging learners, and 2.94% (*n* = 1) were sophomore converging learners. Learning style by year in school for all participants is displayed in Table 18.

Participants who were juniors (*n* = 12) had higher means for three of the four learning modes—CE (*M* = 28.58, *SD* = 2.35), AC (*M* = 35.50, *SD* = 2.56), and AE (*M* =

Table 18

Frequencies of Learning Style of Supplemental Instruction Leaders by Year in School (*N* = 34)

Learning style	Senior		Junior		Sophomore		Total	
	n	%	*n*	%	*n*	%	*n*	%
Accommodating	4	11.76	4	11.76	1	2.94	9	26.47
Diverging	8	23.53	5	14.71	3	8.82	16	47.06
Assimilating	3	8.82	1	2.94	1	2.94	5	14.71
Converging	1	2.94	2	5.88	1	2.94	4	11.76
Total	16	47.06	12	35.29	6	17.65	34	100.00

32.42, *SD* = 3.78)—and preference for transforming information (*M* = 5.92, *SD* = 7.55). Senior participants (*n* = 16) had the highest mean scores for RO (*M* = 29.13, *SD* = 4.60) and lowest scores for AE (*M* = 31.56, *SD* = 2.99), preference for grasping information (*M* = 2.81, *SD* = 4.32) and preference for transforming information (*M* = 2.44, *SD* = 7.14). Mean scores for year in school and learning mode and preferences are shown in Table 19.

A one-way analysis of variance revealed that learning modes and preference for grasping and transforming information were not dependent on year in school (Table 20). Only low effect sizes were found for the learning mode and preference variables (Coolidge, 2006).

Major and Learning Styles and Learning Modes

Of the 34 participants, 14.71% (*n* = 5) were science majors and accommodating learners and 11.76% (*n* = 4) were non-science majors and accommodating learners.

Table 19

Mean Learning Mode and Preference Scores of Supplemental Instruction Leaders by Year in School (*N* = 34)

Construct	Year in school	*n*	*M*	*SD*
Concrete Experience (CE)	Senior	16	28.25	2.08
	Junior	12	28.58	2.35
	Sophomore	6	27.67	2.88
Reflective Observation (RO)	Senior	16	29.13	4.60
	Junior	12	26.50	4.33
	Sophomore	6	28.50	2.43
Abstract Conceptualization (AC)	Senior	16	31.06	3.11
	Junior	12	35.50	2.56
	Sophomore	6	32.83	2.56
Active Experimentation (AE)	Senior	16	31.56	2.99
	Junior	12	32.42	3.78
	Sophomore	6	32.00	2.99
Grasping Information (AC-CE)	Senior	16	2.81	4.32
	Junior	12	3.92	3.61
	Sophomore	6	5.17	4.58
Transforming Information (AE-RO)	Senior	16	2.44	7.14
	Junior	12	5.92	7.55
	Sophomore	6	3.50	3.89

Science majors with a diverging style accounted for 26.47% (*n* = 9) and non-science majors accounted for 20.59% (*n* = 7). There were 8.82% (*n* = 3) who were science majors and assimilating learners and 5.88% (*n* = 2) non-science majors with assimilating learning style. Converging learners who were non-science majors accounted for 8.82% (*n* = 3) of the participants and converging learners with a science major accounted for 2.94% (*n* = 1). Table 21 displays learning styles of SI leaders by major.

Table 20

Results of One-Way Analysis of Variance of Learning Mode and Preference Scores by Year in School (*N* = 34)

Learning mode	Measure	*df*	*F*	*p*	ω^2
Concrete Experience (CE)	Between	2	0.31	.73	.04
	Within	31			
Reflective Observation (RO)	Between	2	1.36	.27	.02
	Within	31			
Abstract Conceptualization (AC)	Between	2	1.35	.28	.02
	Within	31			
Active Experimentation (AE)	Between	2	0.23	.79	.05
	Within	31			
Grasping Information (AC-CE)	Between	2	0.76	.48	.01
	Within	31			
Transforming Information (AE-RO)	Between	2	0.89	.42	.01
	Within	31			

Table 21

Learning Styles of Supplemental Instruction Leaders by Major (*N* = 34)

	Science		Non-Science		Total	
Learning style	*n*	% of total	*n*	% of total	*n*	%
Accommodating	5	14.71	4	11.76	9	26.47
Diverging	9	26.47	7	20.59	16	47.06
Assimilating	3	8.82	2	5.88	5	14.71
Converging	1	2.94	3	8.82	4	11.76
Total	18	52.94	16	47.06	34	100.00

As shown in Table 22, non-science majors scored higher in the RO and AC modes and higher in the preference for grasping information mode. A small effect was found for AC ($d = 0.37$), AE ($d = 0.29$), grasping information ($d = 0.29$), and transforming information ($d = 0.24$). Independent t tests revealed that major had no significant effect on any of the learning modes or preference for grasping and transforming information (Table 23).

Table 22

Mean Learning Mode Scores and Learning Style Scores by Major ($N = 34$)

Construct	Major	*n*	*M*	*SD*	*d*
Concrete Experience (CE)	Science	18	28.33	2.52	0.06
	Non-Science	16	28.19	2.04	
Reflective Observation (RO)	Science	18	27.89	4.17	0.10
	Non-Science	16	28.31	4.51	
Abstract Conceptualization (AC)	Science	18	31.39	2.73	0.37
	Non-Science	16	32.44	2.87	
Active Experimentation (AE)	Science	18	32.39	2.89	0.29
	Non-Science	16	31.44	3.54	
Grasping Information (AC-CE)	Science	18	3.06	4.12	0.29
	Non-Science	16	4.25	4.10	
Transforming Information (AE-RO)	Science	18	4.50	3.40	0.24
	Non-Science	16	3.13	7.47	

Table 23

Results of Independent t *Test for Supplemental Instruction Leader Learning Mode Scores by Major* (*N* = 34)

Construct	*t*	*df*	*p*
Concrete Experience (CE)	-.18	32	.86
Reflective Observation (RO)	.28	32	.78
Abstract Conceptualization (AC)	1.09	32	.28
Active Experimentation (AE)	-.86	32	.40
Grasping Information (AC-CE)	.85	32	.41
Transforming Information (AE-RO)	-.58	32	.57

Semesters of Experience and Learning Styles and Learning Modes

Semesters of experience ranged from 1 to 6, with a mean of 2.38 (*SD* = 1.44). The highest mean for semesters of experience was for participants with a diverging style: 2.75 (*SD* = 1.48). The mean for accommodating learning style was 2.44 (*SD* = 1.67), the mean for assimilating style was 1.80 (*SD* = 0.83), and the mean for converging style was 1.50 (*SD* = 1.00; Table 24). A one-way analysis of variance revealed that learning style was not dependent on semesters of experience, and only a small effect ($\omega^2 = .01$) was found (Table 25).

Pearson product-moment correlations results for relationships between each of the learning modes and the semesters of experience of the SI leaders are presented in Table 26. Correlations for preference for grasping and transforming information and semesters of experience are also displayed in the table. There was no significant relationship between learning modes and preferences and semesters of experience. There

Table 24

Learning Styles and Semesters of Experience (*N* = 34)

Learning style	*n*	*M*	*SD*
Accommodating	9	2.44	1.67
Diverging	16	2.75	1.48
Assimilating	5	1.80	0.83
Converging	4	1.50	1.00
Total	34	2.38	1.44

Table 25

Results of One-Way Analysis of Variance of Learning Styles by Semesters of Experience (*N* = 34)

Learning mode	Measure	*df*	*F*	*p*	ω^2
Semesters of experience	Between	3	1.15	.35	.01
	Within	30			

Table 26

Pearson Product-Moment Correlations Between Learning Mode Scores and Semesters of Experience (*N* = 34)

Construct	*r*	*df*	*p* (two-tailed)
Concrete Experience (CE)	.07	33	.69
Reflective Observation (RO)	.11	33	.53
Abstract Conceptualization (AC)	-.34	33	.05
Active Experimentation (AE)	.04	33	.83
Grasping Information (AC-CE)	-.27	33	.13
Transforming Information (AE-RO)	-.05	33	.77

was a moderate negative (Miller, 1998) but insignificant relationship between AC and semesters of experience, $r = -.34$, $p > .05$. The relationship was low negative but insignificant between grasping information and semesters of experience, $r = -.27$, $p > .05$. There was a low positive but insignificant relationship between RO and semesters of experience, $r = .11$, $p > .05$.

GPA and Learning Styles and Learning Modes

Participant GPA ranged from 3.00 to 4.00, with a mean of 3.65 ($SD = 0.25$). Participants with an accommodating learning style had the highest mean GPA ($M = 3.74$, $SD = 0.29$) and diverging learners had the lowest mean GPA, ($M = 3.59$, $SD = 0.23$). Converging learners had a mean GPA of 3.69 ($SD = 0.13$) and assimilating learners had a mean GPA of 3.68 ($SD = 0.34$; Table 27). A one-way analysis of variance revealed that GPA was not dependent on learning style, $F(3,30) = .69$, $p > .05$ (Table 28). A small effect was found ($\omega^2 = .03$).

Table 27

Learning Styles of Supplemental Instruction Leaders and Grade Point Average ($N = 34$)

Learning style	*n*	*M*	*SD*
Accommodating	9	3.74	0.29
Diverging	16	3.59	0.23
Assimilating	5	3.68	0.34
Converging	4	3.69	0.13
Total	34	3.65	0.25

Table 28

Results of One-Way Analysis of Variance of Learning Styles by Grade Point Average (*N* = 34)

Variable	Measure	*df*	*F*	*p*	ω^2
Supplemental Instruction leader grade point average	Between	3	.69	.57	.03
	Within	30			

Pearson product-moment correlations between each of the learning modes and preferences and GPA of the SI leaders are presented in Table 29. As shown, there was no significant relationship between the learning modes and preferences and GPA. There was a low positive but insignificant relationship between AC and GPA, $r = .11$, $p > .05$.

Table 29

Pearson Product-Moment Correlations Between Learning Mode Scores and Grade Point Average (*N* = 34)

Construct	*r*	*df*	*p* (two-tailed)
Concrete Experience (CE)	-.01	33	.97
Reflective Observation (RO)	-.01	33	.96
Abstract Conceptualization (AC)	.11	33	.55
Active Experimentation (AE)	-.09	33	.62
Grasping Information (AC-CE)	.08	33	.67
Transforming Information (AE-RO)	-.04	33	.84

Age and Learning Styles and Learning Modes

The age of participants ranged from 19 to 23 years, with a mean of 20.47 years (*SD* = 1.08). The mean age for accommodating learners was 20.56 (*SD* = 0.88), 20.25

(*SD* = 0.93) for diverging learners, 21.20 (*SD* = 1.78) for assimilating learners, and 20.25 (*SD* = 0.93) for converging learners (Table 30). A one-way analysis of variance revealed that learning style was not dependent on the age, $F(3,30) = 1.06$, $p > .05$ (Table 31). A small effect was found ($\omega^2 = .01$).

Table 30

Learning Styles of Supplemental Instruction Leaders and Age (*N* = 34)

Learning style	*n*	*M*	*SD*
Accommodating	9	20.56	0.88
Diverging	16	20.25	0.93
Assimilating	5	21.20	1.78
Converging	4	20.25	0.96
Total	34	20.47	1.08

Table 31

Results of One-Way Analysis of Variance of Learning Styles and Age (*N* = 34)

Variable	Measure	*df*	*F*	*p*	ω^2
Supplemental Instruction leader age	Between	3	1.06	.38	.01
	Within	30			

Pearson product-moment correlations between each of the learning modes and age of the SI leaders are presented in Table 32. Correlations for preference for grasping and transforming information and age are also displayed in the table. As shown, there

Table 32

Pearson Product-Moment Correlations Between Learning Mode Scores and Age ($N = 34$)

Construct	*r*	*df*	*p* (two-tailed)
Concrete Experience (CE)	-.07	33	.72
Reflective Observation (RO)	.01	33	.95
Abstract Conceptualization (AC)	.01	33	.96
Active Experimentation (AE)	-.05	33	.77
Grasping Information (AC-CE)	.04	33	.81
Transforming Information (AE-RO)	-.03	33	.86

was no significant relationship between learning modes and preferences and age. All variables had negligible effect sizes.

Objective 2

Objective 2 was to explore the relationship between SI leader demographic variables and the leader's leadership style. Of the 34 participants, only 32 provided useable responses for the MLQ. Data for two participants was removed from analysis because more than 15% of the data on the survey was missing (Mertler & Vannatta, 2010). Scores for the leadership styles and scales had a possible range of 0 to 4. The highest mean score reported was for the inspirational motivation scale ($M = 3.26$, $SD = 0.76$) and the lowest mean score was for the laissez-faire leadership scale ($M = 0.80$, $SD = 0.57$). The mean for transformational leadership style was 3.01 ($SD = 0.30$), the mean for transactional leadership style was 2.45 ($SD = 0.53$), and the mean for passive/avoidant leadership style was 0.62 ($SD = 0.45$). Mean scores for transformational leadership style and the scales associated with it were the highest and

passive/avoidant leadership style means and the two scales associated with it were the lowest. Mean scores for the leadership styles and scales are presented in Table 33.

Table 33

Multifactor Leadership Questionnaire (MLQ) 5X Leadership Style Scores and Leadership Scale Scores ($N = 32$)

Construct	*M*	*SD*	Minimum	Maximum
Idealized Influence (Attributed)	2.95	.57	1.50	4.00
Idealized Influence (Behavior)	2.67	.53	1.33	3.75
Inspirational Motivation	3.27	.76	2.00	4.00
Intellectual Stimulation	2.95	.47	2.00	3.75
Individual Consideration	3.21	.48	2.00	4.00
Transformational Leadership Style	3.01	.30	2.30	3.57
Contingent Reward	2.96	.48	1.50	3.67
Management-by-Exception (Active)	1.94	.77	0.00	3.25
Transactional Leadership Style	2.45	.53	1.13	3.38
Management-by-Exception (Passive)	0.66	.48	0.00	2.00
Laissez-Faire Leadership	0.58	.57	0.00	2.00
Passive/Avoidant Leadership Style	0.62	.45	0.00	2.00

Gender and Leadership Styles and Leadership Scales

There were 21 females and 11 males who provided useable responses on the MLQ. Females had a higher mean score for transformational leadership style ($M = 3.02$, $SD = 0.26$) and the scales idealized influence (attributed; $M = 3.01$, $SD = 0.53$) and individual consideration ($M = 3.27$, $SD = 0.43$). Males had a higher mean score for idealized influence (behavior; $M = 2.73$, $SD = 0.49$), inspirational motivation ($M = 3.30$, $SD = 0.44$), and intellectual stimulation ($M = 2.98$, $SD = 0.54$) scales of transformational leadership style. Male participants also had higher mean scores for transactional

leadership style ($M = 2.58$, $SD = 0.49$) and its scales, as well as for passive/avoidant leadership style ($M = 0.79$, $SD = 0.56$) and its scales. Mean scores for the leadership styles and scales by gender are presented in Table 34.

A medium effect was found for passive/avoidant leadership style ($d = 0.55$). A small effect was found for idealized influence (attributed; $d = 0.27$), idealized influence (behavior; $d = 0.26$), individual consideration ($d = 0.36$), management-by-exception (active; $d = 0.45$), transactional leadership style ($d = 0.38$), management-by-exception (passive; $d = 0.44$), and laissez-faire ($d = 0.47$). Independent t tests revealed that gender had no significant effect on leadership styles or the scales (Table 35).

Ethnicity and Leadership Styles and Leadership Scales

There were 20 White participants and 12 non-White participants included in the analysis of ethnicity and leadership style. Participants in the non-White group scored higher on all leadership styles and leadership scales than those who were White. A large effect size was found in the laissez-faire leadership scale ($d = 1.04$) and the passive/avoidant leadership style ($d = 0.88$). A medium effect was revealed for idealized influence (behavior; $d = 0.62$), inspirational motivation ($d = 0.68$), and transformational leadership style ($d = 0.57$). Mean scores for the leadership styles and scales by ethnicity are presented in Table 36.

Independent t tests revealed a significant difference in ethnicity for the laissez-faire leadership scale, $t(30) = .00$, $p < .01$, and for passive/avoidant leadership style, $t(30) = .01$, $p < .05$ (Table 37).

Table 34

Mean Leadership Scale Scores and Leadership Style Scores by Gender (*N* = 32)

Construct	Gender	*n*	*M*	*SD*	*d*
Idealized Influence (Attributed)	Female	21	3.01	0.53	0.27
	Male	11	2.85	0.66	
Idealized Influence (Behavior)	Female	21	2.63	0.26	0.26
	Male	11	2.73	0.49	
Inspirational Motivation	Female	21	3.25	0.47	0.11
	Male	11	3.30	0.44	
Intellectual Stimulation	Female	21	2.94	0.44	0.08
	Male	11	2.98	0.54	
Individual Consideration	Female	21	3.27	0.43	0.36
	Male	11	3.09	0.56	
Transformational Leadership Style	Female	21	3.02	0.26	0.09
	Male	11	2.99	0.39	
Contingent Reward	Female	21	2.93	0.51	0.17
	Male	11	3.01	0.43	
Management-by-Exception (Active)	Female	21	1.83	0.84	0.45
	Male	11	2.16	0.59	
Transactional Leadership Style	Female	21	2.38	0.55	0.38
	Male	11	2.58	0.49	
Management-by-Exception (Passive)	Female	21	0.58	0.45	0.44
	Male	11	0.80	0.54	
Laissez-Faire Leadership	Female	21	0.48	0.45	0.47
	Male	11	0.77	0.75	
Passive/Avoidant Leadership Style	Female	21	0.53	0.37	0.55
	Male	11	0.79	0.56	

Table 35

Results of Independent t *Test for Supplemental Instruction Leader Leadership Scale Scores and Leadership Style Scores by Gender* (*N* = 32)

Construct	*t*	*df*	*p* (two-tailed)
Idealized Influence (Attributed)	-.75	30	.46
Idealized Influence (Behavior)	.46	30	.65
Inspirational Motivation	.26	30	.79
Intellectual Stimulation	.19	30	.85
Individual Consideration	-1.03	30	.31
Transformational Leadership Style	-.30	30	.77
Contingent Reward	.42	30	.68
Management-by-Exception (Active)	1.17	30	.25
Transactional Leadership Style	1.03	30	.31
Management-by-Exception (Passive)	1.23	30	.23
Laissez-Faire Leadership	1.57	30	.17
Passive/Avoidant Leadership Style	1.57	30	.13

Year in School and Leadership Styles and Leadership Scales

There were 15 seniors, 11 juniors, and 6 sophomores who provided useable responses for analysis with the MLQ data. Seniors had the highest mean score for transformational leadership style (*M* = 3.04, *SD* = 0.34) and four of the five scales associated with the style: idealized influence (behavior; *M* = 2.71, *SD* = 0.66), inspirational motivation (*M* = 3.32, *SD* = 0.50), intellectual stimulation (*M* = 2.97, *SD* = 0.52), and individual consideration (*M* = 3.33, *SD* = 0.40). Sophomores had the lowest mean score for transformational leadership style (*M* = 2.90, *SD* = 0.30) and four of the five of the associated scales: idealized influence (attributed; *M* = 2.79, *SD* = 0.86), idealized influence (behavior; *M* = 2.58, *SD* = 0.34), intellectual stimulation (*M* = 2.96,

Table 36

Mean Leadership Scale Scores and Leadership Style Scores by Ethnicity ($N = 32$)

Construct	Ethnicity	*n*	*M*	*SD*	*d*
Idealized Influence (Attributed)	White	20	2.95	0.54	0.03
	Non-white	12	2.97	0.65	
Idealized Influence (Behavior)	White	20	2.55	0.60	0.62
	Non-white	12	2.85	0.33	
Inspirational Motivation	White	20	3.19	0.49	0.68
	Non-white	12	3.49	0.39	
Intellectual Stimulation	White	20	2.88	0.51	0.45
	Non-white	12	3.08	0.36	
Individual Consideration	White	20	3.18	0.41	0.18
	Non-white	12	3.27	0.60	
Transformational Leadership Style	White	20	2.94	0.30	0.57
	Non-white	12	3.11	0.30	
Contingent Reward	White	20	2.90	0.50	0.00
	Non-white	12	3.05	0.45	
Management-by-Exception (Active)	White	20	1.82	0.63	0.41
	Non-white	12	2.15	0.96	
Transactional Leadership Style	White	20	2.36	0.48	0.44
	Non-white	12	2.60	0.61	
Management-by-Exception (Passive)	White	20	0.57	0.36	0.48
	Non-white	12	0.81	0.62	
Laissez-Faire Leadership	White	20	0.36	0.33	1.04
	Non-white	12	0.94	0.72	
Passive/Avoidant Leadership Style	White	20	0.47	0.24	0.88
	Non-white	12	0.87	0.60	

Table 37

Results of Independent t *Test for Supplemental Instruction Leader Leadership Scale Scores and Leadership Style Scores by Ethnicity* ($N = 32$)

Construct	*t*	*df*	*p*
Idealized Influence (Attributed)	-.09	30	.93
Idealized Influence (Behavior)	-1.59	30	.12
Inspirational Motivation	-1.26	30	.22
Intellectual Stimulation	-1.21	30	.24
Individual Consideration	-.54	30	.59
Transformational Leadership Style	-1.53	30	.14
Contingent Reward	-.82	30	.42
Management-by-Exception (Active)	-1.77	30	.25
Transactional Leadership Style	-1.23	30	.23
Management-by-Exception (Passive)	-1.35	30	.19
Laissez-Faire Leadership	-3.11	30	.00*
Passive/Avoidant Leadership Style	-2.69	30	.01*

*$p < .05$ (two-tailed).

SD = 0.37), and individual consideration (*M* = 2.71, *SD* = 0.46). Mean scores for leadership styles and scales are displayed in Table 38.

One-way analysis of variance revealed that individual consideration differed as a function of year in school, $F(2,29) = 5.14$, $p < .05$ (Table 39). Tukey HSD post hoc test revealed that sophomores differed juniors and seniors (Table 40). Medium effect sizes were found for idealized influence (behavior; $\omega^2 = .06$), intellectual stimulation ($\omega^2 = .07$), and management-by-exception (passive; $\omega^2 = .06$).

Major and Leadership Styles and Leadership Scales

There were 16 participants with a non-science major and 16 participants with a science major who provided useable responses on the MLQ. Participants with a

Table 38

Mean Leadership Style and Scale Scores of Supplemental Instruction Leaders by Year in School (*N* = 32)

Construct	Year in school	*n*	*M*	*SD*
Idealized Influence (Attributed)	Senior	15	2.89	0.51
	Junior	11	3.12	0.78
	Sophomore	6	2.79	0.86
Idealized Influence (Behavior)	Senior	15	2.71	0.66
	Junior	11	2.65	0.45
	Sophomore	6	2.58	0.34
Inspirational Motivation	Senior	15	3.32	0.50
	Junior	11	3.09	0.45
	Sophomore	6	3.46	0.29
Intellectual Stimulation	Senior	15	2.97	0.52
	Junior	11	2.93	0.48
	Sophomore	6	2.96	0.37
Individual Consideration	Senior	15	3.33	0.40
	Junior	11	3.32	0.45
	Sophomore	6	2.71	0.46
Transformational Leadership Style	Senior	15	3.04	0.34
	Junior	11	3.02	0.27
	Sophomore	6	2.90	0.30
Contingent Reward	Senior	15	3.01	0.44
	Junior	11	2.96	0.62
	Sophomore	6	2.83	0.30
Management-by-Exception (Active)	Senior	15	1.92	0.76
	Junior	11	2.18	0.79
	Sophomore	6	1.54	0.70
Transactional Leadership Style	Senior	15	2.46	0.48
	Junior	11	2.57	0.65
	Sophomore	6	2.18	0.39
Management-by-Exception (Passive)	Senior	15	0.82	0.48
	Junior	11	0.45	0.43
	Sophomore	6	0.62	0.49
Laissez-Faire Leadership	Senior	15	0.55	0.52
	Junior	11	0.68	0.71
	Sophomore	6	0.46	0.49
Passive/Avoidant Leadership Style	Senior	15	0.68	0.43
	Junior	11	0.57	0.50
	Sophomore	6	0.54	0.46

Table 39

Results of One-Way Analysis of Variance of Leadership Style Scores and Leadership Scale Scores by Year in School ($N = 32$)

Variable	Measure	*df*	*F*	*p*	ω^2
Idealized Influence (Attributed)	Between Within	2 29	0.78	.47	.01
Idealized Influence (Behavior)	Between Within	2 29	0.11	.90	.06
Inspirational Motivation	Between Within	2 29	1.47	.25	.03
Intellectual Stimulation	Between Within	2 29	0.02	.98	.07
Individual Consideration	Between Within	2 29	5.14	.01*	.21
Transformational Leadership Style	Between Within	2 29	0.49	.62	.03
Contingent Reward	Between Within	2 29	0.27	.77	.05
Management-by-Exception (Active)	Between Within	2 29	1.38	.27	.02
Transactional Leadership Style	Between Within	2 29	1.02	.37	.00
Management-by-Exception (Passive)	Between Within	2 29	1.98	.16	.06
Laissez-Faire Leadership	Between Within	2 29	0.32	.73	.04
Passive/Avoidant Leadership Style	Between Within	2 29	0.31	.74	.05

*$p < .05$ (two-tailed).

Table 40

Tukey HSD Post Hoc for Individual Consideration Scale and Year in School (*N* = 32)

Year in school	*n*	Subset 1	Subset 2
Sophomore	6	2.71	
Junior	11		3.32
Senior	15		3.33

non-science major had higher mean scores for individualized influence (attributed; *M* = 3.08, *SD* = 0.64), individualized influence (behavior; *M* = 2.70, *SD* = 0.42), intellectual stimulation (*M* = 2.97, *SD* = 0.39), and management-by-exception (active; *M* = 2.02, *SD* = 0.80) scales. Participants with a science major scored higher on transformational leadership style (*M* = 3.00, *SD* = 0.32), inspirational motivation (*M* = 3.31, *SD* = 0.36), individual consideration (*M* = 3.31, *SD* = 0.50), contingent reward (*M* = 3.04, *SD* = 0.54), passive/avoidant leadership style (*M* = 0.69, *SD* = 0.56), management-by-exception (passive; *M* = 0.69, *SD* = 0.58), and laissez-faire leadership (*M* = 0.69, *SD* = 0.68). Mean scores for leadership styles and associated scales by major are presented in Table 41.

A medium effect was found for idealized influence (attributed; *d* = 0.50). A small effect was found for individual consideration (*d* = 0.42), contingent reward (*d* = 0.33), management-by-exception (active; *d* = 0.21), laissez-faire (*d* = 0.38), and passive/avoidant leadership style (*d* = 0.31). Independent *t* tests revealed that major had no significant effect on leadership styles or the scales (Table 42).

Table 41

Mean Leadership Factor Scores and Leadership Style Scores by Major ($N = 32$)

Construct	Major	*n*	*M*	*SD*	*d*
Idealized Influence (Attributed)	Science	16	2.82	0.48	0.50
	Non-Science	16	3.08	0.64	
Idealized Influence (Behavior)	Science	16	2.63	0.63	0.13
	Non-Science	16	2.70	0.42	
Inspirational Motivation	Science	16	3.31	0.36	0.19
	Non-Science	16	3.22	0.55	
Intellectual Stimulation	Science	16	2.94	0.55	0.06
	Non-Science	16	2.97	0.39	
Individual Consideration	Science	16	3.31	0.50	0.42
	Non-Science	16	3.11	0.46	
Transformational Leadership Style	Science	16	3.00	0.32	0.07
	Non-Science	16	3.02	0.29	
Contingent Reward	Science	16	3.04	0.54	0.33
	Non-Science	16	2.88	0.41	
Management-by-Exception (Active)	Science	16	1.86	0.76	0.21
	Non-Science	16	2.02	0.80	
Transactional Leadership Style	Science	16	2.45	0.58	0.00
	Non-Science	16	2.45	0.50	
Management-by-Exception (Passive)	Science	16	0.69	0.58	0.12
	Non-Science	16	0.63	0.37	
Laissez-Faire Leadership	Science	16	0.69	0.68	0.38
	Non-Science	16	0.47	0.44	
Passive/Avoidant Leadership Style	Science	16	0.69	0.56	0.31
	Non-Science	16	0.55	0.31	

Table 42

Results of Independent t *Test for Supplemental Instruction Leader Leadership Factor Scores and Leadership Style Scores by Major* ($N = 32$)

Construct	*t*	*df*	*p* (two-tailed)
Idealized Influence (Attributed)	1.3	30	.20
Idealized Influence (Behavior)	.38	30	.70
Inspirational Motivation	-.57	30	.57
Intellectual Stimulation	.16	30	.88
Individual Consideration	-1.21	30	.24
Transformational Leadership Style	.12	30	.91
Contingent Reward	-.92	30	.36
Management-by-Exception (Active)	.59	30	.56
Transactional Leadership Style	.01	30	.99
Management-by-Exception (Passive)	-.39	30	.70
Laissez-Faire Leadership	-.89	30	.29
Passive/Avoidant Leadership Style	-.89	30	.38

Semesters of Experience and Leadership Styles and Leadership Scales

Pearson product-moment correlations between each of the leadership styles and leadership scales and semesters of experience of the SI leaders are presented in Table 43. There was no significant relationship between the leadership styles and leadership scales and semesters of experience.

There was a low positive but insignificant relationship between transformational leadership style, $r = .14$, $p > .05$, and transactional leadership style, $r = .17$, $p > .05$, and semesters of experience. There was also a low positive, insignificant relationship between intellectual stimulation $r = .19$, $p > .05$, individual consideration, $r = .12$, $p > .05$, and management-by-exception (active), $r = .24$, $p > .05$ scales and semesters of experience.

Table 43

Pearson Product-Moment Correlations Between Leadership Scale Scores and Leadership Style Scores and Semesters of Experience ($N = 32$)

Construct	*r*	*df*	*p* (two-tailed)
Idealized Influence (Attributed)	.02	31	.92
Idealized Influence (Behavior)	.02	31	.92
Inspirational Motivation	.10	31	.58
Intellectual Stimulation	.19	31	.29
Individual Consideration	.12	31	.50
Transformational Leadership Style	.14	31	.44
Contingent Reward	.00	31	1.00
Management-by-Exception (Active)	.24	31	.19
Transactional Leadership Style	.17	31	.35
Management-by-Exception (Passive)	.07	31	.72
Laissez-Faire Leadership	-.02	31	.91
Passive/Avoidant Leadership Style	.02	31	.91

GPA and Leadership Styles and Leadership Scales

Pearson product-moment correlations between each of the leadership styles and leadership scales and GPA of the SI leaders are presented in Table 44. There was no significant relationship between the leadership styles and leadership scales and GPA. There was a moderate positive but insignificant relationship between idealized influence (behavior) and GPA, $r = .35$, $p > .05$.

There was a low positive but insignificant relationship between transformational leadership style, $r = .27$, $p > .05$, transactional leadership style, $r = .19$, $p > .05$, idealized influence (attributed), $r = .26$, $p > .05$, intellectual stimulation, $r = .12$, $p > .05$, individual consideration, $r = .13$, $p > .05$, contingent reward, $r = .13$, $p > .05$, management-by-exception (active), $r = .19$, $p > .05$, laissez-faire leadership $r = .20$, $p > .05$, and GPA.

Table 44

Pearson Product-Moment Correlations Between Leadership Scale Scores and Leadership Style Scores and Grade Point Average ($N = 32$)

Construct	*r*	*df*	*p* (two-tailed)
Idealized Influence (Attributed)	.26	31	.15
Idealized Influence (Behavior)	.35	31	.05
Inspirational Motivation	-.11	31	.57
Intellectual Stimulation	.12	31	.50
Individual Consideration	.13	31	.47
Transformational Leadership Style	.27	31	.14
Contingent Reward	.13	31	.49
Management-by-Exception (Active)	.19	31	.30
Transactional Leadership Style	.19	31	.29
Management-by-Exception (Passive)	-.09	31	.64
Laissez-Faire Leadership	.20	31	.27
Passive/Avoidant Leadership Style	.08	31	.65

There was a low negative but insignificant relationship between inspirational motivation and GPA, $r = -.11$, $p > .05$.

Age and Leadership Styles and Leadership Scales

Pearson product-moment correlations between each of the leadership styles and leadership scales and age of SI leaders are presented in Table 45. There was a significant moderate positive relationship between individual consideration scale and age, $r = .39$, $p < .05$. There was a low positive but insignificant relationship between transformational leadership style, $r = .10$, $p > .05$, and idealized influence (behavior), $r = .12$, $p > .05$, and age. There was a low negative but insignificant relationship between laissez-faire leadership and age, $r = .15$, $p > .05$. There was a very high negative but insignificant relationship between passive/avoidant leadership style and age, $r = -.78$, $p > .05$.

Table 45

Pearson Product-Moment Correlations Between Leadership Scale Scores and Leadership Style Scores and Age ($N = 32$)

Construct	*r*	*df*	*p*
Idealized Influence (Attributed)	-.07	31	.70
Idealized Influence (Behavior)	.12	31	.92
Inspirational Motivation	.05	31	.79
Intellectual Stimulation	-.06	31	.73
Individual Consideration	.39	31	.03*
Transformational Leadership Style	.10	31	.60
Contingent Reward	-.02	31	.90
Management-by-Exception (Active)	.05	31	.80
Transactional Leadership Style	.02	31	.90
Management-by-Exception (Passive)	.03	31	.86
Laissez-Faire Leadership	-.15	31	.42
Passive/Avoidant Leadership Style	-.78	31	.68

*$p < .05$ (two-tailed)

Objective 3

Objective 3 was to explore the relationship between learning style and leadership style of the SI leader.

Transformational Leadership and Learning Modes and Preferences

Pearson product-moment correlations between transformational leadership style scores and each of the learning modes and preference for grasping and transforming information are presented in Table 46. There was a significant moderate negative relationship between transformational leadership style and AC, $r = -.35$, $p < .05$, and with the preference for transforming information, $r = -.35$, $p < .05$. There was a low positive but insignificant relationship between transformational leadership style and RO, $r = .29$, $p > .05$.

Table 46

Pearson Product-Moment Correlations for Transformational Leadership Style Scores and Learning Mode and Preference Scores

Variables pair	*r*	*df*	*p*
Transformational Leadership Style and CE	-.03	33	.87
Transformational Leadership Style and RO	.29	33	.10
Transformational Leadership Style and AC	-.09	33	.62
Transformational Leadership Style and AE	-.35	33	.04*
Transformational Leadership Style and AC-CE	-.04	33	.81
Transformational Leadership Style and AE-RO	-.35	33	.05*

Note. CE = Concrete Experience, RO = Reflective Observation, AC = Abstract Conceptualization, AE = Active Experimentation, AC-CE = Grasping Information, AE-RO = Transforming Information.

*$p < .05$ (two-tailed).

Pearson product-moment correlations between transformational leadership scale scores and each of the learning modes and preference for grasping and transforming information are presented in Table 47. The degrees of freedom differed on some of the scales due to the unusable data from some participants.

Idealized influence (attributed). A significant moderate negative relationship existed between idealized influence (attributed) and AE, $r = -.39$, $p < .05$. There was a moderate positive but insignificant relationship with CE, $r = .32$, $p > .05$, and a low positive insignificant relationship between idealized influence (behavior) and RO, $r = .16$, $p > .05$. A low negative but insignificant relationship existed with AC, $r = -.10$, $p > .05$, with preferences for grasping (AC-CE), $r = -.23$, $p > .05$, and with transforming information (AE-RO), $r = -.28$, $p > .05$.

Table 47

Pearson Product-Moment Correlations for Transformational Leadership Scale Scores and Learning Mode and Preference Scores

Variables pair	*r*	*df*	*p*
Idealized Influence (Attributed) and CE	.32	31	.08
Idealized Influence (Attributed) and RO	.16	31	.38
Idealized Influence (Attributed) and AC	-.10	31	.60
Idealized Influence (Attributed) and AE	-.39	31	.03*
Idealized Influence (Attributed) and AC-CE	-.23	31	.20
Idealized Influence (Attributed) and AE-RO	-.28	31	.12
Idealized Influence (Behavior) and CE	-.44	32	.01*
Idealized Influence (Behavior) and RO	.46	32	.01*
Idealized Influence (Behavior) and AC	-.05	32	.79
Idealized Influence (Behavior) and AE	-.25	32	.17
Idealized Influence (Behavior) and AC-CE	.20	32	.27
Idealized Influence (Behavior) and AE-RO	-.40	32	.02*
Inspirational Motivation and CE	.13	32	.47
Inspirational Motivation and RO	-.18	32	.32
Inspirational Motivation and AC	-.16	32	.36
Inspirational Motivation and AE	.27	32	.13
Inspirational Motivation and AC-CE	-.18	32	.32
Inspirational Motivation and AE-RO	.24	32	.19
Intellectual Stimulation and CE	-.18	33	.32
Intellectual Stimulation and RO	.43	33	.01*
Intellectual Stimulation and AC	-.03	33	.89
Intellectual Stimulation and AE	-.45	33	.01*
Intellectual Stimulation and AC-CE	.08	33	.65
Intellectual Stimulation and AE-RO	-.47	33	.00*
Individual Consideration and CE	.11	33	.52
Individual Consideration and RO	-.01	33	.96
Individual Consideration and AC	.03	33	.85
Individual Consideration and AE	-.24	33	.17
Individual Consideration and AC-CE	-.04	33	.82
Individual Consideration and AE-RO	-.11	33	.55

Note. CE = Concrete Experience, RO = Reflective Observation, AC = Abstract Conceptualization, AE = Active Experimentation, AC-CE = Grasping Information, AE-RO = Transforming Information.

*$p < .05$.

Idealized influence (behavior). There was a significant moderate negative relationship between idealized influence (behavior) and CE, $r = -.44$, $p < .05$, and a significant moderate positive relationship between idealized influence (behavior) and RO, $r = .46$, $p < .05$. There was a significant negative positive relationship between idealized influence (behavior) and preference for transforming information (AE-RO), $r = -.40$, $p < .05$.

Inspirational motivation. No significant relationships were found for inspirational motivation and the learning modes and preferences for learning. There was a low negative but insignificant relationship between inspirational motivation and RO, $r = -.18$, $p > .05$, with AC, $r = -.16$, $p > .05$, and with grasping information (AC-CE), $r = -.18$, $p > .05$. There was a low positive but insignificant relationship between inspirational motivation and CE, $r = .13$, $p > .05$, and with transforming information (AE-RO), $r = .24$, $p > .05$.

Intellectual stimulation. A positive moderate significant relationship was revealed between intellectual stimulation and RO, $r = .43$, $p < .05$. A negative moderate significant relationship was found between intellectual stimulation and AE, $r = -.44$, $p < .05$, and with preference for transforming information (AE-RO), $r = -.47$, $p < .05$. A low negative but insignificant relationship was found between intellectual stimulation and CE, $r = -.18$, $p > .05$.

Individual consideration. No significant relationships between individual consideration and the learning modes and preferences were revealed. There was a low positive relationship between individual consideration and CE, $r = .11$, $p > .05$. There

was a low negative but insignificant relationship between individual consideration and AE, $r = -.24$, $p > .05$, and with preference for transforming information (AE-RO), $r = -.11$, $p > .05$.

Transactional Leadership and Learning Modes and Preferences

Pearson product-moment correlations between transactional leadership style scores and learning modes and preference for grasping and transforming information are presented in Table 48. There was a significant moderate positive relationship between transactional leadership style and RO, $r = .38$, $p < .05$. A significant moderate negative relationship was revealed between transactional leadership style and AE, $r = -.38$, $p < .05$, and with preference for transforming information (AE-RO), $r = -.42$, $p < .05$. There was a low negative but insignificant relationship between transactional leadership style and CE, $r = -.13$, $p > .05$.

Table 48

Pearson Product-Moment Correlation for Transactional Leadership Style Scores and Learning Mode and Preference Scores

Variables pair	*r*	*df*	*p*
Transactional Leadership Style and CE	-.13	33	.47
Transactional Leadership Style and RO	.38	33	.03*
Transactional Leadership Style and AC	-.02	33	.89
Transactional Leadership Style and AE	-.38	33	.03*
Transactional Leadership Style and AC-CE	.06	33	.76
Transactional Leadership Style and AE-RO	-.42	33	.01*

Note. CE = Concrete Experience, RO = Reflective Observation, AC = Abstract Conceptualization, AE = Active Experimentation, AC-CE = Grasping Information, AE-RO = Transforming Information.

*$p < .05$.

Pearson product-moment correlations between transactional leadership scale scores and each of the learning modes and preference for grasping and transforming information are presented in Table 49. The degrees of freedom differed for the scales due to the unusable data from some participants.

Table 49

Pearson Product-Moment Correlation for Transactional Leadership Scale Scores and Learning Mode and Preference Scores

Variables pair	*r*	*df*	*p*
Contingent Reward and CE	-.11	33	.54
Contingent Reward and RO	.30	33	.09
Contingent Reward and AC	-.00	33	1.00
Contingent Reward and AE	-.31	33	.07
Contingent Reward and AC-CE	.06	33	.73
Contingent Reward and AE-RO	-.33	33	.06
Management-by-Exception (Active) and CE	-.08	32	.65
Management-by-Exception (Active) and RO	.33	32	.06
Management-by-Exception (Active) and AC	-.02	32	.90
Management-by-Exception (Active) and AE	-.35	32	.05*
Management-by-Exception (Active) and AC-CE	.03	32	.88
Management-by-Exception (Active) and AE-RO	-.37	32	.04*

Note. CE = Concrete Experience, RO = Reflective Observation, AC = Abstract Conceptualization, AE = Active Experimentation, AC-CE = Grasping Information, AE-RO = Transforming Information.

*$p < .05$.

Contingent reward. No significant relationships were revealed between contingent reward and learning modes and preferences for grasping and transforming information. Moderate negative but insignificant relationships were found between contingent reward and AE, $r = .-31$, $p > .05$, and with preference for transforming

information (AE-RO), r = .-33, p > .05. A moderate positive but insignificant relationship was found with RO, r = .30, p > .05, and a low negative insignificant relationship was found with CE, r = -.11, p > .05 (Table 49).

Management-by-exception (active). A significant moderate negative relationship was found between management-by-exception (active) and AE, r = -.35, p < .05, and with preference for transforming information (AE-RO), r = -.37, p < .05. A moderate positive but insignificant relationship was found between management-by-exception (active) and RO, r = .33, p > .05 (Table 49).

Passive/Avoidant Leadership and Learning Modes and Preferences

Pearson product-moment correlations between passive/avoidant leadership style scores and learning modes and preference for grasping and transforming information are presented in Table 50. No significant relationships between passive/avoidant leadership style and learning modes and preferences were revealed. A low positive relationship was found between passive/avoidant leadership style and AE, r = .23, p > .05, and with preference for transforming information (AE-RO), r = .10, p > .05. A low negative insignificant relationship was found with AC, r = -.13, p > .05.

Pearson product-moment correlations between passive/avoidant leadership scale scores and each of the learning modes and preference for grasping and transforming information are presented in Table 51. The degrees of freedom remained consistent at 33.

Management-by-exception (passive). No significant relationships between the management-by-exception (passive) scale and learning modes and preferences were

Table 50

Pearson Product-Moment Correlations for Passive/Avoidant Leadership Style Scores and Learning Mode and Preference Scores

Variables pair	*r*	*df*	*p*
Passive Avoidant Leadership Style and CE	-.04	33	.82
Passive Avoidant Leadership Style and RO	.01	33	.97
Passive Avoidant Leadership Style and AC	-.13	33	.47
Passive Avoidant Leadership Style and AE	.23	33	.19
Passive Avoidant Leadership Style and AC-CE	-.07	33	.71
Passive Avoidant Leadership Style and AE-RO	.10	33	.56

Note. CE = Concrete Experience, RO = Reflective Observation, AC = Abstract Conceptualization, AE = Active Experimentation, AC-CE = Grasping Information, AE-RO = Transforming Information.

Table 51

Pearson Product-Moment Correlations for Passive/Avoidant Leadership Scale Scores and Learning Mode and Preference Scores

Variables pair	*r*	*df*	*p*
Management-by-Exception (Passive) and CE	.00	33	.98
Management-by-Exception (Passive) and RO	-.07	33	.70
Management-by-Exception (Passive) and AC	-.12	33	.52
Management-by-Exception (Passive) and AE	.29	33	.10
Management-by-Exception (Passive) and AC-CE	-.08	33	.65
Management-by-Exception (Passive) and AE-RO	.18	33	.32
Laissez-Faire Leadership and CE	-.07	33	.71
Laissez-Faire Leadership and RO	.07	33	.70
Laissez-Faire Leadership and AC	-.11	33	.54
Laissez-Faire Leadership and AE	.12	33	.50
Laissez-Faire Leadership and AC-CE	-.04	33	.83
Laissez-Faire Leadership and AE-RO	.01	33	.95

Note. CE = Concrete Experience, RO = Reflective Observation, AC = Abstract Conceptualization, AE = Active Experimentation, AC-CE = Grasping Information, AE-RO = Transforming Information.

revealed. A low positive but insignificant relationship was found between management-by-exception (passive) scale and AE, $r = .29$, $p > .05$, and with preference for transforming information (AE-RO), $r = .18$, $p > .05$. A low negative insignificant relationship was found with AC, $r = -.12$, $p > .05$ (Table 51).

Laissez-faire leadership. No significant relationships between the laissez-faire leadership scale and learning modes and preferences were revealed. A low positive but insignificant relationship was found between laissez-faire leadership and AE $r = .12$, $p > .05$. A low negative insignificant relationship was found with AC, $r = -.11$, $p > .05$ (Table 51).

Transformational Leadership and Learning Style

To determine whether leadership styles and scales differed by learning style, one-way analysis of variance was performed. All 34 participants were included for analysis with transformational leadership style, intellectual stimulation, and individual consideration. Two participants, both diverging learners, were removed from the scale idealized influence (attributed) and one of those participants was also removed from idealized influence (behavior) and inspirational motivation due to unusable data.

Participants with an assimilating learning style had the highest mean score for transformational leadership style ($M = 3.20$, $SD = 0.19$) and three scales: idealized influence (attributed; $M = 3.17$, $SD = 0.39$), idealized influence (behavior; $M = 2.95$, $SD = 0.62$), and individual consideration ($M = 3.55$, $SD = 0.37$). Converging learners had the lowest mean scores for transformational leadership style ($M = 2.84$, $SD = .46$) and for

two scales: idealized influence (attributed; $M = 2.38$, $SD = 0.60$) and intellectual stimulation ($M = 2.75$, $SD = 0.41$; Table 52).

Table 52

Transformational Leadership Style and Scale Scores of Supplemental Instruction leaders by Learning Style ($N = 34$)

Construct	Learning style	*n*	*M*	*SD*
Transformational Leadership Style	Accommodating	9	2.92	0.29
	Diverging	16	2.99	0.32
	Assimilating	5	3.20	0.19
	Converging	4	2.84	0.46
Idealized Influence (Attributed)	Accommodating	9	2.98	0.48
	Diverging	14	3.02	0.62
	Assimilating	5	3.17	0.39
	Converging	4	2.38	0.60
Idealized Influence (Behavior)	Accommodating	9	2.34	0.51
	Diverging	15	2.63	0.59
	Assimilating	5	2.95	0.62
	Converging	4	2.75	0.74
Inspirational Motivation	Accommodating	9	3.39	0.38
	Diverging	15	3.14	0.59
	Assimilating	5	3.30	0.45
	Converging	4	3.19	0.24
Intellectual Stimulation	Accommodating	9	2.76	0.45.
	Diverging	16	3.06	0.45
	Assimilating	5	3.05	0.51
	Converging	4	2.75	0.41
Individual Consideration	Accommodating	9	3.11	0.36
	Diverging	16	3.15	0.45
	Assimilating	5	3.55	0.37
	Converging	4	3.13	0.83

One-way analysis of variance revealed that transformational leadership style and the scales associated with it did not differ by learning style. A medium effect was found for idealized influence (attributed; $\omega^2 = .07$). Low effects were found for all other variables (Table 53).

Table 53

Results of One-Way Analysis of Variance of Transformational Leadership Style and Scales by Learning Style ($N = 34$)

Leadership style	Measure	*df*	*F*	*p*	ω^2
Transformational Leadership Style	Between Within	3 30	1.22	.32	.02
Idealized Influence (Attributed)	Between Within	3 28	1.81	.17	.07
Idealized Influence (Behavior)	Between Within	3 29	1.25	.31	.02
Inspirational Motivation	Between Within	3 29	0.53	.67	.04
Intellectual Stimulation	Between Within	3 30	1.91	.33	.02
Individual Consideration	Between Within	3 30	1.11	.36	.01

Transactional Leadership and Learning Style

Data from all 34 participants were used for analysis of transactional leadership style and the contingent reward scale. One diverging learner was removed from analysis of management-by-exception (active) due to unusable data. Participants with a

converging learning style had the highest mean for transactional leadership style, (M = 2.59, SD = 0.50) and management-by-exception (active; M = 2.13, SD = 0.60), and the second-highest mean for contingent reward (M = 3.06, SD = 0.42). Accommodating learners had the lowest mean for transactional leadership style (M = 2.15, SD = 0.61) and the scales contingent reward (M = 2.74, SD = 0.58) and management-by-exception (active; M = 1.56, SD = 0.84). Table 54 displays the means and standard deviations of the leadership styles and scales by learning style.

Table 54

Transactional Leadership Style and Scale Scores of Supplemental Instruction leaders by Learning Style (N = 34)

Construct	Learning style	*n*	*M*	*SD*
Transactional Leadership Style	Accommodating	9	2.15	0.61
	Diverging	16	2.55	0.49
	Assimilating	5	2.56	0.30
	Converging	4	2.59	0.50
Contingent Reward	Accommodating	9	2.74	0.58
	Diverging	16	3.01	0.43
	Assimilating	5	3.07	0.49
	Converging	4	3.06	0.42
Management-by-Exception (Active)	Accommodating	9	1.56	0.84
	Diverging	15	2.09	0.78
	Assimilating	5	2.05	0.60
	Converging	4	2.13	0.60

One-way analysis of variance revealed that transactional leadership style and the scales associated with it did not differ by learning style. Low effects were found for

transactional leadership style ($\omega^2 = .04$) and the scales contingent reward ($\omega^2 = .02$) and management-by-exception (active; $\omega^2 = .07$; Table 55).

Table 55

Results of One-Way Analysis of Variance of Leadership Factor Scores and Leadership Style Scores by Learning Style

Leadership style	Measure	*df*	*F*	*p*	ω^2
Transactional Leadership Style	Between	3	1.47	.24	.04
	Within	30			
Contingent Reward	Between	3	0.80	.51	.02
	Within	30			
Management-by-Exception (Active)	Between	3	1.09	.37	.01
	Within	29			

Passive/Avoidant Leadership and Learning Style

All 34 participants were included for analysis of passive/avoidant leadership style and scales. Converging learners had the highest means for passive/avoidant leadership style ($M = 1.09$, $SD = 0.48$) and the scales management-by-exception (passive; $M = 1.06$, $SD = 0.59$) and laissez-faire leadership ($M = 1.13$, $SD = 0.63$). Participants with an accommodating learning style had the lowest mean score for passive/avoidant leadership style ($M = 0.49$, $SD = 0.31$) and laissez-faire leadership ($M = 0.36$, $SD = 0.28$). The lowest mean score for management-by-exception (passive) was reported for assimilating learners ($M = 0.45$, $SD = 0.27$; Table 56).

Table 56

Passive/Avoidant Leadership Style and Scale Scores of Supplemental Instruction leaders by Learning Style (*N* = 34)

Construct	Learning style	*n*	*M*	*SD*
Passive/Avoidant Leadership Style	Accommodating	9	.49	0.31
	Diverging	16	.59	0.52
	Assimilating	5	.50	0.15
	Converging	4	1.09	0.48
Management-by-Exception (Passive)	Accommodating	9	.61	0.44
	Diverging	16	.63	0.52
	Assimilating	5	.45	0.27
	Converging	4	1.06	0.59
Laissez-Faire Leadership	Accommodating	9	.36	0.28
	Diverging	16	.55	0.68
	Assimilating	5	.55	0.21
	Converging	4	1.13	0.63

One-way analysis of variance revealed that passive/avoidant leadership style and the scales associated with it did not differ by learning style. A medium effect was found for passive/avoidant leadership style ($\omega^2 = .08$) and laissez-faire leadership ($\omega^2 = .07$). A small effect was revealed for management-by-exception (passive; $\omega^2 = .03$). Effect sizes and significance levels are shown in Table 57.

Objective 4

Objective 4 was to explore the relationship between SI leader learning styles and recurring attendance to SI. To determine the influence of learning style of the SI leaders on attendance to SI sessions, one-way analysis of variance was performed. The total mean attendance was 13.33% (*SD* = 5.93%). Participants with a diverging learning style

Table 57

Results of One-Way Analysis of Variance of Leadership Factor Scores and Leadership Style Scores by Learning Style

Leadership style	Measure	*df*	*F*	*p*	ω^2
Passive/Avoidant Leadership Style	Between	3	2.03	.13	.08
	Within	30			
Management-by-Exception (Passive)	Between	3	1.31	.29	.03
	Within	30			
Laissez-Faire Leadership	Between	3	1.84	.16	.07
	Within	30			

had the highest mean percentage attendance (*M* = 14.74, *SD* = 7.40) and accommodating learners has the lowest mean percentage attendance (*M* = 11.88, *SD* = 4.95; Table 58). As shown in Table 59, one-way analysis of variance revealed no significant relationship between learning style and attendance to SI sessions. A small effect size was found (ω^2 = .05).

Table 58

Learning Styles of Supplemental Instruction Leaders by Attendance (*N* = 34)

Learning style	*n*	*Mean %*	*SD*
Accommodating	9	11.88	4.95
Diverging	16	14.74	7.40
Assimilating	5	12.38	4.16
Converging	4	12.11	2.17
Total	34	13.33	5.93

Table 59

Results of One-Way Analysis of Variance of Learning Styles by Attendance (*N* = 34)

Variable	Measure	*df*	*F*	*p*	ω^2
Attendance	Between	3	.56	.65	.05
	Within	30			

Pearson product-moment correlation was used to determine whether a relationship existed between learning modes and preference for grasping and transforming information with attendance. No significant relationship was found for any of the six variables (Table 60). A low negative but insignificant relationship was found for grasping information (AC-CE), $r = -.15$, $p > .05$ and AC, $r = -.13$, $p > .05$. A low positive insignificant relationship was found for CE, $r = .11$, $p > .05$.

Table 60

Pearson Product-Moment Correlations Between Learning Mode Scores and Attendance (*N* = 34)

Construct	*r*	*df*	*p* (2-tailed)
Concrete Experience (CE)	.11	33	.53
Reflective Observation (RO)	.20	33	.91
Abstract Conceptualization (AC)	-.13	33	.47
Active Experimentation (AE)	-.05	33	.78
Grasping Information (AC-CE)	-.15	33	.39
Transforming Information (AE-RO)	-.04	33	.84

Note. CE = Concrete Experience, RO = Reflective Observation, AC = Abstract Conceptualization, AE = Active Experimentation, AC-CE = Grasping Information, AE-RO = Transforming Information.

Objective 5

Objective 5 was to explore the relationship between SI leader leadership styles and recurring attendance to SI. Pearson product-moment correlation was used to determine whether a relationship existed between leadership styles and scales and attendance. No significant relationship was found between any of the variables and attendance. Of the 12 variables, 1 had a moderate insignificant relationship and 8 others had a low insignificant relationship.

A moderate negative but insignificant relationship was found between attendance and idealized influence (behavior), $r = -.32$, $p > .05$. A low negative insignificant relationship was found between attendance and, management-by-exception (passive), $r = -.26$, $p > .05$, idealized influence (attributed), $r = -.22$, $p > .05$), transformational leadership style, $r = -.21$, $p > .05$, passive/avoidant leadership style, $r = -.20$, $p > .05$, inspirational motivation, $r = -.15$, $p > .05$, and laissez-faire leadership, $r = -.11$ $p > .05$. A low positive but insignificant relationship was found between attendance and, intellectual stimulation, $r = .12$, $p > .05$, and management-by-exception (active), $r = .11$, $p > .05$ (Table 61).

Chapter Summary

This chapter presented the findings by specific objectives. The results were first described using means, standard deviations, and frequencies. Results were then analyzed using Pearson product-moment correlations, independent *t* tests, or one-way analyses of variance. Significant relationships were reported at the alpha level of .05, which was set a priori. Effect sizes were reported for the relationships of variables.

Table 61

Pearson Product-Moment Correlations Between Leadership Scale Scores and Leadership Style Scores and Attendance ($N = 32$)

Construct	*r*	*df*	*p* (2-tailed)
Idealized Influence (Attributed)	-.22	31	.22
Idealized Influence (Behavior)	-.32	31	.08
Inspirational Motivation	-.15	31	.40
Intellectual Stimulation	.12	31	.50
Individual Consideration	-.00	31	.98
Transformational Leadership Style	-.21	31	.26
Contingent Reward	-.04	31	.83
Management-by-Exception (Active)	.11	31	.56
Transactional Leadership Style	.06	31	.75
Management-by-Exception (Passive)	-.26	31	.16
Laissez-Faire Leadership	-.11	31	.56
Passive/Avoidant Leadership Style	-.20	31	.26

Objectives 1 and 2 were to examine the influence of demographic variables on learning styles and leadership styles of participants. Objective 3 was to explore the relationship between learning style and leadership style of the SI leader. Objectives 4 and 5 were to investigate the influence of learning and leadership styles of participants on attendance to SI.

CHAPTER V

SUMMARY AND DISCUSSION

Summary of the Study

Statement of the Problem

SI is an academic assistance program that has been demonstrated to be effective for participants. The SI leader is considered one of the personnel key to the success of the program, yet few researchers have explored the characteristics of that leader. The SI leader is at the forefront of the program, and further exploration of the leader's impact on the program is justified.

One characteristic that warrants further investigation is the learning style of the SI leader. Even though SI sessions follow a set of guidelines provided by the program, session design and implementation differs by SI leader. Adams (2011) found that SI session designs exhibited characteristics of the SI leader's learning style identified by D. A. Kolb's (1984) LSI. This is supported by the assertion that instructors teach based on their own learning style preference (Hawk & Shah, 2007; Marshall, 1991; Wolfe et al., 2005). No other studies could be found on the learning style of the SI leader.

The leadership style of the SI leader should not be overlooked. The SI leader title alone suggests that investigation of behavior preferences for approaching the leadership of group study sessions is necessary. The SI model asserts that SI leaders are supposed to create a collaborative learning environment where student attendees feel bonded by a common purpose and motivated to learn (Martin et al., 1992; McGuire, 2006). Northouse (2007) asserted that this ability to motivate and create a common bond and

purpose is encompassing of a transformational leader. However, research regarding the leadership performance of the SI leaders is generally limited to examination of the skills that they gain in the role (Congos & Stout, 2003; Etter et al., 2000; Lockie & Van Lanen, 2008; Stout & McDaniel, 2006; Zaritsky & Toce, 2006).

The role of the SI leader requires integration of leadership and learning. An abundance of research can be found in the literature regarding transformational leadership behavior preferences and learning preferences defined by ELT. However, it was difficult to find literature examining the relationship between the two. In a program where both are prevalent, an understanding of relationship between the two is desirable.

Purpose and Objectives

The purpose of this study was to explore the demographics, learning styles, and leadership styles of current SI leaders. In addition, learning styles and leadership styles were explored to determine whether there was a relationship among the variables. Also, the relationship between learning and leadership styles and recurring attendance to SI sessions was investigated. The study was designed to meet five specific objectives:

1. Explore the relationship between SI leader demographic variables and the leader's learning style.

2. Explore the relationship between SI leader demographic variables and the leader's leadership style.

3. Explore the relationship between learning style and leadership style of the SI leader.

4. Explore the relationship between SI leader learning styles and recurring attendance to SI.

5. Explore the relationship between SI leader leadership styles and recurring attendance to SI.

Methods

To accomplish the research objectives, this study employed quantitative research. Survey research was used for data collection. Three online surveys were distributed to a sample of SI leaders and relationships among variables associated with learning style and leadership style were investigated and analyzed.

The target population was the 51 students employed as SI leaders by PAS at TAMU in the fall 2013 semester. To solicit interest in the study, the Program Coordinator of SI emailed information regarding the study to the 51 SI leaders. Those interested in receiving more information were instructed to send an email to the researcher. Of the 51 SI leaders, 40 contacted the researcher. There were 34 useable response sets received from the 40 who were contacted with survey information.

Data were collected in November and December 2013, guided by the tailored design method (Dillman et al., 2009). The three-contact strategy was used when communicating with participants. The three data collection instruments used were the LSI Version 3.1, the MLQ 5X self-rater short form, and a researcher\-designed demographic instrument. In addition to the instruments, data for students attending the 34 courses led by the SI leaders, including their attendance to the SI sessions, were obtained from PAS at TAMU.

A causal-comparative or ex post facto design was used to for Objectives 1, 2, 4, and 5 to determine whether a difference in groups existed for variables that the researcher did not manipulate and thus occurred prior to the research. Correlational research methods were used to determine whether relationships existed among continuous variables and the strength of those relationships.

For Objectives 1 and 2, the dependent variables were the scores provided on the MLQ and the LSI 3.1, and the independent variables were the demographics of those participants. For Objective 3, variables from the MLQ and LSI were analyzed to determine whether relationships existed. For Objectives 4 and 5, the dependent variable was average attendance and the independent variables were the variables reported on the MLQ and LSI.

Descriptive statistics were reported, including frequencies, means, and standard deviations for the variables. Data analyses included independent *t* tests, Pearson product-moment correlations, and one-way analyses of variance.

Findings

The findings of this study are summarized below. Results of preliminary analysis of the SI leaders and students attending at least one session is presented first. The remainder of the findings are presented by objective.

Preliminary Analysis

SI leader. Of the 34 participants, 64.71% were female and 35.29% were male. In terms of ethnicity, 64.71% participants were White, 14.71% were Hispanic, 5.88% were Asian, 2.94% were Pacific Islander, and 11.76% reported other. Almost half (44.10%)

were White females. Ages of the participants ranged from 19 to 23 years, with a mean age of 20.47. Semesters of experience as an SI leader ranged from 1 to 6, with a mean of 2.38. GPA of the SI leaders ranged from 3.00 to 4.00, with a mean of 3.65. In terms of year in school, 47.06% were seniors, 35.29% were juniors, and 17.65% were sophomores. Participants reported 21 majors. When collapsed and classified as non-science or science, 52.94% of the 34 participants had a science major and 46.06% had a non-science major.

SI attendees. A total of 3,638 students attended at least one SI session in the 34 courses. Of these, 57.12% were female and 42.88% were male. In terms of year in school, 40.32% were sophomores, 31.25% were freshmen, 19.85% were juniors, 8.44% were seniors, and 0.14% were graduate students. Average attendance for the 34 courses ranged from 5.44% to 34.02% of the sessions offered.

Objective 1

Objective 1 was to explore the relationship between SI leader demographic variables and the leader's learning style. Through this, SI leader learning modes were also explored. Demographic variables included in this analysis were gender, ethnicity, year in school, major, semesters of experience, GPA, and age.

All 34 participants were included in the analysis of this objective. Almost half (47.06%, $n = 16$) had a diverging learning style, 26.47% ($n = 9$) had an accommodating learning style, 14.71% ($n = 5$) had an assimilating learning style, and 11.76% ($n = 4$) had a converging learning style.

The highest mean reported for learning modes was 31.94 (*SD* = 3.20) for AE. RO had the lowest mean at 28.09 (*SD* = 4.27). Preference for transforming information scores ranged from -15 to 19, with a mean of 3.85 (*SD* = 6.85) and preference for grasping information scores ranged from -3 to 13, with a mean of 3.62 (*SD* = 4.10).

Gender. The 16 diverging learners and 4 converging learners were equally distributed by gender. All five assimilating learners were female. Over three quarters (77.78%) of the 9 leaders with an accommodating learning style were female.

Females had insignificantly higher mean scores than males for the CE, AC, and AE learning modes. Males scored significantly higher, $t(32) = 2.53$, $p < .05$, on the RO mode (*M* = 30.42, *SD* = 4.54; *M* = 26.82, *SD* = 3.62, respectively).

Females had a higher mean score than males for the grasping information (AC-CE) scale, indicating that they preferred more abstract methods when grasping information. Females had a noticeable but not significantly higher score for transforming information (AE-RO) than their male counterparts, indicating a stronger preference for experimentation when transforming information (*M* = 5.45, *SD* = 6.21; *M* = 0.92, *SD* = 7.27, respectively).

Ethnicity. More than half (62.50%) of the leaders with a diverging learning style were White. All but one of the 9 with an accommodating style were White. Assimilating learners were almost equally divided by gender: 60.00% (*n* = 3) White and 40.00% (*n* = 2) non-White. Converging was the only learning style to have more non-White (75.00%) participants than White (25.00%) participants.

Participants who were White had higher mean scores than non-White participants for CE, AC, and AE. RO was the only learning mode in which the non-White group (M = 28.50, SD = 3.21) scored higher than the White group (M = 27.86, SD = 4.81). Non-White participants had a higher mean for grasping information (M = 4.25, SD = 5.03) and White participants had a higher mean score for transforming information (M = 4.09, SD = 7.28). No significant differences were found for ethnicity and learning modes.

Year in school. Half (50.00%) of the diverging learners were seniors. Only 1 of the 9 participants with an accommodating style was a sophomore; the other 8 were equally represented as junior and seniors. Sixty percent of the 5 assimilating learners were seniors (n = 3), with the remaining two equally distributed as junior and sophomore. There were two (50.00%) converging learners who were juniors, one senior, and one sophomore.

Participants who were juniors (n = 12) had the highest means for CE (M = 28.58, SD = 2.35), AC (M = 35.50, SD = 2.56), AE (M = 32.42, SD = 3.78), and preference for transforming information (M = 5.92, SD = 7.55). Senior participants (n = 16) had the highest mean scores for RO (M = 29.13, SD = 4.60) and the lowest scores for AE (M = 31.56, SD = 2.99), preference for grasping information (M = 2.81, SD = 4.32), and preference for transforming information (M = 2.44, SD = 7.14). No significant differences were found school and learning modes by school year.

Major. Participant learning styles were almost equally distributed for this characteristic, with the exception of participants with a converging learning style. Only one participant with a science major was a converging learner; the other three had a non-

science major. Of the accommodating learners, five were science majors and four were non-science majors. Nine participants with a science major and seven with a non-science major preferred a diverging style. Three participants with a science major and two with a non-science major preferred an assimilating learning style.

Participants with a non-science major had higher mean scores than those with a science major for RO (M = 28.31, SD = 4.51; M = 27.89, SD = 4.17), AC (M = 32.44, SD = 2.87; M = 31.39, SD = 2.73), and preference for grasping information (M = 4.25, SD = 4.10; M = 3.06, SD = 4.12). None of the differences was significant.

Semesters of experience. Semesters of experience ranged from 1 to 6, with a mean of 2.38 (SD = 1.44). No significant differences were found for the relationships between semesters of experience and learning style and learning mode. Participants with the highest mean years of experience preferred a diverging learning style (M = 2.75; SD = 1.48), but only a little more than one semester more than converging learners, who had the lowest mean for semesters of experience (M = 1.50; SD = 1.00). A moderate negative but insignificant relationship was found between AC and semesters of experience, r = -.34, $p > .05$.

GPA. GPA for participants ranged from 3.00 to 4.00, with a mean of 3.65 (SD = 0.25) No significant differences were found for the relationships between GPA and learning style and learning mode. As with semesters of experience, the lowest mean and highest mean were close. The highest mean GPA was reported for leaders with an accommodating style (M = 3.74, SD = 0.29) and the lowest for diverging learners (M = 3.59, SD = 0.23).

Age. The age of participants ranged from 19 to 23 years, with a mean of 20.47 (*SD* = 1.08). Mean scores for age and learning style were close. Assimilating learners had the highest mean age (*M* = 21.20, *SD* = 1.78), followed by 20.56 (*SD* = 0.88) for accommodating learners, 20.25 (*SD* = 0.93) for diverging learners, and 20.25 (*SD* = 0.96) for converging learners. No significant differences were found for the relationships between age and learning style and learning mode.

Objective 2

Objective 2 was to explore the relationship between SI leader demographic variables and the leader's leadership style. Only 32 of the 34 participants provided useable data for this objective. Participants reported the highest frequency of behavior associated with transformational leadership style and scales. The highest mean score was reported for inspirational motivation (*M* = 3.27, *SD* = 0.76). The lowest mean score was reported for passive/avoidant leadership style (*M* = 0.62, *SD* = 0.45). and scales. Transformational leadership style had a mean of 3.01 (*SD* = 0.30) and transactional leadership style had a mean of 2.45 (*SD* = 0.53).

Gender. There were 21 females and 11 males who provided useable responses on the MLQ. Females had higher mean scores for transformational leadership style (*M* = 3.02, *SD* = 0.26; *M* = 2.99, *SD* = 0.39), idealized influence (attributed; *M* = 3.01, *SD* = 0.53; *M* = 2.85, *SD* = 0.66), and individual consideration (*M* = 3.27, *SD* = 0.43; *M* = 3.09, *SD* = 0.56). Male participants had higher mean scores for transactional leadership style (*M* = 2.58, *SD* = 0.49; *M* = 2.38, *SD* = 0.55) and its scales, as well as for

passive/avoidant leadership style ($M = 0.79$, $SD = 0.56$; $M = 0.53$, $SD = 0.37$) and its scales.

Ethnicity. There were 20 White participants and 12 non-White participants included in the analysis of ethnicity and leadership style. Participants in the non-White group scored higher on all leadership styles and leadership scales than those in the White group. This difference was significant, with large effect size for laissez-faire leadership, $t(30) = .00$, $p < .05$ ($d = 1.04$), and passive/avoidant leadership style, $t(30) = .01$, $p < .05$ ($d = 0.88$).

Year in school. There were 15 seniors, 11 juniors, and 6 sophomores who provided useable responses for analysis with the MLQ data. Seniors had the highest mean score for transformational leadership style ($M = 3.04$, $SD = 0.34$) and four of the five scales associated with the style: idealized influence (behavior; $M = 2.71$, $SD = 0.66$), inspirational motivation ($M = 3.32$, $SD = 0.50$), intellectual stimulation ($M = 2.97$, $SD = 0.52$), and individual consideration ($M = 3.33$, $SD = 0.40$). Sophomores had the lowest mean score for transformational leadership style ($M = 2.90$, $SD = 0.30$) and four of the five of the associated scales: idealized influence (attributed) ($M = 2.79$, $SD = 0.86$), idealized influence (behavior) ($M = 2.58$, $SD = 0.34$), intellectual stimulation ($M = 2.96$, $SD = 0.37$), and individual consideration ($M = 2.71$, $SD = 0.46$). Sophomore participants reported significantly lower scores than seniors and juniors for individual consideration, $F(2,29) = 5.14$, $p < .05$.

Major. There were 16 participants with a non-science major and 16 participants with a science major included in this analysis. Participants with a non-science major had

higher mean scores than those with science majors for individualized influence (attributed; $M = 3.08$, $SD = 0.64$), individualized influence (behavior; $M = 2.70$, $SD = 0.42$), intellectual stimulation ($M = 2.97$, $SD = 0.39$), and management-by-exception (active; $M = 2.02$, $SD = 0.80$) scales. Participants with a science major scored higher on transformational leadership style ($M = 3.00$, $SD = 0.32$), inspirational motivation ($M = 3.31$, $SD = 0.36$), individual consideration ($M = 3.31$, $SD = 0.50$), contingent reward ($M = 3.04$, $SD = 0.54$), passive/avoidant leadership style ($M = 0.69$, $SD = 0.56$), management-by-exception (passive; $M = 0.69$, $SD = 0.58$), and laissez-faire leadership ($M = 0.69$, $SD = 0.68$). Differences in mean scores were not significant.

Semesters of experience, GPA, and age. No significant relationships were found for SI leader semesters of experience and GPA with leadership styles and scales. There was a significant moderate positive relationship between individual consideration scale and age, $r = .39$, $p < .05$. There was a very high negative but insignificant relationship between passive/avoidant leadership style and age, $r = -.78$, $p > .05$.

Objective 3

Objective 3 was to explore the relationship between learning style and leadership style of the SI leader. Learning modes were first analyzed with leadership styles and scales, and then learning styles were analyzed with the leadership styles and scales.

Transformational leadership and learning modes. There was a significant moderate negative relationship between transformational leadership style and AC, $r = -.35$, $p < .05$, and with the preference for transforming information, $r = -.35$, $p < .05$. A significant moderate negative relationship was found between idealized influence

(attributed) and AE, $r = -.39$, $p < .05$. There was a significant moderate negative relationship between idealized influence (behavior) and CE, $r = -.44$, $p < .05$, and a significant moderate positive relationship between idealized influence (behavior) and RO, $r = .46$, $p < .05$. There was a significant moderate negative relationship between idealized influence (behavior) and preference for transforming information (AE-RO), $r = -.40$, $p < .05$.

A positive moderate significant relationship was found between intellectual stimulation and RO, $r = .43$, $p < .05$. A negative moderate significant relationship was found between intellectual stimulation and AE, $r = -.44$, $p < .05$, and with preference for transforming information (AE-RO), $r = -.47$, $p < .05$. No significant relationships were revealed for inspirational motivation and individual consideration and the learning modes and preferences for learning.

Transactional leadership and learning modes. There was a significant moderate positive relationship between transactional leadership style and RO, $r = .38$, $p < .05$. A significant moderate negative relationship was found between transactional leadership style and AE, $r = .-38$, $p < .05$, and with preference for transforming information (AE-RO), $r = -.42$, $p < .05$. A significant moderate negative relationship was found between management-by-exception (active) and AE, $r = -.35$, $p < .05$, and with preference for transforming information (AE-RO), $r = -.37$, $p < .05$. No significant relationships were found between contingent reward and learning modes and preferences for grasping and transforming information.

Passive/avoidant leadership and learning modes. No significant relationships between passive/avoidant leadership style and learning modes and preferences were found. Further, no significant relationships between the management-by-exception (passive) and laissez-faire leadership scales and learning modes and preferences were found.

Learning styles and leadership styles and scales. No significant differences were found between SI leader learning style and the leadership styles and scales. Participants with an assimilating learning style had the highest mean score for transformational leadership style (M = 3.20, SD = 0.19), idealized influence (attributed; M = 3.17, SD = 0.39), idealized influence (behavior; M = 2.95, SD = 0.62), and individual consideration (M = 3.55, SD = 0.37). These leaders had the lowest mean score for passive/avoidant leadership style (M = 0.50, SD = 0.15).

Converging learners had the lowest mean scores for transformational leadership style (M = 2.84, SD = .46), idealized influence (attributed; M = 2.38, SD = 0.60), and intellectual stimulation (M = 2.75, SD = 0.41). Leaders with a preference for this learning style had the highest mean for transactional leadership style (M = 2.59, SD = 0.50), management-by-exception (active; M = 2.13, SD = 0.60), passive/avoidant leadership style (M = 1.09, SD = 0.48), management-by-exception (passive; M = 1.06, SD = 0.59), and laissez-faire leadership (M = 1.13, SD = 0.63).

Participants with an accommodating learning style had the lowest mean for transactional leadership style (M = 2.15, SD = 0.61), contingent reward (M = 2.74, SD = .58), management-by-exception (active; M = 1.56, SD = 0.84), passive/avoidant

leadership style (M = 0.49, SD = 0.31), and laissez-faire leadership (M = 0.36, SD = 0.28).

Objectives 4 and 5

Objective 4 was to explore the relationship between SI leader learning styles and recurring attendance to SI. The highest mean percentage of attendance occurred for persons with a diverging learning style (M = 14.74%, SD = 7.40). The lowest mean attendance occurred for persons with an accommodating learning style (M = 11.88%, SD = 4.95). No significant relationship was found between average recurring attendance and learning style and learning mode.

Objective 5 was to explore the relationship between SI leader leadership styles and recurring attendance to SI. No significant relationships were found between average recurring attendance and leadership style and leadership scales.

Conclusions

Based on the findings summarized above, the following conclusions were drawn.

1. The majority of participants in this study preferred a diverging or accommodating learning style.

2. No males reported preference for an assimilating style.

3. Males preferred RO when transforming information more than did their female counterparts. It was the only significant difference found for demographics and learning modes and styles.

4. Participants reported utilizing transformational leadership behaviors the most and behaviors associated with passive/avoidant leadership the least.

5. Non-White participants perceived themselves to engage in significantly more laissez-faire leadership and passive/avoidant behaviors than did their White counterparts.

6. Sophomores reported engaging in behaviors associated with individual consideration significantly less than did seniors and juniors. There was a significant relationship between age and individual consideration.

7. Gender, year in school, major, GPA, and semesters of experience as an SI leader did not have a relationship with leadership behaviors perceived to be exhibited by the participants.

8. Of the 14 significant relationships found for learning modes and leadership behaviors, 12 were associated with transforming information, and none of those relationships occurred with passive/avoidant leadership behaviors.

9. Learning style was not significantly related to leadership style.

10. Learning mode preferences, learning style, and leadership behaviors were not related to recurring attending to SI sessions.

Discussion and Implications

Objective 1

Objective 1 was to explore the relationship between SI leader demographic variables and the leader's learning style. The majority of participants in this study preferred a diverging or accommodating learning style. Of the 34 SI leaders in this study, 16 (47.06%) reported a preference for the diverging learning style and 9 (26.47%) reported a preference for an accommodating style. This finding is important because it highlights that almost three quarters of the participants enjoyed working with others

when learning. Both of these styles emphasize CE, a preference for being personally involved and values relating to people (Kolb, D. A., 1984). Since the tendency is to teach how one prefers to learn (Hawk & Shah, 2007; Marshall, 1991; Wolfe et al., 2005), it is reasonable to postulate that the SI leaders were doing the same.

This is consistent with the findings of Adams's (2011) investigation of the relationship between learning style and session design. Adams found that SI leaders with a diverging learning style reported designing sessions that incorporated brainstorming and gathering information by creating learning games to get the students involved with each other in small groups. Accommodating learners reported designing sessions that relied heavily on student involvement. Those with an assimilating style reported engaging in extensive talking and lecturing during their sessions. Participants with a converging style reported incorporating a systematic application of tasks.

The results in the present study are encouraging in that the sessions of the diverging and accommodating SI leaders in Adams's (2011) study align with the foundations of SI. McGuire (2006) stressed that students can be motivated to attend regularly when the SI leader engages them with learning games and other interactive activities, which can be seen in the sessions of the diverging and accommodating learners in Adams's study. Beyond this, the fact that persons using these two styles prefer to work with others, view situations from different points of view, and learn from hands-on experience is also encouraging. SI leaders have the responsibility to involve all attendees in the session with each other and with the material (Hurley et al., 2006). They

should be open to suggestions from student attendees and consider their needs so that all attendees benefit (Hurley et al., 2006).

Five leaders reported a preference for the assimilating style, and none of them was male. This result is inconsistent with studies that reported on learning style and gender. A person with an assimilating style has a preference for AC and RO. The normative data from the LSI 1, 2, and 3.1 report males being more abstract than females (Kolb, A. Y., & Kolb, 2005b). The data are also inconsistent with Philbin et al. (1995), who reported that the assimilating style was the most preferred by males and least preferred by females. In Adams's (2011) study, 6 or the 11 SI leaders with an assimilating learning style were male. There were 17 male and 26 female participants in Warren's (1997) study with a preference for an assimilating learning style.

Perhaps the population or sample of the current study influenced this finding. In the responsibilities of the SI leader there is overlap with the preferences of a diverging or accommodating learner. The SI leader position may not be attracting males who prefer assimilating because this preference is less focused on people and more focused on readings and lectures (Kolb, A. Y., & Kolb, 2005a; Kolb, D. A., 1984). Also, data for this variable were collected from only 34 of the 51 SI leaders employed in the fall 2013 semester. Given that males have a preference for this style, the males who were not included in the study could have self-identified as assimilating learners.

Males preferred RO when transforming information more than did their female counterparts. This was the only significant difference found for demographics and learning modes and styles. The RO learning mode was a preference for transforming

information through observation and reflection with an appreciation for different approaches. Males in this study significantly preferred RO more than did females, $t(32) = 2.53$, $p < .05$, $d = 0.88$. This result is consistent with the normative data from the LSI 3.1 (Kolb, A. Y., & Kolb, 2005b), which was the only study that reported a significant difference for RO by gender.

This finding is interesting in relation to the above conclusion because the assimilating style is RO dominant for transforming information but no males reported using this style. Diverging is the other learning style with preference for RO, and males and females were equally represented for this style. An investigation of the modes and the learning styles separately is important to understand the complexities of individual preferences.

The remainder of the demographic characteristics—ethnicity, year in school, major, semesters of experience, GPA, and age of the SI leaders—did not have a relationship with learning preferences. A review of the literature revealed that care should be taken to examine the interaction of more than one variable. Peters (2012) found a significant relationship with learning style when ethnicity and gender were examined together. Severiens and Ten Dam (1994) found a relationship with learning style when age and gender were examined together. A. Y. Kolb and Kolb (2005a) cautioned that education specialization could interact with gender difference outcomes.

Most of the demographic characteristics of SI leaders in the current study did not have a relationship with learning preferences. However, given the sample size, multiple

variables could not be examined together. A study with a larger sample size could reveal different results.

Objective 2

Objective 2 was to explore the relationship between SI leader demographic variables and the leader's leadership style. Participants reported utilizing transformational leadership behaviors the most and behaviors associated with passive/avoidant leadership the least. The 32 SI leaders who provided useable data via the MLQ reported a mean score of 3.01 (SD = 0.30) for transformational leadership style, indicating that they perceived themselves to demonstrate transformational leadership behaviors fairly often.

This finding is encouraging, as the responsibilities of the SI leader that contribute to the success of SI can be seen to overlap transformational leadership behaviors. SI leaders are responsible for creating an environment in their sessions in which students gain skills to be successful independent learners (Hurley et al., 2006). They incorporate strategies to help attendees with *how* to learn (Arendale, 1997). This can be seen to interrelate with the intellectual stimulation scale. Bass (1988) claimed that an intellectually stimulating leader contributes to followers' independence by teaching them how to fish rather than giving them fish. The mean score for intellectual stimulation was 2.95 (SD = 0.47), indicating that these SI leaders perceived themselves to engage in this behavior fairly often.

The highest mean score reported by the SI leaders was for inspirational motivation (M = 3.27, SD = 0.76). Behaviors of leaders engaging in inspirational

motivation provide a vision of what is possible and a clear understanding of shared goals. Both of these are responsibilities of the SI leader (Hurley et al., 2006), which SI leaders in this study perceived that they displayed at least fairly often.

Individual consideration is shown when each individual is treated uniquely and individual support is provided (Bass & Avolio, 2004). The mean score for this scale was 3.21 (SD = 0.48). The SI leader can demonstrate individual consideration behaviors by engaging all students in the session, designing sessions that consider a diverse group of students, and delivering learning activities that involve all types of learning.

On the other side of the full range of the leadership continuum are passive/avoidant leaders, who make no effort toward effective leadership behaviors. They do not set goals or clarify expectations (Northouse, 2007). This style has a negative effect on desired outcomes (Avolio & Bass, 2004). The mean score for passive/avoidant leadership for SI leaders in this study was noticeably lower (M = 0.62, SD = 0.45), indicating that they perceived that they engaged in these behaviors less than once in a while. Low scores for this style signify that these SI leaders believed that they were choosing to utilize effective leadership behaviors.

Non-White participants perceived themselves to engage in significantly more laissez-faire leadership and passive/avoidant behaviors than did their White counterparts. Non-White participants scored higher on all the leadership scales and styles. This difference was significant for laissez-faire leadership, $t(30) = .00$, $p < .05$, $d = 1.04$, and passive/avoidant leadership style, $t(30) = .01$, $p < .05$, $d = 0.88$. Laissez-faire and passive/avoidant behaviors involve avoidance of making decisions and getting involved.

Although statistically significant, this finding does not provide practical significance. The mean scores for non-White and White participants for laissez-faire and passive/avoidant leadership were both below 1, indicating that the leaders perceived themselves to engage in this behavior *not at all* to only *once in a while*. So, even though the groups were different, the finding does not influence the outcomes in the current study.

Sophomores reported engaging in behaviors associated with individual consideration significantly less than did seniors and juniors. Further, there was a significant relationship between age and individual consideration. Individual consideration is a scale of transformational leadership and is exhibited when individuals are treated uniquely and individual support is provided by the leader (Avolio & Bass, 2004). SI leaders who identified as sophomores provided significantly lower mean scores for individual consideration than did juniors and seniors.

There was a significant moderate positive relationship between individual consideration scale scores and age, $r = .39$, $p < .05$. As the age of the SI leaders in this study increased, they were more likely to perceive themselves as displaying more of these behaviors. This aligns with the year in school finding because a review of age by year in school revealed that the sophomore participants were the youngest, with a mean age of 19.17 ($SD = 0.41$). Juniors reported a mean age of 20.09 ($SD = 0.70$) and seniors reported a mean age of 21.27 ($SD = 0.88$).

Barbuto et al. (2007) found that leaders above the age of 46 revealed significantly higher scores for individualized consideration than did those ages 22 to 45.

The remainder of the literature on the relationship between age and transformational leadership involved people above the age of 29, which does not allow for comparison, since participants in this study were 19 to 23 years old (M = 20.47, SD = 1.08). Research could not be found on the relationship between year in school and individual consideration, but Ekeland (2005) revealed that freshmen and seniors were rated to have significantly higher transformational leadership style behaviors than sophomores and juniors.

Younger SI leaders in the present study perceived themselves to engage in behaviors that identify and strengthen individual needs of others less than those who were older or in a higher year in school. Further research in leadership behavior preferences of collegiate students is needed.

Gender, year in school, major, GPA and semesters of experience did not have a relationship with leadership behaviors perceived to be exhibited by the participants. With the exception of the individual consideration scale, perceived leadership behaviors did not have a relationship with the demographic variables.

There is a lack of literature exploring the relationship of year in school, major, age, GPA, and semesters of experience with leadership behaviors. The majority of studies that examined the relationship between gender and leadership behaviors measured by the MLQ reported insignificant differences (Carless, 1998; Komives, 1991; Maher, 1997; Moore, 2003). However, as with learning preferences, significant differences were found for leadership behavior when gender was analyzed with additional variables. Barbuto et al. (2007) found that males and females differed

significantly when level of education was included in the analysis. van Engen and Willemsen (2004) found that the inclusion of the type of organization resulted in gender differences in leadership behaviors.

It is encouraging to find that transformational leadership behaviors are perceived to be displayed the most by SI leaders in the present study, regardless of demographic characteristics. However, given that studies have revealed differences when variables were combined, a larger study examining more than one variable together would be beneficial.

Objective 3

Objective 3 was to explore the relationship between learning style and leadership style of the SI leader. Of the 14 significant relationships found between learning modes and leadership behaviors, 12 were associated with transforming information, and none of those relationships occurred for passive/avoidant leadership. The significant relationships between learning modes and leadership preferences revealed interesting results. First, 12 of the 14 significant relationships involved transforming information scores from the LSI. ELT identifies two preferences for transforming information: RO and AE. The LSI 3.1 provides scores on these preferences, as well as a combined score for preference for transforming information (AE-RO). Higher scores for AE-RO indicate stronger preference for AE.

RO is a preference for transforming information by observation and reflection. Persons with this preference are neutral in their approaches and are more concerned with what is true rather than with application. AE is a preference for transforming information

by actively influencing and changing situations (Kolb, D. A., 1984). These individuals are concerned with results and getting things done.

A positive relationship was found between RO and the leadership scales idealized influence (behavior), intellectual stimulation, and transactional leadership. A positive relationship between these variables indicated that, as the preference for RO increased, the perceived engagement of behaviors associated with the three leadership scales also increased.

A negative relationship was found between AE and the leadership scales intellectual stimulation, transactional leadership, and management-by-exception (active). These correlations were supported by a negative relationship between the preference for transforming information score (AE-RO) and idealized influence (behavior), intellectual stimulation, transactional leadership and management-by-exception (active). There was also a negative correlation between AE-RO and transformational leadership style, as well as between AE and idealized influence (attributed).

A closer look at the intellectual stimulation leadership scale revealed a positive correlation with RO and a negative correlation with AE and the combined score for preference for transforming information (AE-RO). This indicates that the more the SI leaders in this study perceived themselves to engage in behaviors that encourage members to think creatively and challenge their own ideas, the stronger their preference to be neutral in their approaches and to appreciate different approaches (Kolb, D. A., 1984).

Similar to this, idealized influence (behavior) was positively correlated with RO and negatively correlated with preference for transforming information (AE-RO). This indicates that, as perceived behaviors that emphasize the importance of a collective mission and sense of purpose increased, the preference to be neutral in their descriptions and be more concerned with the truth than practical application when transforming experience also increased.

Idealized influence (attributed) had a negative relationship with AE. This indicates that the more a SI leader self-perceived to put group interests before personal interests, the less likely the leader was to prefer being actively involved in influencing situations and taking risks to achieve goals.

Transformational leadership style was negatively correlated with AE-RO, indicating that the leader who reported more transformational behaviors had a weaker preference for scientific methods and thinking over feeling when transforming information. In other words, the more relational a SI leader perceived himself/herself to be, the more he/she had a preference for RO or a neutral approach to learning with an appreciation of different ideas.

Two significant relationships were found for grasping information. A positive relationship was found for AC and transformational leadership style and a negative relationship was found for CE and idealized influence (behavior). AC is a preference for grasping knowledge by scientific method and building theories. In contrast, CE is a preference for intuition and reality when grasping information.

The transformational leadership style score is derived by averaging all the statements of the leadership scales. Examination of the above findings shows that the variables pertaining to transforming information and transformational leadership were consistent in that more perceived transformational behaviors correlated with stronger preference for appreciation of different solutions. This is encouraging because part of transformational leadership is including all members and appreciating unique approaches to work and problem solving.

Transactional leadership style was positively correlated with RO and negatively correlated with AE and AE-RO. Aligning with this, management-by-exception (active), a scale of transactional leadership, was negatively correlated with AE and AE-RO. Transactional leadership is an exchange of rewards for efforts, with a concern for processes over ideas. Management-by-exception (active) is displayed when a leader proactively seeks mistakes and intervenes to give corrective criticism. Based on this, the more the SI leaders perceived themselves to engage in these behaviors, the less preference they showed for AE, being actively involved in changing situations and putting what works into action. Also, their preference for the truth rather than practical application and an appreciation for different approaches to solutions increased. In other words, a stronger preference for processes and transactions reflected a preference for a neutral approach to learning and appreciation of different ideas.

The findings for transactional leadership and transforming information variables revealed the same correlations as the findings for transformational leadership and transforming information variables. This is surprising, given that transactional and

transformational leadership are conceptually different (Bass, 1985). Intuitively, it would be assumed that the two would have opposite correlations because of this difference. Given this, and the fact that the finding for the grasping information variables contradict each other, it is clear that more research is needed to determine the validity of these findings.

Nine of the significant relationships were for transformational leadership behaviors and five were for transactional leadership behaviors. Significant relationships were not found for passive/avoidant leadership style and its scales. Passive/avoidant leadership is essentially the absence of leadership, and participants in the current study reported very little engagement in these behaviors. Thus, the learning preferences were not related to the avoidance or absence of leadership.

Learning style was not significantly related to leadership style. Although learning mode preferences revealed relationships with leadership behaviors, learning styles did not reveal such relationships. When considering that most of the significant relationships occurred for transforming information, this is not surprising, since styles are determined from an individual's preference for grasping and transforming information.

Brown and Posner (2001) reported that learning was related to leadership in that better learners displayed more effective leadership behaviors as measured by the LTI and the LPI. Their study examined the relationship from a different perspective but nonetheless revealed that leadership and learning were related. Additional studies examining the relationship from differing perspectives is needed for a better understanding of the relationship.

Objectives 4 and 5

Objective 4 was to explore the relationship between SI leader learning styles and recurring attendance to SI. Objective 5 was to 3xplore the relationship between SI leader leadership styles and recurring attendance to SI.

Learning mode preferences, learning style, and leadership behaviors were not related to recurring attendance at SI sessions. Average recurring attendance ranged from 5.44% to 34.02% for individual SI leaders in this study. The learning and leadership preferences of the SI leaders did not have a relationship with attendance rates. Learning style can influence session design (Adams, 2011) and the design that is assumed to be the most effective for regular attendance overlaps with accommodating/diverging learning styles (McGuire, 2006) but evidence was not found that these styles had a relationship to recurring attendance. Further, even though overlaps can be seen for SI leader responsibilities and effective leadership behaviors associated with transformational leadership, these had no significant relationship with recurring attendance in this study.

Attending SI sessions on a regular basis has been reported to have a stronger impact on course performance than occasional attendance (Arendale, 1997; PAS, 2006-2011) but many choose not to attend or to go only occasionally (McGuire, 2006). Based on the findings in the current study, the learning preferences and perceived leadership behaviors of the SI leaders did not have a relationship with those who attended at least once but did not attend regularly. Additional factors such as personality variables of students could influence attendance rates. Visor et al. (1992) found that students who

attended SI sessions only occasionally had lower mean scores for self-esteem, lower beliefs that they could succeed, and more external locus of control than did those who attended SI sessions regularly.

Recommendations for Practice

With the understanding that teachers teach as they prefer to learn and that session design can reflect learning style, SI leaders should be given the LSI as part of training. The LSI provides a language for learning preferences that can foster conversations on creating the best learning environment (Kolb, A. Y., & Kolb, 2005b). These conversations can occur between SI leaders or between SI leaders and administrators. A SI leader with an understanding of how personal learning style impacts teaching sessions is more likely to plan sessions that appeal to all learning styles.

Elements of transformational leadership were found to overlap the essential responsibilities of the SI leader. Administering the MLQ as part of training provides a profile for leadership preferences that can be used by SI supervisors to provide individualized feedback and coach specific behaviors.

This study revealed few relationships between demographics and learning and leadership preferences. SI administrators should not tailor training, feedback, or coaching according to demographic characteristics of the SI leaders. They should make all students, novice to veteran, aware of the differences in styles and approaches.

Learning preferences and leadership preferences for participants in this study did not have a relationship with recurring attendance. Staff involved with SI should continue ongoing marketing efforts that encourage regular attendance.

Suggestions for Research

The MLQ leader form was used to obtain information about the leadership behaviors of the SI leaders. The MLQ rater form could be administered to students who attend SI sessions and to the SI supervisor to provide a more comprehensive picture of the SI leader's leadership behaviors.

SI is implemented in hundreds of colleges and universities across the globe. This study represented a small sample from only one of those universities. A larger and random sample across multiple universities could serve to validate conclusions drawn in this study.

This study examined the relationships between variables. A similar study with a larger sample could be conducted to determine the *influence* of variables, not just relationship. Further, since research has shown that relationships between demographic variables and leadership preferences occur when more than one demographic variable is examined at a time, a study with a larger and more diverse sample would allow for the examination of this consideration.

Research concerning the relationship between learning and leadership preferences is narrow. Relationships were found between perceived engagement in transformational and transactional leadership behaviors and learning preferences, but the sample was limited in size. A study administering the LSI 3.1 and MLQ to a larger and more diverse sample could serve to validate results found in this study. A larger sample would also allow for investigation of the influence of demographic variables on the relationships among variables.

Learning styles defined by the LSI 3.1 did not have a relationship with leadership style. However, the LSI is now available in version 4.0, which identifies nine learning styles. Just as the MLQ has been improved to identify leadership behaviors more effectively, the LSI 4.0 may do the same. A study could be conducted administering the LSI 4 and the MLQ to determine whether relationships exists with the nine styles.

Because literature addressing the SI leader is still sparse, additional studies could be conducted to explore additional characteristics of the SI leader, such as personality type or emotional intelligence.

Information pertaining to the attendees in this study was limited, which allowed for unknown influence of extraneous variables related to the choice to attend SI sessions regularly. A study examining the SI leader and attendees simultaneously would be beneficial. This could include the learning style of the attendees to determine whether a match between learning styles of SI leaders and attendees results in greater attendance.

Students are sometimes enrolled in two courses with SI in the same semester. A study examining their attendance habits in relation to the characteristics of the two SI leaders could be conducted.

Academic achievement is an important outcome of SI. A study including the exploration of course performance by students enrolled in courses with SI should be conducted

REFERENCES

Adams, J. (2011). *The relationship between supplemental instruction leader learning style and study session design* (Doctoral dissertation). (UMI No. 3486469)

Arendale, D. (1994). Understanding the supplemental instruction model. *New Directions for Teaching and Learning, 60*, 11-21.

Arendale, D. (1997). *Supplemental instruction (SI): Review of the research concerning the effectiveness of SI from the University of Missouri-Kansas City and other institutions from across the United States*. Paper presented at the 17th and 18th Annual Institutes for Learning Assistance Professionals, Tucson, AZ.

Avolio, B. J., & Bass, B. M. (2004). *Multifactor Leadership Questionnaire (Third edition): Manual and sample set*. Menlo Park, CA: Mind Garden, Incl.

Barbuto, J. E., Fritz, S. M., Matkin, G. S., & Marx. D. B. (2007). Effects of gender, education, and age upon leaders' use of influence tactics and full-range leadership behaviors. *Sex Roles, 56*(1-2), 71-83.

Bass, B. M. (1985). *Leadership and performance beyond expectation*. New York, NY: Free Press.

Bass, B. M. (1988). The inspirational process of leadership. *Journal of Management Development, 7*(5), 21-31.

Blanc, R., DeBuhr, L. E., & Martin, D. C. (1983). Breaking the attrition cycle: The effects of supplemental instruction on undergraduate performance and attrition. *Journal of Higher Education, 54*(1), 80-90.

Blanc, R., & Martin, D. C. (1994). Supplemental instruction: Increasing student performance and persistence in difficult academic courses. *Academic Medicine, 69*, 452-454.

Brown, L. M., & Posner, B. Z. (2001). Exploring the relationship between learning and leadership. *Leadership & Organization Development Journal, 22*, 274-280.

Burns, J. M. (1978). *Leadership*. New York, NY: Harper & Row.

Carless, S. A. (1998). Gender differences in transformational leadership: An examination of superior, leader, and subordinate perspectives. *Sex Roles, 39*, 887-902.

Cassidy, S. (2004). Learning styles: An overview of theories, models, and measures. *Educational Psychology, 24*, 419-444.

Congos, D. (1998). Inside supplemental instruction sessions: One model of what happens that improves grades and retention. *Research & Teaching in Developmental Education, 15*(1), 47-62.

Congos, D. (2001). 20 FAQs from faculty about supplemental instruction programs. *Research & Teaching in Developmental Education, 18*(1), 41-49.

Congos, D. H., & Schoeps, N. (1993). Does supplemental instruction really work and what is it, anyway? *Studies in Higher Education, 18*(2), 165-177.

Congos, D. H., & Stout, B. (2003). The benefits of Supplemental Instruction (SI) leadership experience after graduation. *Research & Teaching in Developmental Education, 20*(1), 2-41.

Coolidge, F. L. (2006). *Statistics: A gentle introduction*. Thousand Oaks, CA: Sage.

Demirbas, O. O., & Demirkan, H. (2007). Learning styles of design students and the relationship of academic performance and gender in design education. *Learning and Instruction, 17*, 345-359.

Dillman, D. A., Smyth, J. D., & Christian, L. M. (2009). *Internet, mail, and mixed-mode surveys: The tailored design method* (3rd ed.). Hoboken, NJ: Wiley.

Eagly, A. H., Johannesen-Schmidt, M. C., & van Engen, M. L. (2003). Transformational, transactional, and laissez-faire leadership styles: A meta-analysis comparing men and women. *Psychological Bulletin, 129*, 569-591.

Ekeland, T. P. (2005). *The relationships among affective organizational commitment, transformational leadership style, and unit organizational effectiveness within the corps of cadets at Texas A&M University* (Doctoral dissertation). Texas A&M University, College Station, TX.

Etter, E. R., Burmeister, S. L., & Elder, R. L. (2000). Improving student performance and retention via supplemental instruction. *Journal of Accounting Education, 18*, 355-368.

Felder, R. M., & Brent, R. (2005). Understanding student differences. *Journal of Engineering Education, 94*(1), 57-72.

Fraenkel, J. R., & Wallen, N. E. (2009). *How to design and evaluate research in education* (7th ed.). New York, NY: McGraw-Hill.

Grandzol, C., Perlis, S., & Draina, L. (2010). Leadership development of team captains in collegiate varsity athletics. *Journal of College Student Development, 51*, 403-418.

Hargrove, S. K., Wheatland, J. A., Ding, D., & Brown, C. M. (2008). The effect of individual learning styles on student GPA in engineering education at Morgan State University. *Journal of STEM Education, 9*(3-4), 37-46.

Hawk, T. F., & Shah, A. J. (2007). Using learning style instruments to enhance student learning. *Decision Sciences Journal of Innovative Education, 5*(1), 1-19.

Healey, M., Kneale, P., & Bradbeer, J. (2005). Learning styles among geography undergraduates: An international comparison. *Area, 37*(1), 30-42.

Heffler, B. (2001). Individual learning style and the Learning Style Inventory. *Educational Studies, 27*, 307-316.

Hensen, K. A., & Shelley, M. C. (2003). The impact of supplemental instruction: Results from a large, public, Midwestern university. *Journal of College Student Development, 44*, 250-259. doi:10.1353/csd.2003.0015

Howell, B. D. (2013). *An examination of demographic characteristics, preferred managerial leadership style, and managerial effectiveness of full-service lodging managers in Florida* (Doctoral dissertation. Nova Southeastern University, Fort Lauderdale, FL.

Hurley, M., Jacobs, G., & Gilbert, M. (2006). The basic SI model. In M. E. Stone & G. Jacobs (Eds.), *Supplemental instruction: New visions for empowering student learning* (pp. 11-22). San Francisco, CA: Wiley.

Jones, C., Reichard, C., & Mokhtari, K. (2003). Are students' learning styles discipline specific? *Community College Journal of Research and Practice, 27*, 363-375. doi:10.1080/713838162

Kayes, D. C. (2005). Internal validity and reliability of Kolb's Learning Style Inventory Version 3. *Journal of Business and Psychology, 20*, 249-257.

Kochenour, E. O., Jolley, D. S., Kaup, J. G., Patrick, D. L., Roach, K. D., & Wenzler, L. A. (1997). Supplemental instruction: An effective component of student affairs programming. *Journal of College Student Development, 38*, 577-586.

Kolb, A. Y., & Kolb, D. A. (2005a). The Kolb Learning Style Inventory, version 3.1: 2005 technical specification. Philadelphia, PA: Hay Group.

Kolb, A. Y., & Kolb, D. A. (2005b). Learning styles and learning spaces: Enhancing experiential learning in higher education. *Academy of Management Learning & Education, 4*(2), 193-212.

Kolb, A. Y., & Kolb, D. A. (2009). The learning way: Meta-cognitive aspects of experiential learning. *Simulation & Gaming, 40*, 297-327.

Kolb, D. A. (1981). Learning styles and disciplinary differences. In A. W. Chickering and Associates (Eds.), *The modern American college: Responding to the new realities of diverse students and a changing society* (pp. 232-255). San Francisco, CA: Jossey-Bass.

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Upper Saddle River, NJ: Prentice Hall.

Komives, S. R. (1991). Gender differences in the relationship of hall directors' trans-formational and transactional leadership and achieving styles. *Journal of College Student Development, 32*(2), 155-165.

Latham, G. P., & Pursell, E. D. (1975). Measuring absenteeism from the opposite side of the coin. *Journal of Applied Psychology, 60*, 369-371.

Lockie, N. M., & Van Lanen, R. J. (2008). Impact of supplemental instruction experience on science SI leaders. *Journal of Developmental Education, 31*(3), 2-14.

Lowe, K. B., Kroeck, K. G., & Sivasubramaniam, N. (1996). Effectiveness correlates of transformational and transactional leadership: A meta-analytical review of the MLQ literature. *Leadership Quarterly, 7*, 385-425.

Maher, K. J. (1997). Gender-related stereotypes of transformational and transactional leadership. *Sex Roles, 37*, 209-225.

Marin, J. R. (2013). *The relationship between ethnicity, self-efficacy, and beliefs about diversity to instructional and transformational leadership practiced of urban school principles* (Doctoral dissertation). University of Southern California, Los Angeles, CA.

Marshall, C. (1991). Teachers' learning styles: How they affect student learning. *The Clearing House, 64*, 225-227.

Martin, D. C., & Arendale, D. (1993). *Supplemental Instruction: Improving first-year student success in high-risk courses* (2nd. ed.). Columbia, SC: National Resource Center for the First Year Experience and Students in Transition.

Martin, D. C., & Arendale, D. R. (1994). *Review of the research concerning the effectiveness of SI from the University of Missouri-Kansas City and other institutions from across the United States*. Paper presented at the Annual Conference of the Freshman Year Experience, Columbia, SC.

Martin, D. C., Arendale, D. R., & Associates. (1992). *Supplemental Instruction: Improving first-year student success in high-risk courses—The freshman year experience.* Columbia, SC: National Resource Center for the Freshman Year Experience.

McGee, J. V. (2005). *Cognitive, demographic, and motivational factors as indicators of help-seeking in supplemental instruction* (Doctoral dissertation). (UMI No. 3172055)

McGuire, S. Y. (2006). The impact of supplemental instruction on teaching students how to learn. *New Directions for Teaching and Learning, 106*, 3-10.

Mertler, C. A., & Vannatta, R. A. (2010). *Advanced and multivariate statistical methods* (4th ed.). Glendale, CA: Pyrczak.

Miller, L. E. (1998). Appropriate analysis. *Journal of Agricultural Education, 39*(2), 1-10.

Moore, L. L. (2003). *Leadership in the cooperative extension system: An examination of leadership styles and skills of state directors and administrators* (Doctoral dissertation). University of Florida, Gainesville, FL.

Northouse, P. G. (2007). *Leadership: Theory and practice* (4th ed.). Thousand Oaks, CA: Sage.

Office of Management and Budget, Executive Office of the President. (2006). *Standards and guidelines for statistical surveys.* Retrieved from http://www.whitehouse .gov/sites/default/files/omb/inforeg/statpolicy/standards_stat_surveys.pdf

Peer Academic Services. (2006-2011). *Supplemental Instruction statistics.* College Station, TX: Texas A&M University.

Peer Academic Services. (2014). *How to become an SI leader.* Retrieved from http:// successcenter.tamu.edu/Programs/Supplemental-Instruction/How-To-Become-an-SI-Leader

Peters, K. (2012). *Understanding community college students' learning styles and the link to academic achievement* (Doctoral dissertation). Minneapolis, MN: Walden University.

Philbin, M., Meier, E., Huffman, S., & Boverie, P. (1995). A survey of gender and learning styles. *Sex Roles, 32*, 485-494.

Posner, B. Z. (2004). A leadership development instrument for students: Updated. *Journal of College Student Development, 45*, 443-456.

Severiens, S. E., & Ten Dam, G. (1994). Gender differences in learning styles: A narrative review and quantitative meta-analysis. *Higher Education, 27*, 487-501.

Skalicky, J., & Caney, A. (2010). PASS student leader and mentor roles: A tertiary leadership pathway. *Journal of Peer Learning, 3*(1), 24-37.

Stout, M. L., & McDaniel, A. J. (2006). Benefits to supplemental instruction leaders. *New Directions for Teaching and Learning, 106*, 55-62.

van Engen, M. L., & Willemsen, T. M. (2004). Sex and leadership styles: A meta-analysis of research published in the 1990s. *Psychological Reports, 94*(1), 3-18.

Visor, J. N., Johnson, J. J., & Cole, L. N. (1992). The relationship of supplemental instruction to affect. *Journal of Developmental Education, 16*(2), 12-18.

Warren, B. Z. (1997). *Personality, learning style, gender, and ethnic characteristics of students attending supplemental instruction spring of 1997 at the University of Central Florida*. Paper presented at the Annual Teaching/Learning Conference, Ashland, KY.

Wolfe, K., Bates, D., Manikowske, L., & Amundsen, R. (2005). Learning styles: Do they differ by discipline? *Journal of Family and Consumer Sciences, 97*(4), 18-22.

Zaritsky, J. S., & Toce, A. (2006). The basic SI model. In M. E. Stone & G. Jacobs (Eds.), *Supplemental instruction: New visions for empowering student learning* (Vol. 106, pp. 23-32). San Francisco: Jossey-Bass.

APPENDIX A

MULTIFACTOR LEADERSHIP QUESTIONNAIRE (MLQ)

Sample questions from the Multifactor Leadership Questionnaire 5X leader short form.

0	1	2	3	4
Not at all	Once in awhile	Sometimes	Fairly often	Frequently, if not always

1. I provide others with assistance in exchange for their efforts… 0 1 2 3 4
2. I talk optimistically about the future……0 1 2 3 4
3. I fail to interfere until problems become serious…….0 1 2 3 4
4. I talk about my most important values and beliefs……. 0 1 2 3 4
5. I seek different perspectives when solving problems……. 0 1 2 3 4

APPENDIX B

DEMOGRAPHIC INSTRUMENT QUESTIONS

1. What is your gender?
   - Male
   - Female

2. What is your grade classification?
   - Freshman
   - Sophomore
   - Junior
   - Senior
   - Graduate Student

3. How many semesters have you been a SI leader (including the Fall 2013 semester)?

4. What is your race?
   - White/Caucasian
   - African American
   - Hispanic
   - Asian
   - Native American
   - Pacific Islander
   - Other

5. What is your age?

6. What is your major?

7. What is your cumulative GPA?