USING THE LEARNING AND STUDY STRATEGIES INVENTORY TO
PREDICT LEARNER PERFORMANCE IN ONLINE AND TRADITIONAL
EDUCATIONAL PSYCHOLOGY COURSES

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ABSTRACT

USING THE LEARNING AND STUDY STRATEGIES INVENTORY TO

PREDICT LEARNER PERFORMANCE IN ONLINE AND TRADITIONAL

EDUCATIONAL PSYCHOLOGY COURSES

CHAD E. SLAYBAUGH

In college settings today, learners have increasing availability of choice between participating in Traditional group attendance courses, and participating individually in those same courses asynchronously Online. This study investigated the relationship between learner's characteristics and their performance in an educational psychology course. This study also examined if there were differences in learner characteristics between students who attended Traditional courses and those who participated in the same course asynchronously Online. Finally, this study examined the internal relationship patterns among the 10 scales of the Learning and Study Strategies Inventory, Second Edition (LASSI-2), the three components of the Skill, Will, and Self-Regulation (SWSR) interpretation model, and the three constructs of the Affective, Goal, and Comprehension Monitoring Strategies (AGC) interpretation model. Learner characteristics were inventoried using the LASSI-2, which provides a ten scale profile. The SWSR model clustered the scales into components and the AGC model into constructs. Student performance was determined by final course grade. The sample

included 344 undergraduate teacher education students pursuing bachelor's degrees at Northern Arizona University.

Multiple logistic regression analysis found that only the Will component of the SWSR model predicted learner success and further analysis identified the Motivation scale of the LASSI-2 as the only significant contributor for Will. AGC constructs were absent any predictive relationship with learner performance. Multivariate analysis of variance showed that students who chose to participate in an Online course scored significantly higher on the Self-Regulation component and Affective Strategies construct than did peers who chose to attend a Traditional format course. Finally, bivariate correlation analysis confirmed that both the SWSR and AGC interpretation models are internally cohesive among components and constructs. These findings can be useful to college students selecting between Traditional and Online course formats, and by college faculty advising these students in that learner characteristics clustered in the Affective Strategies construct and the Self-Regulation component were shown to positively correlate with online instruction. Additionally, these findings can be useful for instructors working to improve the performance of their students by reinforcing the vital role of motivation in both Online and Traditional settings.

ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to Dr. Bohan and Dr. Horn, my committee co-chairpersons, as well as Dr. Gaddis, Dr. Hagstrom, and Dr. Gallagher for their guidance and support throughout this research process and for their encouragement and counsel during my time at Northern Arizona University. I am particularly grateful to Dr. Bohan for allowing me to participate in her existing research project, and to Dr. Horn for his invaluable help with statistical analyses. I also offer my thanks to Dr. Mellott for being flexible while requiring accountability, to Dr. Martin for 'reeling me in' as necessary, and to Dr. Smith for crystallizing the importance going *through* the information, not just going *over* it. I would also like to extend my thanks to the College of Education staff that I have encountered during my past 10 years at Northern Arizona University. I have always felt welcomed as a student and colleague, and am grateful for their kindness.

As I finish this project, it occurs to me that I have been a student for two-thirds of my life. That's long. I'd like to express my appreciation to Dr. Fairchild at the University of Idaho for bringing me into his program and to Dr. Hurst and Dr. Gray for their continued guidance along the way. Special thanks goes to Dr. Hurst for showing me how to wind a watch and to Dr. Gray for teaching me that pieces to the puzzle fit only one way. Lastly, I wish to thank my family for their patience and understanding. Thank you John and Joey for making me a father. I have done nothing better in my life and now look forward to helping you both along your own paths. Thank you to Ken and Florence for always encouraging me to continue school and for always thinking about my sons

before anything else. Thank you Mom and Dad for teaching me the importance of protecting your own and telling it like it is. Do that, and you won't get in too much trouble. And most of all, Thank you Donna, my lovely wife, for your unwavering support. For simple things like editing my graduate school application and cross-checking my references as I write these acknowledgements, and for bigger things like knowing me deeper than anyone and for always taking care of my heart. This has been a difficult journey at times, and life has gotten in the way. Thank you honey, for helping to navigate this road and for never doubting that we'd make it.

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Chapter 1

Introduction

In an economic climate where the national unemployment rate averaged above 9% over the past three years, the unemployment rate for people who have a Bachelors degree or higher has averaged about 4.5%, and people with no college experience have been unemployed at a rate of about 11.5% over the same three year period. In 2011, the unemployment rate for people with a Doctoral degree was 2.5% (Bureau of Labor Statistics, 2012). Clearly, there is a positive correlation between education and employment. Americans seeking to achieve a higher degree of employment security through post-secondary education are faced with a choice between a few distinct options to achieve a degree that can increase the likelihood of consistent sustained employment. New high school graduates as well as those who have completed their high school education years, or decades prior may choose to place their work lives on hold in favor of attending full-time at a post-secondary institution such as a university, college, or technical institute. Others may opt to attend college part-time while maintaining gainful employment also on a part-time basis. Still others seeking to secure educational credentials beyond a high school diploma may choose to pursue their educational goals in an Online format. Those choosing the Online option may have further options available to them with respect to both the synchronicity of the medium as well as the credentialing paradigm under which Online course is offered.

Courses offered in a synchronous Online format tend to mimic Traditional instruction in ways other than learner location. Although the learner participates in the course in real-time, the learner may participate from virtually any location allowing for

two-way audio and video communication. Given the relatively plentiful availability of contemporary personal communication technology, learners may now attend asynchronous courses from countless locations. Courses may also be offered in asynchronous Online format allowing the learner to participate in the course in fashion that would likely serve to be more convenient. Instead of logging-on to a broadcast in real-time, learners participate in course activities at times of their own choosing while also maintaining the benefit of accessing their education even more simply than synchronous learners given the lesser technological demands of a participation without need for two-way real-time communication. Traditionally, synchronous and asynchronous courses offered by post-secondary institutions allow learners who complete the course an opportunity to garner credits toward eventual completion of a course of study and ultimately a certification or degree. This generally requires payment of tuition and, or fees by the learner. Very recently, another Online alternative has become available. In the last two years, pilot programs at the University of Manitoba and Stanford University offered Online computer science programs and allowed anyone to take these courses, and get graded, for free. The popular success of these offerings prompted the creation of the for-profit company, Coursera which now partners with more than a dozen universities and technical colleges including Stanford University, University of Pennsylvania, Duke University, Princeton University, Johns Hopkins University, Caltech, and University of Michigan to provide 116 free Online courses (Rehm, Selingo, Carey, Koller, & Struck, 2012). Additionally, Harvard University and the Massachusetts Institute of Technology (MIT) announced they are collaborating in a venture to provide free Online classes (NPR Staff, 2012). Now referred to as MOOCs (Massive Online

Open Courses), some of these free asynchronous Online courses have had class sizes of up to 160,000 students from 190 countries with American students making up about one-third of the student population (Rehm et al., 2012). While there is no charge to take MOOCs, there is also not yet an established credit or certification structure surrounding this learning modality and there is not yet clear feedback regarding the value of MOOC completion to employers (Rehm et al., 2012).

More than a decade into the 21st century, there seem to be a number of potentially viable avenues for learners to access post-secondary education. For purposes of this study, these avenues are broadly classified into 'Traditional' courses where students attend class face-to-face, and 'Online' courses including asynchronous courses, but not synchronous courses or hybrid courses that would include both synchronous and asynchronous components.

Theoretical Framework

After extensive literature review, Weinstein, Acee, and Jung (2011) concluded that researchers and practitioners fundamentally agree that successful learning strategies include use of cognitive strategies, metacognition, and motivation, but more broadly encompass any thoughts, behaviors, beliefs or emotions that serve to aid the learner in acquiring, understanding, or transferring new knowledge and skills (Cano, 2006). Weinstein et al. (2011) further report that the self-regulated use of learning strategies, including rehearsal, elaboration, and organization, promote personal responsibility for learning outcomes and encourages students to become lifelong learners.

The Learning and Study Strategies Inventory (LASSI), published in 1987 and its subsequent revision, LASSI-2 published in 2002 (Weinstein & Palmer, 2002) were

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originally derived both from models of self-regulation and strategic learning and were intended to be used as a global screening measure incorporating an array important variables related to learning, studying, and educational achievement. In reviewing theoretical underpinnings of the development of this instrument, this paper will briefly review aspects of theoretical orientations of Piaget, James, Vygotsky, Ames, Archer, Dweck, and Leggett as their work relates to the development of the LASSI-2.

Cognitive Development and Learning. Piaget's theory of cognition suggests that cognitive development occurs as a result of a learner's self-motivated interaction with the people in the surrounding world (Pruitt, 2011), while Vygotsky maintains that cognitive development occurs as a result of a learner's interaction with objects or symbols in the surrounding world (Pruitt, 2011). Heikkila and Lonka (2006) posit that there are three basic cognitive learning orientations in academic achievement situations. These three orientations are illusory optimism, defensive pessimism, and self-handicapping. Learners orienting toward illusory optimism tend to strive for success. Given their likely history of successful endeavors, they generally have high outcome expectations and intent to bolster already strong confidence. These optimistic learners tend to be willing to take credit for their own positive outcomes, but commonly blame others, or situational factors for failures. Learners orienting toward defensive pessimism tend to have low expectations and to be nervous just prior to performance. Defensive pessimism is a self-worth protecting strategy that should be regarded as dysfunctional (Martin, Marsh, & Debus, 2001), but over multi-year spans, learners orienting toward defensive pessimism were more productive than those orienting toward illusory optimism in that they typically pass more classes. The third cognitive learning orientation is self-

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handicapping. Students orienting toward self-handicapping are described as fearing potential failure and often hyper-focus in task-irrelevant behavior in order to create excuses for their failure (Martin et al., 2001).

Self-regulation. Weinstein (2006) notes that historical development leading to the present day conceptual understanding of self-regulation has roots in a number of areas of psychological research including cognitive, social, developmental, personality and occupational psychology. Fox and Riconscente (2008) recall orientation of psychological theorist William James who wrote about automatic and habituated activity that would serve to diminish the need for allocation of cognitive attention resources, thus lessening fatigue through self-regulation. Cognitive development theorist, Jean Piaget (Fox & Riconscente, 2008) divided self-regulation into components of intellect (intention, deliberate direction of thought, and problems solving) and affect (will, and control over one desires and emotions). Similarly, social constructivist Lev Vygotsky (Fox & Riconscente, 2008) characterized self-regulation as taking control of one's attention, thoughts and actions.

Metacognition. John Flavel is credited with coining the term metacognition and defining the term as 'thinking about one's own thinking' (Lajoie, 2008). Furthering this notion, James wrote of thinking about thinking, and supposed that in the ideal, this awareness would become habitual, (Fox & Riconscente, 2008), but cautioned that metacognition can be limited if events are subconscious or if they happen to quickly to be perceived. Similarly, Piaget explains metacognition as requiring that the observer be able to detach himself from his surroundings, and that he begin to see his point of view as only one, of possibly many (Fox & Riconscente, 2008). For Vygotsky, (Fox & Riconscente,

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2008) metacognitive knowledge is the basis for reflective abstraction and learners are not capable of this until adolescence and beyond.

Achievement Goal Theory. As described by Ames and Archer (1988) and Dweck and Leggett (1988) in addressing achievement goal theory, students with mastery goal orientation present with a desire to increase knowledge, understanding, competence, and appreciation of the educational materials. Alternately, students showing an orientation toward performance goals show a desire to outperform others, to demonstrate competence, and to avoid demonstrating incompetence (Clayton, Blumberg, & Auld, 2010). Mastery goal oriented students tend to be less engaged in their learning, to avoid challenges and to have heightened concern for how they are perceived by others.

Statement of the Problem

While a body of research suggests that there is little difference in learning outcomes between Traditional and Online instruction (Aragon, Johnson, & Shaik, 2002; Buckley, 2003; McDonnell, Jameson, Riesen, Polychronis, Crockett, & Brown, 2011; Neuhauser, 2002; Woo & Kimmick, 2000), literature does not rule out the possibility that certain types of students have a capacity to perform better in Online courses than do others (Boyd, 2004; Lorenzo & Moore, 2002; Meyer, 2003; Navarro & Shoemaker, 2000; Tallent-Runnels et al., 2006; Williams, 2006; Zacharis, 2011). Some inherent demands of Online instruction participation differ from those in Traditional classes. Aragon et al. (2002) notes that Online courses require students to utilize reflective observation (learning by listening and watching) and abstract conceptualization (learning by thinking) as a function of how Online courses are delivered, while Traditional learners report higher use of active experimentation (learning by doing) than do Online learners.

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Further, Meyer (2003) offers that students who are highly motivated, well self-regulated and confident are more successful in Online instruction. Given this variation in demand, differences in learner characteristics may contribute to differences in performance outcomes in courses. In a study investigating the influence of leaning style on student success in Online and Traditional courses, Aragon et al. (2002) used the original LASSI to characterize task engagement among successful learners in each environment and found that Online learners were significantly more adept in their use of available materials, resources, and support strategies than were their Traditional learning counterparts.

Boyd (2004) suggests that the higher than average attrition rates common in most Online course offerings warrants study of this concerning problem. If learners could quantify their existing learning and study characteristics and use that information to discern if a Traditional attendance class, or an Online class would be more appropriate given their own constellation of skills and abilities, then the likelihood of successfully completing the course would seem to be higher. Additionally, it is supposed that learners' awareness of their own weaknesses might give them opportunity to improve on those identified weaknesses in the event that circumstances dictate they participate in a learning modality that is not ideally suited to their makeup.

Purpose of the Study

The Learning and Study Skills Inventory, Second Edition (LASSI-2) is an instrument often used in academic advising at the college level. The purpose of this study is to investigate the relationship between Skill, Will, and Self-regulation (SWSR) components (see Figure 1) and Affective Strategies, Goal Strategies, and Comprehension Monitoring Strategies (AGC) constructs (see Figure 2) of the LASSI-2 and their

usefulness in predicting learner success, as measured through the course grade, in Online

and Traditional learning courses. Ideally, this study may also illuminate useful self-

knowledge for learners by identifying profiles that are more highly correlated with

success in Traditional attendance classes and Online classes. It is expected that results of

this study may be of use to students choosing between participation in Traditional

attendance courses, and Online versions of those courses.

- **Skill Component**
  - Information Processing
  - Selecting Main Ideas
  - Test Strategies

- **Will Component**
  - Anxiety
  - Attitude
  - Motivation

- **Self-Regulation Component**
  - Concentration
  - Self-Testing
  - Study Aids
  - Time Management.

INP
SMI
TST

S

ANX
ATT
MOT

W

CON
SFT
STA
TMT

SR
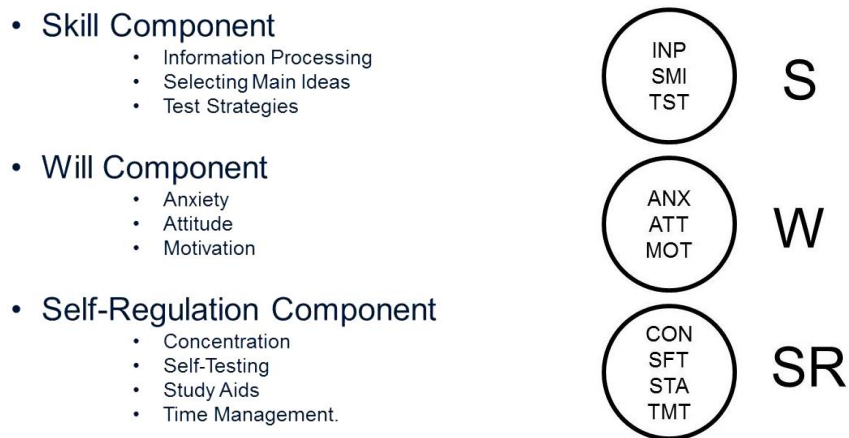
Figure 1. SWSR Component Model for LASSI-2 Interpretation

- **Affective Strategies**
  - Time Management
  - Motivation
  - Concentration
  - Attitude
  - Self-Testing

- **Goal Strategies**
  - Concentration
  - Attitude
  - Selecting Main Ideas
  - Anxiety
  - Test Strategies

- **Comprehension Monitoring**
  - Self-Testing
  - Selecting Main Ideas
  - Information Processing
  - Study Aids

A   **G**

TMT   ATT   ANX

MOT   CON   TST

SFT   SMI

INP   STA

C
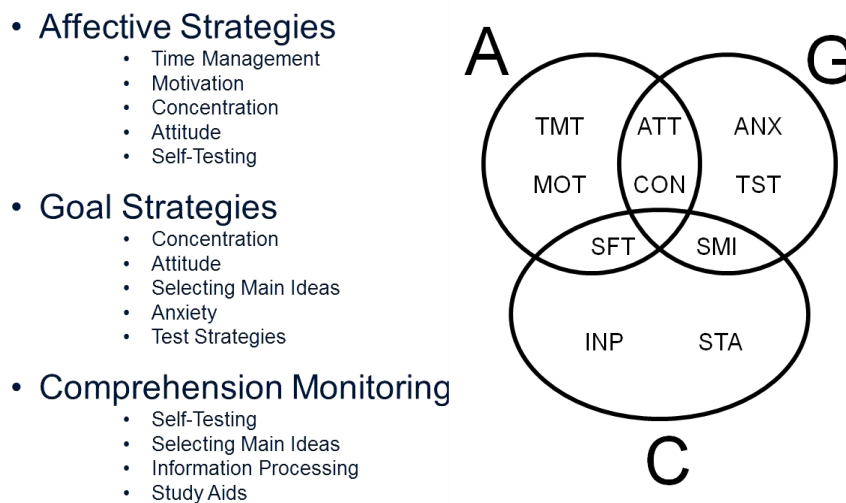
Figure 2. AGC Construct Model for LASSI-2 Interpretation

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In constructing interpretation models, the authors of the SWSR and AGC models sorted the ten LASSI-2 scales into three distinct component (SWSR) or overlapping construct (AGC) model groupings. The 10 LASSI-2 scales differently grouped in SWSR and AGC interpretation models are:

- Anxiety (ANX). The degree to which students worry about school.

- Attitude (ATT). The student's interest in succeeding academically in college.

- Concentration (CON). The student's ability to focus on academic tasks.

- Information Processing (INP). Use of imagery, reasoning, organization and learning strategies to connect existing knowledge with new material.

- Motivation (MOT). Diligence, self-discipline, and willingness to exert necessary effort to achieve academically.

- Selecting Main Idea (SMI). Proficiency at separating important information from less important information.

- Self-Testing (SFT). Use of personal monitoring techniques to determine if a level of understanding is adequate.

- Study Aids (STA). Use of resources, support strategies, and materials to help learn new information.

- Testing Strategies (TST). Use of both test preparation strategies and testing taking strategies.

- Time Management (TMT). Assesses student's use of time management principles for academic tasks.

Research Questions

1.   To what degree do learner characteristics predict performance in an

Educational Psychology foundations course?

    1.1.   To what degree do SWSR Model learner characteristics predict

    performance in an Educational Psychology foundations course?
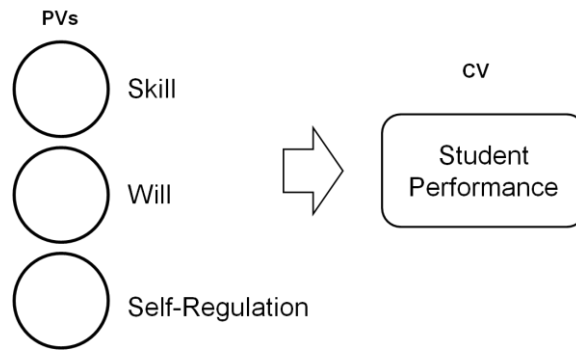
Figure 3. Research Question 1. SWSR predicts Performance?

    1.2.   To what degree do AGC Model learner characteristics predict

    performance in an Educational Psychology foundations course?
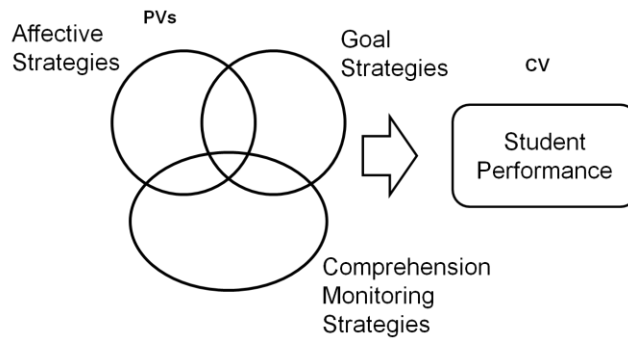
Figure 4. Research Question 1. AGC predicts Performance?

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2.   What are the differences in learner characteristics between students in Traditional and Online course formats?

      2.1.   What are the differences in SWSR Model learner characteristics between student in Traditional and Online course formats?
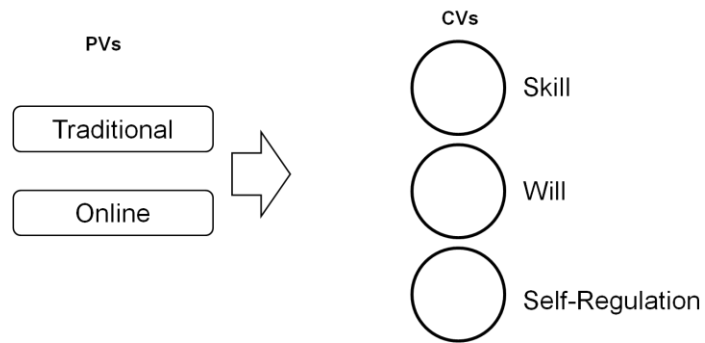
Figure 5. SWSR Model learner differences by format?

      2.2.   What are the differences in AGC Model of learner characteristics between student in Traditional and Online course formats?
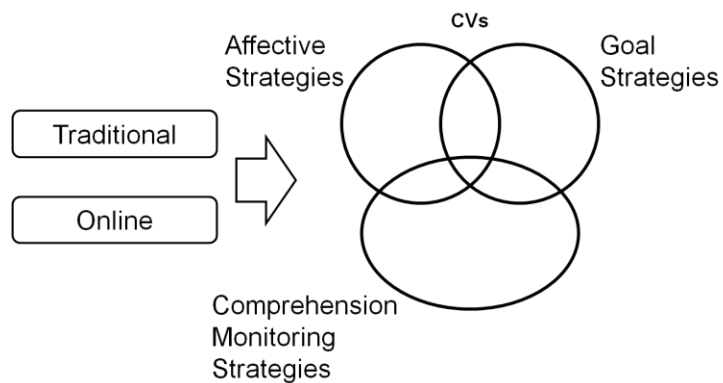
Figure 6. AGC Model learner differences by format?

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3.   What are the relationship patterns among the LASSI-2 components,

constructs, and scales for the Entire sample and Traditional and Online course formats?

     3.1.   What are the relationship patterns among the three LASSI-2

          SWSR components for the Entire sample?
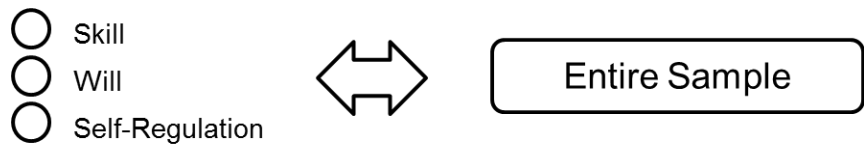
Figure 7. SWSR Relationships in Entire sample?

     3.2.   What are the relationship patterns among the three LASSI-2

          SWSR components for the Traditional course format sample?
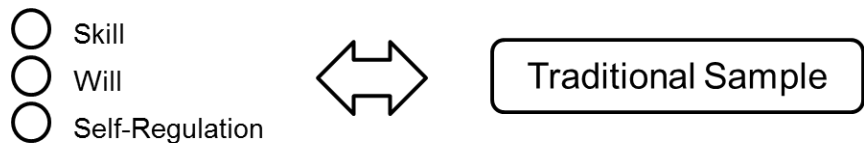
Figure 8. SWSR Relationships in Traditional sample?

     3.3.   What are the relationship patterns among the three LASSI-2

          SWSR components for the Online course format sample?
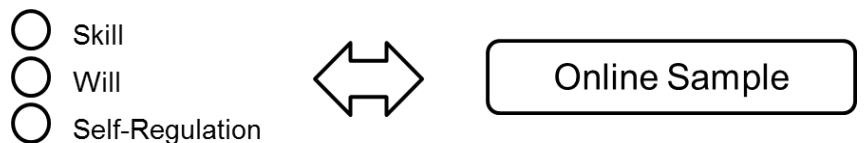
Figure 9. SWSR Relationships in Online sample?

3.4.   What are the relationship patterns among the three LASSI-2 AGC
constructs for the Entire sample?
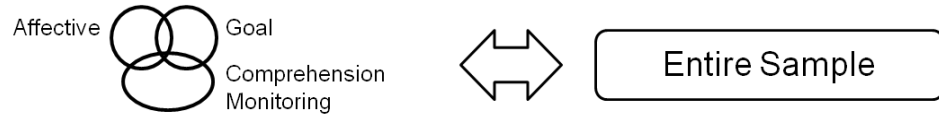
Figure 10. AGC Relationships in Entire sample?

3.5.   What are the relationship patterns among the three LASSI-2 AGC
constructs for the Traditional course format sample?
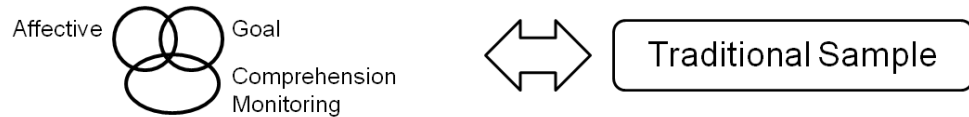
Figure 11. AGC Relationships in Traditional sample?

3.6.   What are the relationship patterns among the three LASSI-2 AGC
constructs for the Online course format sample?
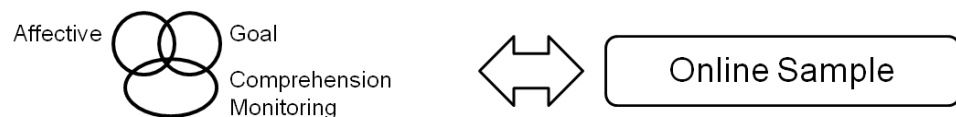
Figure 12. AGC Relationships in Online sample?

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3.7.   What are the relationship patterns among the 10 LASSI-2 scales

for the Entire sample?
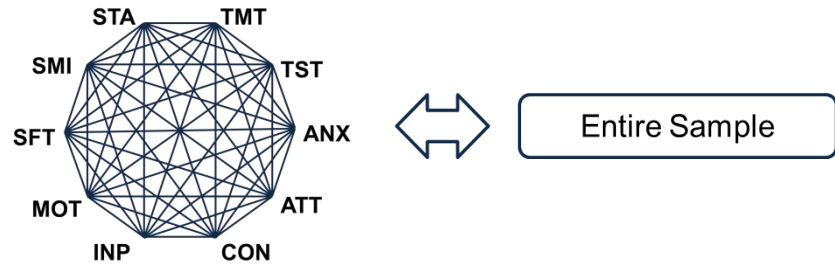
Figure 13. LASSI-2 Relationships in Entire sample?

3.8.   What are the relationship patterns among the 10 LASSI-2 scales

for the Traditional course format sample?
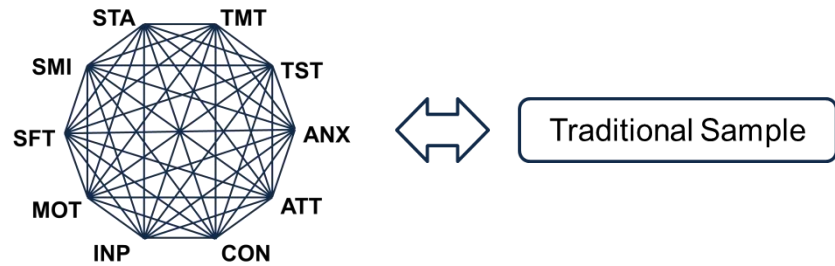
Figure 14. LASSI-2 Relationships in Traditional sample?

3.9.   What are the relationship patterns among the 10 LASSI-2 scales

for the Online course format sample?
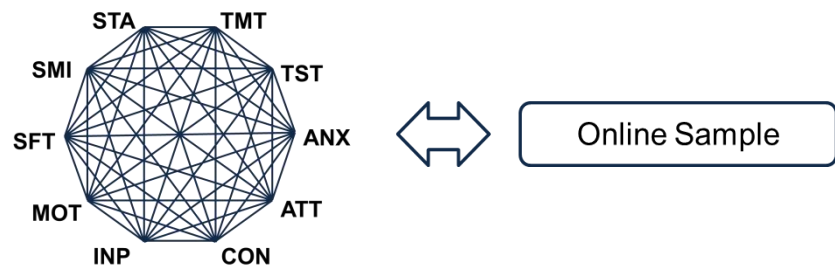
Figure 15. LASSI-2 Relationships in Online sample?

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Delimitations

A delimiting factor for this study comes from comparing two modes of instruction without also comparing the hybrid model where the course structure requires less-than-typical in-class meeting frequency paired with a substantial Online component. This mode of instruction was not included in the current model primarily due to the absence of a hybrid section of either course within the accessible convenience sample. A second limiting factor may be the relatively low n for running particular statistical analyses to compare models. In the literature, the SWSR model seems to be the most well accepted, but other interpretive models may offer more parsimonious interpretive information. If thoroughly researched, this may well be a good follow-up question for future research, but the relatively low n in the available data set does not allow for adequately robust statistical analysis of this question.

Significance of the Study

This study made comparisons among the SWSR component model, the AGC construct model, and scale analysis approach to LASSI-2 interpretation in an effort to assess the utility of each approach in predicting the best fit between a learner's characteristics and the learning demands of Traditional and Online learning environments. It is expected that this research may assist college students in selecting educational environments that are more suited to their existing characteristics. Better choices should lead to lower student attrition levels, higher levels of education attainment, and ultimately a position in society where more opportunities are available. This study should also assist college administrators with knowing whether the LASSI-2 may be a helpful tool to administer to undergraduate education students to assist the

learners with gaining a better understanding of their use of learning and study strategies, as well as whether identified patterns of strategy use impacts student success in either Online or Traditional classroom settings. Additionally, this research should serve to inform college and university faculty regarding integration of technology and effective structuring of Online educational opportunities that may be provided. Lastly, this research will add to the literature on Online course delivery and add to the literature on psychometrics and use of the LASSI-2.

Definitions

Traditional: Mode of learning in which students attend class in-person at a common time and location (e.g. community college, or university campus).

Distance: Mode of learning that allows students to participate in class at locations other than the main campus. This mode includes correspondence courses and synchronous and asynchronous Online instruction.

Online: Mode of learning using web facilitated interaction from student selected remote location. Online instruction can be synchronous or asynchronous.

Hybrid: Mode of learning including components of both Traditional and Online modes if instruction. In the K-12 setting, this is referred to as blended learning.

Synchronous: Online learning mode requiring students to be logged in to their remote locations at the same time so that instruction and peer-interaction can take place in real time.

Asynchronous: Online learning mode allowing students to participate in instruction and peer interaction at times that are individually convenient and not necessarily in real time.

Chapter 2

Review of the Literature

This chapter provides a review of the literature pertaining to postsecondary Online instruction. This chapter also includes a discussion of relevant literature, which reviews a brief history of higher education course delivery and review the timeline of change and structural factors of Traditional and Online instruction. The chapter begins by addressing instructional quality factors and reviews the effectiveness of instructional and course delivery, teacher training in Online instructional delivery, and potential impact of instructor and student attitudes. Next, the chapter addresses learner characteristics and reviews the influence of motivation, self-regulation, and emotional factors. Lastly, the chapter will address external factors and review the influence of lifestyle, subjective norms, and other additional responsibilities. Finally, this section will review the Learning and Study Skills Inventory, 2nd Edition (LASSI-2) and two specific interpretation models; the first being Skill, Will, and Self-Regulation (SWSR), and the second being Affective Strategies, Goal Oriented Strategies, and Comprehension Monitoring Strategies (AGC). The review of the literature will also include related research to the area of study from major contributors such as Tallent-Runnels, Weinstein and Palmer, Cano, Sullivan, Stephens, and Yip. This review outlines each of the important concepts related to this study, such as cognitive development and learning self-regulation, metacognition, and achievement goal theory, all of which provide a firm foundation of knowledge to explore the topic of postsecondary Online instruction further.

History of Higher Education Course Delivery

      This section will discuss the history of higher education course delivery by reviewing the timeline of change in distance learning beginning in the 1800s in Europe. Next, this section will discuss the structural factors of contemporary Online instruction.

      Timeline of Change. The first example of distance learning is from the mid-nineteenth century in Europe. Beginning in 1840, Sir Isaac Pitman is credited with the first recorded correspondence course in his teaching of shorthand by mail to learners in Great Britain, France, and Germany (Encarta, 2000). In those days, communication between students and instructors was primarily conducted in writing and transmitted with the help of the mail system of the time. Correspondence learning first became available in the United States through Cornell University in 1883 (Nasseh, 2001) and availability of this mode of distance learning continued until well into the 20th century.

      Correspondence learning accounted for virtually all distance learning opportunities for students in developed countries around the world. Various additional forms of distance education, began to emerge early in the 20th century in the form of mass broadcasting of educational courses via radio and television (Kim, Lee, & Skellenger, 2012). Then, in the early part of the 1920s, the University of Wisconsin's School of the Air introduced Broadcast Instructional Radio, giving thousands of students the opportunity to learn simultaneously (Prewitt, 1998). By the 1930s, the University of Iowa was experimenting with Instructional Television and recognized several limitations of the medium. Among these limitations was the learner's inability to access any meaningful interaction to seek guidance, and university personnel quickly discovered that

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some of the televised images being broadcast in their courses served to distract students rather than contribute their learning (Bullock, Gable, & Mohr, 2008).

In recent years, options for flexibility have grown (Waits, 2003) with the advent of educational models that include Online student participation and access to course material and content. Allen and Seaman (2011) define Online courses as those characterized by most or all (80+ %) of the course content being delivered Online and typically void of any scheduled face-to-face meetings of staff or classmates. Courses that are arranged to where 30% to 79% of the course content is delivered Online are termed blended or hybrid courses. These courses typically allow for a reduced number of face-to-face meetings, make use of Online discussions, and provide for a substantial portion of course material and content to be delivered Online. Web facilitated courses are those that are essentially Traditional learning courses that utilize web-based technology to facilitate the two-way interaction and content delivery. These contemporary uses of computers and the Internet make it possible to participate in college courses while not physically attending Traditional classes on a campus (Allen & Seaman, 2011).

In the past few decades, avenues to access distance education have progressively evolved to include computer based Online courses that can be attended or accessed through a learner's personal computer in the home through an Internet service provider. Prevalence of this mode of instruction has gained popularity over the past decade. In an unprecedented policy decision, administration at Northwest State Community College (NSCC) in Archbold, Ohio determined that beginning in the Fall of 2007 semester, all students would be required to take at least one course Online in order to graduate (Powers, 2007). NSCC reasoned that the skills needed for success in Online learning

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course are the same skills needed for success in life-long learning. This policy was somewhat short lived however, and was rescinded in the Spring of 2009. According to the NSCC Vice President for Academics Cindy Krueger (personal communication, July 9, 2012), this policy was rescinded mainly due to the college not having an efficient way to track if a course was taken Online, making verification of graduation requirements unreliable. Vice President Krueger added that in retrospect, many of the NSCC programs contained an Online component even though the course was not taught Online. At the time of this writing, these 21 months at NSCC seem to represent the only verifiable instance of an otherwise Traditional campus-based post-secondary educational institution requiring some Online learning as a requirement for graduation. This is in contrast, however with our nation's K-12 public education system that seems to have more fully embraced a range of blended learning models. In referring to K-12 education, Staker (2011) categorizes hybrid models of learning as 'blended learning' and defines this learning that which takes places in a supervised location away from home and where the student has some measure of control over the time, place, path, and/or pace. Presently, all 50 states offer some form of blended learning opportunities to students in public schools and the states of Alabama, Idaho, Michigan and New Mexico require all students to participate in at least one Online learning experience before graduating from high school (Kennedy & Archambault, 2012). If current trends hold, 50% of all high school classes in the United States will be offered Online by the year 2020 (Kennedy & Archambault, 2012).

Recently, Allen and Seaman (2011) reported that 1 in 3 students attending degree-granting postsecondary institutions now take at least one course Online. With 6.1 million

of these college students taking an Online course in the Fall semester of 2010, the annual growth rate for Online enrollment of 10% actually represented the smallest annual growth rate increase since 2002 when only 1.6 million students took a course Online (Allen & Seaman, 2011). From the Fall of 2002 through the Fall of 2010, Online enrollment in the US has seen an annual growth rate averaging 18.5%, where the annual growth rate for total enrollment in degree-granting postsecondary institutions averaged just over 2% for the same time period (Allen & Seaman, 2011).

   Structural Factors of Online Instruction. Beginning in the 1840s and continuing into the early 20th century, correspondence between learner and instructor accounted for all formalized distance learning opportunities (Encarta, 2000). It was not until the 1920s that audio then video broadcasting technologies were employed to deliver learning content to students beyond the traditional classroom, and sometimes very rural locations (Nasseh, 2001). The next major advancement in distance learning was likely initially regarded as a technical convenience, but ultimately served to divide non-correspondence distance learning into two distinct modes of instructional access that remain today, synchronous and asynchronous. In 1977, the United States saw the release of the first Video Home System (VHS) allowing for comparatively simple, reliable, and economical recording and playback of audio and visual (A/V) information (Nasseh, 2001). Prior to VHS, similar communication of A/V information would have required expensive film recording and projection equipment, and the analog film technology of the day required that film be developed in a special laboratory prior to viewing. Prior to VHS capability, distance learning was necessarily available to learners only at set times, most likely via broadcast during the time that the instruction was occurring live

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elsewhere. This mode of access is referred to as synchronous distance learning. Bullock et al. (2008) further note that effective contemporary synchronous participation in distance learning has historically been hampered by the need for elaborate technology to communicate two-ways, and concerns with scheduling are similar to those that present with traditional participation. To some extent, these concerns are mediated by modern computer capability and broadband Internet capacity affording contemporary video conferencing and ease of technology portability. Real-time interaction Online, or 'synchronous chats' are also useful in promoting social relationships and interactivity among students (Im & Lee, 2003) because they provide opportunity for direct and immediate responses and interaction. Of primary benefit to synchronous participants is that it allows for the student and instructor to be separated by space (to be in different location) and more closely mimics traditional instruction than do other distance learning options, such as asynchronous distance learning.

Asynchronous participation in distance learning allows for the student and instructor to be separated by both space and time, to be in different places and on different schedules. Web-based asynchronous participation allows learners access to courses in a new and more convenient way and tends to be more popular than synchronous course participation for its characteristic flexibility. When participating asynchronously, Online students in the class are typically held to common deadlines, but are free to move through the material at their individual convenience and may not be Online at the same time as any of their classmates or the instructor. When participating asynchronously however, students are able to log on and join the discussion when it is convenient for them (Althaus, 1997), and are naturally afforded time to reflect and

compose responses. Being naturally temporally delayed, asynchronous responses tend to be more purposeful and thoughtful (Davidson-Shivers, Tanner, & Muilenburg, 2000) and therefore more useful for task-oriented communication (Im & Lee, 2003), but require a higher degree of self-management on the part of the student (Hanta, 1998).

A quick review of a typical software system for supporting either a synchronous or asynchronous Online course brings some additional clarity to these very different organizational structures, and the demands placed on instructors of these differing offering modes. Collaborative Cyber Community (3C) is a synchronous learning management system commonly used to support virtual learning environments (Wang & Chen, 2009) and can be used in two basic modes. In the asynchronous mode, 3C addresses educational demands by providing audio, video, and text based learning resources such as discussion forums, lecture notes, web-based materials, class assignments, and video recordings of face-to-face interviews and presentations. In the synchronous mode, 3C addresses a very different set of educational demands. The synchronous cyber classroom is presented to the learner in a 5-way split screen format. On a typical computer screen, five separate windows display the main presentation channel featuring the instructor, the control panel, the text chat box, the whiteboard, and the sub video window which is subdivided as necessary to provide separate windows for up to 18 classmates (Wang, Chen, & Levy, 2010). These cyber classrooms are additionally supported by various data sharing tools such as window capture, joint web browsing, remote control, and collaborative annotation tools in the form of colored pens. While instructor training pertaining to the asynchronous mode of 3C seems to be fairly straight forward and somewhat similar to contemporary social media forums that are

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likely familiar to the majority of learners, Wang et al. (2010) suggest that the learning curve progressed through by instructors working to become fluent in the synchronous mode of 3C is well described using four stages; "wow," "uh-oh," the anxious stage, and finally, internalizing.

While availability of these modes of Online instruction have become remarkably more prevalent and available among degree-granting postsecondary institutions over the last decade (Allen, 2011), many on these institutions have not established comprehensive policies to guide distance education or Online courses (Tallent-Runnels et al., 2006; Thomas et al., 2006).

Instructional Quality and Delivery Factors

In order for distance education to become truly a effective alternative to traditional classroom instruction, Bullock et al. (2008) argue that particular attention must be paid to issues of course design, course construction, and to the actual delivery of instruction. Mayes, Ku, Akarasriworn, Luebeck, and Korkmaz add, "the instructional value of any technology is only as good as the quality of its implementation and the skill and comfort levels of its users" (2011, p. 161). Stephens (2012) discusses the potential peril of Online learner isolation and suggests that this can lead Online students to become frustrated with technological glitches that take time and focus away from learning tasks. Additionally, Stephens (2012) cautions that variability and flexibility of timelines and due dates inherent in the asynchronous environment may encourage procrastination. Geelan and Taylor (2001) comment on what seems to be an ironic paradox of distance education, however, in that Online students who may be comparatively geographically isolated from the instructor, often tend to receive much more one-on-one attention from

the instructor than they might if they were participating in a Traditional course. After finding no previous reports addressing the effects of course duration on the performance of Online learners, Stephens (2012) conducted a 5-year study comparing two asynchronous Online sections of Human Physiology offered in 1-month, and 2-month formats. Over the five consecutive summers that the course was offered, Stephens (2102) found no significant difference in the mean final grades between the two sections in any one year, and reported that all of the students completing the longer section and the majority of those completing the shorter section, indicated that they would advise a friend to choose the longer section over the shorter one.

Effectiveness of Online Instruction and Course Delivery

While it seems to be intuitively obvious that a learner who completes an entire course, be it Online or in the Traditional format, will gain more benefit from the course than a learner who does not follow the course to full completion, it is not obvious whether the Traditional format or the Online format leads to better learning outcomes. This line of inquiry has been followed by a number of researchers for more than a decade. Woo and Kimmick (2000) found no significant difference between test scores of nursing students participating in Internet based instruction and those attending Traditional live lecture based courses. Neuhauser (2002) compared learning outcomes of students in Traditional and asynchronous Online sections of the same course taught by the same instructor using the same materials. Results of Neuhauser's work (2002) revealed no significant differences in test scores, participation grades, core assignments, or final grades. Buckley (2003) found no significant differences between test performance of students participating in Traditional classes and Online courses and similarly, McDonnell

et al. (2011) did not find significant differences in student outcomes when comparing students in Online distance learning courses, and on-campus teacher education cohorts. Likewise, Aragon et al. (2002) found that Online and Traditional learners can learn equally well. Clearly there is a substantial body of research to support the view that Online instruction is of the same caliber and quality as Traditional instruction and outcomes are comparably equal. However, there is also a body research supporting the view that Online education can be superior. Navarro and Shoemaker (2000) reported that University of California students taking an asynchronous Online undergraduate economics course consistently performed as well, or better than their Traditional counterparts and regarded CD-ROM based lectures simulating a Traditional classroom experience as a most essential and enjoyable medium. Additionally, in The Sloan Consortium Report to the Nation: Five Pillars of Quality Online Education, Lorenzo and Moore (2002) reported the following:

> A thorough review of research conducted by Learning Effectiveness Effective Practices Editor Karen Swan, Associate Professor of Instructional Technology at the University of Albany, overwhelmingly supports the view that Online learning can be just as good as, and in some cases better than, Traditional learning. (p. 4)

Williams (2006) later compared learning outcomes using various models of distance learning with allied health professionals. The author reported finding that learners in the synchronous instruction model and those in open instruction model (a combination of synchronous and asynchronous learning) well outperformed those participating in a Traditional classroom. Learners in the asynchronous distance learning model, however, performed more poorly than those in a Traditional classroom.

Zacharis (2011) referred to the different ways that a learner uses to perceive, process, and conceptualize information as learning styles. In taking account of prior research to date and also reporting on his own research, Zacharis (2011) concluded that the majority of research studies have shown that learning style has no significant impact on a learner's choice between Traditional or Online formats, on the likelihood that a learner will complete the course, or on the overall level of student achievement in the course.

A review of the literature over the past dozen years seems to lean toward the orientation that Online learning is no better, and no worse than Traditional learning. In fact, in 2006, Tallent-Runnels et al. (2006) reported that the majority of researchers agreed that Online instruction is at least as effective as more traditional teaching formats. More recently, however, Allen and Seaman (2011) state that, "the view that Online education is *just as good as* traditional instruction is by no means universally held" (p. 13). While there is an identifiable, albeit slow increase in the proportion of leaders at academic institutions that have a neutral or positive view of the relative quality of Online instruction in comparison with traditional instruction, a consistent and sizable minority then, sees Online instruction as inferior (Allen & Seaman, 2011). Between 2003 and 2011 the percentage of leaders at academic institutions that view Online instruction as providing for same, or superior educational outcomes has increased from fifty-seven percent to sixty-seven percent, but Allen and Seaman (2011) point out that this leaves a full one-third of academic leaders holding the opinion that Online instruction is inferior. As would be expected, academic leaders associated with institutions offering either Online instruction courses or fully Online programs tend to express a more positive view

of the educational value of Online course offerings than do academic leaders associated with institutions not offering courses Online (Allen & Seaman, 2011). While this direct relationship would be expected, there seems to be no evidenced of causation. While it is possible that academic leaders holding high regard for Online instruction may have prompted more Online course offerings, Allen and Seaman, (2011) point out that it is equally likely that factors other than high regard prompted institutions to offer more courses Online, which subsequently impacted the opinions of many of the 2,500 plus educational leaders polled.

Faculty Training in Online Instructional Delivery. In a 2009 survey of more than 2,500 colleges and universities, chief financial officers of the institutions were asked about specialized training afforded to their respective teaching staff responsible for delivering Online instruction. Specifically, they were asked if this kind of training was afforded to these teachers and if so, how was it delivered to them? Allen and Seaman (2011) report that in 2009, nearly one-in-five (nineteen percent) of degree-granting post-secondary institutions that offered courses Online did not provide any training to the faculty members responsible for delivering Online instruction. By 2011, the number of institutions not providing specialized training to their responsible staff members fell to six percent, or about one-in-seventeen schools. Of this training, internally run training programs were the most commonly taken approach, followed by informal mentoring programs, and then formal mentoring programs. Certification programs and external training courses were relied upon roughly equally and were the approaches least frequently used (Allen & Seaman, 2011).

Edwards, Perry, and Janzen (2011) have found that exemplary Traditional and Online teachers share several effective methods and strategies and also found the same types of learning activities can be equally effective for learners in Online courses and those participating in Traditional instruction. These strategies and methods include challenging students to perform at their highest level, respecting and affirming learner values to the class in general and to the instructor, and influencing learners through role-modeling (Edwards et al., 2011).

In seeking to create a comprehensive and prioritized list of Online teacher competencies, Bawane and Spector (2009) conducted a meta-analysis to compile a list of teacher competencies (1972 – 2005) and of Online instructor roles (1995 – 2007). The obtained lists were integrated and duplicative and overlapping categories were eliminated, resulting in a list of eight comprehensive roles. To obtain priority rankings, 30 qualified education experts from four countries (17-USA, 10-India, 2-Sri Lanka, 1-Australia) were asked to rank the eight comprehensive roles in order of significance for effective teaching. The 30 experts were chosen based on experience, university affiliation, nomination of senior experts, and willingness to participate; 21 of 30 (70%) responded. The prioritized list of eight competencies for Online teachers follows:

1. The Pedagogical Role. Designing instructional strategies and developing learning resources, facilitating participation, and encouraging motivation.

2. The Professional Role. Demonstration of commitment and favorable attitude, communicating effectively, operating legally and ethically, and striving to update educational standards.

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3.   The Evaluator Role. Monitoring progress, assessing performance and

evaluating the course.

4.   The Social Role. Conflict resolution, promoting interactivity, and

maintaining an amicable learning environment.

5.   The Technologist Role. Selecting and developing learning resources,

accessing technical resources and suggesting additional resources.

6.   The Advisor/Counselor Role. Providing guidance to students in need and

suggesting measures to enhance performance.

7.   The Administrator Role. Establishing rules, demonstrating leadership, and

managing the timing of the course.

8.   Researcher Role. Interpreting and integrating research findings and

conducting research on classroom teaching.

In synthesizing findings and framework from the literature pertaining to the role

of Online instructors, Mayes et al. (2011) suggests collapsing the view of appropriate

roles for an Online instructor to play in the Online classroom into five roles. In the role

of Manager, the instructor develops the structure of the course, implements the learning

processes, and manages the timeline for the course. In the role of Technical Advisor, the

instructor is quickly available to address and advise on any technical issues of learners so

that they may get back to the learning process and not be stymied by technical

obstructions. In the role of Social Director, the instructor is tasked with keeping

discourse moving and providing affective support where needed. And lastly, in the role

of Educationalist, the instructor poses questions, responds with feedback, encourages

students to engage in reflective thinking, and helps to synthesize and summarize

comments of the learning group. These instructional roles for effective Online teaching are further synthesized by Anderson, Rourke, Garrison, and Archer (2001) into the construct of teaching presence.

Factors Influencing Student Satisfaction and Success. Throughout the literature pertaining to Online instruction, there seems to be a direct stepwise relationship among factors of perceived interaction with peers and instructors, learner satisfaction with the course, and academic success in Online instruction. While learners have frequently expressed dissatisfaction with the overall outcomes of Online instruction, they also commonly report having particular dislike for Online instructors. As noted by Summers, Waigandt, and Whittaker (2005), Online courses have historically been unsatisfying to some students, and the participants in Online courses often identified the instructor as the main source of discontent. Students in an Online statistics class were dissatisfied with instructor's inadequate explanations, lack of enthusiasm and interest in student learning, as well as the instructor's general lack of openness and concern toward the students in the Online class. Zacharris (2010) notes similar discontent and suggests that this contributes to the relatively high attrition rate associated with Online courses in comparison with Traditional courses. It seems that instructors of Online courses are typically held accountable for the perceived quality of the class and that their perceived Online personalities may be to blame.

Kim et al. (2012) found that course modality did not significantly predict satisfaction with a program but did impact level of student-student and student-instructor interaction. Kim et al. (2012) found that students participating in on-campus programming reported both higher levels of student-student interaction as well as higher

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levels of student-instructor interaction. To further investigate the optimal role of the instructor in an Online course, Nandi, Hamilton, and Harland (2012) evaluated the quality of asynchronous discussions in two Online courses in an effort to provide an ideal dyadic framework between students, and between the instructor and students in a fully Online course. The Nandi et al. (2012) study supported as being the most appreciated orientation, a combination of instructor-centered and student-centered approaches where students and instructors shared responsibility for constructing and sharing knowledge and ideas. Additionally, Abdous and Yen (2010) examined self-perceived learner-teacher relationships in Online and Traditional sections where both formats were offered by the same instructor. The author found no difference between satisfaction across formats, however the author did find that a self-perceived increase in learner-teacher interaction tended to be accompanied by significant increases in learner satisfaction. It seems that the most appreciated role for an Online instructor may be one of consultant and collaborator, but the degree of learner interaction with peers and the course instructor is most highly prized. In older studies, Biner, Dean, and Mellinger (1994) and Sherry, Fulford, and Zhang (1998) found this to be the case as well. In conducting a factor analysis of distance learner satisfaction, Biner et al. (1994) found that attitude toward instructor and the degree of communication between students and the instructor were significant factors of student satisfaction. Sherry et al. (1998) found that how a student perceives the level of interaction in their educational setting can largely contribute to satisfaction with a course. Sherry et al. (1998) found that when learners perceive that the level of interaction was high, learners were more satisfied than when they perceived it to be low. And finally, Pascarella, Whitt, Nora, and Edison (1996) found that when learners

are more satisfied with instruction, they are subsequently more likely to succeed in the course.

Learner Characteristics

The literature surrounding Online instruction suggests that there are a number of learner characteristics that tend to influence learner choice regarding learning modality. Additionally, there are other, different learner characteristics that tend to play a significant role in determining if a learner will succeed in an Online class over a Traditional class. Sullivan (2002) found that women reported a positive view of Online instruction for the anonymity afforded by this Online asynchronous modality as well as for its relative convenience.

Motivation. Historically, according to Schneider and Germann (1999) and Bocchi, Eastman, and Swift (2004), a majority of the learners who are faced with the choice between Traditional and Online courses are older than the typical Traditional student and virtually balanced in composition between men and women. Around the first few years of the new century, Schneider and Germann (1999) and Bocchi, et al. (2004) were observing an educational environment where Online instruction was well outside the norm for nine out of ten college students (Allen & Seaman, 2011) and Online learning was a virtual last resort for non-Traditional learners seeking to access higher education while managing their adult lives. As educational paradigms followed technological advances (e.g. Napster, Myspace, LinkedIn, Twitter, Facebook, etc.) into the 21st century, learners have become more competent in utilizing modern communication technology and comfortable interacting via the Online digital medium. When Clayton et al. (2010) polled students more recently as to their preference for learning modality, many learners

indicated favoring less Traditional environments over Traditional environments. Clayton et al. (2010) found that students indicating a preference for less Traditional learning environments (e.g., Online and/or Hybrid instruction) also presented as more confident in their ability to manage the requirements of a course offered in just such a non-traditional format. Alternately, Robinson and Doverspike (2006) found that a learner's general attitude toward computer technology was a reliable predictor of learning modality choice. For example, students were more likely to register for a Traditional class than an Online class if they held a negative attitude toward computers or toward the Internet.

Along with contemporary technological prowess, in their examination of student intentions to enroll in an Online psychology course versus a traditional version of the same class, Robinson and Doverspike (2006) found that subjective norms also contributed to learning modality choice. Student decisions between Traditional and Online instruction were influenced by the perceived opinions of their peers and family regarding components germane to each modality such as the requirement for heavy computer and Internet use and the absence of consistent physical class attendance.

In addition to technological fluency, attitude and subjective norms, there are other important distinctions between learners who prefer non-traditional Online learning over more traditional instruction. Clayton et al. (2010) found that students indicating a preference for more Traditional learning environments showed more of an orientation toward mastery goals; that is, they reported a greater interest in putting forward more effort in coursework than did those who indicated a preference for courses incorporating an Online component. This is consistent with earlier research reported in the literature (Brown & Leidholm, 2002; Kanuka & Anderson, 1998). Furthermore, as described by

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Ames and Archer (1988) and Dweck and Leggett (1988) in addressing achievement goal theory, students with mastery goal orientation present with a desire to increase knowledge, understanding, competence, and appreciation of the educational materials. Alternately, students showing an orientation toward performance goals show a desire to outperform others, to demonstrate competence, and to avoid demonstrating incompetence (Clayton et al., 2010). They tend to be less engaged in their learning, to avoid challenges, and to have heightened concern for how they are perceived by others.

Consistent with the preponderance of research in the area of Online and distance learning, Parker (2003) has identified self-motivation as among the very most important traits of a successful Online learner. Parker (2003) notes that students assessed as having internal locus of control (seeing events as contingent upon one's own behavior) are viewed as self-motivated and were significantly more likely to complete an Online course than were those students assessed as having an external locus of control (seeing events as contingent upon luck, fate, or the control of others). Furthermore, Parker (2003) found that despite pre-course assessment of locus of control, students who complete an Online course tend to become more self-motivated than their traditional counterparts, who's assessed degree of self-motivation did not significantly change. It seems that motivation and successful completion of a task, in this example an Online college course, are reciprocally supporting. Also impacting likelihood of course completion is learner attitude. As suggested by Richie and Newby (1998) students holding a more positive attitude toward schooling may be more likely to finish a course of study.

While student motivation stands out in the literature as one of the necessary attributes of a successful Online learner, the relative isolation inherent in Online learning

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can pose a challenge to some learners. Galusha (1997) reports observing a loss of student motivation attributable to lack of face-to-face contact with teachers and peers and cautions that this is among the significant barriers to distance learning models such as Online instruction. Hartley, Gill, Walters, Bryant, and Carter (2001) concur noting that Online courses may often be long endeavors and suggests that many students fall victim to motivational depletion when working in isolation for extended periods of time contributing to increased non-completion rates.

Self-Regulation. How learners access information in the educational setting has changed with the pervasive use of digital medium in education. Through use of computers, hyperlink software, and the Internet, learners are able to peruse information on any number of subjects by freely jumping from one idea to the next (McManus, 2000) in a fashion that seems intuitive. This availability of low-linearity investigation allows learners to move autonomously through material without concern for a predetermined sequence of learning or instruction. Studies have historically shown (Richards, 1998) that learner control, learner autonomy and quality of instruction lead to improved engagement and learner satisfaction and are crucial factors in providing a successful learning experience. McManus (2000) found similar results and suggests that students considered to be highly regulated typically require less in the way of formal lesson design than do students who are considered to be less regulated. Additionally, McManus (2000) suggests these highly regulated students will perform better in Online environments across varying degrees of linearity and that they will perform particularly and relatively better in environments that are low in linearity. Further, McManus (2000) suggests that less self-regulated students will perform particularly better in highly linear environments

where choices are more limited and timing of activities is more standardized. In his research on self-regulation with mathematics students participating in asynchronous Online instruction, Hodges (2009) suggests seven distinct strategies to promote self-regulation in Online college students. Hodges (2009) indicated that when students worked practice quizzes, took notes on the course, reviewed notes taken in class, sought peer assistance to review areas of difficulty, attended to week-to-week grade progress, set personal goals of getting a better grade in the course, and constructed a personal reward system of rewarding oneself for completed work with leisure activities, self-regulation improved. Hartley et al. (2001) additionally offers the time management tips of selecting and protecting both fixed times each week to study and a study area where it is easier for the learner to concentrate.

Emotional Factors. While there seems to be no literature indicating a gender difference in Online course completion or success, there are indicators of differing motivations for selecting Online instruction over Traditional instruction related to gender and to emotional factors. Sullivan (2002) reports that females expressed having a positive view of the anonymity afforded by Online learning and reveal that in some ways, this asynchronous Online modality offers a more welcoming and less "chilly environment" than traditional classrooms which may be dominated by a more "masculine style" of discourse such as highly assertive speech, and competitive "devil's advocate" interchanges. Gavin DeBecker is a well-known security expert who is credited with designing a standardized protocol for assessing threats made to high ranking United Stated government officials. In his book *The Gift of Fear*, DeBecker (1997) acknowledges a gender characteristic that seems to underpin some identified perceptions

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of females that Online instruction may be a safer alternative than Traditional instruction. DeBecker reports that men in all parts of the world tend to be more violent than women. Further, DeBecker discusses that in the worst case, men tend to fear embarrassment in the presence of women, while women tend to fear physical harm from men. While there is not literature indicating that female students choose Online instruction over Traditional instruction due to safety concerns, independent of other factors, females tend to be more at risk of physical harm than their male counterparts. In addition to fear, anxiety also may impact the decision between Online and Traditional instruction. Zembylas (2008) discusses that mature female students may struggle with contradictions and discontinuities in their identity when facing the challenge of committing themselves to spending time focused on Online learning in an environment where they may otherwise identify as homemaker, mother, or wife. While Choy, McNickle, and Clayton (2002) agree that a student's initial foray into the Online instruction from Traditional classes may be an anxiety provoking experience, there are many ways to ease student concerns as they make this transition. Choy et al. (2002) offer examples of efforts that might include providing comprehensive course orientation to the Online courses, providing access to the same services as Traditional classroom students, and ensuring that supports are available throughout the learning experience and do not necessarily decline as the course nears its end (Choy et al., 2002).

External Learner Factors

As previously reviewed, both innate and acquired learner attributes seem to have clear and significant impact on a student's longevity and success Online learning. It is also reasonable to suggest that a student's awareness of their own personal attributes would also contribute to their decision to utilize Online or other distance learning options in their plan to educate themselves. While it would seem that an honest appraisal of personal strengths and weaknesses would be an important component to consider, this assumption does not seem to be borne out in research. As found by Clayton et al. (2010), the main driving force accounting for learner choice between Online and fact-to-face learning is lifestyle. Clayton et al. (2010) found that student lifestyle greatly influenced decision making when selecting Online or Traditional versions of the same course and this finding generally agrees with earlier literature in this area. For many decades, rural students and those who cannot afford to leave their homes, jobs, and families have accessed education through distance learning programs (Kim et al., 2012; Ludlow & Lombardi, 1992). In Bickel and Carrol's research (2003), participants in the study reported that their jobs, their family commitments, and their personal schedules to be the three primary factors impacting this same decision. Sullivan (2001) reports that learners are commonly drawn to Online learning for flexibility in scheduling and convenience, and Hartley et al. (2001) reminds that learners may frequently select Online course options for the flexibility to work around professional and/or domestic commitments. She cautions that learners often report believing that working at their full-time occupation or running a home should take precedence over studying and school work (Hartley et al., 2001). Choy et al. (2002) concur that flexibility, specifically of time, place and pace, is

the key reason for students to choose an Online study option. In the ninth and most recent version of the Sloan Online Survey, Allen and Seaman (2011) report that 63% of academic leaders rate Online courses as superior in scheduling flexibility for students, and an additional 27% rate Online courses somewhat superior on the same continuum in comparison with Traditional courses. With a full 90% of education leaders highly supportive of Online education when considering student flexibility in scheduling, it seems to be a bit of a quandary why even the remaining 10% of education leaders polled would rate the two as equal, or rate Online courses as somewhat inferior, or far inferior in scheduling flexibility in comparison with Traditional courses.

In recent years, increased opportunities to advance learning goals Online have provided a measure of flexibility and scheduling convenience that has made postsecondary education more accessible to a broader range of people and for a wider range of purposes (Allen & Seaman, 2011; Choy et al., 2002; Sullivan, 2001). In addition to appealing to learners on the merits of accommodating lifestyle constraints, Hartley et al. (2001) adds that Online courses tend to be attractive to institutions looking to assist their staff members in developing their skills so that they may become more valuable employees.

Historically, most students have resorted to Online versions of their selected course only when other alternatives were exhausted and constraints on their schedule dictated that Online options must be considered (Bee & Usip, 1998). While a contemporary review of the surrounding literature supports Online learning attributes of scheduling convenience and flexibility as being central considerations of learners when deciding if Online learning will meet their personal education needs, it appears that there

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is some difference in priorities between males and females faced with the same choice. Both male and female students have reported a positive view of Online instruction for its relative convenience and flexibility in scheduling, but females tend to point out other benefits to this instructional modality. When Sullivan (2002) asked learners to complete two open-ended questions relating to their recent experience in Online classrooms, 18% of females mentioned "children" and "family" compared to 2% of their male classmates responding to the same questions.

Learning and Study Skills Inventory, Second Edition (LASSI-2)

The Learning and Study Skills Inventory, Second Edition (LASSI-2) is an academic counseling and advising tool that has been used in more than 1,300 universities and colleges (Olaussen & Braten, 1998; Weinstein & Palmer, 2002). The LASSI-2 is a 10-scale assessment of student's awareness about, and use of learning and study strategies. The LASSI-2 was originally derived from models of self-regulation and strategic learning and intended to be used as a global screening measure incorporating an array important variables related to learning, studying, and educational achievement (Weinstein & Palmer, 2002). The 10 LASSI-2 scales below are presented in the order that they appear in the self-scoring protocol (LASSI-2, 2002).

- Anxiety (ANX) measures the degree to which students worry about school and academic success. Low scores on this scale may indicate need for increased skills in coping with anxiety and worry so that attention may be better focused.

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- Attitude (ATT) measures student's attitude and interest in succeeding academically in college. Since this scale is reverse-scored, low scores may indicate a belief that college is relevant or important.

- Concentration (CON) measures the student's ability to focus attention on academic tasks. Low scores on this scale may indicate the need for monitoring of concentration level and development of techniques or strategies to assist in redirection of attention and blocking of interfering thoughts or stimuli.

- Information Processing (INP) measures the effective use of imagery, reasoning, organization and learning strategies to connect existing knowledge with new material. Low scores on this scale may indicate difficulty in making new information meaningful and in storing information in memory for later retrieval.

- Motivation (MOT) measures diligence, self-discipline, and willingness to exert necessary effort to achieve academically. Low scores on this scale may indicate need for the respondent to take more responsibility for their educational outcomes and to use progressive goal setting strategies to accomplish a specific task.

- Self-Testing (SFT) measures the fluency and use of personal monitoring techniques to determine if level of information understanding is adequate. Low scores on this scale may indicate need for developing an appreciation of self-testing techniques that can be used to monitor understanding level.

- Selecting Main Idea (SMI) measures proficiency at separating important information from less important information. Low scores on this scale may indicate need for additional training in separating important information from other details so that important information can be retained.

- Study Aids (STA) measures use of available resources, support strategies, and materials to help learn new information. Low scores on this scale may indicate need for increased understanding and familiarity with resources that can help in improving learning efficiency.

- Time Management (TMT) measures use of time management principles as applied to academic tasks. Low scores on this scale may indicate need to develop work habits and scheduling techniques that will reduce procrastination and increase timely completion of academic tasks while realistically including non-academic activities.

- Testing Strategies (TST) measures use of both test preparation strategies and testing taking strategies. Low scores on this scale may indicate need to learn effective test taking strategies so that of mastery of knowledge can be effectively demonstrated (Weinstein & Palmer, 2002).

The instrument prompts the test-taker to respond to a series of 80 declarative statements about learning and study strategies by selecting a response corresponding to a five-point Likert scale. Response options range from 1) *Very much typical of me,* to 5) *Not at all typical of me.* When compiled, these ratings serve to reflect the test-takers

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standing with respect to each of the ten LASSI-2 scales (Fowler, Maxwell, & Froyd, 2003; Weinstein & Palmer, 2002).

At the college level, the LASSI-2 may be completed in a web-based format or by completing a self-scoring printed booklet. While the Online version is automatically scored and produces computer generated reports, the printed booklet version may be easily scored by the subject in around 10 minutes. A completed LASSI-2 reflects the test-takers standing relative to the 10 scales. Upon completion, the measure provides both a scaled score and a percentile score for each individual scale. Given the diagnostic and prescriptive purpose if this instrument, no total score or other single omnibus characterization of overall performance is computed (Weinstein & Palmer, 2002).

According to instrument authors Weinstein and Palmer (2002), the original Learning and Study Skills Inventory (LASSI) began as a component of a cognitive learning strategies project beginning in 1980 at the University of Texas, in Austin. The LASSI was subsequently published in 1987 after several years of development (Weinstein & Palmer, 2002). The LASSI was designed to function both as a diagnostic indicator of student's strengths and weaknesses, and a prescriptive tool for providing feedback about student weaknesses and has been shown to be adequately reliable. Coefficient alpha (α) is a statistic reflecting internal consistency (Cortina, 1993) and with respect to the LASSI, indicates the degree to which we can be confident that items distinct to one of the 10 scales measure the same construct as other items within that scale. It is generally accepted (Cortina, 1993) that coefficient alpha levels greater than .70 are considered acceptable, greater than .80 are considered good, and greater than .90 are considered excellent. It is important to note that there was some skepticism regarding

the reported reliability and validity of the first version of the LASSI, published in 1987. Cano posits the question of the appropriateness of the author's application of statistical techniques, writing "the concerns of some researchers about this instrument (e.g., items' factor structure) appear to derive from a misunderstanding of how it was designed and developed" (2006, p. 1024). Further, Cano adds "in the user's manual [of the original LASSI], these authors reported Cronbach's alphas ranging from .86 to .68. A controversial topic among psychometricians is whether the magnitude of these estimates of reliability is adequate" (2006, p. 1024). Similarly, for this study's sample, the Cronbach's alphas ranged from .68 to .88. Also seeking to investigate the reliability and validity of the original seventy-seven item measure, Malancon (2002) administered both the LASSI and the Personal Preferences Self-Description Questionnaire (PPSDQ) to 502 university students and conducted a varimax-rotated principal components analysis in addition to computing Cronbach's alphas for each scale in both measures. Melancon's (2002) calculations showed that Cronbach's alphas were within $\pm$.03 of the alphas reported in the manual, but was struck that none of the ten coefficient alphas were larger than .86. In all, Melancon (2002) concluded that the original LASSI did not measure the 10 scales described in the manual.

In direct comparison, Cronbach's alphas from the original LASSI and the 2nd Edition evidence what might be considered improved reliability on eight of the 10 scales averaging +.06 α, and what might be considered slightly less reliability of the remaining two scales averaging -.02 α. Over all 10 scales, Cronbach's alphas from the LASSI-2 improved by an average of +.02 α over the original LASSI. The LASSI-2 manual (Weinstein & Palmer, 2002) reports eight of the ten LASSI-2 scales (Anxiety,

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Concentration, Information Processing, Motivation, Self-Testing, Selecting Main Ideas, Time Management, and Testing Strategies) having coefficient alpha levels greater than .80 (good), and the remaining two scales, Attitude and Study Aids, having coefficient alpha levels greater than .70 (adequate). This evolution speaks well of the LASSI-2's reliability, but it seems that there are questions of validity that may not be conclusively decided. For purposes of this study, it is reasonable to move forward using the current factor structure delineated by the LASSI-2 authors.

Intended uses of the LASSI-2 include; screening to help students become more aware of strengths and weaknesses in learning and studying, offering diagnostic information and assisting students in identifying areas where interventions may be most successful, and as an advising or counseling tool in various college applications. Armed with this information, students may strive to improve their knowledge, skills, attitudes, motivations and beliefs (Weinstein & Palmer, 2002).

Skill, Will, and Self-Regulation. Since its initial publication, a handful of research projects have been directed toward identifying a parsimonious model for characterizing the LASSI-2 and identifying the scale configuration likely to be most useful in predicting success in higher education. According to Cano (2006), there have only been five representative and well-designed research projects focusing on psychometric analysis of the LASSI. Two of the projects used high school students as participants and the remaining three used college students.

To date, the most popular structural model for LASSI-2 interpretation (Prevatt, Petscher, Proctor, Hurst, & Adams, 2006) is the aforementioned, three uncorrelated factor

model of strategic learning, Skill, Will, and Self-Regulation (SWSR) promoted by test developers and authors, Weinstein and Palmer (2002).

The SWSR interpretation model provides the test-taker with a characterization of personal strengths and weaknesses on ten discrete scales presumptively grouped by the model's three model components; Skill, Will and Self-Regulation. According the authors of the instrument, "The LASSI[-2] scales related to the Skill component of strategic learning are: Information Processing, Selecting Main Ideas, and Testing Strategies. These scales examine students' learning strategies, skills and thought processes related to identifying, acquiring and constructing meaning for important new information, ideas and procedures, and how they prepare for and demonstrate their knowledge on tests or other evaluative procedures" (Weinstein & Palmer, 2002, p. 4). "The LASSI[-2] scales related to the Will component of strategic learning are: Anxiety, Attitude, and Motivation. These scales measure the degree to which students worry about their academic performance, their receptivity to learning new information, their attitudes and interest in college, their diligence, self-discipline, and willingness to exert the effort necessary to successfully complete academic requirements" (Weinstein & Palmer, 2002, p. 5). And finally,

> The LASSI[-2] scales related to the Self-Regulation component of strategic
> learning are: Concentration, Self-Testing, Study Aids, and Time Management.
> These scales measure how the students manage, or self-regulate and control, the
> whole learning process through using their time effectively, focusing their
> attention and maintaining their concentration over time, checking to see if they
> have met learning demands for a class, an assignment or a test, and using study

supports such as review sessions, tutors or special features of a textbook.
(Weinstein & Palmer, 2002, p. 5)

While this model is generally well accepted, important differences were found by Yip (2009) between study strategies of university students with high and low academic achievement. Yip (2009) observed that Will and Self-Regulation components within the model of strategic learning were even more important in differentiating high from low academic achieving students than earlier studies had shown. Furthermore, it has been largely agreed upon in the literature, that the Motivation scale, embedded within the Will component of the LASSI-2, is the most important discriminator between students who are academically successful in Traditional in-person college courses, and those who are less so (Ley & Young, 1998; Marrs, Sigler, & Hayes, 2009). While the SWSR model of interpretation is recommended by the LASSI-2 authors, there are competing views among some researchers.

Affective, Goal, and Comprehension Monitoring Strategies. Following his own research using the original LASSI with 956 participants, Cano (2006) found that the Skill, Will, and Self-Regulation (SWSR) model of strategic learning did not present three separate components, but rather merged constructs (Cano, 2006). As a more statistically plausible configuration, Cano (2006) offers his own three-factor model of the latent constructs, Affective Strategies, Goal Strategies, and Comprehension Monitoring Strategies (AGC). As presented in Figure 2 (repeated here), there are there are interrelationships among components of Cano's AGC model (2006), but while the author's results indicate that each AGC component is generally associated with academic performance, multiple regression analysis shows that only two of the components,

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Affective Strategies and Goal Strategies, were shown to be significant predictors of learner performance in the postsecondary academic setting.

- **Affective Strategies**
  - Time Management
  - Motivation
  - Concentration
  - Attitude
  - Self-Testing
- **Goal Strategies**
  - Concentration
  - Attitude
  - Selecting Main Ideas
  - Anxiety
  - Test Strategies
- **Comprehension Monitoring**
  - Self-Testing
  - Selecting Main Ideas
  - Information Processing
  - Study Aids
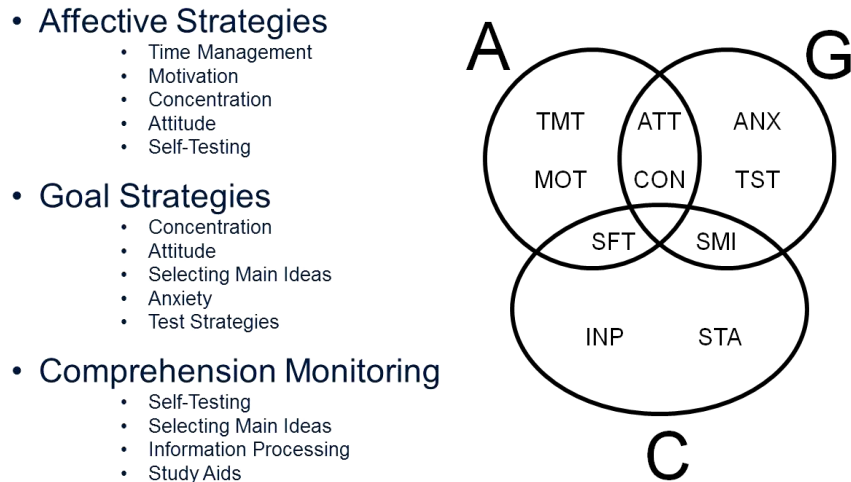
Figure 2 (repeated). AGC Construct Model for LASSI-2 Interpretation

Ten years after publication of the original instrument, work began on an updated version of the LASSI that would be completed and published in 2002. Development of the LASSI-2 was marked by extensive development (Fowler et al., 2003) including administration of a field test 'norming' version to more than one thousand college students from twelve regionally diverse universities, community colleges, state colleges, and technical institutions. Direct comparison between the original LASSI, and the LASSI-2 evidences improved reliability on the instrument as a whole (Weinstein & Palmer, 2002). While questions of validity may not be conclusively decided, this evolution speaks well of the reliability of the LASSI-2 for contemporary use.

Summary

In an effort to assist advanced learners in making educational modality decisions that will maximize their likelihood of success, it will be useful to better understand learner characteristics for use in deciding which method of instruction would represent the learner's best instructional modality fit. Alternately, making these same learners aware of specific mismatches between their own learner characteristics and delivery modality demands may give the learner the opportunity to modify or bolster weaknesses in the event that other extraneous factors require participation in a modality that is not optimum. The Learning and Study Strategies Inventory (LASSI-2) may well be useful in better understanding learning characteristics for these uses.

Chapter 3

Methodology

The following sections describe the methodology for this study, including a description of the research design of the study, followed by a description of the identified sample, including an explanation of the sampling criteria and the selection procedures. This will be followed by a description of the instruments (including the scale's Cronbach's alphas for this study's sample) used in the data gathering portion of the study and an explanation of the procedures used for this study. This section concludes with a description of the statistical analyses, which includes exploratory data analysis, assumption checking procedures, and information about the particular statistical analyses for each of the research questions.

Research Design

This study is a between-participants design utilizing correlation research methods. Cone and Foster (2008) state that a between-participants' design does not assess participants over time, but rather examines the variation that arises from them at a single point in time. This study also looks at relationships between learner characteristics and learner performance collectively and separately in the Traditional and Online courses. Additionally, this study utilizes survey research methods to investigate in answering the research questions. Survey research is a method involving the use of questionnaires and/or statistical surveys to gather data about learners and their characteristics and study strategies (i.e., motivation, time management, self-regulation, etc.). According to Gall, Gall, and Borg (2003), the purpose of a survey is "to use questionnaires to collect data from a sample that has been selected to represent a population to which the findings of the data can be generalized" (p. 223). Survey research can provide an understanding of

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educational phenomena through careful descriptions of such phenomena at a single point and time (Gall et al., 2003); it is quantitative in nature, with a noninterventionist approach to gathering data; it also attempts to analyze the data collected from the instruments completed by the target population.

Correlation methods are often used to investigate the degree of relationship among various variables (e.g., motivation and course grade). Correlation research is a type of research that seeks to uncover the direction and magnitude of the relationship among variables through the use of correlation statistics (Gall et al., 2003). According to Gall et al. (2003), multivariate correlation methods are "any statistical analyses that express the relationship among three or more variables" (p. 629). Multivariate correlation methods permit researchers to explore how each factor that is under investigation, both alone and in combination, affect outcome variables.

During the 2011 academic year, the LASSI-2 survey instrument was used to collect data on the existing learning characteristics of college students for comparative analysis with their subsequent performance in education psychology classes as measured by performance on various class assignments, and course grades. The purpose was to gather information on the constructs of learning and study strategies within college students to study the relationship with educational success in both Traditional and Online learning environments. In the present study, the existing data set compiled during the 2011 academic year is used to study differences in educational success, as discerned using the course letter grades of participants. Correlation methods to investigate the degree of relationship among various variables (e.g., relationship patterns among the LASSI-2 components, factors, and scales) are also used.

Participants

      Data analyzed in this study was gathered using a convenience sample of 344 undergraduate teacher education students pursuing bachelor's degrees to become certified teachers. Most of these students would be considered college juniors and these courses are likely among the first educational foundations course taken toward their teacher education degree. All students had registered at Northern Arizona University for EPS 324 (Educational Psychology in Elementary and Middle-School Education) or EPS 325 (Educational Psychology in Middle-School and Secondary Education) during the 2011 semesters and students independently selected Traditional, or Online sections of these courses as both were offered. Of the 344 participants in the study, 245 were in Traditional sections, and 99 were in Online sections. While use of a convenience sample certainly is a threat to external validity, it would not be feasible to randomly assign participants to conditions in this case due to individual circumstances with each student and typical university enrollment processes and procedures that allow students to choose among offered sections.

      This study's sample consisted of 162 (47.1%) females, 38 (11%) males, and 144 who did not indicate their gender. Of the 309 who reported their age, 66.3% (228) were between 18-21 years of age, 48 (14%) between 22-30, 21 (6.1%) between 31-40, and 12 (3.5%) over 40 years of age. The majority (290, 84.3%) were enrolled full-time, with 19 (5.5%) enrolled part-time, and 35 not indicated their enrollment status. Of the 308 who reported their current employment status, 103 (29.9%) reported being unemployed, 138 (40.1%) reported being employed part-time, 58 (16.9%) reported being employed full-time, and 9 (2.6%) reported being the family caregiver.

Instrumentation

Learning and Study Skills Inventory (LASSI). The LASSI-2 is a 10-scale assessment of student's awareness about, and use of learning and study strategies. The instrument prompts the test-taker to respond to a series of 80 declarative statements using a five-point Likert rating from *Very much typical of me,* to *Not at all typical of me* (Fowler et al., 2003; Weinstein & Palmer, 2002). When scored, the raw score for each of the 10 scales on the LASSI-2 is converted to a percentile using an interpretation chart. The authors indicate that a percentile scores above 75 indicate a relative strength for that scale, percentiles between 50 and 75 indicate areas where improvement is needed, and percentile scores below 50 indicate areas of relative weakness such that improvement should be a priority (Weinstein & Palmer, 2002). The LASSI was designed to function both as a diagnostic indicator of student's strengths and weaknesses, and a prescriptive tool for providing feedback about student weaknesses and has been shown to be adequately reliable. As earlier reviewed however, there has been some skepticism regarding the reported reliability and validity of the first version of the LASSI having to do with the appropriateness of the author's application of statistical techniques (Malancon, 2002). Cronbach's alphas from the LASSI-2 evidence somewhat improved reliability over the original LASSI on eight of the 10 scales averaging +.06 α, and slightly less reliability of the remaining two scales averaging -.02 α. This evolution speaks well of the LASSI-2's reliability, but it seems that there are questions of validity that may not be conclusively decided. For purposes of this study, it is reasonable to move forward using the current factor structure delineated by the LASSI-2 authors.

Intended uses of the LASSI include; screening to help students become more aware of strengths and weaknesses in learning and studying, offering diagnostic information and assisting students in identifying areas where interventions may be most successful, and as an advising or counseling tool in various college applications. Armed with this information, students may strive to improve their knowledge, skills, attitudes, motivations and beliefs (Weinstein & Palmer, 2002).

At the college level, the LASSI-2 may be completed in a web-based format or by completing a self-scoring printed booklet. While the Online version is automatically scored and produces computer generated reports, the printed booklet version may be easily scored by the subject in around 10 minutes. A completed LASSI-2 yields 10 separate scaled scores corresponding to the scales assessed by the measure. While the LASSI-2 yields a separate scaled score for each scale, there is not a total score computed since the instrument as a diagnostic tool. All students in the sample completed the LASSI-2 in the Online format.

The LASSI-2 scales and their Cronbach's alphas for this study's sample are:

- Anxiety (ANX) is the degree to which students worry about school (Cronbach's alpha = .880).

- Attitude (ATT) is the student's interest in succeeding academically in college (Cronbach's alpha = .675).

- Concentration (CON) is the student's ability to focus on academic tasks (Cronbach's alpha = .871).

- Information Processing (INP), the use of imagery, reasoning, organization and learning strategies to connect existing knowledge with new material (Cronbach's alpha = .834).

- Motivation (MOT), diligence, self-discipline, willingness to exert necessary effort to achieve academically (Cronbach's alpha = .837).

- Selecting Main Idea (SMI), proficiency at separating important information from less important information (Cronbach's alpha = .836).

- Self-Testing (SFT), use of personal monitoring techniques to determine if their level of understanding is adequate (Cronbach's alpha = .882).

- Study Aids (STA), use of resources, support strategies, and materials to help learn new information (Cronbach's alpha = .692).

- Testing Strategies (TST), use of both test preparation strategies and testing taking strategies (Cronbach's alpha = .860).

- Time Management (TMT), assesses students use of time management principles for academic tasks (Cronbach's alpha = .767).

For this study, the internal consistency, as measured by Cronbach's alpha, provided notable findings with respect to the SWSR Components Model. For the Skill Component, the Cronbach's alpha was .773; however, further analysis with this sample revealed that the component's internal consistency could be improved to .869 with the removal of the Information Processing Scale. Similarly, for the Will Component, it yielded a Cronbach's alpha of .477, which could be improved to .714 with the removal of the Anxiety Scale. The Self-Regulation Component's Cronbach's alpha was .803 for this sample, with all four of the indicated scales. It should be pointed out that for this sample,

the bivariate correlations for each of the scales with their respective components were found to be significantly related to each other as would be expected. The added analysis simply suggests that further research is warranted to investigate the model structure.

For the AGC Constructs Model; the Affective Strategies' Cronbach's alpha was .833, Goal Strategies' Cronbach's alpha was .813, and Comprehension Monitoring Strategies' Cronbach's alpha was .734. Unlike the SWSR Component Model, the three AGC construct's internal consistency could not be improved with the removal of any of the indicated scales. That is, removal of any of the indicated scales from the construct would not make a substantive improvement (> .05) or would in fact reduce the Cronbach's alpha (internal consistency).

Demographic Questionnaire. Immediately following completion of the LASSI-2, all students in the sample responded to a Survey Monkey demographic questionnaire consisting of personal demographic information and 5 to 7 questions pertaining to their choice to take the class Online, or in-class.

1. Last name:

2. First name:

3. NAU identification number:

4. Current student status: Full-time part-time?

5. Current Employment status: Employed full-time, employed part-time, self-employed, family caregiver, or unemployed?

6. Degree program completing:

- B.S.Ed. Elementary Education, B.S.Ed. Early Childhood

- B.A.S. Early Childhood, Secondary Education

- Dual B.S.Ed. Special and Elementary Education

- Dual B.S.Ed. Special and Secondary Education

- B.S.Ed. Career and Technical Education

7. Age: 18-21 years, 22-25 years, 26-30 years, 31-35 years, 36-40 years, and over 40 years.

8a. Why did you choose to take this course in-person rather than Online? Check all that apply. (included in surveys of in-class students).

- In-person course is convenient with my work schedule.

- In-person course works better for my family's schedule.

- In-person course is convenient with my other classes.

- I prefer in-person courses to Online courses.

- The Online course was full.

- Other.

8b. Why did you choose to take this course Online rather than in-person? Check all that apply (included in surveys of Online students).

- Online course is convenient with my work schedule.

- Online course works better for my family's schedule.

- Online course is convenient with my other classes.

- In-person class was not available in my community.

- I prefer Online courses to in-person.

- The in-person course was full.

- Online courses are more economical (e.g., travel, fees, sitter, etc.)

- Other (please specify)

Demographic information obtained regarding this sample will be reported but is not included in the structure of the proposed data analysis.

Procedures

Following an application for consideration for the Dean's Research Grant made through submission to the Northern Arizona University's dean of the College of Education, an existing IRB application was amended to add the administration of the LASSI-2 to a group of students enrolled in Traditional and Online classes in the educational psychology graduate program. An additional IRB was submitted regarding using this existing data set for this proposed dissertation and subsequently approved.

The data set used in this study was collected during the 2011 Summer and Fall semesters from undergraduate students pursuing bachelor's degrees to become certified teachers. Participants had selected to register for EPS 324 (Educational Psychology in Elementary and Middle-School Education**)** or EPS 325 (Educational Psychology in Middle-School and Secondary Education) which are both undergraduate level foundations courses in educational psychology and were both offered as a Traditional attendance course or one that was delivered in an Online format. During the first three weeks of the course, each student was asked to complete the LASSI-2 and a demographic questionnaire. All students took the LASSI-2 Online using the LASSI-2 website and were provided the university code. All students took the survey using SurveyMonkey during the first three weeks of the class. Following completion of the LASSI-2 and the demographic questionnaire, students reviewed their scores and wrote short reflections. It is permissible to consider that students' awareness of their score profile may have influenced students to adjust their study habits or regulate their performance in class.

In all, the LASSI-2 was completed a combined total of 351 times in Traditional and Online class sections, while the demographic questionnaire was completed 297 times. The discrepancy is likely the result of confusion on the part of Online students who may have mistakenly completed the LASSI-2 more than one time. Through analysis of demographic data and matching of student identification numbers, instances of multi-testing were identified and duplicate administrations of the LASSI-2 were discarded in favor of the administration that was completed first.

Statistical Analyses

According to Tabachnick and Fidell (2007), preparatory data analysis is considered essential to an honest analysis of the data, as these preliminary steps allow the researcher to determine whether the data is clean and appropriate for analysis. Examining the accuracy of data entry, checking for missing data, assessing both univariate and multivariate outliers, and investigating the fit between the data set and pertinent statistical assumptions represent the initial steps of the data screening process. This was then followed by an examination of the normality, linearity, and homoscedasticity of the data by looking at the skewness, kurtosis, scatter plots, and residual plots of the variables**.**

Accuracy of data entry. Tabachnick and Fidell (2007) indicate that the first step in data screening is to check the accuracy of the data file. The data file was proofread to verify the accuracy of the data statistically analyzed. Issues addresses include implausible means and standard deviations, variables that may be out of range, and univariate or multivariate outliers**.**

Missing data analysis. The next step taken in data screening is to examine the file for data that is missing, possibly due to participants not responding to certain items or sets of items, participant attrition, or various data management mistakes. Missing data can be considered a threat to the generalizability of research findings. There are various methods for dealing with missing data, including deleting the subject data altogether or replacing the missing value with an acceptable estimation (Tabachnick & Fidell, 2007).

Assessment of univariate and multivariate outliers. Both types of outliers refer to extreme values in the data, which may distort the results of the statistical analyses, resulting in potential Type I and Type II Errors. According to Tabachnick and Fidell (2007), outliers may be the result of any one of four potential causes:

1. The data may have been entered incorrectly.

2. The computer may consider a missing value to be "real" data.

3. The outlier is not representative of the population that one intends to sample.

4. The distribution of the population values includes more extreme values than would be anticipated in a normal distribution.

The Mahalanobis distance statistic is often used to identify multivariate outliers (Tabachnick & Fidell, 2007). This statistic is the measure of the distance of the case from the centroid of the remaining cases (the centroid is point of intersection of all the variables). The presence of a multivariate outlier in the data can be dealt with via data transformation or case deletion, thereby reducing the distorting influence on the data.

Assessment of univariate and multivariate normality. Multivariate normality refers to the assumption that each variable – and all combinations of the variables and the

residuals – are normally distributed. Univariate and multivariate normality was assessed by looking at the variables skewness, kurtosis, scatter plots, and residual plots. Skewness refers to the overall symmetry of the distribution, with a mean of the data existing at the center of the distribution. Kurtosis refers to how peaked or flat the distribution of the data is. If the residuals of the analysis are normally distributed and independent, then the assumption of normality is met (Tabachnick & Fidel 2007).

Linearity and homoscedasticity. Linearity refers to the assumption of a straight-line relationship between two variables. Nonlinearity is assessed in this study by examining the residual plots in the analysis that involve the predicted variable, and from bivariate scatter plots generated for pairs of variables. Homoscedasticity refers to the assumption that the variability scores for one continuous variable are approximately the same across all levels of another continuous variable (Tabachnick & Fidell, 2007). The bivariate scatter plots will be examined to evaluate this assumption, and if the scatter plots between two variables are of approximately the same width, with some clustering towards the middle, then this assumption is not violated. According to Tabachnick and Fidell, violation of this assumption is not fatal to the analysis, though it does weaken the analysis.

Multicollinearity and singularity. Variables that are too highly correlated lead to the potential for redundancy among variables. In such cases, variables are essentially measuring the same construct and are consequently accounting for the same variance, thus making it difficult to ascertain their unique effects on the dependent variable. High correlations among variables can be detected from the squared multiple correlation

(SMC) of a variable, as well as measures of tolerance, the variance inflation factor (VIF), the condition index, and variance proportions (Tabachnick & Fidell, 2007).

Research Question 1 examined the degree to which learner characteristics predict performance in an Educational Psychology foundations course. To answer this overarching question, the predictive nature of the SWSR components (Research Question 1.1.) and the AGC constructs (Research Question 1.2.), in relation to learner performance in an Educational Psychology foundations course, which was measured by the students' final grades, was examined. Specifically, Research Question 1.1. used the Skill, Will, and Self-Regulation Components as predictor variables with the Students Performance being the criterion variable. Research Question 1.2. used the Affective, Goal, and Comprehension Monitoring Strategy Constructs as predictor variables, and the Students Performance as the criterion variable. These two sub-questions were assessed utilizing multiple logistic regression.

Multiple Logistic Regression. Multiple Logistic Regression (MLR) is essentially used for predictive purposes through the analysis of one or more continuous predictor variables (PV's) and a single categorical criterion variable (CV). MLR allows for estimation of association between each predictor while controlling for all other predictors, and is useful in describing the underlying dynamics of a particular construct (e.g., course grade) by indicating which variables or sets of variables are more strongly associated with that particular construct (Tabachnick & Fidell, 2007).

In MLR, all of the PV's are entered into the regression equation at the same time. The entire set of PV's are examined collectively, and then each PV is examined with respect to its unique contribution to the prediction of the CV. Interpretation of the

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regression analysis is conducted through an examination of the Multiple R^2, the F Ratio, β coefficients, and the probability of significance (Tabachnick & Fidell, 2007).

Research Question 2 was analyzed by assessing the differences in learning characteristics between students in Traditional and Online course formats using SWSR components (Research Question 2.1.) and the AGC constructs (Research Question 2.2.), in relation to learner performance in an Educational Psychology foundations course. Specifically, Research Question 2.1. used the Skill, Will, and Self-Regulation Components as dependent variables with the Traditional and Online course formats being the two levels of independent variable. Research Question 2.2. used the Affective, Goal, and Comprehension Monitoring Strategy Constructs as dependent variables, with the Traditional and Online course formats being the two levels of independent variable. These two sub-questions will be assessed utilizing multivariate analysis of variance.

Multivariate Analysis of Variance (MANOVA). The MANOVA is the multivariate version of ANOVA with multiple DV's being assessed (Tabachnick & Fidell, 2007). In Research Question 2 the DV's are the SWSR components and the AGC constructs are derived from the LASSI-2.

Research Question 3 was analyzed by assessing the relationship patterns among the LASSI-2 SWSR components for the Entire sample and Traditional and Online course formats (Research Questions 3.1. – 3.3.), AGC constructs for the Entire sample and Traditional and Online course formats (Research Questions 3.4. – 3.6.), and LASSI-2 scales for the Entire sample and Traditional and Online course formats (Research Questions 3.7. – 3.9.). Specifically, Research Questions 3.1. – 3.3. used the Skill, Will, and Self-Regulation components as variables. Research Questions 3.4. – 3.6. used the

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Affective, Goal, and Comprehension Monitoring Strategy constructs variables, and Research Questions 3.7. – 3.9. used LASSI-2 scales (information processing, selecting main ideas, test strategies, anxiety, attitude, motivation, concentration, self-testing, study aids, and time management) as variables. These nine sub-questions were assessed utilizing bivariate correlation analysis.

Bivariate Correlation. Bivariate Correlation analysis assesses the degree of relationship between two continuous variables. Bivariate Correlation measures the association between two variables with no distinction necessary between IV and DV (Tabachnick & Fidell, 2007).

Chapter 4

Results

This chapter presents the results from the data analyses conducted in this dissertation study, starting with the data screening results followed by the analyses of each question and their sub-questions. Multiple statistical analyses were conducted for the three research questions and their sub-questions. This research was based on a sample of 344 undergraduate teacher education students pursuing bachelor's degrees to become certified teachers. Most of these students would be considered college juniors likely participating in one of the first educational foundations course taken toward their teacher education degree. Of the 344 participants in the study, 245 were in Traditional (face-to-face, in-person) course sections and 99 were in Online course sections. Data were gathered from the participants during the Spring, Summer, and Fall semesters of 2011 and the Fall semester of 2012. Given the timing of this analysis, data reflecting the criterion variable *Student Performance* (i.e., course grade) was not available for participants currently completing courses during the current Fall 2012 semester. As such, data gathered from participants during the current Fall 2012 semester were not included in the analysis for Research Question 1; however, these data were included in the analyses of Research Questions 2 and 3.

Data Screening

The prescribed protocols, established by Tabachnick and Fidell (2007), were followed for data screening and assumption testing for each statistical analysis prior to analyzing the data. Data were checked for missing data points, normality, outliers, and multicollinearity. During the data screening, four participants were identified and

eliminated from the data set because they had incomplete information or did not complete the survey.

For all of the research questions, and sub-questions, data screening and assumption testing revealed no concerns with the data and that the underlying assumptions of the applicable analyses were met. Sample sizes for the specific research questions did vary as a function of the available data (e.g., reported grades) from the study's sample – and is noted for each research question.

Multivariate Analysis of Variance (MANOVA) was used in the analysis of Research Question 2. MANOVA is the multivariate version of ANOVA and may be used in cases with two or more levels of Predictor Variables (PVs) and multiple Criterion Variables (CVs) being assessed (Tabachnick & Fidell, 2007). In Research Question 2, the PV levels are Traditional and Online class formats and the CVs are the Skill, Will, and Self-Regulation (SWSR) components and the Affective, Goal, and Comprehension Monitoring Strategies (AGC) constructs derived from the LASSI-2.

Bivariate Correlation was used in the analysis of Research Question 3. Bivariate Correlation analysis assesses the degree of relationship between or association between two continuous variables with no distinction necessary between the PV and CV (Tabachnick & Fidell, 2007). In Research Question 3, the SWSR components, the AGC constructs, and the LASSI-2 scales were analyzed with respect to their relationship to the Entire sample, the subset of participants participating in the Traditional class format, and the subset of participants participating in the Online class format.

Research Question 1

Recall that Research Question 1 examined the degree to which learner characteristics predict performance in an Educational Psychology foundations course, through two sub-questions. Research Question 1.1. investigated the predictive nature of the three SWSR components (Skill, Will, and Self-Regulation) on learner performance (final course grade). Participants for Research Question 1.1. ($N = 173$) included those who had a reported final course grade and responses to the Skill, Will, and Self-Regulation components from the LASSI-2 survey. The samples' means, standard deviations, and correlations for Research Question 1.1. are shown in Table 1.

Table 1

Means, Standard Deviations, and Correlations for Learner Performance and SWSR Components

Variables	1	2	3	4
1. Grade	--	.085	$.182^{**}$	.043
2. Skill Component		--	$.637^{***}$	$.538^{***}$
3. Will Component			--	$.485^{***}$
4. Self-Regulation Component				--
Means	5.200	87.197	91.468	98.913
Standard Deviations	.944	13.675	12.746	18.372

Note. $**p < .01$, $***p < .001$

As shown in Table 2, the Multiple R^2 for the set of predictors (Skill, Will, and Self-Regulation) was non-significant, $R^2 = .036$, $p = .098$. An examination of the individual influence of the PV's revealed that neither Skill ($\beta = -.034$, $p = .746$) nor Self-Regulation ($\beta = -.049$, $p = .596$) were significant. However, for this sample of students, the Will component ($\beta = .227$, $p = .025$) was identified as a statistically significant contributor to learner performance. The significant positive relationship indicates greater levels on the Will component are associated with higher levels of learner performance (i.e., higher grades).

Table 2

Results of Regression of Learner Performance on the SWSR Components

SWSR Components	B	β	t
Skill	-.002	-.034	-.324
Will	.017	.227	2.265[*]
Self-Regulation	-.003	-.049	-.531

Note. *$p < .05$; Multiple $R^2 = .036$, $p = .098$

To provide further insight on the influence of the Will component of learner performance, a subsequent regression analysis was conducted on the three Will scales (Anxiety, Attitude, and Motivation). The samples' means, standard deviations, and correlations for the three Will scales with course grade are shown in Table 3.

Table 3

Means, Standard Deviations, and Correlations for Learner Performance and SWSR Will Component

Variables	1	2	3	4
1. Grade	--	.026	.157[*]	.278[***]
2. Anxiety Scale		--	.166[*]	.168[*]
3. Attitude Scale			--	.667[***]
4. Motivation Scale				--
Means	5.200	26.358	32.503	32.607
Standard Deviations	.944	7.961	4.152	5.263

Note. *$p < .05$, ***$p < .001$

As shown in Table 4, the Multiple R^2 for the set of Will scales (Anxiety, Attitude, and Motivation) was significant, $R^2 = .079$, $p = .003$. An examination of the individual influence of the three Will scales revealed that neither Anxiety ($\beta = -.018$, $p = .807$) nor Attitude ($\beta = -.048$, $p = .626$) were significant. However, in this sample of students, the Motivation scale ($\beta = .313$, $p = .002$) was shown to be a statistically significant contributor to learner performance. The significant positive relationship indicates that higher levels of motivation are associated with higher of learner performance.

Table 4

Results of Regression of Learner Performance on the SWSR Will Components

SWSR Will Components	*B*	β	*t*
Anxiety Scale	-.002	-.018	-.244
Attitude Scale	-.011	-.048	-.488
Motivation Scale	.056	.313	3.154[**]

Note. **$p < .01$; Multiple $R^2 = .079$, $p = .003$

Research Question 1.2. investigated the predictive nature of the three AGC constructs (Affective, Goal, and Comprehension Monitoring Strategy) on learner performance (final course grade). Participants for Research Question 1.2. ($N = 173$) included those who had a reported final course grade and responses to the Affective, Goal, and Comprehension Monitoring Strategy constructs from the LASSI-2 survey. The samples' means, standard deviations, and correlations for Research Question 1.2. are shown in Table 5.

Table 5

Means, Standard Deviations, and Correlations for Learner Performance and AGC
Constructs

Variables	1	2	3	4
1. Grade	--	.129[*]	.081	.059
2. Affective Strategies		--	.612[***]	.725[***]
3. Goal Strategies			--	.590[***]
4. Comprehension Monitoring Strategies				--
Means	5.200	139.405	145.069	104.301
Standard Deviations	.944	21.897	22.444	16.576

Note. $*p < .05$, $***p < .001$

As shown in Table 6, the Multiple R^2 for the set of predictors (Affective, Goal, and Comprehension Monitoring Strategy) was non-significant, $R^2 = .020$, $p = .339$. An examination of the individual influence of the PV's revealed that none of the AGC constructs were significant; Affective Strategies ($\beta = .175$, $p = .138$), Goal Strategies ($\beta = .022$, $p = .827$), and Comprehension Monitoring Strategies ($\beta = -.081$, $p = .482$).

Table 6

Results of Regression of Learner Performance on the AGC Constructs

AGC Constructs	B	β	t
Affective Strategies	.008	.175	1.490
Goal Strategies	.001	.022	.219
Comprehension Monitoring Strategies	-.005	-.081	-.705

Note. Multiple $R^2 = .020$, $p = .339$

Research Question 2

Recall that Research Question 2 examined the differences in learning characteristics between students in Traditional and Online course formats, through two sub-questions. Multivariate analysis of variance was used to investigate the differences in learner characteristics between students in Traditional and Online course formats. Each of the sub-questions of Research Question 2 was analyzed by assessing the differences in learning characteristics between students in Traditional and Online course formats. Research Question 2.1. investigated the differences in SWSR (Skill, Will, Self-Regulation) learner characteristics between students in Traditional and Online course formats. Table 7 reports the means and standard deviations for students' ascription of component characteristics to themselves by class format.

Table 7

Means and Standard Deviations for LASSI-2 SWSR components by class format

SWSR Component	Class Format	N	M	SD
Skill[1]	Traditional	245	85.592	13.780
	Online	99	88.939	13.304
	Total	344	86.555	13.710
Will[2]	Traditional	245	90.249	12.199
	Online	99	93.192	11.665
	Total	344	91.096	12.104
Self-Regulation[3]	Traditional	245	97.914	18.686
	Online	99	104.465	19.486
	Total	344	99.799	19.123

Pairwise differences: [1]$p = .040$, [2]$p = .041$, [3]$p = .004$

A multivariate analysis of variance was used to assess the differences in learning characteristics between students in Traditional and Online course formats using SWSR components. The Skill, Will, and Self-Regulation Components were used as the dependent variables with the Traditional and Online course formats as the two levels of the independent variable. The Box's *M* test of equality of covariance matrices was not significant ($p = .876$), indicating that the assumption of homogeneity of covariance was

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not violated. A significant multivariate difference was found, Wilk's Λ = .974, $F(3, 340)$ = 3.032, p = .029, multivariate η^2 = .026.

To examine the univariate effect, the Bonferroni approach was used to control for Type I error across the three analyses and a p value of less than .017 (.05 / 3 = .017) was required for significance. A significant between-subjects effect was found for the Self-Regulation Component by class format, $F(1, 342)$ = 8.453, p = .004, partial η^2 = .024. These results show that the students in the Online format (M = 104.465, SD = 19.486) were significantly higher on the Self-Regulation Component then their in-person Traditional course format counterparts (M = 97.914, SD = 18.686).

While not significant at the adjusted .017 alpha level, both the Skill Component (p = .040) and the Will Component (p = .041) show higher levels for the students in the Online course format than their in-person Traditional course format counterparts (see Table 7 for means and standard deviations). This non-significance could be attributed to the smaller sample size, and as such, is worth further investigation in future research.

Research Question 2.2. investigated the differences in AGC (Affective, Goal, and Comprehension Monitoring) learner characteristics among students in Traditional and Online course formats. Table 8, reports the means and standard deviations for students' ascription of component characteristics to themselves by class format.

Table 8

Means and Standard Deviations for LASSI-2 AGC construct by class format

AGC Construct	Class Format	N	M	SD
Affective Strategies[1]	Traditional	245	138.118	21.389
	Online	99	146.263	21.834
	Total	344	140.462	21.801
Goal Strategies[2]	Traditional	245	142.278	21.973
	Online	99	147.506	22.231
	Total	344	143.782	22.142
Comprehension Monitoring Strategies[3]	Traditional	245	103.061	17.123
	Online	99	107.636	17.109
	Total	344	104.378	17.220

Pairwise differences: [1]$p = .002$, [2]$p = .047$, [3]$p = .025$

A multivariate analysis of variance was used to assess the differences in learning characteristics between students in Traditional and Online course formats using AGC Constructs. The Affective, Goal, and Comprehension Monitoring Strategy Constructs were used as the dependent variables with the Traditional and Online course formats as the two levels of the independent variable. The Box's *M* test of equality of covariance matrices was not significant ($p = .984$), indicating that the assumption of homogeneity of

covariance was not violated. A significant multivariate difference was found, Wilk's Λ = .971, $F(3, 340) = 3.378$, $p = .019$, multivariate $\eta^2 = .029$.

To examine the univariate effect, the Bonferroni approach was used to control for Type I error across the three analyses and a p value of less than .017 (.05 / 3 = .017) was required for significance. A significant between-subjects effect was found for the Affective strategies construct by class format, $F(1, 342) = 10.101$, $p = .002$, partial $\eta^2 = .029$. These results show that the students in the Online format ($M = 146.263$, $SD = 21.834$) were significantly higher on the Affective Strategies Construct then their in-person Traditional course format counterparts ($M = 138.118$, $SD = 21.389$).

While not significant at the adjusted .017 alpha level, both the Goal Strategies ($p = .047$) and the Comprehension Monitoring Strategies ($p = .025$) show higher levels for the students in the Online course format than their in-person Traditional course format counterparts (see Table 8 above for means and standard deviations). This non-significance could be attributed to the smaller sample size, and as such, is worth further investigation in future research.

Research Question 3

Recall that Research Question 3 examined the relationship patterns between SWSR components, SGC constructs, LASSI-2 scales, for the Entire Sample, Traditional Sample, and the Online Sample. Bivariate correlations were conducted to investigate these relationships and the results of the correlation analyses for Research Question 3 are presented in Table 9 through Table 17. Research Question 3.1. investigated the relationships among the Skill, Will, and Self-Regulation components for the Entire sample of participants taking courses either in the Traditional or Online course format (N

= 344). All of the paired correlations were found to be statistically significant at the ($p <$ .001) level (see Table 9).

Table 9

Means, Standard Deviations, and Correlations for SWSR Components for Entire Sample

Variables	1	2	3
1. Skill Component	-	.657[**]	.575[**]
2. Will Component		-	.459[**]
3. Self-Regulation Component			-
Means	86.556	91.096	99.799
Standard Deviations	13.710	12.105	19.123

**$p < .001$

Research Question 3.2. investigated the relationships among the Skill, Will, and Self-Regulation components for sample participants taking courses in the Traditional course format ($N = 245$). All of the paired correlations were found to be statistically significant at the ($p < .001$) level (see Table 10).

Table 10

Means, Standard Deviations, and Correlations for SWSR Components for Traditional sample

Variables	1	2	3
1. Skill Component	-	.643**	.581**
2. Will Component		-	.442**
3. Self-Regulation Component			-
Means	85.59	90.25	97.91
Standard Deviations	13.78	12.20	18.69

**p < .001

Research Question 3.3. investigated the relationships between the Skill, Will, and Self-Regulation components for sample participants taking courses in the Online course format (N = 99). All of the paired correlations were found to be statistically significant at the (p < .001) level (see Table 11).

Table 11

Means, Standard Deviations, and Correlations for SWSR Components for Online sample

Variables	1	2	3
1. Skill Component	-	.679[**]	.538[**]
2. Will Component		-	.470[**]
3. Self-Regulation Component			-
Means	88.94	93.19	104.46
Standard Deviations	13.30	11.67	19.49

**$p < .001$

Research Question 3.4. investigated the relationships among the Affective, Goal, and Comprehension Monitoring Strategy constructs for the Entire sample of participants taking courses either in the Traditional or Online course format ($N = 344$). All of the correlations were found to be statistically significant at the ($p < .001$) level (see Table 12).

Table 12

Means, Standard Deviations, and Correlations for AGC Constructs for Entire sample

Variables	1	2	3
1. Affective constructs	-	.638[**]	.771[**]
2. Goal constructs		-	.599[**]
3. Comprehension Monitoring Strategy constructs			-
Means	140.462	143.782	104.378
Standard Deviations	21.800	22.142	17.220

**p < .001

Research Question 3.5. investigated the relationships among the Affective, Goal, and Comprehension Monitoring Strategy constructs for sample participants taking courses in the Traditional course format (*N* = 245). All of the correlations were found to be statistically significant at the (*p* < .001) level (see Table 13).

Table 13

Means, Standard Deviations, and Correlations for AGC Constructs for Traditional sample

Variables	1	2	3
1. Affective constructs	-	.632**	.756**
2. Goal constructs		-	.592**
3. Comprehension Monitoring Strategy constructs			-
Means	138.118	142.278	103.061
Standard Deviations	21.389	21.973	17.123

**$p < .001$

Research Question 3.6. investigated the relationships between the Affective, Goal, and Comprehension Monitoring Strategy constructs for sample participants taking courses in the Online course format ($N = 99$). All of the correlations were found to be statistically significant at the ($p < .001$) level (see Table 14).

Table 14

Means, Standard Deviations, and Correlations for AGC Constructs for Online sample

Variables	1	2	3
1. Affective constructs	-	.634**	.796**
2. Goal constructs		-	.599**
3. Comprehension Monitoring Strategy constructs			-
Means	146.263	147.506	107.636
Standard Deviations	21.834	22.231	17.109

**$p < .001$

Research Question 3.7. investigated the relationships among the LASSI-2 scales for the Entire sample of participants taking courses either in the Traditional or Online course format ($N = 344$). This analysis revealed that 41 of the 45 of the correlations were found to be statistically significant at the ($p < .05$) level (see Table 15). The four non-significant correlations do however provide support to SWSR Component Model and the AGC Construct Model in that the Anxiety Scale correlated significantly with the other two scales in the Will Component (Attitude and Motivation) and the other four scales in the Goal Strategies Construct (Attitude, Concentration, Selecting Main Ideas, and Test Strategies).

Research Question 3.8. investigated the relationships among the LASSI-2 scales for the Traditional sample of participants taking courses either in the Traditional course

format ($N = 245$). This analysis revealed that 40 of 45 of the correlations were found to be statistically significant at the ($p < .05$) level as were in Research Question 3.7. (see Table 16). Similar support for the SWSR Component Model and the AGC Construct Model are provided for the Traditional course format sample. The noted exception is that while the correlation between Anxiety and Attitude was not significant, it did show a strong positive correlation.

Research Question 3.9. investigated the relationships among the LASSI-2 scales for the sample of participants in the Online course format ($N = 99$). This analysis revealed that in addition to the same non-significant comparisons found in both Research Questions 3.7. and 3.8., the analysis for Research Question 3.9. revealed another four non-significant comparisons, for a total of nine comparisons not significant. Only 36 of the 45 correlations were found to be statistically significant at the ($p < .05$) level (see Table 17). These findings provide mixed support for the SWSR Component Model and the AGC Construct Model. Similar to the Traditional course format group, the correlation between Anxiety and Attitude was not significant; however, it did show a strong positive correlation. Also, while Anxiety and Motivation were not significantly correlated, they did show a stronger relationship than the other scale correlations with Anxiety. For the Selecting Main Ideas scale, the results show a non-significant and weak correlation, with Study Aids, which supports the SWSR Model in that these two scales are in separate components. This Selecting Main Ideas finding is counter to the AGC Model in that these two scales are part of the same construct. Selecting Main Ideas' non-significant correlation with Time Management supports both models in that these two scales are not in the same component or construct. Study Aids' non-significant

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correlation with Test Strategies also supports both models in that these two scales are not

in the same component or construct.

Table 15

- *Means, Standard Deviations, and Correlations for LASSI-2 Scales for the Entire Sample (N = 344)*

LASSI-2 Scale	1	2	3	4	5	6	7	8	9	10
1. Anxiety	-	.186**	.306***	.063	.163**	-.087	.571***	-.068	.012	.600***
2. Attitude		-	.536***	.306***	.568***	.353***	.321***	.261***	.453***	.393***
3. Concentration			-	.429***	.560***	.461***	.569***	.364***	.623***	.611***
4. Information Processing				-	.444***	.583***	.430***	.482***	.349***	.394***
5. Motivation					-	.447***	.362***	.412***	.556***	.473***
6. Self-Testing						-	.296***	.514***	.564***	.281***
7. Selecting Main Ideas							-	.167**	.250***	.783***
8. Study Aids								-	.490***	.176**
9. Time Management									-	.368***
10. Test Strategies										-
Means	25.538	32.657	27.157	28.125	32.901	22.794	28.564	24.895	24.954	29.866
Standard Deviations	7.689	4.009	5.951	5.497	4.972	6.255	6.023	5.264	6.580	4.966

**p < .01, ***p < .001

Table 16

Means, Standard Deviations, and Correlations for LASSI-2 Scales for the Traditional Sample (N = 245)

LASSI-2 Scale	1	2	3	4	5	6	7	8	9	10
1. Anxiety	-	.159	.303***	.068	.167**	-.108	.565***	-.075	.011	.589***
2. Attitude		-	.498***	.300***	.571***	.373***	.277***	.248***	.453***	.404***
3. Concentration			-	.421***	.534***	.432***	.567***	.359***	.613***	.631***
4. Information Processing				-	.425***	.582***	.449***	.492***	.349***	.412***
5. Motivation					-	.421***	.352***	.402***	.540***	.482***
6. Self-Testing						-	.262***	.525***	.554***	.270***
7. Selecting Main Ideas							-	.212**	.261***	.778***
8. Study Aids								-	.480***	.187**
9. Time Management									-	.381***
10. Test Strategies										-
Means	25.388	32.363	26.682	27.747	32.498	22.298	28.359	24.657	24.278	29.486
Standard Deviations	7.809	4.051	5.819	5.550	5.011	6.074	5.984	5.192	6.540	4.958

**$p < .01$, ***$p < .001$

Table 17

Means, Standard Deviations, and Correlations for LASSI-2 Scales for the Online Sample (N = 99)

LASSI-2 Scale	1	2	3	4	5	6	7	8	9	10
1. Anxiety	-	.255	.312[**]	.038	.141	-.053	.588[***]	-.058	-.003	.633[***]
2. Attitude		-	.609[***]	.289[**]	.537[***]	.272[**]	.422[***]	.274[**]	.415[***]	.322[**]
3. Concentration			-	.422[***]	.603[***]	.496[***]	.570[***]	.359[***]	.623[***]	.544[***]
4. Information Processing				-	.469[***]	.571[***]	.373[***]	.445[***]	.309[**]	.315[**]
5. Motivation					-	.481[***]	.377[***]	.421[***]	.567[***]	.418[***]
6. Self-Testing						-	.359[***]	.479[***]	.560[***]	.270[**]
7. Selecting Main Ideas							-	.050	.204	.796[***]
8. Study Aids								-	.500[***]	.127
9. Time Management									-	.291[**]
10. Test Strategies										-
Means	25.909	33.384	28.333	29.061	33.899	24.020	29.071	25.485	26.626	30.808
Standard Deviations	7.411	3.824	6.138	5.274	4.754	6.553	6.120	5.420	6.410	4.884

$**p < .01, ***p < .001$

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Chapter 5

Discussion

This chapter discusses the results of the investigation of two approaches to interpretation of the 10 scales of the Learning and Study Strategies Inventory (LASSI-2) and of the 10 LASSI-2 scales themselves. The Skill, Will, and Self-Regulation component model (SWSR) and the Affective, Goal, and Comprehension Monitoring Strategies construct model (AGC) were scrutinized for performance prediction utility when used with undergraduate college students. Additionally, this chapter discusses the results of the differences in the ascription of SWSR and AGC model student learning characteristics between those college students attending a Traditional (in-class) format course and those students participating in the same course in an Online format. Lastly, this chapter discusses the results of the investigation of the relationship patterns among the three components of the SWSR interpretation model, the three constructs of the AGC interpretation model, and the 10 scales of the LASSI-2 for students in the Entire sample, for students in Traditional format courses, and for students in Online format courses. For each of the three research question posed, statistically significant results were found. The balance of this chapter is organized into the following sections: (1) an overview of the study, (2) discussion of the results presented in Chapter 4, (3) implications for college students, instructors, and administrators, (4) limitations and considerations, (5) suggestions for future research, and finally (6) conclusions.

Overview of the Study

The results of Research Question 1 evidenced that the Will component of the SWSR model of LASSI-2 interpretation showed statistically significant utility in learner

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performance prediction. The results of Research Question 2 evidenced that both the Self-Regulation component of the SWSR model and the Affective construct of the AGC model produced significant differences in ascription of learner characteristics between Traditional and Online students. Lastly, the results of Research Question 3 showed that while the three components and three constructs that configure the 10 LASSI-2 scales to comprise the SWSR and AGC interpretation models are each statistically significantly correlated with their respective models for all sample groupings, only six of the 10 LASSI-2 scales correlated with all, or all-but-one of the remaining scales for some sample groupings. The non-significant, and weak, correlations did however provide mixed support for both the SWSR Component Model and the AGC Construct Model.

Discussion of the Results

The present study, investigating the usefulness of the LASSI-2 in assisting college students in choosing between Traditional and Online courses, was proposed at a unique time in history when the national unemployment rate in the United States has remained stubbornly high for several years and a historic positive correlation between degree of achievement in college education and employment remains (Bureau of Labor Statistics, 2012). Contemporary opportunities for access to post-secondary education are varied and in addition to Traditional attendance format courses, student access to asynchronous Online learning is readily available through Traditional educational institutions (Aragon et al., 2002; Boyd, 2004; Buckley, 2003; Lorenzo & Moore, 2002; McDonnell et al., 2011; Meyer, 2003; Navarro & Shoemaker, 2000; Neuhauser, 2002; Tallent-Runnels et al., 2006; Williams, 2006; Woo & Kimmick, 2000; Zacharis, 2011).

Throughout history, learning theorists such as Piaget (Pruitt, 2011), Vygotsky (Fox & Riconscente, 2008), James (Fox & Riconscente, 2008), and Flavel (Lajoie, 2008) have proposed models and theories of development and learning, and their work in explaining the nature of learning is often referenced by present day educators. The question of the efficacy of Online learning versus learning in the Traditional classroom format has drawn differing responses. While the literature is void of research that would indicate Online learning is inferior to traditional learning, there are bodies of research suggesting both that there is little difference in learning outcomes between Traditional and Online instruction (Aragon et al., 2002; Buckley, 2003; McDonnell et al., 2011; Neuhauser, 2002; Woo & Kimmick, 2000), and that certain types of students have a capacity to perform better in Online courses than do others (Boyd, 2004; Lorenzo & Moore, 2002; Meyer, 2003; Navarro & Shoemaker, 2000; Tallent-Runnels et al., 2006; Williams, 2006; Zacharis, 2011). The purpose of the present study is to illuminate useful self-knowledge for learners by identifying individual factors and profiles that are more highly correlated with success in Traditional attendance based classes and those that are more highly correlated with success in Online classes. The Learning and Study Strategies Inventory, Second Edition (LASSI-2), an academic counseling and advising tool that has been used in more than 1,300 universities and colleges, (Olaussen & Braten, 1998; Weinstein & Palmer, 2002) was employed and two different models of interpretation, and the LASSI-2 scales themselves, were analyzed for their likely predictive utility in assisting students who are faced with choosing between participation in Traditional attendance courses, and versions of those same courses offered Online. To that end, three research questions were developed around the Skill, Will and Self-

regulation (SWSR) components, Affective Strategies, Goal Strategies, and Comprehension Monitoring Strategies (AGC) constructs and the 10 LASSI-2 scales.

The first research question is intended to inform on how well students' characterizations of themselves on a survey of learning and study strategies predicts their eventual success in class, which is measured by the student's final grade for the course. The first sub-question, Research Question 1.1., investigated the success of the three SWSR components (Skill, Will, and Self-Regulation) in predicting student's performance (i.e., final course grade). Analysis showed that of the three components, Will was the only component that contributed to learner performance. Further investigation of the three LASSI-2 scales that comprise the Will component (Anxiety, Attention, and Motivation) revealed that only the Motivation scale contributed significantly to the predictive utility of the Will component. With respect to the LASSI-2 and SWSR model, Will, and Motivation reflect a student's diligence, self-discipline and willingness to exert effort. A student that would be characterized as motivated would be one that sets personally high standards and works consistently to meet them. A motivated student will push-through tasks that are disliked or boring and will generally not give up when faced with academic adversity. As these attributes become more prominent in a student, the LASSI-2's reflection of the learner's Motivation increases, which contributes to an increase in the Will component, and the likelihood of learner success (getting good grades) also improves. Similarly, Research Question 1.2. investigated success of the three AGC constructs (Affective, Goal, and Comprehension Monitoring Strategy) in predicting student's performance. Statistical analysis of these three constructs revealed that none of the AGC constructs were significantly predictors of student success. In

answering Research Question 1 then, it is reasonable to conclude that the single SWSR model learner characteristic that can reliably predict learner performance is the component of Will. This component is primarily bolstered by the LASSI-2 Motivation scale, which reflects the qualities of diligence, self-discipline, and willingness to exert effort toward academic pursuits.

The second research question investigated the differences in learning characteristics between students who have selected to participate in a Traditional course and those who have selected to participate in an Online course. The first sub-question, Research Question 2.1., used learner characteristics as defined by the SWSR component model of clustering LASSI-2 scales into three components in the analysis to determine if a significant difference in learner characteristics exists between Traditional and Online students. The results showed that a difference between the two sample groupings did exist and that the difference was that students who chose to participate in an Online course scored higher on Self-Regulation than students who chose to participate in a Traditional course. This suggests that learners in the Online grouping tended to be those with good time management skills in that they have learned to be realistic with their time commitments inside and outside of school. They often plan their school and personal schedules in advance and combat procrastination by simply moving forward through assignments. Learners in this grouping of students that selected the Online course option should also tend to present with good study strategies and techniques, such as reviewing course material, underlining information during review, and asking questions and seeking help when uncertain.

Similarly, Research Question 2.2. used learner characteristics as defined by the AGC construct model of clustering LASSI-2 scales into three components in the analysis to determine if a significant difference in learner characteristics exists between Traditional and Online students. The analysis showed that a difference between the two sample groupings exists and that the difference was that students who chose to participate in an Online course also scored higher on Affective Strategies than did students who chose to participate in a Traditional course. While further statistical analysis was not completed to investigate the similarities between the significant Self-Regulation component and the significant Affective Strategies construct, simple observation of contributing LASSI-2 scales reveals that the Concentration, Self Testing, and Time Management scales account for three of the four scales comprising the Self-Regulation construct, and three of the five scales comprising the Affective Strategies Construct. There is little difference between characteristics of well self-regulated learners discussed in part 2.1. of this question and those that would be described as having good affective strategies in part 2.2. of this question. A small difference is that the latter also tend to receive higher marks for motivation, which includes diligence, self-discipline, and willingness to exert effort. In answering Research Question 2 then, the differences in learner characteristics between students in the Traditional and Online course formats are that students who chose to attend the Online format course would be good planners and time managers and tend to stick to a routine. The Online students may also be generally more prepared to approach studying and testing strategically and would seem to tend to procrastinate less. These learners would seem to be better at focusing on academic tasks

presented, have good self-discipline overall, and have a gritty drive to push through challenging situations.

The third, and final research question, is comprised of nine sub-questions and is intended to investigate the internal cohesion of both the SWSR component and AGC construct models of LASSI-2 interpretation as well as investigating the internal cohesion of the LASSI-2, itself. These internal relationships were analyzed for the entire group as a whole and for the Traditional and Online groupings separately. Research Questions 3.1., 3.2., and 3.3. investigated relationships among the SWSR components for the Entire sample, for students in the Traditional course format, and for students in the Online course format, while Research Questions 3.4., 3.5., and 3.6. investigated relationships among the AGC Constructs for the Entire sample, for students in the Traditional course format, and for students in the Online course format. All of the correlations were found to be statistically significant which suggests that both the SWSR and AGC interpretation models are significantly cohesive internally and have good correlation among components and constructs.

Drawing from discussion surrounding Research Question 1 however, we can recall that although both the SWSR and AGC models evidence good internal consistency and reliability, only a component of the SWSR model was significantly predictive of learner performance. Combined findings of Research Questions 1, and 3.1. through 3.6. then, suggest that the SWSR model would be an effective measure for functional use in counseling college learners about class format and learner success. The remaining three sub-questions, Research Question 3.7., 3.8., and 3.9., similarly investigated the relationships among the ten LASSI-2 scales for the Entire sample of students, for the

Traditional sample, and for Online students, respectively. The analysis for Research

Question 3.7. revealed that for the Entire sample, 41 of the 45 inter-scale correlations

analyzed were found to be significant. This finding is supportive of both the SWSR

component model and the AGC construct model scale configurations in that the four non-

significant scale relationships identified (see Figure 16) occur between scales that are

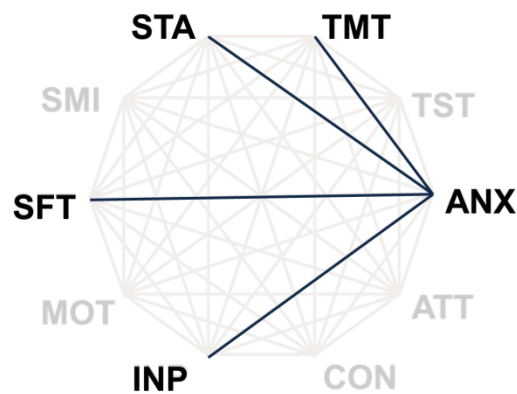clustered into different components (for SWSR) and constructs (for AGC).

Figure 16. Non-significant LASSI-2 Relationships in Entire sample.

Furthermore, this finding supports both the SWSR and AGC scales configurations

in that Anxiety, which is common to each non-significant relationship, remains

significantly correlated to each of the remaining scales within the construct or component

that it resides. Findings of Research Question 3.7. then, show that for the individual

scales in all non-significant LASSI-2 scale relationships, scales that are unrelated are

appropriately separated into different clusters of components and constructs and that

within clusters, the Anxiety scale correlates well with each remaining scale and seems to be appropriately placed.

Results from Research Question 3.8. revealed that for the Traditional sample, 40 of the 45 inter-scale correlations analyzed were found to be significant and the five non-significant correlations for this analysis included the same four non-significant correlations with Anxiety from Research Question 3.8., and one additional non-significant correlation also associated with the Anxiety scale (see Figure 17). These findings for the Traditional sample support both the SWSR and AGC models similarly to results of Research Question 3.7. except with respect to Anxiety and Attitude.
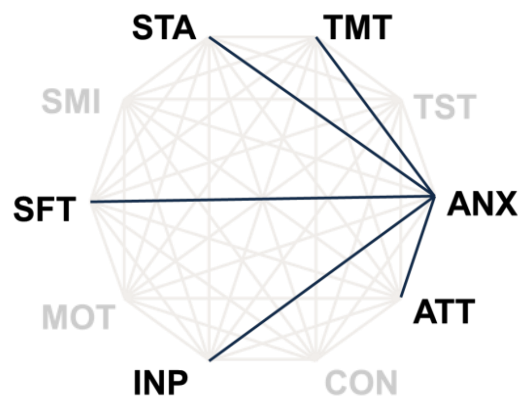

Figure 17. Non-significant LASSI-2 Relationships in Traditional sample.

Although the relationship between these two scales is positive and moderately strong, it is not statistically significant, so the inclusion of these two scales in the same SWSR component and AGC construct seems to warrant further investigation with respect to model building. These instances of non-significant relationships might suggest that a learner's anxiety and degree to which a learner worries about school and academic

success may not play as large a role with Online learning as was once thought. Additional research could consider other factors (e.g., faculty experience, course structure, course content, subject area, length of class) that may further investigate the impact of anxiety on performance.

Research Question 3.9. results revealed that for the Online sample, 36 of the 45 inter-scale correlations analyzed were found to be significant and six of the nine non-significant correlations for this analysis included the same five non-significant correlations with Anxiety from Research Question 3.8., and one additional non-significant correlation between Motivation and Anxiety (see Figure 18).
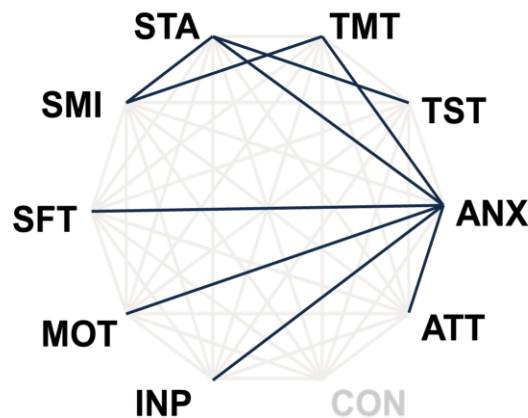

Figure 18. Non-significant LASSI-2 Relationships in Online sample.

While there seems to not be a significant relationship between these two scales, a relatively strong and positive relationship is present. The metric for Research Question 3.9. additionally presents three additional non-significant correlations for the Online

sample among the scales Selecting Main Ideas, Study Aids, Time Management, and Test Strategies. Similar to the findings from Research Questions 3.7. and 3.8., these findings for the Online sample provide support for both the SWSR and AGC models. The additional non-significant relationships between Selecting Main Ideas and Time Management, and Study Aids and Testing Strategies support the cluster distinctions of both models by having assigned these scales separate groups. In all, the preponderance of the data from these analyses seem to suggest that the LASSI-2 may well be employed in counseling or advising settings with college students who have both Traditional and Online course format options available to them and who are interested in selecting their best learning format fit.

Implications for Students, Instructors, and Administrators

The intent of the present study was to illuminate useful self-knowledge for learners by identifying individual factors and profiles that are more highly correlated with success in Traditional format based classes and those that are more highly correlated with success in Online classes. Ultimately, the purpose of the study was to provide future learners with decision making tools to employ when faced with a choice between participating in Traditional attendance courses, and versions of those same courses offered Online. This was attempted by employing the widely used Learning and Study Strategies Inventory, Second Edition (LASSI-2) with a group of college students taking education courses either Online or in the Traditional campus attendance format. In addition to analyzing the LASSI-2 scale data, two distinct models of LASSI-2 interpretation were analyzed for their internal consistency as well as their predictive utility with respect to college students and their choices regarding the format of selected

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learning environments. Results of this research indicate that greater levels on the Will component are associated with higher levels of learner performance (i.e., final course grade). Also, higher levels on the LASSI-2 Motivation scale, which is the only significantly contributing scale to the Will component, are also associated with higher learner performance. Results indicate that while both the SWSR and AGC models correlate well internally and each model evidences one component (Self-Regulation for the SWSR) or construct (Affective Strategies for the AGC) that is correlated with Online class format, only the SWSR is significantly correlated with learner performance. Lastly, results of this research show some mixed support for the SWSR component and AGC construct model's of LASSI-2 scale interpretation. While it seems that each of the LASSI-2 interpretation models may be a meaningful and useful tool for LASSI-2 interpretation, the AGC construct model of interpretation presents as more structurally sound.

Results of the current research has implications for student learners at the college level, college instructors (particularly those who teach courses Online), and instructors or administrator acting in an advising or counseling capacity for college students. As reflected in literature (and supported by this current research) the 'key to success' in education is motivation, which Weinstein and Palmer (2002) define as a, "student's diligence, self-discipline, and willingness to exert the effort necessary to successfully complete academic requirements" (p. 5). It would be prudent for college students across course formats to heed this statement and to recognize that demonstrating the characteristic of motivation means that there is a significantly good chance of being a student that succeeds academically. A second implication of this study for college

learners surrounds choosing Traditional or Online instruction. This current research reveals that the Affective Strategies construct of the AGC and the Self-Regulation component of the SWSR are both positively correlated with Online instruction. That is to say, those who scored adequately high on Affect and Self-Regulation were significantly more likely to be in Online courses than other learners in the study.

It is important to note that while Affective Strategies has five contributing LASSI-2 scales and Self-Regulation has four contributing LASSI-2 scales, the Concentration, Self Testing, and Time Management scales are common to both interpretation configurations. Weinstein and Palmer (2002) define Concentration as, "the student's ability to direct and maintain their attention on academic tasks" (p. 6). The same authors defined Self Testing as a, "students' use of reviewing and comprehension monitoring techniques to determine their level of understanding of the information or task to be learned" (p. 6). And lastly, they define Time Management as the degree to which students create, manage and use schedules (Weinstein & Palmer, 2002). As shown in this research, students intending to participate in Online format courses should attend to these student characteristics that are typically more highly associated with Online instruction.

Results of the current study also have implications for college instructors, particularly those guiding courses on an Online format. It is clear from review of the literature as well as discussion of results for this study, that learner motivation tends to be a significant component of a the character of successful students in both Traditional and Online courses, so encouraging learner motivation is wise in virtually all instructional settings. Specific to Online format courses however, research results suggest that students who self select an Online format course come prepared with adequate

Concentration, Self Testing, and Time Management, which are the three LASSI-2 scales common to both the Affective Strategies construct and that Self-Regulation component. It would be wise for Online instructors to have the capacity to assess student standing relative to Affective strategies and Self-Regulation. It may even be feasible to use the LASSI-2 instrument itself with the student populations to ascertain any skill gaps or characteristics that might be shown to hinder the student in making effort and succeeding in Online or Traditional courses and offers early steps toward remediation.

Lastly, results of this research may have implications for college student advisors or counselors responsible for working with college students to plan schedules and programs of study. There is support for the use of the AGC model of LASSI-2 interpretation with college student such as those in the present study, and further evidence that learner characteristic subsumed by the Affective Strategies construct, Time Management, Motivation, Concentration, Attitude, and Self Testing are important for success in Online learning. In the event that full participation in Online learning represents too great of a challenge for a given student due to inadequately developed Affective Strategies, a student advisor or counselor might recommend participation in one, or more hybrid courses that may serve to appropriately expose the student to the demands of Online learning and provide opportunity for the student to bolster the skills necessary to succeed Online.

Limitations and Considerations

Instructional infidelity presents a potential limitation in this study. In order to attribute the variation in the dependent variable to manipulation of the independent variable, it is ideal to hold all other factors constant and to eliminate the noise of error

variance. Comparing learner performance in two environments with differing demands is a central focus of this project and it will be critically important that the courses be as equivalent as possible. Although the courses used a common syllabus, approved textbooks, and had the same expected learning outcomes, the researchers did not gather extensive information regarding how instructors taught the concepts, what attributes the instructors possessed, and their teaching styles.

College students participating in the study did so voluntarily. Completion of the LASSI-2, the demographic questionnaire, and the reflection were requested by the instructor, but students were not rewarded or compensated in any way for participation. Students who chose to complete these extracurricular tasks then, may be different from those students who chose to forego the tasks.

The LASSI-2 was completed a combined total of 351 times in Traditional and Online class sections, while the demographic questionnaire was completed 297 times. The discrepancy is likely the result of confusion on the part of Online students who may have mistakenly completed the LASSI-2 more than one time. Through analysis of demographic data and matching of student identification numbers, instances of multi-testing were identified and duplicate administrations of the LASSI-2 were discarded in favor of the administration that was completed first.

The use of a convenience sample in this study is a threat to external validity and may reduce the generalizability of the significant results to the broader population. Similarly, the use of a convenience sample may threaten internal validity of the significant results, making it more difficult to assign change in the dependent variable, to manipulation of the independent variable. While these internal and external validity

threats are common to virtually all research that makes use of convenience sampling, statistically significant effects may still be meaningful.

As describe in the Instrumentation section of Chapter 3, there remains at least some level of skepticism regarding the validity of the original LASSI. While validity may be of some concern, there does seem to be good reliability for the LASSI, which was statistically improved for the LASSI-2. While a potential predictive relationship between a LASSI-2 scale or interpretive component or construct and student performance may present as significant, there may be some question as the meaning of that relationship as the description and classification of the dependent variable may be questionable. As noted earlier, there is suggested evidence to support the need to reexamine the scale structure of the LASSI-2. Data from this study's sample suggest stronger support for the AGC Construct Model as compared to the SWSR Component Model.

Future Research

This study provides necessary information to support several areas of research. Such research might simply involve expansion of the sample population to include additional student participation courses. While the current study fielded participants only from EPS 324 (Educational Psychology in Elementary and Middle-School Education**)** and EPS 325 (Educational Psychology in Middle-School and Secondary Education) offered Online and in the Traditional attendance format on campus at Northern Arizona University, in Flagstaff, Arizona, future research may include students in other EPS classes, in other NAU colleges, or may include students attending Traditional courses at remote Arizona locations through the NAU Statewide education program.

While the sample size of 344 participants was well adequate for investigating the three research questions posed and associated sub questions, another study with an increased sample size would allow for a true test of the models.

This study is largely based on quantitative data gathered by requesting that participants complete a structured survey. A similar future study might usefully employ a participant interview process to collect qualitative date regarding components and constructs as well as data surrounding the 10 scales of the LASSI-2.

Future research on this topic may be enhanced by expanding the student survey to include more extensive demographic information in order that additional combinations of variables may be considered and potentially investigated.

Lastly, research in this area may seek to include students participating in hybrid or blended learning models of instruction that is more prevalent in our nation's K-12 public education system.

Conclusions

In conclusion, the impetus for this study was to develop a method for assisting college students in selecting their own programmatic 'best-fit' from the course format options available to them. At NAU, those options were the Traditional in-class format course, and the asynchronous Online format course. Ideally, students would have use of a method of finding their own best-fit and selecting to participate in the indicated format. It has been postulated that this kind of perceptually ideal matching would reduce the incompletion rate for courses and meet the needs of the learner in convenience and desired outcomes. After analyzing groups of Traditional and Online students by administering them the LASSI-2, comparing the scale results with two recommended and

accepted models of interpretation, and conducting correlation analysis with learner outcomes, it seems that several truisms have presented themselves for recognition. First, motivation e.g., diligence, self discipline, and willingness to exert effort describes the most important cluster of characteristics leading to educational success in college. Secondly, self-regulation attributes such as concentration, self testing, and time management are critical for students to be successful in the Online format courses of the future. Lastly, while we seem to be able to quantify desirable and necessary characteristics for educations success at the college level, it would seem prudent to move this kind of assessment forward so that students may participate in the assessment during their high school years. This kind of assessment would provide ample time to bolster characteristics that are shown to lead to more success and may also assist high school students in getting more benefit from the educational opportunities that they have available to them before even embarking on their post-secondary education career.

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APPENDIX

NORTHERN ARIZONA UNIVERSITY

Institutional Review Board for the	Northern Arizona University	928-523-4340
Protection of Human Subjects in Research	PO Box 4087	928-523-1075 fax
	Flagstaff, AZ 86011-4087	www.research.nau.edu/vpr/IRB

To:	Chad Slaybaugh and Dr. Robert Horn
From:	Paula Garcia McAllister
Approval Date:	October 11, 2012
Project:	Using the LASSI-2 to Predict Learner Performance in Online and Traditional Educational Psychology Courses
Project Number:	13.0070
Review Category/ies:	4) Analyses involving existing data

Your research protocol has been approved by the Human Subjects Committee/Institutional Review Board (IRB) at NAU under the category of EXEMPT. This category means that your IRB approval for this project does not have an expiration date, so periodic renewal of approval is not necessary unless there are changes in your project that affect the status.

If your project **changes** in any way, you must file a Research Amendment form available at https://www.research.nau.edu/compliance/irb/forms.aspx PRIOR TO implementing any changes. You may not implement the changes until you have written approval for the change from the IRB, unless the change is necessary to eliminate immediate hazards to participants. Failure to do so will result in noncompliance and possible suspension or termination of your research project.

Any unanticipated problems or unexpected **adverse events** must be reported to the IRB within 5 business days (within 24 hours for serious adverse events) of your becoming aware of the event by filling out an Adverse Reaction or Event Reporting form (also available at website above).

As you conduct your research, please remember that:
1.   Participants are volunteers or are involved in regular educational programs; they are free to withdraw from the research at any time without penalty.

2.   Unless you are using existing data, participants must be informed of the research project through written or oral explanation and must sign or approve electronically or verbally an informed consent form (for minors and children the parent or guardian must sign).

3.   Unless the participants agreed to an alternative arrangement, the participants' anonymity and confidentiality must be protected. They should not be able to be identified through the responses. The presentation of the data should not put them at risk of any negative consequences. Access to the data is specified and restricted by the researcher and the department.

Additional IRB information may be found at https://www.research.nau.edu/compliance/irb/index.aspx.