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A Comparison of Sensory Learning Modes and Adaptive Study Strategies in College Students

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A COMPARISON OF SENSORY LEARNING MODES AND ADAPTIVE STUDY STRATEGIES IN COLLEGE STUDENTS

By

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The Office of Graduate Studies has verified and approved the above named committee members.
This thesis is dedicated to my husband, Andrew, without whom I would not have been able to complete this work. Thanks for all you have done to help me follow my educational dreams.

This degree is for both of us!
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ABSTRACT

Survey responses from 1,962 students attending Florida State University during the Spring 2007 semester were analyzed for a preferred sensory learning mode, number and variety of study methods, a match between sensory learning mode and sensory preference within the study habits, and passive versus deep learning processes. The students were found to demonstrate a sensory learning mode preference, but did not report using study habits that matched this sensory mode. Most of the students were found to employ too few study methods to allow for the development of true study strategies, were found to use memorization as a primary study method, and to utilize passive learning rather than deep learning processes.
INTRODUCTION

Prior research regarding sensory learning modes demonstrates a correlation between successful student learning and the adaptation of lesson materials to the preferred sensory mode. This adaptability on the part of students requires self-assessment and the willingness to invest in the learning process by taking an active rather than passive role.

The researcher designed this study to gain an understanding of how well students adapt their study strategies to match their sensory learning mode. Data was obtained by survey and analyzed for the purpose of answering the following research questions:

1. Do college students demonstrate a preferred sensory learning mode?
2. Do college students demonstrate a suitably varied range of study strategies?
3. Do the study strategies of college students match their preferred sensory learning mode?
4. Do self-reported study strategies demonstrate passive or deep learning processes?

Survey responses from 1,962 students attending Florida State University during the Spring 2007 semester were analyzed for a preferred sensory learning mode, number and variety of study methods, a match between sensory learning mode and sensory preference within the study habits, and passive versus deep learning processes. The students were found to demonstrate a sensory learning mode preference, but did not report using study habits that matched this sensory mode. Most of the students were found to employ too few study methods to allow for the development of true study strategies, were found to use memorization as a primary study method, and to utilize passive learning rather than deep learning processes.

The research findings of this study support the researcher's hypothesis that our educational system excels in teaching children facts and procedures, but usually fails to teach children how to learn. It is likely that many of these students are ill prepared to enter a workforce where career advancement is based on the ability to self-assess and participate in self-directed learning.
CHAPTER 1

THE CURRENT STUDY

Introduction

With the U.S. public school system in place for approximately 100 years, it would be expected that all children know how to study and learn by the time they reach the end of High School. Yet statistics challenge this assumption and suggest that an alarming number of students are unprepared to direct their own learning efficiently.

Peter Smith, the founding president of California State University, Monterey Bay, who has also served as a Vermont state senator, lieutenant governor, and member of the U.S. Congress, summarizes what some see as the crisis facing the U.S. educational system:

The National Center for Higher Education Management Systems (NCHEMS) reports that out of 100 ninth-graders, 18 graduated within 10 years with either a BA or an AA. [...] In California, more than 30% of those who enter ninth grade do not graduate. [...] The challenge facing American higher education is not simply to improve access, but also to dramatically improve the completion rates for these students with whom we have not been historically successful. (Smith, 2004)

Smith’s statistics are not unusual or even of particular note for today’s educational system. Any number of worrisome statistics are available to further demonstrate the current state of our students' preparation for college as they finish high school. A national report on the assessment of educational progress indicated that 71% of 12th graders reported studying no more that one hour per day, and that 25% stated that they didn’t study at all (Gettinger & Seibert, 2002). Only 22% of the over one million high school students who took the ACT in 2004 achieved scores that indicated their readiness for college requirements for English, math, and science (Nonis & Hudson, 2006). Ishitani (2006) found the likelihood of dropping out of college for first-generation college students to be three times greater than for non-first generation college students, with contributing variables being family income, lower educational expectation, lower
high school performance, lower high school academic intensity, enrollment in a public institution, and low college admission requirements.

Such statistics leave little room for doubt that U.S. students are often ill prepared for the demands of college academics. Many students come to college with the ability to succeed, but without the basic skills they need, and fail so quickly that they never have a chance to develop these missing skills (Kuo, Hagie & Miller, 2004; Lynch, 2006; Kumrow, Vogt & Kazlauskas, 2002; Bender, 2001). Students in the college environment are expected to take responsibility for their learning and to adopt a philosophy of equal partnership with their instructors in a learning process that includes studying on their own outside of the classroom (Hendry & Farley, 2006; Grasha & Yangarber-Hicks, 2000; Somuncuogoglu & Yildirim, 1999). Yet students often enter college with prior experience consisting primarily of learning in which they took a passive role with the expectation that the teacher would spoon feed them the information they needed to learn in a didactic approach (Hendry & Farley, 2006; Schroeder, 1993; Lynch, 2006; Cukras, 2006).

While primary school students are rarely expected to engage in unsupervised study, older students are assumed to spend more time studying on their own than the time spent in class (Harley, 1986). Research conducted on nearly 300,000 students at 413 U.S. four-year colleges or universities found that only 34% of today’s freshmen spend six or more hours per week on academic work outside of the classroom, that today’s college students are, overall, less prepared for college level work, and that students are more likely to work as a means of financing their education than previous generations (Nonis & Hudson, 2006). Nor can it be assumed that graduate students have developed sound study skills during their undergraduate studies. Research by Onwuegbuzie, Slate & Schwartz (2001) found that fewer than 58% of the graduate students in their study responded appropriately to questions on study skills, and that 87% reported reading in a passive manner that left them with little understanding of the content.

Students’ theories of intelligence and learning often involve the belief that failure is due to low ability rather than to study strategy failure (McKeachie, 1988). Having the motivation to succeed is not likely to be enough for students entering college without the necessary preparation and study skills, a problem that is even stronger for those colleges with low admission standards.
(Nonis & Hudson, 2006). Students need to be taught that academic success requires a combination of ability, motivation, and study behavior, and that only through learning appropriate study patterns can they improve their academic performance (Nonis & Hudson, 2006; Hadwin & Winne, 1996). Currently in the U.S. what study skills that are taught before college are taught in a general way with the assumption that students will know when and how to deploy different strategies according to learning circumstances, yet research has shown that many students don’t have the ability to apply this form of generalized learning to specific learning needs (Harley, 1986; Gettinger & Seibert, 2002). Still, success stories do exist. York St. John College offers a sixteen hour workshop in study skills to prepare students for degree study, and has seen a remarkable decrease in college dropouts since its launch (Roberts & Pritchard, 2004).

Is it possible that after 13 years of formalized education young adults could be unaware of how their brain gathers and processes information? Are they unable to devise and use study strategies that maximize learning, and that match the workings of their brains so that learning is faster and easier for them? What is wrong with our educational system that it leaves students inadequately prepared to successfully guide their own future learning?

It is my hypothesis that our educational system excels in teaching children facts and procedures, but usually fails to teach children how to learn. Youngsters are not taught to self-assess, nor are they schooled in developing and utilizing a variety of study strategies appropriate to how they learn. This study was designed to evaluate the study strategies of college students and to compare them to the students' sensory learning mode as a means of analyzing whether most of these students have made the connection between how they learn and what study strategies are most likely to prove effective in their learning.

**Significance of the Current Study**

Research regarding sensory learning modes demonstrates a correlation between successful student learning and the ability to adapt lesson materials to a sensory learning mode comfortable to the student. This adaptability on the part of students requires them to understand their own learning and to generate study methods that work well for their specific learning style. This form
of self-assessment requires the student to be willing to invest in the learning process and take an active rather than passive role in learning. However, no prior research was found regarding whether, by the time they reach college, students understand how they learn best or how to utilize study strategies to maximize the benefits of, and compensate for weaknesses of, their preferred sensory learning mode.

**Purpose of the Current Study and Research Questions**
Recognizing the gap in the current research, the researcher designed this study as a quantitative, cross-sectional, exploratory research study to gain an understanding of how well students adapt their study strategies to match their sensory learning mode. Data was obtained by survey and analyzed for the purpose of answering the following research questions:

1. Do college students demonstrate a preferred sensory learning mode?
2. Do college students demonstrate a suitably varied range of study strategies?
3. Do the study strategies of college students match their preferred sensory learning mode?
4. Do self-reported study strategies demonstrate passive or deep learning processes?

**Instrumentation**
The researcher designed a survey (Appendix A) to collect the needed data from the college students at Florida State University during the spring semester of 2007. The survey was placed online to allow respondents to access and answer the survey in a location and at a time of their choice. The researcher sent an email containing a link to the survey explaining the research and asking for student participation. The decision to participate was voluntary, and respondents were not screened in any way. Informed consent was obtained through the introductory page of the online survey (Appendix B). The informed consent detailed what would be asked of the participants, informed them of their rights, ensured anonymity, and provided contact information for further discussion or questions. Submission of the survey constituted participants’ acknowledgement of informed consent and confirmed their understanding that only those 18 years old or older were permitted to participate in the study without parental approval.

The survey consisted of three sections. The initial section asked for information on student demographics such as gender, age, and year in school. The next section asked students to
identify which of 24 commonly used study strategies they utilized in their own study sessions. Strategies were equally split between those found by prior research to be most useful to auditory learners, visual learners, and kinesthetic learners. This section also included an open response choice for adding any other useful study strategies not addressed in the list provided by the researcher. The final section asked questions designed to determine the preferred sensory learning mode of each student through a combination of 16 multiple choice and 12 Likert Scale type questions. The collected data was examined for incomplete survey responses, and those response sets were removed from the data before analysis.

Participants
The survey link was emailed to over 37,000 students registered at Florida State University during the spring semester of 2007. This study group was comprised of 56% female, and 44% male students representing 16 colleges within the university. Both graduate and undergraduate students in a variety of online-based and classroom-based programs were included in the research. The semester demographics show that FSU’s spring 2007 student body was comprised of 20% graduate students, 76% undergraduate students, and 4% non-degree seeking students. Students ranging from 16 to 82 years of age were registered during the semester. All students except those under the age of 18 were permitted to participate on a voluntary basis.

Complete survey responses were received from 1,962 students, representing a response rate of approximately 5% of the total student population for the semester. Of these responding students, 832 contributed additional information about their study strategies in the free response section of the survey. Responses were received from all 16 of the colleges within the university, with 1,420 (72%) of the responses submitted by female students and 542 (28%) of the responses submitted by male students. Graduate students provided 622 (32%) of the survey responses, while undergraduate students provided 1,306 (67%). The additional 34 (1%) of the responses came from non-degree seeking students. Students pursuing classroom-based degrees provided 1,692 (86%) of the responses, while 270 (14%) responses were received from students enrolled in online-based degree programs. Figures 1 - 3 compare the demographics of the study participants to the FSU demographics for the spring 2007 semester. Further comparisons of the demographics are available in Appendix E.
Figure 1 – FSU Spring 2007 Demographics vs. Current Study by Gender

Figure 2 – FSU Spring 2007 Demographics vs. Current Study by Degree Program
Analysis

Student responses to the study strategy questions and learning mode questions were evaluated separately for sensory preference. The resulting scores were evaluated for a single sensory preference, a dual sensory preference, or no clear preference by utilizing a rubric to ensure consistency within the scoring. Dual preferences included auditory/kinesthetic, auditory/visual, and visual/kinesthetic. The scoring will be discussed in greater detail under Reliability.

Once a sensory mode had been assigned for both sections of the survey, the results were crosstabulated for matches between the student's sensory learning mode(s) and the sensory mode(s) most common to the study strategies utilized by the student. This analysis was
completed first on the entire data set, and then checked for variance between the various demographic classifications of the respondents, including:

- Gender
- Age
- College
- Graduate versus undergraduate
- Online versus classroom based
- Grade Point Average
- Number of study strategies utilized

Finally, answers to the free response question included in the student study strategy section of the survey were analyzed for a tendency for deep or passive learning. Responses judged to indicate a passive approach were characterized by self-reported behaviors including:

- A general reliance on the instructor to include all pertinent materials in the lectures;
- Expecting to be told what is important within the lesson materials;
- Expecting to be taught the answers and solutions to lessons problems;
- Reading with the intent of memorizing the materials in their entirety;
- Lack of interest in developing an understanding of the concepts within assignments;
- Failure to go beyond the bare minimum of the assigned reading;
- Failure to take notes and/or reliance on the notes of classmates or instructors;
- Relying on others (i.e., classmates, tutors, etc.) to teach the lesson or concepts; and
- Cramming for tests or failure to study for tests.

Responses such as, “Reading a chapter several times so that the pages become imprinted on my memory” and “memorization always works for me, rather than a general concept of a subject” were scored as representative for learning of a passive nature.
Responses judged to indicate a deep processing approach to learning were characterized by behaviors including:

- Comparing and contrasting lecture materials to reading assignments;
- Reading unassigned materials to explore concepts and additional viewpoints;
- Thinking about lectures or reading materials;
- Relating lesson materials to prior knowledge or personal experiences;
- Participating in discussions of lesson materials and concepts;
- Organizing the lesson concepts through the use of outlines, concept maps, etc.;
- Self quizzing or other methods of exploring comprehension of the materials;
- Drawing charts or other representations of the materials to improve understanding; and
- Summarizing key points in the student’s own words.

Responses such as “I like to conceptually apply the information to my own life” and “basic research into the ‘bigger picture’ of the subject I'm studying” were considered to be illustrations of deeper processing.

Validity
The extent to which a data gathering instrument accurately measures what it is aimed at measuring is referred to as validity (Kovacs, 1985). Three aspects of validity can be examined: content validity, pertaining to whether the instrument adequately samples all possible content known to the subject under consideration; predictive validity, referring to whether the measurement device can accurately predict future behavior or achievement; and construct validity, which is concerned with attempts to explain the individual differences found when using the measurement device (Babbie, 1990). Ultimately, validity defines whether a measurement instrument yields data that is relevant to the problem under consideration (Kovacs, 1985).

Validity for the measurement instrument utilized for this research was addressed by initially basing the learning mode portion of the survey on instruments similar to those utilized successfully by previous researchers and professionals in the field of adult learning (Fleming,
The study strategy section of the survey was created based on prior research into study methods appropriate to each of the sensory learning modes; auditory (Clark, 2000; Pennell, 1985; Felder & Soloman, n.d.; Fritz, 2002), visual (Clark, 2000; Felder & Soloman, n.d.; Pennell, 1985; Fritz, 2002; ), and kinesthetic (Rayneri, Gerber & Wiley, 2003; Clark, 2000; Pennell, 1985).

Next, the survey was pre-tested with ten volunteers who had recently completed a period of college study and were still mindful of the study methods they found useful during their studies. These volunteers were given a copy of the introductory letter and informed consent to read before completing the survey, and took the survey without any other prior explanation or coaching from the researcher.

After these volunteers completed the survey, their learning and study modes were calculated by the researcher. Each volunteer was then privately interviewed by the researcher to get feedback on the survey and to assess whether the volunteer agreed with the researcher’s analysis. Four of the ten volunteers agreed with the survey results regarding their learning mode based on their prior learning experiences, while the remaining volunteers were unsure of their learning preferences and couldn't confirm the survey results. All ten volunteers found the survey easy to understand, and felt that the survey was not too long.

Before distribution to the FSU student body, the survey was reviewed and approved by the professors overseeing the research. The survey was also reviewed and approved by the FSU Human Subjects Committee.

**Reliability**

Reliability refers to the question of whether a measurement instrument or technique is capable of yielding the same results when applied repeatedly (Babbie, 1990). Reliability is commonly determined by using one of four testing procedures (Kovacs, 1985):

- The test-retest method consisting of retesting the same population with the same device a short time after the initial test;
• Alternate form testing where the researcher designs two equivalent measures and administers both to the same population;
• Split-half testing involving correlation of scores for half of the test with scores on the other half of the scores; and
• Average intercorrelations where the item response pattern is used to analyze objective testing and questions that are answered with "right" or "wrong" responses.

For this research, the split-half method was utilized to test the reliability of the survey. The questions were separated by random selection into two halves with the Likert scale questions being divided by mode before random selection to ensure equal representation of each mode in the two resulting halves. The two halves were then scored separately and correlated for learning mode match. The reliability results of the learning mode questions was found to be 88%, well within the 80% or better needed to demonstrate reliability (Monette, et. al., 2005).

Another concern regarding reliability is that of intercoder reliability, referring to coding problems when multiple coders or inconsistent coding methods are used. Intercoder reliability was achieved by utilizing scoring rubrics to assign a mode classification (e.g., a single learning mode was assigned to the multiple choice questions if the highest variable was greater than or equal to ½ of possible score and other the two variables were less than ⅓ of the possible score). All scoring was done by the researcher to ensure consistency in the scoring. See Appendix D for the complete scoring criteria.

**Bias**

Research is expected to be objective, socially responsible, and to contain balanced views rather than biased information (Shamoo & Resnik, 2003). There are a number of ways of introducing bias into a questionnaire or into the responses provided to a questionnaire. To guard against introducing bias, the researcher utilized standard methods and protocols to ensure the most unbiased information possible within the scope and limits of this study.

Researcher bias, possible actions on the part of the researcher that influence how the respondent answers (Neuman, 2003), was negated by using a computer based survey that each participant
was able to complete without any contact with, or influence from, the researcher. However, the use of voluntary participation did introduce the potential for a greater sampling error than that expected in a true random sample (Babbie, 1990) due to the fact that the demographic makeup of the respondents is not a statistically exact match to the population being studied. In addition, the use of the computer based survey may itself have introduced sampling bias. Though computer aided interviewing yields significantly higher levels for reporting of sensitive information or behavior (Monette, et. al., 2005), those that respond to a Web based survey may differ notably from those who elected not to respond (Neuman, 2003).

A key issue in research is whether the answers provided by respondents accurately reflect their true behaviors or beliefs without any form of bias (Monette, et. al., 2005). Bias within responses can be introduced in a number of ways. For example, some people tend to answer a large number of questions in the same way, creating *response bias* (Neuman, 2003).

Another form of bias that holds particular concern for multiple choice questions is that of *response pattern anxiety*. This anxiety is brought about by the concern some people experience if several consecutive questions all have the same answer. Response pattern anxiety tends to cause alterations to the pattern even if the resulting answers are less representative of true beliefs or behaviors of the participant (Monette, et. al., 2005).

Bias can also be introduced if the researcher includes language that implies a negative or positive attitude to question responses (Babbie, 1990). In addition, the use of poorly written questions, such as double barreled questions which in reality ask more than one question or questions that utilize jargon or confusing language, may also lead to inaccurate responses from participants (Neuman, 2003). To improve participant response reliability, survey questions should be clear, consistent, precise, objective, and written in simple language and format (Kovacs, 1985). In addition, questions should be formatted to guard against the likelihood of response bias or response pattern anxiety (Monette, et. al., 2005).

To avoid introducing bias into the survey through the participants’ answers, the researcher utilized a number of question writing techniques designed to improve the clarity of the survey.
and the likelihood of collecting data that accurately represented the behaviors of the respondents. The survey questions were written in common language without the use of jargon, slang, or abbreviations, and were worded without emotionally charged or leading questions. Patterns were avoided in both question format and response order to reduce the likelihood of response bias or response pattern anxiety.

Another form of bias that may influence survey results is social desirability bias, which occurs when answers are distorted by respondents to make their responses fit their view of the social norms (Neuman, 2003). Working from the understanding that complying with social norms is less important when the researcher is unaware of the identity of the respondent (Babbie, 1990), the researcher utilized respondent anonymity as the primary method of overcoming this form of bias. In addition, the survey contained two questions regarding the respondent’s grade point average (GPA), the first asking for the current GPA, and a second asking for expected GPA at graduation. The second question was included as a “face saving” alternative (Neuman, 2003) for respondents with current GPA’s below those that might be considered the social norm in hopes of improving the likelihood of truthful responses regarding the current GPA.

**Study Limitations**

This study serves as an initial examination of the interplay between sensory learning modes, study strategies, and student reliance on active or passive learning processes. The scope of this research is not intended as a deep analysis of the full spectrum of components that contribute to the learning of college students, or as a means of drawing conclusions regarding how or why the participants learned to utilize the study strategies reported.

The participants utilized for this study don't form an exact representative sample of the student body at FSU during the spring 2007 semester, and may not provide an appropriate sample for other colleges, the general population of the United States, or statistically similar groups outside of the U.S. The researcher in no way wishes to imply that the results found in this study can be generalized to include these or other populations.
Throughout the planning, implementation and analysis of the current study, the researcher utilized relevant prior research to support the research assumptions and to provide background information regarding sensory learning modes, study strategies, student ability to self-assess, and deep versus passive learning.
CHAPTER 2
A REVIEW OF THE RELATED RESEARCH

Relevance of Prior Research
Learning styles have been analyzed from many different perspectives. In the 16th century John Locke described three modes of perception, which he called intuitive, demonstrative, and sensitive (Lemire, 2001). Developmental psychologist Jean Piaget introduced a different philosophy, believing in an invariant sequence of learning stages through which each human passes based on age related brain development (Piaget, 1971). Others, including Jerome Bruner, believed in developmental stages that controlled sensory learning choice and representation style, but not in an age dependency for these learning preferences (Bruner, 2006). More recently, the Myers-Briggs Type Indicator, based on Carl Jung’s typology of personality types (Myers, 1995) which examined personalities across dimensions including extroversion versus introversion and sensing versus intuition, has become a widely used instrument for examining the preferences of students (Schroeder, 1993; Felder & Brent, 2005; Clark, 2000). For example, research utilizing the Myers-Briggs indicator to identify the types typical of current student populations has demonstrated that most of today's students do not have a well-developed independent learning style or an abstract thinking style, and consequently learn differently than the majority of their instructors (Grasha & Yangarber-Hicks, 2000; Schroeder, 1993).

In addition to research regarding learning styles, extensive research has been utilized to examine the use of study strategies by students. Generally these studies report that the study habits of successful students characteristically demonstrate a deep processing approach to learning and a high level of metacognitive awareness. Lower achieving students tend to demonstrate the opposing orientation of surface processing that relies heavily on passive learning techniques and shows little metacognitive awareness.

However, there appears to be no research linking student awareness of personal learning preferences to chosen study strategies. This gap in current research offers an opportunity to examine this aspect of student self-awareness and self-regulation as a means of identifying methods for improving student learning success. Before initiating research examining the study
strategies utilized by college students, their preferred sensory learning mode, and whether there is a match between the learning style and the use of appropriate study methods, the examination of prior research on a number of topics was essential. First, research into human learning preferences was examined. Next, the ability for students to self-assess was seen as an important consideration. Finally, existing research into effective study strategies and into sensory learning modes was considered.

**Learning Styles**

Learning styles are not neatly sorted, mutually exclusive categories, and are not different ways of encoding the same kind of knowledge. Rather, they consist of methods of concentrating on, processing, internalizing, and recalling incoming sensory input in a way that generates meaning for the individual (Tennant, 2006; Grasha & Yangarber-Hicks, 2000; Shaughnessy, 1998; Szewczak & Snodgrass, 2002). Learning preferences may be influenced by conditions of an individual's childhood such as cultural differences (Gadt-Johnson & Price, 2000; Brown, 1998), or even by the types of toys and games children are exposed to during their formative years (Lowrie & Kay, 2001). One domain of learning style theory encompasses the physiological aspects of learning styles as an examination of an individual’s sensory learning mode through a visual, auditory, or kinesthetic preference for information processing (Cambiano, DeVore & Denny, 2000; Brown, 1998).

Research into the working of the human mind demonstrates that it is reasonable to expect a student to have a stronger memory for information presented in their preferred sensory learning mode, and that this may offer an advantage when learning material most suited to this mode (Willingham, 2006). Although teaching to match student learning style has been suggested over the last forty years as a means of improving learning (McKeachie, 1995; Shaughnessy, 1998; Ross & Schulz, 1999; Cambiano, DeVore & Denny, 2000), there is a trade off between using comfortable tactics to capitalize on the learner’s strengths and using methods that utilize tactics slightly dissonant to student personality that stretch the student’s learning style (Schmeck, 1988). Tennant (2006) points out that opposition, contradiction, and obstacles are necessary conditions for triggering development and Olson (2006) notes that students receiving instruction in their
preferred learning style are more likely to experience overconfidence in their ability, leading to investing less effort in learning and ultimately to lower performance.

As research into learning styles has advanced, some teachers and students have come to believe that students can learn through only their primary learning style, and that an individual’s learning style is discrete, concrete, and unchangeable (McKeachie, 1995; Burke & Dunn, 2003; Moallem, 2003; Terry, 2002; Szewczak & Snodgrass, 2002). Although it is pointless to think that teaching can be tailored to the learning preferences of every student, it is equally misguided to think that a one-size-fits-all approach to education is going to meet the needs of a diverse student population (Felder & Brent, 2005; Hlawaty, 2001). Teaching through the use of multiple sensory modes provides for learning style differences as well as broadening the input range of the learning experience as a means of making better use of cognitive resources (Debevec, Shih & Kashyap, 2006; Christie, 2000; Gault, 2005; Goolkasian, 2000). Choices such as presentation mode should reflect learning effectiveness for the specific materials being taught rather than a desire to accommodate every student's learning preference (Doo, 2005; Velayo & Quirk, 2000). Unfortunately, lectures remain the predominant instructional technique despite research that clearly demonstrates the effectiveness of utilizing multiple presentation modes (Elliot, Foster & Stinson, 2002; Minotti, 2005).

Learning style preference can have such a profound effect on attention and motivation that it is sometimes difficult to accurately interpret student behaviors (Szewczak & Snodgrass, 2002; Jensen 2000; Tileston, 2004; Ross & Schulz, 1999). For example, a kinesthetic child who learns best when allowed mobility and informal seating may be labeled as developmentally slow, hyperactive, or as having attention deficit problems when forced into a more rigid learning setting (Shaughnessy, 1998; Jensen, 2000; Goodwin & Smith, 2003; Mitchell, Dunn, et. al., 2002; Hodgin & Wooliscroft, 1997). Lower achieving students often demonstrate either a lack of adequate study strategies or less success in using study strategies successfully (Wade & Trathen, 1989; Robertson, Priest & Fullwood, 2001; Dunn, 2002; Gettinger & Seibert, 2002). Many of these students show a preference for kinesthetic learning over visual or aural learning modes (Dunn & Dunn, 2005; Cutolo, 2003; Belka, 2002). This learning preference isn’t engaged in traditional lecture or discussion based learning environments (Cutolo, 2003; Jensen, 2000).
Research by Rayneri, Gerber & Wiley (2003) found that 15-40% of gifted students are not performing at their expected level or are considered to be at risk for failure, and attribute this to a mismatch between student learning style and instructional approach, especially for those students demonstrating a need for kinesthetic learning activities.

It is imperative that students be able to draw associations from sensory input, process this information, and develop the ability to recall it for output (Christie, 2000). Most people prefer to learn through one of the three primary sensory modes (vision, hearing, or touch), and experience difficulty in controlling impulsivity and maintaining motivation when learning is not in a comfortable modality (Tileston, 2004; Jensen, 2000; Felder & Spurlin, 2005). This can be especially true when technology is utilized in the teaching process (Grasha & Yangarber-Hicks, 2000). Helping students to identify their learning style and adjust for the learning strengths and weaknesses of this preference can help them to learn more successfully (Tileston, 2004; Gadt-Johnson & Price, 2000; Fritz, 2002; Minotti, 2005).

Though most people do demonstrate a sensory learning preference, 100% of all students are multi-modality processors capable of processing from all input modes; yet 75% of the teachers have learned to present lessons in an essentially sequential, analytic manner that demonstrates little use of multi-modal presentation methods (Jensen, 2000). Most often children in kindergarten through third grade are taught in a kinesthetic mode, children in grades four through eight are given a more visually oriented education, and from ninth grade on education emphasizes auditory presentations (Clark, 2000; McKeachie, 1995; Christie, 2000; Ross & Schulz, 1999; Jensen, 2000); however, the best teaching involves stimulation of all of these senses (Brent, 2005; Jensen, 2000). Research into the sensory learning of students demonstrates that, though young children appear to be balanced in their sensory learning modes with no clear preference of style, by adulthood the three learning modes are represented at approximately 52% visual learners, 31% kinesthetic learners, and 17% auditory learners (Lemire, 2001).

Visual learners, who learn through the most common sensory learning mode preference, tend to remember faces but have difficulty recalling names, learn best when visual elements are utilized, prefer reading over lectures, organize thoughts by writing them, enjoy puzzles and visually
oriented games, and often give away their emotions through their facial expressions (Tileston, 2004; Ross & Schulz, 1999; Jensen, 2000; Thagard, 2005). Visually oriented learners also tend to develop a preference for using multi-color highlighting to group complex information for better processing (Worley & Moore, 2001).

Kinesthetic learners, who learn through the second most common sensory learning mode preference, remember best when learning includes doing something that involves movement and manual manipulation, prefer to participate rather than watch, enjoy simulations or drama as well as outdoor activities, and express themselves through body language (Tileston, 2004; Jensen, 2000; Ross & Schulz, 1999). They tend to wiggle, tap their fingers, move around a lot, appear to have too much energy to sit still, and learn best when movement is incorporated into learning situations through the use of models, simulations, and other items that can be manipulated during the learning process (Burke & Dunn, 2002). Understanding kinesthetic and tactile abilities are especially important for students such as the visually impaired, since, for them, non-visual clues are particularly important (Stankov & Roberts, 2001). However, movement during learning is not only effective for those students who learn best through kinesthetic experiences. Jensen (2000) found that only 25% of all students learn well with minimal mobility, that another 25% need occasional mobility, and that approximately 50% need extensive mobility while learning.

Auditory learners, those that learn best through the least common sensory learning mode preference, tend to remember names but forget faces, often become fidgety when required to sit for long periods, retain reading best when it is discussed, prefer group discussion to reading, tend to be sensitive to the physical environment, and respond to physical encouragement such as a pat on the back (Tileston, 2004; Jensen, 2000; Thagard, 2005). These students are less likely to take detailed notes, but instead tend to devote their attention to listening to the lecture (Ross & Schulz, 1999).

**The Ability to Self-Assess**

Students with good metacognitive understanding of their study processes are informed self-regulated learners who demonstrate the ability to set goals, adapt a variety of study methods to
achieving these goals, and are motivated to engage in active learning (Hadwin & Winne, 1996; Dunigan & Curry, 2006; Lynch, 2006; Schraw, 1998). In contrast, a lack of metacognitive ability plays a central role in test anxiety and leads to the use of a surface approach to studying (Spada, Nikcevic, Moneta & Ireson, 2006). A lack of metacognitive knowledge has also been associated with a failure to employ effective study strategies, short attention spans, insufficient motivation to learn, and failure to gain sufficient knowledge about the study topic (Nwafor, 2000; Zimmerman, 2002).

Many students are hindered by their own lack of metacognition, and benefit from training in sound learning methods and self-assessment (Sobral, 1997; Sizoo, Malhotra & Bearson, 2003; Jacobson, 1998; Trainin & Swanson, 2005). Students often enter college with such poor self-assessment skills that they lack the ability to determine whether or not they are prepared for an exam (Clump, Bauer & Bradley, 2004; Bartling, 1988). Often these students are non-learners who attempt to follow the teacher’s instructions without understanding their purpose, cannot explain their thinking, and apply random and ineffectual strategies (Pennell, 1985). Without the ability to self-assess and self-regulate, students are likely to be unable to sustain concentration, control persistence in learning, correct or repair comprehension errors, or focus on test-related information (Warkentin & Bol, 1997; Jakubowski & Dembo, 2004; Zimmerman, 2002).

Self-concept and a student’s beliefs about his or her ability to learn can have a profound effect on learning success and study strategy usage (Robertson, Priest & Fullwood, 2001; Gettinger & Seibert, 2002; Goetz & Palmer, 1991; Zimmerman, 2002). The belief that the ability to learn is fixed leads to helpless behavior and negative thinking while understanding learning as a process that can be improved leads to self-encouragement, persistent effort, and increased likelihood of success (Schommer, 1998). To realize the potential of their intellectual capacity, students need to take an active role in analyzing and regulating their learning through the use of emotion control, motivation control, and comprehension monitoring (Brown, 1998; Hadwin & Winne, 1996; Warr & Downing, 2000; Cukras, 2006; Schraw, 1998). Teaching students how to assess their own learning style allows them to identify how they prefer to learn and provides them with insight into where in their studies learning is likely to come easy and where adaptive strategies
are likely to be needed to achieve success (Shaughnessy, 1998; Terry, 2002; Jacobson, 1998; Pennell, 1985; Minotti, 2005).

Wade & Trathen (1989) found that lower achieving college students are generally successful at identifying important information, although they may find it difficult to focus adequate attention on the material to process it well enough for learning to take place; conversely, higher achieving students are better at selecting strategies that enable them to learn while diverting fewer cognitive resources to the task. Students lacking in appropriate study strategies can be taught to become more self-sufficient by providing opportunities to monitor understanding, teaching steps to take when they find themselves stuck in the learning process, by modeling techniques of questioning prior knowledge on the topic, and by helping them learn to assess which of their available resources are likely to be helpful in a given situation (Robertson, Priest & Fullwood, 2001). With the understanding that self-regulated study contributes to learning (Kornell & Metcalfe, 2006; Cukras, 2006), study skill training is most effective when presented from a metacognitive perspective that helps students develop self-regulation along with the needed procedural skills (Stewart & Landine, 1995; Purdie & Hattie, 1999; Hadwin & Winne, 1996).

**Study Strategies**

Though learning style research has shown the relevance of input mode to learning, it is easier to teach learning strategies than it is to modify personality traits such as learning style, especially since such changes will have far reaching ramifications (Schmeck, 1988). Though each of us tends to have a preferred sensory mode for learning, the sensory mode utilized to perceive the initial experience has little effect on the mind’s ability to store information. The human mind is able to store memories in a number of different formats with the resulting representation ultimately stored independently of any one modality (Willingham, 2006).

Study strategy training can be traced to at least 1894 at Wellesley College (McKeachis, 1988), with interest in study skill training increasing in the 1950s when educators began to think that students were failing to perform as well as expected academically due to inadequacies in their study methods (Harley, 1986). Many of today’s college freshmen still enter college unprepared
to learn on their own due to a lack of mature and efficient learning strategies, or because they utilize minimal strategies with little understanding of when a specific strategy can be used effectively (Clump, Bauer & Bradley, 2004; Purdie & Hattie, 1999; Kumrow, Vogt & Kazlauskas, 2002).

Learning strategies refer specifically to activities that assist the student in learning in a variety of circumstances and for any given learning task (Sankaran & Bui, 2001; Dunigan & Curry, 2006; Sizoo, Malhotra & Bearson, 2003). For a study method to be strategic, the student must have alternatives to choose from, must be able to deliberate about the advantages and disadvantages of each option relative to the current task, and must choose a specific technique because it is deemed to be the most effective method of meeting the current learning goal (Hadwin & Winne, 1996; Lynch, 2006; Cukras, 2006; Palmer & Goetz, 1988). Research has shown a positive relationship between academic success and study habits (Blai, 1993; Elliot, Foster & Stinson, 2002; Gettinger & Seibert, 2002; Trainin & Swanson, 2005), with study skills accounting for approximately 15% of the grade variance for undergraduate students (Onwuegbuzie, Slate & Schwartz, 2001).

Study strategies can be taught as an effective way of enabling students’ learning, even when they experience a mismatch between teaching and learning styles (McKeachie, 1995; Moallem, 2003; Hlawaty, 2001; Hodgin & Wooliscroft, 1997; Cutolo, 2003). However, transferring this knowledge from one domain to another cannot be assumed to be simple or straightforward (Granott, 1998). Additionally, students must accept the use of a study strategy for it to be useful. Research by Goetz & Palmer (1991), utilizing responses from 224 undergraduate students, demonstrated that each student tends to assess the level of skill necessary to use a specific study strategy, judge his or her own level of skill, and decide whether to use or reject the study strategy based on the outcome of this self judgment.

Often, students demonstrating inefficient and inappropriate study skills are resistant to learning new study skills because of a belief that they do not need to, or cannot, change their study methods (Yiuksel, 2006; Jakubowski & Dembo, 2004; Palmer & Goetz, 1988). These unprepared students are likely to equate increased study time with improved performance, even
though research has shown that good study behavior and the use of versatile study strategies correlates with cognitive and affective outcomes, whereas time-on-task does not (Purdie & Hattie, 1999; Gettinger & Seibert, 2002; Van Blerkom, Van Blerkom & Bertsch, 2006). Students needing study strategy training may display self-limiting thinking patterns. Miles (1988) categorizes students who use such self-limiting thinking as:

- *Algorithmic thinkers*, who learn mechanically;
- *Mental chip thinkers*, who treat information as isolated and disconnected bits;
- *Catatonics*, who mentally freeze when confronted with unfamiliar materials;
- *Muscle thinkers*, who have a single learning method (usually memorization) which is used to the exclusion of all other approaches; and
- *Mental lobotomies*, who seem to forget much of what they learn during even a weekend away from exposure to the material.

Teachers rarely instruct students about effective study strategies, yet students are expected to develop an arsenal of strategies and knowledge of when and how each study skill can best serve their learning needs (Elliot, Foster & Stinson, 2002; Chalupa, Chen & Charles, 2001; Lambert & Nowacek, 2006; Minotti, 2005). There is no best set of study skills that will work for every student in every situation; rather, students need to be instructed on how to evaluate study strategy usefulness for specific tasks and learning goals as they relate to the learner’s prior knowledge and skill level (Purdie & Hattie, 1999; Gettinger & Seibert, 2002; Yuksel, 2006; Jones, 1988). Study strategy training to improve student understanding of such contributors to success as study environment, self-management, time management, stress management, effective listening, reading comprehension, note-taking, and sophisticated writing skills has proven useful in improving academic performance (Thomas, 1993; Robertson, Priest & Fullwood, 2001; Hadwin & Winne, 1996; Chalupa, Chen & Charles, 2001).

Debevec, Shih & Kashyap (2006) found that the use of appropriate study strategies carries a high correlation with learning success, and that class attendance was also highly correlated with successful learner performance. Successful students are able to assess the demands of the lesson materials, their prior knowledge relating to the topic, the importance and purpose of the
assignment, the instructor’s expectations, and their available study time, and then adjust their studies accordingly (Blai, 1993; Robertson, Priest & Fullwood, 2001; Gettinger & Seibert, 2002).

Purdie & Hattie (1999) utilize the term *learning pathologies* to describe behaviors common to low achievers that hinder rather than improve learning including:

- Disorganization,
- Test anxiety,
- Cutting classes,
- Avoiding studies,
- Jumping to conclusions, and
- Inappropriate use of memorization.

Appelhans & Schmeck, (2002) found that these students are also likely to use avoidance coping strategies that could interfere with academic preparation, such as:

- *Leveling*, a method of overlooking stress-causing stimuli;
- *Blunting*, reducing stress by focusing attention elsewhere; and
- *Repression*, avoiding the perception and memory of upsetting stimuli.

Study strategies can be grouped as promoting either passive or deep processing. Passive strategies utilize surface level processing geared towards getting a good grade with minimal work and do little to promote learning (Gettinger & Seibert, 2002; Barnett, 2000; Sankaran & Bui, 2001). Passive learners are likely to utilize strategies such as cramming for tests, and single or repetitive reading of the text without activities to improve comprehension (Wade & Trathen, 1989). These strategies do little to improve learning, especially when students expend little time and few cognitive resources on them.

Universities often recommend at least two hours per week of study time outside of class for each class credit, and emphasize the importance of reading the textbook for comprehension. However, research by Clump, Bauer & Bradley (2004) demonstrated that most students read their textbook less than three hours per week, and that students devalue textbooks in favor of
using the instructor’s lectures as their primary information source. Clump, Bauer, and Bradley (2004) found that most of the 423 undergraduate students in their study read about 27% of the assigned reading before class, and less than 70% before an exam; they further found that 62% of the students demonstrated a passive approach to learning by stating that they felt the instructor should tell them what they needed to know during class time. In contrast to such demonstrations of passive learning, deep processing is directed at understanding meaning and satisfying curiosity through the use of longer study hours directed at making detailed notes, going beyond the minimum work required to complete assignments, and continuous study towards mastery of the materials (Sankaran & Bui, 2001).

Less successful students generally utilize simplistic approaches to learning while successful students utilize deeper learning processes that lead to greater understanding. Research by Goetz & Palmer (1991) found that 80% of the 224 undergraduate students in their research reported rereading the text to be the most commonly utilized study strategy. Rehearsal, the repeated reading of the same material multiple times in hopes of memorizing a sufficient portion, is perhaps among the most simplistic of study strategies. Though rehearsal activities can be used as a means of keeping information in the short-term memory long enough to allow encoding into long-term memory, they work best with multiple exposures rather than the practice of cramming just before an exam (Robertson, Priest & Fullwood, 2001). Rehearsal is often seen as a surface approach study method more appropriate to the simplistic learning of children, with limited usefulness in college study circumstances (Warr & Downing, 2000; Lynch, 2006; Gettinger & Seibert, 2002), but useful for assignments such as learning foreign language vocabulary (Purdie & Hattie, 1999).

A deeper approach involves the imposing of organization on the materials to be learned through the identification of key issues. The grouping of related elements goes beyond mere rehearsal as a means of helping the student create mental structures that assist in learning (Warr & Downing, 2000; Gettinger & Seibert, 2002). A still deeper form of learning can be seen in the use of elaboration, a method that takes learning a step further than organization since it promotes the examination of both appropriate and inappropriate examples pertaining to new concepts (Robertson, Priest & Fullwood, 2001; Dunigan & Curry, 2006; Lynch, 2006). Elaboration is
accomplished through the use of strategies such as the creation of summaries, graphs, tables, analogies, examples, and conclusions (Elliot, Foster & Stinson, 2002; Warr & Downing, 2000).

Overall, deep processing is found in practices used to focus attention on actively processing relevant information, with methods commonly utilized by college students including generating possible testing questions, underlining, note taking (Wade & Trathen, 1989; McNeal & Dwyer, 1999), outlining, summarization (Wade & Trathen, 1989), and nonverbal imagery (McNeal & Dwyer, 1999). However, in their research Goetz & Palmer (1991) found that fewer than 20% of 224 undergraduate students reported using self-questioning, identifying major ideas, summarizing, or outlining in their studies.

As a part of the task of taking greater responsibility for their learning, college students must be able to plan and organize to get the most out of their study time (Hendry & Farley, 2006; Kumrow, Vogt & Kazlauskas, 2002). Academic load is lightened when a student develops the ability to maintain sound study habits that match their cognitive needs, such as choosing appropriate times and session lengths for studying, adjusting to the surroundings of the study area, taking meaningful notes, and reading for comprehension (Blai, 1993). The way students space their study sessions can influence learning. However, students often mass their study time, especially for materials judged to be difficult, even though this type of cramming leads to decreased learning in comparison to more strategically appropriate study methods (Son, 2004; Barnett, 2000; Zimmerman, 2002).

Generally, college students choose to study alone at home rather than on campus with an organized study group or with a tutor (Kuo, Hagie & Miller, 2004; Purdie & Hattie, 1999). Studying at home may be difficult for students who are easily distracted from their studies and those prone to procrastination. These students may benefit from utilizing spaces that are commonly provided by campus libraries and are appropriate either for independent study or for working with a small group (Hendry & Farley, 2006).

Students with positive self-efficacy who make use of deep and elaborate processing that calls upon critical evaluation, conceptual organization, comparing and contrasting study materials,
using mental imagery, reorganizing material for personal relevance, good note taking with meaningful review, and self-testing are more likely to experience better outcomes than those who utilize inflexible or surface approaches to studying (Purdie & Hattie, 1999; Spada, Nikcevic, Moneta & Ireson, 2006; Bartling, 1988). Students’ approaches to study can be classified according to different sets of contrasting goal orientations. They demonstrate contrasts such as; learning versus performance, task versus ego, and mastery versus performance. Each orientation demonstrates a difference in the student's attitude towards learning. For example, mastery orientation emphasizes self-development, while an ego-social orientation emphasizes out performing others to gain social approval and enhance one’s ego, and the work-avoidant orientation demonstrating a desire to complete tasks with as little effort as possible (Somuncuooglu & Yildirim, 1999).

In terms of specific study strategies, note taking stands out as the predominant way students attempt to capture and retain knowledge, yet teachers seldom know how their students use their notes for studying and are reluctant to teach effective note usage strategies (Elliot, Foster & Stinson, 2002). Note taking during the typical classroom lecture puts such a heavy cognitive demand on the student that there is no time for meaningful processing to take place (Elliot, Foster & Stinson, 2002). Using note taking and note review as a study strategy may offer the student the useful learning functions of encoding during the note taking process and rehearsal of new information during note review, but these functions are best activated when a student is able to take their own notes rather than simply borrowing notes from another student for review as is often the case for the hearing impaired (Elliot, Foster & Stinson, 2002).

Note taking while reading can serve as a means of strengthening memory through the use of additional processing (Wade & Trathen, 1989), but to be effective students must use their notes as a means of generating links between the material and their own prior knowledge (Elliot, Foster & Stinson, 2002). Like note taking, underlining can be utilized as a surface study method if it is used only as a method of decreasing the amount of text needed for review prior to testing, but can be adapted to deep processing if important material in the text is identified and manipulated to add meaning (Hadwin & Winne, 1996; Cukras, 2006; Van Blerkom, Van Blerkom & Bertsch, 2006).
Self-questioning, another deep processing study skill, has been shown to improve comprehension over note taking and review when students work to manipulate concepts rather than creating simplistic questions pertaining to specific facts (Hadwin & Winne, 1996; Gettinger & Seibert, 2002; Van Blerkom, Van Blerkom & Bertsch, 2006). Another study method that can add to deep processing is concept mapping. Study of the use of concept mapping and other similar visual concept processing methods such as flow charting has shown that high achieving students produce complex diagrams while lower achieving students tend to produce more linear maps that do little to improve comprehension (Hadwin & Winne, 1996).

Whether or not a particular study method works well for an individual may depend on learning preferences as well as the level of processing promoted by the strategy. For example, auditory learners often benefit from:

- Verbal learning (Clark, 2000);
- Hearing the materials they are attempting to learn (Clark, 2000);
- Discussing the materials within a group setting (Clark, 2000);
- Reading the materials aloud (Clark, 2000);
- Recording and playing back the text (Clark, 2000);
- Verbalizing possible test questions (Clark, 2000);
- Repeating items to be memorized rhythmically (Pennell, 1985);
- Writing concepts to be learned from someone’s dictation (Pennell, 1985);
- Writing summaries or outlines of course materials (Felder & Soloman, n.d; Fritz, 2002.);
  and
- Working with a study group (Felder & Soloman, n.d; Fritz, 2002.).

Visual learners may improve their performance by:

- Drawing graphs, charts, or other visual aids that represent the reading material (Clark, 2000);
- Using outlines to visually organize the main points of a lesson (Clark, 2000);
- Using colored highlighters to help visually identify connected material (Clark, 2000);
- Minimizing visual distractions while studying (Clark, 2000);
• Tying visual images to course material that is primarily verbal (Felder & Soloman, n.d.; Pennell, 1985; Fritz, 2002);
• Using concept maps to help visualize connections within the material (Felder & Soloman, n.d.; Pennell, 1985; Fritz, 2002); and
• Color coding their notes to make similar and connected concept stick together visually in their memory (Felder & Soloman, n.d.; Pennell, 1985; Fritz, 2002).

Kinesthetic learners usually learn best when manipulating materials during the learning process, and may benefit from:
• Utilizing models and other real objects to help tie reading to concepts (Rayneri, Gerber & Wiley, 2003);
• Taking frequent breaks during study sessions (Clark, 2000);
• Using music to maintain attention (Clark, 2000);
• Using toys (such a foam ball) that can be manipulated while studying (Clark, 2000);
• Physically transferring the information from the text to another medium such a computer or writing tablet (Clark, 2000);
• Practicing unusual techniques such as writing words while looking at the book rather than their paper (Pennell, 1985);
• Reading with the book sideways or upside-down (Pennell, 1985);
• Using an index card as a tracer while reading (Pennell, 1985);
• Rocking while reading (Pennell, 1985); and
• Changing the lighting in the room (Pennell, 1985).

Though utilizing study strategies that primarily match a student’s learning style can facilitate learning, students should be encouraged not to limit their study methods to only those that most closely fit their learning preferences. To function effectively in college, and later in the work environment, students will need abilities associated with a variety of learning preferences, which they are not likely to develop if they are never given practice in their less preferred learning styles (Felder & Spurlin, 2005; Tennant, 2006; Zimmerman, 2002). It is important to remember that learning styles are habitual preferences that can be adjusted and augmented over time (McKeachie, 1995; Felder & Spurlin, 2005; Lowrie & Kay, 2001), and that it is important for
students to be flexible in their adaptation to their own learning style if they are to succeed (Hendry & Farley, 2006; Felder & Brent, 2005; Gadt-Johnson & Price, 2000). However, a student’s ability to understand their own learning and make informed decisions regarding how to best facilitate learning in a given situation may contribute significantly to self-efficacy and overall learning success. Whether or not students are gaining this ability during their schooling would seem to be an important consideration in the planning of our educational programs.
CHAPTER 3
RESULTS

Introduction
This exploratory research study was designed to investigate how well students adapt their study strategies to match their sensory learning mode(s). The basic supposition is that students benefit from an understanding of how they learn, and that with this understanding it is likely that they will be more successful at their studies by utilizing adaptive strategies to maximize the strengths and overcome the weaknesses of their preferred learning mode(s).

The research was conducted through the use of an online survey that was made available to over 37,000 students registered for the spring 2007 semester at Florida State University. The survey consisted of three parts; demographic questions, questions on study methods (including one free response question), and questions on learning preferences consisting of a combination of multiple choice questions and Likert Scale type questions. More information on the research instrument can be found in Chapter 1. A copy of the survey is provided in Appendix A.

Complete survey responses were received from 1,962 students representing all 16 of the University's colleges. Undergraduate and graduate students from both online-based and classroom based programs were represented within the responses. Chapter 1 contains more detailed information on the demographics of the respondents as well as a comparison of these demographics with the demographic of the university for the semester.

Data Analysis
All data analysis was completed by the researcher with the use of scoring rubrics to ensure consistency within the scoring. The rubric rules consisted of statements such as "Single mode if highest variable greater than or equal to half of possible score and other two variables less than one third of the possible score." The complete set of rules utilized for scoring the question sets can be found in Appendix D. The survey responses were analyzed for sensory learning mode, number of study methods utilized, prevalence of a sensory mode in the study methods, match
between the sensory learning and study modes, and tendency towards passive or deep learning processes.

**Sensory Mode Analysis** - The initial data analysis consisted of identifying the sensory learning mode(s) for each respondent through the scoring of the questions regarding learning preferences. Responses that demonstrated a preference for visual input were considered to be indicative of a tendency towards visual learning. Likewise, answers indicating a preference for aural input were deemed to represent a more auditory centered learning preference, and answers indicating a tendency towards physical manipulation during learning were scored as indicative of a kinesthetic learning preference.

Response sets where a clear preference for one sensory mode was evident were designated as single mode (auditory, visual, or kinesthetic). The scoring rubric also included rules for those responses where two modes were found to be equally or nearly equally preferred by the respondent. These response sets were scored as a dual sensory mode (auditory/kinesthetic, auditory/visual, or visual/kinesthetic). Responses displaying equal and nearly equal scores for all three sensory modes were scored as displaying no discernable sensory mode.

The study methods section of the survey listed 24 statements regarding the use of study methods found by prior research to be commonly utilized by students. These statements represented eight study methods for each of the three sensory modes. Students’ sensory study mode(s) were assigned based on how many of the common study practices for each sensory mode they utilized in their own studies. The preferred sensory mode(s) displayed within the study habits for each participant was identified in the same manner as the sensory learning mode through the use of a scoring rubric. Again, modes were designated as single mode (auditory, visual, or kinesthetic), dual mode (auditory/kinesthetic, auditory/visual, or visual/kinesthetic), or as displaying no discernable sensory mode. The possible modes and the abbreviation used to represent each mode throughout the study are listed in Table 1.
Once the scoring for both the learning mode and the study strategies was complete, the data was analyzed for the frequency percentage of each mode. See Figure 4 and Figure 5 for a frequency breakdown of the sensory learning modes and sensory study modes respectively. Within the distribution of learning modes the greatest single mode (33%) is the visual mode, followed by kinesthetic (7%), with auditory learners representing the smallest percentage (3%). As expected from the findings of prior research, the visually oriented learners represented the largest single sensory mode with kinesthetic and aural learners falling second and third in preference respectively. Dual learning modes were found for 41% of the respondents, with only 14% of the students demonstrating no clear sensory learning mode preference.

### Table 1 – Sensory Mode Designations

<table>
<thead>
<tr>
<th>MODE</th>
<th>ABBREVIATION</th>
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<tbody>
<tr>
<td>Auditory</td>
<td>A</td>
</tr>
<tr>
<td>Auditory/Kinesthetic</td>
<td>AK</td>
</tr>
<tr>
<td>Auditory/Visual</td>
<td>AV</td>
</tr>
<tr>
<td>Kinesthetic</td>
<td>K</td>
</tr>
<tr>
<td>No Clear Indication</td>
<td>N</td>
</tr>
<tr>
<td>Visual</td>
<td>V</td>
</tr>
<tr>
<td>Visual/Kinesthetic</td>
<td>VK</td>
</tr>
</tbody>
</table>

![Figure 4 – Learning Mode Distribution](image)

![Figure 5 – Study Mode Distribution](image)
The distribution percentages within the sensory modes for student study habits varied a great deal from those found in the sensory learning modes. A preference for a single sensory mode was found for 21% of the students, with visually based study methods found in 9% of the responses, a reliance on primarily auditory study methods in 8%, and emphasis on kinesthetic study practices in 4%. These results are not in keeping with the preference order of visual, kinesthetic, and aural expected from the findings of prior research.

An additional 27% of students reported utilizing study methods that emphasized a combination of two sensory modes. It is of particular note that, although only 14% of the students demonstrated no discernable sensory learning mode, 52% of the respondents were found to have no particular sensory mode apparent in their preferred study strategies.

Table 2 provides a distribution comparison of each sensory mode for both learning and study preferences. This initial comparison seems to demonstrate reasonably close frequency percentage between learning mode and study mode for the auditory, auditory/kinesthetic, auditory/visual, and kinesthetic modes. Yet it seems questionable that, with this great a variance between the sensory learning data and sensory study mode percentages overall, the students are purposely utilizing study habits that emphasize their sensory learning preference. A true comparison of each student's sensory learning mode and preferred study strategy mode was established through the use of a crosstabulation performed with the SPSS statistical analysis software.

Table 2 – Mode Distribution Comparison

<table>
<thead>
<tr>
<th></th>
<th>Learning Mode</th>
<th>Study Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>3%</td>
<td>8%</td>
</tr>
<tr>
<td>AK</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td>AV</td>
<td>15%</td>
<td>18%</td>
</tr>
<tr>
<td>K</td>
<td>7%</td>
<td>4%</td>
</tr>
<tr>
<td>N</td>
<td>14%</td>
<td>52%</td>
</tr>
<tr>
<td>V</td>
<td>33%</td>
<td>9%</td>
</tr>
<tr>
<td>VK</td>
<td>22%</td>
<td>5%</td>
</tr>
</tbody>
</table>
Comparative Analysis of the Entire Data Set - Two generally recognized purposes of quantitative research are to discover relationships and to provide descriptive information, with complex descriptive statistics (e.g., crosstabulation tables) providing a significant method of achieving both of these goals (Gliner & Morgan, 2000) while reducing the data from unmanageable details to manageable summaries (Babbie, 1990). A crosstabulation table is a table in which cases in each category of one variable get distributed against the variables of another category (Newman, 2003).

A crosstabulation analysis of the entire data set is shown in Table 3, along with the count and percentages found for each sensory learning mode for the survey results. The table also provides the percentage of matches found between sensory learning modes and the preferred study modes for all responses. As the table shows, the highest percentage match between sensory learning mode and study method mode is 23% for the auditory/visual oriented students, followed by 15% for the visual students and 11% for the auditory students. The remaining mode match percentages were found to be 10% or less with kinesthetic students at 10%, auditory/kinesthetic students at 8%, and visual/kinesthetic students at 6%.

<table>
<thead>
<tr>
<th></th>
<th>LEARNING MODE</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>AK</td>
</tr>
<tr>
<td>STUDY MODE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>AK</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>AV</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>K</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>N</td>
<td>36</td>
<td>53</td>
</tr>
<tr>
<td>V</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>VK</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Learning Mode Count Total</th>
<th>Mode % of Total Responses</th>
<th>Match of Learning &amp; Study Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>62</td>
<td>78</td>
<td>304</td>
</tr>
<tr>
<td></td>
<td>3%</td>
<td>4%</td>
<td>15%</td>
</tr>
<tr>
<td></td>
<td>11%</td>
<td>8%</td>
<td>23%</td>
</tr>
</tbody>
</table>
Although no specific value can be categorically labeled as statistically significant in all research situations, leaving researchers with the decision of what value will be classified as significant to their particular research (Babbie, 1990), the percentages reported in Table 3 were well below those considered by the researcher as indicative of students’ purposeful or intuitive use of sensory study methods matching their sensory learning mode. For this study, the researcher utilized the following scale to categorize whether a significant match was found between sensory learning mode and the sensory modes selected for study strategies:

- 0% to 59% - No significant match
- 60% to 74% - Match apparent
- 75% to 100% - Significant match found

Since none of the mode matches reached 25% and most were found to be at 15% or less, the match percentages between learning mode and study mode were found to be below the statistical significance set by the researcher. The only match between modes found to demonstrate some significant correlation was that between students displaying no learning mode preference and no study mode preference. However, even this case displayed a match of only 55%, and was judged to be statistically too low to indicate purposeful matching of learning and study modes.

Once the crosstabulation between sensory learning mode and prevalent sensory mode shown in student study habits had been examined and found to show no significant correlation between student learning and study modes, the researcher completed additional analysis of the data through the use of comparisons across the various demographic divisions supplied by the first series of survey questions. These demographics included gender, type of degree being sought, classroom versus online programs, age, number of study strategies utilized, current GPA, and college of major.

**Comparative Analysis by Gender** - A comparison of the learning mode and study strategy frequencies demonstrated by gender are presented in Table 4 and Table 5 respectively. The frequencies for each of the learning modes again repeats the expected pattern of sensory
preference with the ranking of most common to least common being visual, kinesthetic, and aural. However, the frequencies for the study strategy modes are, again, skewed towards no sensory mode preference.

**Table 4 – Comparison of Learning Mode Frequency by Gender**

<table>
<thead>
<tr>
<th>Female Count</th>
<th>Percent of Total Female Responses</th>
<th>Male Count</th>
<th>Percent of Total Male Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>42</td>
<td>20</td>
<td>4%</td>
</tr>
<tr>
<td>AK</td>
<td>51</td>
<td>27</td>
<td>5%</td>
</tr>
<tr>
<td>AV</td>
<td>207</td>
<td>97</td>
<td>18%</td>
</tr>
<tr>
<td>K</td>
<td>108</td>
<td>39</td>
<td>7%</td>
</tr>
<tr>
<td>N</td>
<td>179</td>
<td>104</td>
<td>19%</td>
</tr>
<tr>
<td>V</td>
<td>503</td>
<td>154</td>
<td>28%</td>
</tr>
<tr>
<td>VK</td>
<td>330</td>
<td>101</td>
<td>19%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1420</strong></td>
<td><strong>542</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

**Table 5 – Comparison of Study Strategy Mode Frequency by Gender**

<table>
<thead>
<tr>
<th>Female Count</th>
<th>Percent of Total Female Responses</th>
<th>Male Count</th>
<th>Percent of Total Male Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>115</td>
<td>44</td>
<td>8%</td>
</tr>
<tr>
<td>AK</td>
<td>58</td>
<td>27</td>
<td>5%</td>
</tr>
<tr>
<td>AV</td>
<td>274</td>
<td>79</td>
<td>15%</td>
</tr>
<tr>
<td>K</td>
<td>33</td>
<td>37</td>
<td>7%</td>
</tr>
<tr>
<td>N</td>
<td>731</td>
<td>295</td>
<td>54%</td>
</tr>
<tr>
<td>V</td>
<td>145</td>
<td>35</td>
<td>6%</td>
</tr>
<tr>
<td>VK</td>
<td>64</td>
<td>25</td>
<td>5%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1420</strong></td>
<td><strong>542</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>
Within the crosstabulations between sensory learning mode and study strategies based on the gender of the respondent, the greatest match percentage for the female students was in the auditory/visual mode at 24%, while the greatest match percentage for the males was in the kinesthetic mode at 26%. The male students were found to show a notable increase in match percentages for the auditory/kinesthetic and kinesthetic modes over that of their female counterparts (an increase of 11% and 21% respectively). The female students were found to show a slight increase in the match percentage for the visual mode (6%) over that of the male students. However, neither the examination of the data for the female students, nor that of the male responses, produced statistically significant correlations between learning and study modes. The crosstabilatation results for female and male respondents are shown in Table 6 and Table 7 respectively.

Table 6 – Crosstabulation of Female Responses.

<table>
<thead>
<tr>
<th>STUDY MODE</th>
<th>LEARNING MODE</th>
<th>A</th>
<th>AK</th>
<th>AV</th>
<th>K</th>
<th>N</th>
<th>V</th>
<th>VK</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>5</td>
<td>2</td>
<td>24</td>
<td>7</td>
<td>22</td>
<td>34</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>AK</td>
<td>6</td>
<td>2</td>
<td>6</td>
<td>11</td>
<td>10</td>
<td>8</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>AV</td>
<td>8</td>
<td>5</td>
<td>49</td>
<td>5</td>
<td>29</td>
<td>137</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>21</td>
<td>36</td>
<td>108</td>
<td>68</td>
<td>99</td>
<td>213</td>
<td>186</td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>0</td>
<td>1</td>
<td>12</td>
<td>5</td>
<td>8</td>
<td>82</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>VK</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>7</td>
<td>5</td>
<td>26</td>
<td>18</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Learning Mode Count Total</th>
<th>42</th>
<th>51</th>
<th>207</th>
<th>108</th>
<th>179</th>
<th>503</th>
<th>330</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mode % of Total Female Responses</td>
<td>3%</td>
<td>4%</td>
<td>15%</td>
<td>8%</td>
<td>13%</td>
<td>35%</td>
<td>23%</td>
</tr>
</tbody>
</table>

| Match of Learning & Study Mode | 12% | 4% | 24% | 5% | 55% | 16% | 5% |
Comparative Analysis by Degree Sought - Crosstabulations were also run separately by degree sought (Undergraduate, Masters, and PhD) to check for differing results. The crosstabulation results for these demographic classifications are shown in Table 8, Table 9, and Table 10 respectively. Within the data by degree sought, percentage of students falling within each learning mode did show some variation (e.g. an increase of visually oriented students from 31% for Undergraduates to 38% and 41% for Master’s and PhD students respectively). However, no remarkable difference or discernable patterns within the learning mode distribution were evident. The expected trend toward visual learners making up the greatest percentage followed by kinesthetic and then by aural learners was again repeated within all three crosstabulations of the data for the sensory learning mode.

Within these crosstabulations, none of the match percentages between learning and study modes were high enough to be classified as demonstrating either purposeful or intuitive use of study methods emphasizing the student’s sensory learning mode. However, the Master’s students did show a generally greater tendency to match their study modes to their learning modes than the Undergraduate students. Likewise, the PhD students also displayed a general trend towards higher mode match percentages than the Master’s students.
### Table 8 – Crosstabulation of Undergraduate Responses.

<table>
<thead>
<tr>
<th>STUDY MODE</th>
<th>LEARNING MODE</th>
<th>A</th>
<th>AK</th>
<th>AV</th>
<th>K</th>
<th>N</th>
<th>V</th>
<th>VK</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>5</td>
<td>2</td>
<td>28</td>
<td>6</td>
<td>28</td>
<td>24</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>AK</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>10</td>
<td>10</td>
<td>6</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>AV</td>
<td>7</td>
<td>4</td>
<td>42</td>
<td>3</td>
<td>32</td>
<td>110</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>0</td>
<td>3</td>
<td>4</td>
<td>11</td>
<td>12</td>
<td>4</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>27</td>
<td>37</td>
<td>105</td>
<td>68</td>
<td>107</td>
<td>174</td>
<td>157</td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>0</td>
<td>4</td>
<td>12</td>
<td>5</td>
<td>12</td>
<td>62</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>VK</td>
<td>0</td>
<td>1</td>
<td>5</td>
<td>8</td>
<td>6</td>
<td>23</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>Learning Mode Count Total</td>
<td>43</td>
<td>56</td>
<td>202</td>
<td>111</td>
<td>207</td>
<td>403</td>
<td>284</td>
<td></td>
</tr>
<tr>
<td>Mode % of Total Undergrad Responses</td>
<td>3%</td>
<td>4%</td>
<td>15%</td>
<td>8%</td>
<td>16%</td>
<td>31%</td>
<td>22%</td>
<td></td>
</tr>
<tr>
<td>Match of Learning &amp; Study Mode</td>
<td>12%</td>
<td>9%</td>
<td>21%</td>
<td>10%</td>
<td>52%</td>
<td>15%</td>
<td>7%</td>
<td></td>
</tr>
</tbody>
</table>

### Table 9 – Crosstabulation of Master’s Degree Student Responses.

<table>
<thead>
<tr>
<th>STUDY MODE</th>
<th>LEARNING MODE</th>
<th>A</th>
<th>AK</th>
<th>AV</th>
<th>K</th>
<th>N</th>
<th>V</th>
<th>VK</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2</td>
<td>0</td>
<td>5</td>
<td>1</td>
<td>6</td>
<td>7</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>AK</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>AV</td>
<td>1</td>
<td>1</td>
<td>14</td>
<td>3</td>
<td>7</td>
<td>33</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>7</td>
<td>9</td>
<td>33</td>
<td>12</td>
<td>23</td>
<td>71</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>0</td>
<td>1</td>
<td>5</td>
<td>0</td>
<td>1</td>
<td>26</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>VK</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>8</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Learning Mode Count Total</td>
<td>15</td>
<td>12</td>
<td>59</td>
<td>24</td>
<td>40</td>
<td>152</td>
<td>99</td>
<td></td>
</tr>
<tr>
<td>Mode % of Total Master’s Responses</td>
<td>4%</td>
<td>3%</td>
<td>15%</td>
<td>6%</td>
<td>10%</td>
<td>38%</td>
<td>25%</td>
<td></td>
</tr>
<tr>
<td>Match of Learning &amp; Study Mode</td>
<td>13%</td>
<td>8%</td>
<td>24%</td>
<td>8%</td>
<td>58%</td>
<td>17%</td>
<td>4%</td>
<td></td>
</tr>
</tbody>
</table>
Table 10 – Crosstabulation of Responses for PhD Students.

<table>
<thead>
<tr>
<th>STUDY MODE</th>
<th>LEARNING MODE</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>AK</td>
<td>AV</td>
<td>K</td>
<td>N</td>
<td>V</td>
</tr>
<tr>
<td>A</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>AK</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>AV</td>
<td>2</td>
<td>2</td>
<td>12</td>
<td>0</td>
<td>2</td>
<td>26</td>
</tr>
<tr>
<td>K</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>N</td>
<td>1</td>
<td>7</td>
<td>14</td>
<td>5</td>
<td>23</td>
<td>43</td>
</tr>
<tr>
<td>V</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>VK</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Learning Mode Count Total</td>
<td>3</td>
<td>9</td>
<td>34</td>
<td>11</td>
<td>32</td>
<td>90</td>
</tr>
<tr>
<td>Mode % of Total PhD Responses</td>
<td>1%</td>
<td>4%</td>
<td>15%</td>
<td>5%</td>
<td>14%</td>
<td>41%</td>
</tr>
<tr>
<td>Match of Learning &amp; Study Mode</td>
<td>0%</td>
<td>0%</td>
<td>35%</td>
<td>18%</td>
<td>72%</td>
<td>9%</td>
</tr>
</tbody>
</table>

Comparative Analysis for Classroom versus Online Students - Responses from students pursuing classroom-based and online-based programs were also compared by crosstabulation. The learning mode distribution was again within the expected range with mode occurrence falling by order of preference as visual, kinesthetic, and auditory. The percentages of occurrence for each mode between the online and classroom students were very close with the only difference of more than 2% being found in the visual/kinesthetic mode where classroom-based students scored 21% and online-based students scored 26%, showing a 5% increase.

Again, the matches between learning and study modes were still too low to be considered statistically significant. However, the online students did demonstrate a higher percentage of matches across every sensory mode as well as for those students not demonstrating a distinct sensory learning mode. These match increase percentages varied between 2% for the auditory and auditory/visual modes to 11% for the kinesthetic mode. Overall, the online-based students showed approximately a 5% greater likelihood of matching learning mode to study mode than the classroom-based students. The crosstabulation results for classroom-based and online students are shown in Table 11 and Table 12 respectively.
Table 11 – Crosstabulation of Responses for Students in Classroom Based Degree Programs.

<table>
<thead>
<tr>
<th>STUDY MODE</th>
<th>LEARNING MODE</th>
<th>A</th>
<th>AK</th>
<th>AV</th>
<th>K</th>
<th>N</th>
<th>V</th>
<th>VK</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td>6</td>
<td>2</td>
<td>34</td>
<td>7</td>
<td>29</td>
<td>36</td>
<td>24</td>
</tr>
<tr>
<td>AK</td>
<td></td>
<td>6</td>
<td>5</td>
<td>8</td>
<td>12</td>
<td>13</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td>AV</td>
<td></td>
<td>10</td>
<td>6</td>
<td>60</td>
<td>3</td>
<td>37</td>
<td>152</td>
<td>43</td>
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<tr>
<td>K</td>
<td></td>
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<td>20</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td>31</td>
<td>47</td>
<td>138</td>
<td>78</td>
<td>134</td>
<td>257</td>
<td>213</td>
</tr>
<tr>
<td>V</td>
<td></td>
<td>0</td>
<td>4</td>
<td>17</td>
<td>5</td>
<td>13</td>
<td>77</td>
<td>24</td>
</tr>
<tr>
<td>VK</td>
<td></td>
<td>1</td>
<td>1</td>
<td>6</td>
<td>11</td>
<td>7</td>
<td>30</td>
<td>19</td>
</tr>
</tbody>
</table>

Learning Mode Count Total
- Total: 54, 69, 267, 127, 245, 569, 361

Mode % of Total Classroom Responses
- 3%, 4%, 16%, 8%, 14%, 34%, 21%

Match of Learning & Study Mode
- 11%, 7%, 22%, 9%, 55%, 14%, 5%

Table 12 – Crosstabulation of Responses for Students in Online Based Degree Programs.

<table>
<thead>
<tr>
<th>STUDY MODE</th>
<th>LEARNING MODE</th>
<th>A</th>
<th>AK</th>
<th>AV</th>
<th>K</th>
<th>N</th>
<th>V</th>
<th>VK</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td>1</td>
<td>0</td>
<td>5</td>
<td>1</td>
<td>6</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>AK</td>
<td></td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>AV</td>
<td></td>
<td>0</td>
<td>1</td>
<td>9</td>
<td>3</td>
<td>4</td>
<td>19</td>
<td>6</td>
</tr>
<tr>
<td>K</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td>5</td>
<td>6</td>
<td>20</td>
<td>8</td>
<td>22</td>
<td>36</td>
<td>31</td>
</tr>
<tr>
<td>V</td>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>20</td>
<td>14</td>
</tr>
<tr>
<td>VK</td>
<td></td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>6</td>
</tr>
</tbody>
</table>

Learning Mode Count Total
- Total: 8, 9, 37, 20, 38, 88, 70

Mode % of Total Online Responses
- 3%, 3%, 14%, 7%, 14%, 33%, 26%

Match of Learning & Study Mode
- 13%, 11%, 24%, 20%, 58%, 23%, 9%
Additional crosstabulation comparison tables can be found in the following appendices:

Appendix F - Based on student age,
Appendix G – Based on number of study strategies selected,
Appendix H – Based on reported current GPA, and
Appendix I – Based on FSU College of major.

As with the data already examined, no significant variation in the mode match percentages was found in these crosstabulation tables.

**Summary of Mode Matches by Demographic** - Table 13 summarizes responses, mode matches, match percentage, and match deviation from the entire data set by demographic. The mode match totals deviate between -5.60% and +7.02% from the mode match total found for the entire data set, with female students demonstrating a 0.64% greater match over male students, graduate students demonstrating a 0.55% greater match over undergraduate students, and no consistent improvement found across GPA increases. A range of 10.81% is seen in the match percentages across the 16 FSU colleges without any clear trend for certain types of degree seeking students (e.g. liberal arts versus science degrees) to demonstrate a greater likelihood for matching sensory modes apparent in the data.

**Number of Study Strategies Reported** - Within the survey data, quite a variance in number of study strategies utilized by the respondents was apparent. Figure 6 provides a graph summarizing study strategy usage for the student respondents. Students reported using between zero (two students) and 19 (four students) of the 24 common study strategies listed in the survey. The two students reporting not using any of the offered study strategies replied to the free-form study strategy question by stating “I rarely study” and “I just attend class.”
### Table 13 – Summary of Mode Matches by Demographic

<table>
<thead>
<tr>
<th>Learning/Study Mode Matches</th>
<th>Total Responses by Demographic</th>
<th>Mode Matches by Demographic</th>
<th>Matches as a Percent of the Demographic</th>
<th>Demographic’s Deviation from Percentage of Matches for all Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total for All Responses</td>
<td>1962</td>
<td>226</td>
<td>11.16%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Female</td>
<td>1420</td>
<td>166</td>
<td>11.34%</td>
<td>0.18%</td>
</tr>
<tr>
<td>Male</td>
<td>542</td>
<td>60</td>
<td>10.70%</td>
<td>-0.46%</td>
</tr>
<tr>
<td>Graduate</td>
<td>622</td>
<td>75</td>
<td>11.58%</td>
<td>0.42%</td>
</tr>
<tr>
<td>Undergraduate</td>
<td>1306</td>
<td>146</td>
<td>11.03%</td>
<td>-0.13%</td>
</tr>
<tr>
<td>Non-degree Seeking</td>
<td>34</td>
<td>3</td>
<td>8.82%</td>
<td>-2.34%</td>
</tr>
<tr>
<td>Classroom</td>
<td>1692</td>
<td>184</td>
<td>10.52%</td>
<td>-0.64%</td>
</tr>
<tr>
<td>Online</td>
<td>270</td>
<td>42</td>
<td>15.19%</td>
<td>4.03%</td>
</tr>
<tr>
<td>GPA 1st Semester</td>
<td>80</td>
<td>9</td>
<td>11.25%</td>
<td>0.09%</td>
</tr>
<tr>
<td>GPA 2.0 or less</td>
<td>17</td>
<td>2</td>
<td>17.65%</td>
<td>6.49%</td>
</tr>
<tr>
<td>GPA 2.01 - 2.5</td>
<td>68</td>
<td>10</td>
<td>14.71%</td>
<td>3.55%</td>
</tr>
<tr>
<td>GPA 2.51 - 3.0</td>
<td>271</td>
<td>24</td>
<td>8.49%</td>
<td>-2.67%</td>
</tr>
<tr>
<td>GPA 3.01 - 3.5</td>
<td>529</td>
<td>62</td>
<td>11.53%</td>
<td>0.37%</td>
</tr>
<tr>
<td>GPA 3.5 - 4.0</td>
<td>979</td>
<td>117</td>
<td>11.44%</td>
<td>0.28%</td>
</tr>
<tr>
<td>GPA Unknown</td>
<td>16</td>
<td>1</td>
<td>5.56%</td>
<td>-5.60%</td>
</tr>
<tr>
<td>Arts and Sciences</td>
<td>400</td>
<td>41</td>
<td>8.40%</td>
<td>-2.76%</td>
</tr>
<tr>
<td>Business</td>
<td>212</td>
<td>27</td>
<td>12.74%</td>
<td>1.58%</td>
</tr>
<tr>
<td>Communication</td>
<td>94</td>
<td>7</td>
<td>7.45%</td>
<td>-3.71%</td>
</tr>
<tr>
<td>Criminology &amp; Criminal Justice</td>
<td>60</td>
<td>9</td>
<td>15.00%</td>
<td>3.84%</td>
</tr>
<tr>
<td>Education</td>
<td>203</td>
<td>21</td>
<td>10.34%</td>
<td>-0.82%</td>
</tr>
<tr>
<td>Engineering</td>
<td>56</td>
<td>8</td>
<td>14.29%</td>
<td>3.13%</td>
</tr>
<tr>
<td>Human Sciences</td>
<td>153</td>
<td>26</td>
<td>16.99%</td>
<td>5.83%</td>
</tr>
<tr>
<td>Information</td>
<td>97</td>
<td>15</td>
<td>15.46%</td>
<td>4.30%</td>
</tr>
<tr>
<td>Law</td>
<td>43</td>
<td>4</td>
<td>9.30%</td>
<td>-1.86%</td>
</tr>
<tr>
<td>Medicine</td>
<td>32</td>
<td>2</td>
<td>6.25%</td>
<td>-4.91%</td>
</tr>
<tr>
<td>Motion Picture, TV &amp; Rec. Arts</td>
<td>11</td>
<td>2</td>
<td>18.18%</td>
<td>7.02%</td>
</tr>
<tr>
<td>Music</td>
<td>59</td>
<td>7</td>
<td>11.36%</td>
<td>0.70%</td>
</tr>
<tr>
<td>Nursing</td>
<td>67</td>
<td>11</td>
<td>16.42%</td>
<td>5.26%</td>
</tr>
<tr>
<td>Social Sciences</td>
<td>213</td>
<td>23</td>
<td>10.80%</td>
<td>-0.36%</td>
</tr>
<tr>
<td>Social Work</td>
<td>96</td>
<td>7</td>
<td>7.37%</td>
<td>-3.79%</td>
</tr>
<tr>
<td>Visual Arts, Theatre &amp; Dance</td>
<td>79</td>
<td>9</td>
<td>11.39%</td>
<td>0.23%</td>
</tr>
</tbody>
</table>
Of the remaining students reporting use of between 1 and 19 of the common study strategies, the mode was found to be 8 study strategies with approximately 36% of the students reporting the use of 7 to 9 strategies and approximately 58% of the students reporting the use of 6 to 10 strategies. Over 87% of the students reported utilizing between 5 and 14 of the study strategies with approximately 52% using 5 to 9 strategies and approximately 35% using 10 to 14 strategies. Of note are the students at either end of the spectrum. A surprising 8.4% of the students reported using 0 to 4 of the common study methods, while a small number (4.5%) reported using 15 to 19 of the methods.
**Sensory Modes within Study Strategies** - The study strategy section of the survey consisted of 24 statements geared towards evaluating which sensory modes students utilize in their study practices. The statements were evenly split between study strategies found by prior research to be most useful to each sensory mode (auditory, visual, and kinesthetic), with eight strategies provided for each mode as follows:

**Study strategies with an emphasis on aural learning:**
- I find it useful to read or talk out loud when studying.
- I benefit from studying with a partner or study group.
- I like to tape the instructor's lectures for review.
- I learn more by explaining the material to others.
- I record my notes or sections of the textbook on tape and play it back to review the material.
- I find that I recall ideas best when studying in a quiet place.
- I explain overheads, pictures, and other visuals to someone else to clarify the concepts for myself.

**Study strategies with an emphasis on visual learning:**
- I close my eyes and picture the information as I study.
- I learn more from reading the text than listening to a lecture.
- I use multiple colors to highlight associated points in my textbook or notes.
- I remember better if I write things down.
- I find diagrams, charts, or pictures that illustrate the material helpful to my learning.
- I write practice answers when studying for a test.
- I practice redrawing diagrams from memory when studying.
- I practice turning pictures into words when studying.
- I find that my class notes are sparse and expand upon them from the textbook or conversations with others.
Study strategies with an emphasis on kinesthetic learning:

- I remember what I learn in a lab better than what I read.
- I like to try out a new technique rather than concentrating on the instructions.
- I like to walk around while studying.
- I prefer to learn by the trial and error method.
- I learn best from hands-on exercises.
- I find role playing helpful in learning new concepts.
- I rewrite my notes from memory when studying.
- I find field trips, tours, and exhibits helpful in my learning.

In 52% of the responses either the choice of study strategies were so evenly split between the three modes that no particular mode preference was apparent, or the number of study strategies utilized were so limited as to provide insufficient information for determining the student's preferred sensory mode for studying. Data sets demonstrating the use of 4 or fewer study strategies were considered to provide insufficient information and scored as displaying no discernable sensory mode for study strategies. Most of the respondents (over 86%) reported utilizing study strategies appropriate to all three of the sensory modes. Notably, less than 1% of the students demonstrated a preference for a single sensory mode in their study habits. Table 14 provides a summary of student mode choice for study strategies.

Table 14 – Sensory Mode Variety Show in Choice of Study Strategies.

<table>
<thead>
<tr>
<th>Modes Present</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>None Apparent</td>
<td>2</td>
<td>0.10%</td>
</tr>
<tr>
<td>Single Mode Utilized</td>
<td>15</td>
<td>0.76%</td>
</tr>
<tr>
<td>Two Modes Utilized</td>
<td>246</td>
<td>12.54%</td>
</tr>
<tr>
<td>Three Modes Utilized</td>
<td>1699</td>
<td>86.60%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1962</td>
<td>100.00%</td>
</tr>
</tbody>
</table>
Of the common study methods offered to students in the sensory study mode section of the survey, all 24 were reported as being utilized by some percentage of the respondents. The percentage of students reporting the use of the individual study methods ranged from 2% for “I record my notes or sections of the textbook on tape and play it back to review the material” to 90% for “I remember better if I write things down.” No clear preference for a single sensory mode was evident in the study method preference. Although methods identified by prior research as most helpful to visual and auditory methods did rank as the top 5 study methods employed, the top 12 (50%) of the study methods were nearly equally split between the sensory modes, with 5 being categorized as auditory, 4 being categorized as visual, and 3 being categorized as kinesthetic. Table 15 provides a list of the 24 study methods provided in the sensory study mode section of the survey, along with the sensory mode designation for each method, and the percentage of students that reported utilizing each method.

Table 15 – Study Method Preference

<table>
<thead>
<tr>
<th>Percent of Students</th>
<th>Survey Question</th>
<th>Mode Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>90%</td>
<td>I remember better if I write things down.</td>
<td>Vls.</td>
</tr>
<tr>
<td>71%</td>
<td>I learn more by explaining the material to others.</td>
<td>Aud.</td>
</tr>
<tr>
<td>68%</td>
<td>I find diagrams, charts, or pictures that illustrate the material helpful to my learning.</td>
<td>Vls.</td>
</tr>
<tr>
<td>67%</td>
<td>I find that I recall ideas best when studying in a quiet place.</td>
<td>Aud.</td>
</tr>
<tr>
<td>62%</td>
<td>I find it useful to read or talk out loud when studying.</td>
<td>Aud.</td>
</tr>
<tr>
<td>60%</td>
<td>I learn best from hands-on exercises.</td>
<td>KIn.</td>
</tr>
<tr>
<td>48%</td>
<td>I find field trips, tours, and exhibits helpful in my learning.</td>
<td>KIn.</td>
</tr>
<tr>
<td>45%</td>
<td>I benefit from studying with a partner or study group.</td>
<td>Aud.</td>
</tr>
<tr>
<td>39%</td>
<td>I remember what I learn in a lab better than what I read.</td>
<td>KIn.</td>
</tr>
<tr>
<td>36%</td>
<td>I close my eyes and picture the information as I study.</td>
<td>Vls.</td>
</tr>
<tr>
<td>35%</td>
<td>I use multiple colors to highlight associated points in my textbook or notes.</td>
<td>Vls.</td>
</tr>
<tr>
<td>34%</td>
<td>I explain overheads, pictures, and other visuals to someone else to clarify the concepts for myself.</td>
<td>Aud.</td>
</tr>
<tr>
<td>33%</td>
<td>I write practice answers when studying for a test.</td>
<td>KIn.</td>
</tr>
<tr>
<td>30%</td>
<td>I practice redrawing diagrams from memory when studying.</td>
<td>Vls.</td>
</tr>
<tr>
<td>29%</td>
<td>I learn more from reading the text than listening to a lecture.</td>
<td>Vls.</td>
</tr>
<tr>
<td>26%</td>
<td>I find that my class notes are sparse and expand upon them from the textbook or conversations with others.</td>
<td>Aud.</td>
</tr>
<tr>
<td>24%</td>
<td>I rewrite my notes from memory when studying.</td>
<td>Vls.</td>
</tr>
<tr>
<td>19%</td>
<td>I like to try out a new technique rather than concentrating on the instructions.</td>
<td>KIn.</td>
</tr>
<tr>
<td>19%</td>
<td>I prefer to learn by the trial and error method.</td>
<td>KIn.</td>
</tr>
<tr>
<td>13%</td>
<td>I like to walk around while studying.</td>
<td>KIn.</td>
</tr>
<tr>
<td>11%</td>
<td>I find role playing helpful in learning new concepts.</td>
<td>KIn.</td>
</tr>
<tr>
<td>11%</td>
<td>I practice turning pictures into words when studying.</td>
<td>Vls.</td>
</tr>
<tr>
<td>5%</td>
<td>I like to tape the instructor’s lectures for review.</td>
<td>Aud.</td>
</tr>
<tr>
<td>2%</td>
<td>I record my notes or sections of the textbook on tape and play it back to review the material.</td>
<td>Aud.</td>
</tr>
</tbody>
</table>
Table 16 provides the study methods categorized by the sensory mode each best serves per prior research findings, and ordered by percentage of the students reporting use of each study method. The average percentage of preference for each mode was calculated to be 40% for visual, 39% for auditory, and 30% for kinesthetic, demonstrating a nearly equal preference by the students for use of study methods appropriate to each of the 3 sensory modes. However, while none of the study methods classified as being visual or kinesthetic were found to be used by fewer than 11% of the students, two of the auditory mode study methods were found to be rarely utilized. These two study methods were “I like to tape the instructor’s lectures for review” at 5% utilization, and “I record my notes or sections of the textbook on tape and play it back to review the material” at 2%. Further analysis of the study method data by student demographic was not considered for the current study.

Table 16 – Study Preferences by Sensory Mode

<table>
<thead>
<tr>
<th>Mode Type</th>
<th>Percent of Students</th>
<th>Survey Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auditory</td>
<td>71%</td>
<td>I learn more by explaining the material to others.</td>
</tr>
<tr>
<td></td>
<td>67%</td>
<td>I find that I recall ideas best when studying in a quiet place.</td>
</tr>
<tr>
<td></td>
<td>62%</td>
<td>I find it useful to read or talk out loud when studying.</td>
</tr>
<tr>
<td></td>
<td>45%</td>
<td>I benefit from studying with a partner or study group.</td>
</tr>
<tr>
<td></td>
<td>34%</td>
<td>I explain overheads, pictures, and other visuals to someone else to clarify the concepts for myself.</td>
</tr>
<tr>
<td></td>
<td>26%</td>
<td>I find that my class notes are sparse and expand upon them from the textbook or conversations with others.</td>
</tr>
<tr>
<td></td>
<td>5%</td>
<td>I like to tape the instructor’s lectures for review.</td>
</tr>
<tr>
<td></td>
<td>2%</td>
<td>I record my notes or sections of the textbook on tape and play it back to review the material.</td>
</tr>
<tr>
<td>Visual</td>
<td>90%</td>
<td>I remember better if I write things down.</td>
</tr>
<tr>
<td></td>
<td>68%</td>
<td>I find diagrams, charts, or pictures that illustrate the material helpful to my learning.</td>
</tr>
<tr>
<td></td>
<td>36%</td>
<td>I close my eyes and picture the information as I study.</td>
</tr>
<tr>
<td></td>
<td>35%</td>
<td>I use multiple colors to highlight associated points in my textbook or notes.</td>
</tr>
<tr>
<td></td>
<td>30%</td>
<td>I practice redrawing diagrams from memory when studying.</td>
</tr>
<tr>
<td></td>
<td>29%</td>
<td>I learn more from reading the text than listening to a lecture.</td>
</tr>
<tr>
<td></td>
<td>24%</td>
<td>I rewrite my notes from memory when studying.</td>
</tr>
<tr>
<td></td>
<td>11%</td>
<td>I practice turning pictures into words when studying.</td>
</tr>
<tr>
<td>Kinesthetic</td>
<td>60%</td>
<td>I learn best from hands-on exercises.</td>
</tr>
<tr>
<td></td>
<td>48%</td>
<td>I find field trips, tours, and exhibits helpful in my learning.</td>
</tr>
<tr>
<td></td>
<td>39%</td>
<td>I remember what I learn in a lab better than what I read.</td>
</tr>
<tr>
<td></td>
<td>33%</td>
<td>I write practice answers when studying for a test.</td>
</tr>
<tr>
<td></td>
<td>19%</td>
<td>I like to try out a new technique rather than concentrating on the instructions.</td>
</tr>
<tr>
<td></td>
<td>19%</td>
<td>I prefer to learn by the trial and error method.</td>
</tr>
<tr>
<td></td>
<td>13%</td>
<td>I like to walk around while studying.</td>
</tr>
<tr>
<td></td>
<td>11%</td>
<td>I find role playing helpful in learning new concepts.</td>
</tr>
</tbody>
</table>
Deep versus Passive Learning - Question 32, stating "briefly list any other study methods you have found to help you learn," was scored for tendencies towards deep or passive learning. Of the 832 students providing answers to this question, 612 demonstrated a definite trend towards either a deep or passive approach to learning. Approximately 26% (220) of these responses provided information that didn’t allow for an assessment of passive versus deep learning processes. These responses included statements such as:

- “A cigarette and music on the porch,”
- “Adderol,”
- “Eating foods that are said to help with focus and learning,” and
- “I find that candles help me focus.”

Responses that were deemed to demonstrate passive learning processes included statements such as:

- “Cramming right before test to keep info fresh in photographic/short term memory,”
- “Memorizing pages and graphs etc. as a whole before a test,”
- “Repeatedly re-writing the information I need to know until it is stuck in my head,” and
- “Reading a chapter several times so that the pages become imprinted on my memory.”

Deep processing was found in statements such as:

- “I find it helpful to restate central concepts in my own words,”
- “Creating my own diagrams, charts to summarize,”
- “Focusing on key concepts and then researching them after the lecture for further clarification,” and
- “Outlining the material from class and from the book together to understand how it all fits together.”

The Analysis section of Chapter 1 provides more details on how the answers were scored.
The majority of these responses (59%) demonstrated a generally passive approach to learning, with some form of memorization being given as the primary means of learning for 211 (over 58%) of these passive learners. Table 17 provides a summary of the findings regarding deep and passive learning preferences.

Following the findings presented in Table 17, the data from question 32 of the survey was analyzed by student demographic as a means of looking for differing trends within the demographic groups. Of the learners classified as employing passive learning approaches, 9% also reported using fewer than 5 of the common study strategies provided by the survey, while 7% of those found to be deep learners utilized this number of study strategies. Differences in reported GPA for the deep versus passive learners were also slight, with 212 (85%) of the deep learners reporting a GPA of 3.0 to 4.0 in contrast to 295 (81%) of the passive learners.

Table 17 – Summary of Deep versus Passive Learning

<table>
<thead>
<tr>
<th>Approach to Learning</th>
<th>Count</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep</td>
<td>249</td>
<td>41%</td>
</tr>
<tr>
<td>Passive</td>
<td>363</td>
<td>59%</td>
</tr>
<tr>
<td>Total Responses</td>
<td>612</td>
<td>100%</td>
</tr>
</tbody>
</table>

A more significant variance in deep versus passive learning was found by gender, with 48% of the males reporting deep learning compared to 39% of the females. Another significant variance in deep versus passive learning was found between classroom-based and online-based students, with 39% of the classroom-based students reporting deep learning processes compared to 54% of the online-students. Likewise, analysis by degree level produced notable variances with 60% of the PhD students, 53% of the Master’s students, and 34% of the Undergraduate students demonstrating a deep approach to learning.
Student preference for deep learning also varied by age, with the only 29% of the youngest students (ages 18 and 19) giving responses demonstrating a deep learning approach, 37% of the students ages 20-24 providing answers that indicated deep learning, 48% of the students ages 25-29 demonstrating a deep learning approach, and 63% of the students of ages 30-39 giving responses appropriate to deep learning. The percentages of deep versus passive learning decreased for students over the age of 39, with 56% of the students ages 40-49 giving deep learning responses, and 43% of those over 50 providing examples of deep learning. However, the numbers of responses in these age categories were relatively small in comparison to the other categories which may have skewed the percentages. Appendix J contains a more complete report on these statistics.

The results of the current study provide an interesting look at the study strategies of the college students responding to the survey. Though correlation between sensory learning mode and study strategies was found to be statistically low for all demographic categories, some notable variance was apparent. The variety and nature of the study methods employed by the respondents were also found to be insignificant with regards to sensory study mode choices, but were found to display a tendency towards passive learning. Discussion of the conclusions drawn from the survey data will be examined in the next chapter.
CHAPTER 4

DISCUSSION

The Sensory Learning Mode Preferences of College Students

Prior research has found that most adults prefer information presented in a particular sensory format, and learn better when information is presented in this preferred format (Tileston, 2004; Lemire, 2001). Of the 1,962 college students who responded to the research survey, all but 283 (14%) of them provided answers that indicated a sensory learning preference.

As found by Tileston (2004) and Lemire (2001), visual format is the most common sensory mode preference, followed by kinesthetic format, with auditory format being the least commonly preferred presentation method. The sensory mode percentages for the responses to the survey demonstrated this expected trend for the learning modes (thought study modes did not correspond to this trend). A single sensory mode (auditory, visual, or kinesthetic) was evident for over 43% of the students, with answers following the expected sensory preference pattern. In addition, over 41% of these students selected answers appropriate to this single mode for over 75% of their answers, demonstrating a very strong preference for the mode. A dual mode (auditory/kinesthetic, auditory/visual, or visual/kinesthetic) was found for over 41% of the students. The results were consistent with Fleming’s (2007) finding that some adults are comfortable with sensory input in more than one mode, and capable of adapting their learning well to either of their sensory learning modes.

With approximately 86% of the students answering in such a way that a clear sensory mode preference was indicated, it seems that they do, whether they are aware of it or not, tend to have a preference for the presentation mode of their learning. These findings support prior research into the sensory learning mode preferences within the U.S. adult population.
Study Strategies of College Students

In this study, students were given the opportunity to indicate their study strategies in two ways: by selecting their preferred strategies from a list of 24 common study strategies, or by writing information about their study habits in the free form area provided at the end of the study strategy section of the survey. The 24 common study strategies were equally divided into those found by prior research to be helpful to each of the three sensory learning modes (auditory, visual, and kinesthetic). Each student's choices from these 24 strategies were evaluated for number of strategies employed and sensory mode preference.

The survey respondents selected between zero and 19 of the 24 common study strategies, with 8% (165) indicating that they have utilized between zero and 4 of the strategies, 52% (1,027) indicating the use of 5 to 9, 35% (682) indicating the use of 10 to 14, and 4% (88) selecting 15 to 19 of the strategies. The responses indicating the use of fewer than 5 study strategies were judged to provide too little information for assessment of the student's preferred sensory study mode and were classified as displaying no clear preference. While 52% of the responses did not indicate a sensory preference within the selected study strategies, approximately 21% of the responses were found to indicate a single sensory mode preference and approximately 27% of the answers were found to correspond with a dual sensory mode preference.

Though no set number of study strategies was identified as optimal in prior research, Onwuegbuzie, Slate & Schwartz (2001) did find a variance in grades of approximately 15% related to the use of appropriate study strategies. In addition, for a study method to be strategic, the student must demonstrate sufficient study alternatives from which to choose (Hadwin & Winne, 1996; Lynch, 2006; Cukras, 2006; Palmer & Goetz, 1988). The majority (60%) of students responding to the survey selected fewer than 10 of the 24 common study strategies provided. It is likely that these students possess too few study methods to be able to deliberate about the advantages and disadvantages of each option relative to the current learning objective in order to choose a strategically viable study method to facilitate learning for the particular task. This finding is in keeping with the additional information reported by many of the students indicating that memorization served as their primary study method. Seeing the limited number
of study methods applied by the majority of the responding students, the question of whether the students' study strategies match their sensory learning preference is likely to be even more vital.

**Match Between Sensory Learning Mode and Study Strategies**

Research over the last forty years has found that it is reasonable to expect students to improve learning with the use of lesson presentations in their preferred sensory learning mode (Willingham, 2006; McKeachie, 1995; Shaughnessy, 1998; Ross & Schulz, 1999, Cambiano, DeVore & Denny, 2000), and that most people experience difficulty in controlling impulsivity and maintaining motivation when learning is not in a comfortable mode (Tileston, 2004; Jensen, 2000; Felder & Spurlin, 2005). Having seen this correlation between sensory modes and learning, whether college students have made this connection and have learned to incorporate appropriate study methods for their sensory mode is an important research question. Of the 1,962 students responding to the survey, only 219 (approximately 11%) demonstrated a match between their sensory learning mode(s) and the predominant sensory mode(s) of their study methods.

When the data was examined across the various demographics present in the survey responses, some small variations in this correlation of learning modes and study strategies were seen. Female students showed a slightly higher tendency towards a match of learning mode and study strategies. Improvement to the match percentage was also seen according to degree level, with PhD students having a slightly higher match rate than Master's students, and the Master's students having a slightly higher rate than Undergraduate students. The most significant improvement of match percentage was found in the difference between that of the classroom-based students (10.52%) and the online-based students (15.19%). However, improvement to the match percentages didn't appear to correlate with increased GPA, and no discernable pattern of change could be found in the match percentages across the 16 FSU colleges.

Though variations in the match percentages were apparent and in some cases did seem to indicate a definite trend in certain demographic populations towards matching learning mode to study mode, even the highest match percentage (18.18% for students in the College of Motion Picture, TV, and Recording Arts) was well below what would be expected if students were
making the connection between how they learn and how to use sensory preferences to improve
their study practices. The results of this study clearly suggest that most of the respondents have
not adapted their studies to their preferred learning mode.

The opinions expressed by previous researchers are split between those emphasizing the
importance of learning based on a student's preferred sensory mode (McKeachie, 1995; Burke &
Dunn, 2003; Moallem, 2003; Terry, 2002; Szewczak & Snodgrass, 2002), and those emphasizing
the need for the adaptability promoted by learning based in all sensory modes despite the
student's preferences (Doo, 2005; Velayo & Quirk, 2000; Debevec, Shih & Kashyap, 2006;
Christie, 2000; Gault, 2005; Goolkasian, 2000). In the current study, most of the students (over
86%) reported using study methods appropriate to all three sensory modes, even if a single or
dual sensory mode preference was evident in their answers.

The findings raise the question of whether students are aware of their sensory learning
preferences and, if so, why sensory mode matches weren't displayed in a greater number of the
study methods these students reported employing. Do they find using multiple sensory modes
useful in adapting their learning to the various learning tasks presented in their studies, or have
they simply adopted study methods modeled for them over the years without any understanding
of how study methods tie to their own learning? Perhaps the answer may be found in the
tendency of the respondents towards deep or passive learning processes.

**Demonstration of Tendency towards Passive or Deep Learning**

Generally, less successful students utilize simplistic approaches to learning while successful
students utilize deeper learning processes (Goetz & Palmer, 1991; Purdie & Hattie, 1999; Spada,
Nikcevic, Moneta & Ireson, 2006; Bartling, 1988). Prior research has found that students with a
good understanding of their learning are self-regulated learners who are motivated to engage in
active learning (Hadwin & Winne, 1996; Dunigan & Curry, 2006; Lynch, 2006; Schraw, 1998),
as compared to students who demonstrate both a lack of metacognitive understanding and the use
of a surface approach to learning (Spada, Nikcevic, Moneta & Ireson, 2006; Nwafor, 2000;
Zimmerman, 2002).
The students participating in the research were given the option of providing additional information regarding their study methods in a free form response area of the survey. The majority (59%) of the answers were found to demonstrate passive learning, with an emphasis on memorization as a primary study method. In the college environment, where educators are expecting students to complete the majority of their learning tasks outside of the classroom, these findings are disheartening. This apparent mismatch between student performance and instructor expectation is likely to produce frustration for both parties involved in the educational process, and is not likely to address the apparent failure of students' prior educational experiences to adequately instruct them on sound learning techniques.

Research Conclusions
The findings of the current research seem to support prior research findings that U.S. students often come to college without the basic skills they need (Kuo, Hagie & Miller, 2004; Lynch, 2006; Kumrow, Vogt & Kazlauskas, 2002; Bender, 2001), and often enter college with prior experience consisting primarily of learning where they took a passive role (Hendry & Farley, 2006; Schroeder, 1993; Lynch, 2006; Cukras, 2006). Further, while primary school students are rarely expected to engage in unsupervised study, older students are assumed to spend more time studying on their own than in class (Harley, 1986). Yet many of the participants reported doing nothing more than attending class with the expectation that simply listening to the instructor's lectures would be enough to secure a passing grade, and demonstrated no inclination to engage in unsupervised study. Those that did report studying on their own time often reported using memorization as their primary study method, with cramming being reported by some as their best option for passing their exams.

Though prior research has shown that students need to be taught that academic success requires a combination of ability, motivation, and study behavior, and that only through learning appropriate study patterns can they expect to improve their academic performance (Nonis & Hudson, 2006; Hadwin & Winne, 1996), the findings of the current study seem to indicate that what study methods were learned during the students' prior education were, in most cases, insufficient to provide students with strategic study options or an understanding of the importance of directing their own learning. In keeping with the theories of other researchers,
these results seem to demonstrate our educational system's tendency to excel in teaching children facts and procedures, while failing to teach children how to learn (Elliot, Foster & Stinson, 2002; Chalupa, Chen & Charles, 2001; Lambert & Nowacek, 2006; Minotti, 2005). It seems likely that, as youngsters, most of the students participating in this research were not taught to self-assess or schooled in developing and utilizing a variety of study strategies appropriate to how they learn, a concern also noted by prior researchers (Sobral, 1997; Sizoo, Malhotra & Bearson, 2003; Jacobson, 1998; Trainin & Swanson, 2005; Clump, Bauer & Bradley, 2004; Bartling, 1988).

The findings of this research, indicating a low frequency of metacognitive awareness regarding learning, are likely to also be indicative of a decreased ability to self-direct the lifelong learning important to future success. Prior research findings assert that to function effectively in the work environment, students will need to develop abilities associated with a variety of learning preferences (Felder & Spurlin, 2005; Tennant, 2006; Zimmerman, 2002), and must utilize flexibility in adapting study methods to their own learning style (Hendry & Farley, 2006; Felder & Brent, 2005; Gadt-Johnson & Price, 2000). With the results found here, it is likely that many of these students are ill prepared to enter a workforce where career advancement is often based on the ability to assess learning needs and participate in self-directed learning as a means of developing needed skills.

Apparently, after 13 years of formalized education, most of these young adults are unaware of how their brain gathers and processes information. As a result, they are unable to devise and use study strategies that maximize learning, and that match the workings of their brains so that learning is faster and easier for them. The comparison of the study strategies of these college students to their sensory learning mode demonstrated that few had made the connection between how they learn and what study strategies are most likely to prove effective in their learning. Despite this seeming lack of metacognitive development, the majority of these students report a high current GPA that would be in keeping with successful student learning. This raises a serious question about an educational system that leaves students inadequately prepared to successfully guide their own current and future learning, yet provides feedback that indicates learning success.
CONCLUSION

Summary of the Findings
The study methods of the 1,962 participants in this study were not found to match their sensory learning mode(s). Most of the students were also found to be utilizing too few study methods to promote the development of study strategies, with many of them choosing to use memorization as a primary study method. In keeping with this reliance on memorization, passive learning was found to be more commonly utilized than deeper approaches. Student age, degree level sought, and choice of online over classroom programs were all found to be positively associated with improvement in both the match percentage between learning and study modes, and in the tendency towards deep versus passive learning. Students’ reported GPA, gender, and college of major were found to have little correlation with changes in either sensory mode match or pursuit of deep versus passive learning processes. The findings of this study support the researcher’s hypothesis that our educational system excels in teaching children facts and procedures, but usually fails to teach children how to learn.

Possible Improvements to the Current Study
Though the current research did provide an interesting look at the learning and study habits of the participating college students, some improvement to the research instrument and technique could be achieved based on the researcher’s experience with this study. Perhaps the most important change that could be incorporated into future research would be the use of a true random sample that more closely matches the demographics of the entire student population of the university. Comparison between the demographics of the population versus the participants demonstrates some significant sampling problems, such as the disproportionate participation of female students. Though sampling a portion of the population makes research more economically feasible and is often more accurate than interviewing every member of a given population (Babbie, 1990), a good sample should be representative, unbiased, and randomly selected to ensure its characteristics match the study population as closely as possible (Kovacs, 1985). A true representative sampling requires careful participant selection (Babbie, 1990), the participants in this study were volunteers and were not screened to ensure a true random sampling.
The lack of a clear sensory preference in the study methods of over half the students suggests room for improvement in the overall understanding of sensory mode usage in study practices, or for improvement to the survey tool itself. Improvement in either area offers a strong likelihood of improving the findings regarding sensory mode match percentages between learning and study methods. Further research is needed to ascertain whether the low match percentages are indicative of student study methods in general, or whether the study methods section of the survey lacked the clarity necessary to truly collect accurate sensory study mode information.

The current research was conducted using student responses to a Web-based survey based on the belief that administration of the survey by personal interview might have compromised the data through the introduction of researcher bias or social desirability bias. However, during a survey administered in person, the possibility for clarification of participant questions by the researcher or for additional questioning to clarify participant responses might have improved the data collected. Further, those approached to participate in the study might have found it harder to refuse a personal request than to refuse a request sent by email. Additionally, offering the survey in both online and paper versions might improve the response rate from those not comfortable with the technology utilized to collect the data for the current study. The tradeoffs between these choices are complex and would likely require further research to decide on the best alternatives.

As the researcher analyzed the data, additional questions that might have been incorporated into the survey arose. Asking students about their beliefs regarding sensory learning mode(s) in study and teaching situations might have been interesting. Likewise, asking about their own perceptions regarding their preferred sensory mode(s)—whether they feel they utilize sufficiently varied study methods, and their beliefs regarding the passive or deep nature of their learning processes—might have provided some interesting data. Such a comparison of student beliefs to the results found by the survey questions might provide a better understanding of the findings.

**Implications of the Study**

Though there is considerable debate regarding whether learning is best when consideration is given to the sensory learning mode(s) of the student, or whether challenging a student to adapt
his or her learning to multiple sensory modes is better for overall learning, the findings of this study provide interesting data regarding the learning and study habits of the participants. Though the majority of the students were found to have a preferred sensory learning modes, fewer than half of them were found to exhibit a sensory mode preference in their study habits, and few of them demonstrated a match between learning and study modes. If prior research regarding the benefits of matching study habits to sensory learning modes is to be accepted, then the current research raises serious questions about how students are taught to study and how improvements might be made to our educational programs.

One possible consideration regarding the low percentage of modes matches might be found in the low number of study methods utilized by the majority of participants. Prior research has shown that, without adequate study methods to choose from, students are likely to be unable to form study strategies or adapt learning tasks to their learning preferences. Again, the current findings raise questions about how students learn to study and how both the number and variety of their study methods develop over the course of their school years. Perhaps the low number of study methods employed by students can be related to their reliance on passive versus deep processing in their learning.

Many learning theorists agree that students can enhance their learning through the use of study habits that take their sensory learning mode(s) into consideration. Additionally, most educators and theorists would agree that a passive approach decreases learning and lowers overall educational success. However, a preference for passive learning was found in the majority of the answers that could be analyzed for deep or passive learning methods. The surprising finding that many of these students use memorization as their primary method of learning raises serious questions regarding their beliefs and expectations for their schooling. What are the educational goals of these students? Do they understand the benefits of deeper learning processes? If not, why hasn’t this understanding developed by the time they reach college? These questions offer a number of possible directions for future research into the learning and study practices of college students.
Future Research Opportunities

Investigation into how and why some students develop study methods matching their sensory learning modes while others fail to make this connection—as well as why some students become passive learners while others develop a deeper approach to learning—is a natural direction for future research. Further research might also incorporate survey responses from representative samples of other universities in the United States or around the world in an attempt to get a more generalized picture of the learning and study habits of college students. Likewise, pre-college educational programs, as well as non-college-based adult training programs, might be examined to see how these learners differ from their college-based counterparts.

Over the years of an average teaching career an instructor is sure to witness the demonstration of a variety of learning and study approaches by students. Research into the beliefs and opinions of teaching professionals would likely also prove interesting, and provide another perspective on student learning. Further, research into the beliefs of educators might provide insight into how students develop their learning beliefs and habits. An examination of the both prior learning experiences and current beliefs regarding learning of parents is also likely to provide a glimpse at how students develop their learning traits.

However, the researcher’s first choice for a next research step would be to locate a small group of college students who are interested in improving their learning by participating in a follow-up study that starts with the current survey, but builds on the survey findings. Students could be assessed for sensory learning mode, number and variety of study methods, match between sensory learning mode and the sensory styles displayed in their existing study methods, and a preference for deep or passive learning. Next, students could be taught about their sensory learning mode and study methods appropriate to this mode. Changes in grades could be examined to track improvements in learning outcomes. Additionally, the study could incorporate instruments to examine student beliefs and feelings about their learning at the beginning and end of the research. This type of research study should provide additional information regarding the usefulness of training regarding the processes of learning and studying, and might well initiate useful changes in the way students are taught to approach learning.
APPENDIX A - SURVEY

Please supply information regarding you and your current schooling:

Name* ____________________________ Email Address* ___________________________
(* This is optional information required only for the drawing for Borders gift certificates as defined above, and will not be attached in any way to the survey answers.)

1. Age (in years): ______________ (NOTE: You must be 18 years or older to participate in this research)

2. Sex: Male ____ Female ____

3. Primary Method of Accessing Classes: Online ____ Classroom ____

4. Current Education Level
   Undergraduate - Freshman
   Undergraduate - Sophomore
   Undergraduate - Junior
   Undergraduate - Senior
   Graduate - Master's Program
   Graduate - Doctoral Program
   Other: ________________________ (Please Specify)

5. Current GPA
   None (1st Semester)
   2.0 or less
   2.01 – 2.5
   2.51 – 3.0
   3.01 – 3.5
   3.51 – 4.0
   Unknown
6. What GPA do you expect to have at graduation?
   2.00 – 2.50
   2.51 – 3.00
   3.10 – 3.50
   3.51 – 4.00
   Unknown

7. Area of Study
   College of Arts and Sciences
   College of Business
   College of Communication
   College of Criminology and Criminal Justice
   College of Education
   FAMU-FSU College of Engineering
   College of Human Sciences
   College of Information
   College of Law
   College of Medicine
   College of Motion Picture, Television, and Recording Arts
   College of Music
   School of Nursing
   College of Social Sciences
   College of Social Work
   College of Visual Arts, Theatre and Dance

**Study Preferences:**
*Please select all the statements below that match those study methods you use regularly and find particularly important to your mastery of the study materials.*

<table>
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<th>Study Preferences</th>
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<tr>
<td>8. I find it useful to read or talk out loud when studying.</td>
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<td>9. I find field trips, tours, and exhibits helpful in my learning.</td>
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<td>10. I benefit from studying with a partner or study group.</td>
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<td>11. I close my eyes and picture the information as I study.</td>
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<td>12. I remember what I learn in a lab better than what I read.</td>
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<td>13. I like to tape the instructor's lectures for review.</td>
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<tr>
<td>14. I learn more from reading the text than listening to a lecture.</td>
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<td>15. I like to try out a new technique rather than concentrating on the instructions.</td>
</tr>
<tr>
<td>16. I use multiple colors to highlight associated points in my textbook or notes.</td>
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<td>17. I learn more by explaining the material to others.</td>
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<td>31.</td>
</tr>
</tbody>
</table>

32. Briefly list any other study methods you have found to help you learn:

__________________________________________________________________________

**Learning Preferences:**
*Please choose the statement that best completes each sentence to describe your preferences for learning.*

33. When learning new material I get the most from…
   - Reading
   - Labs
   - Lectures

34. If I have to learn to assemble something I would rather…
   - Have someone tell me how to do it
   - Get right into trying the assembly
   - Read the instructions
35. When taking a test I most often…
   Remember the physical act of writing the answer in my notes
   Hear the answers as they were delivered during a lecture
   See the answers in my head as they appeared in my notes or textbook

36. If buying a new CD player where price was not a concern, you would be most influenced by…
   What the salesperson tells you about the item.
   Playing with the controls and mechanisms
   The written description and look of the machine

37. You must learn a new computer program, you would rather…
   Go to the computer and begin experimenting with the program
   Read the user manual that came with the program
   Ask someone that knows the program some questions

38. When trying to remember how to spell a word I usually…
   Say the letters or sounds out loud until I think I've got the correct spelling
   Picture the word or write alternative spellings until I see the spelling that looks right
   Spell the letters with my finger in the air or on a table top

39. When I think about what I did yesterday, I am most likely to remember…
   What I saw
   What I did
   What I heard

40. When learning my way to an unknown location I would rather…
   Have written directions and/or a map
   Drive there myself with someone along that knows the way
   Have verbal instructions

41. When trying to remember a phone number, usually…
   My fingers seem to remember the number on their own
   I can hear the number in my head as it was previously recited out loud
   I can see the number sequence in my head, or visualize the way the numbers look on the phone
42. I think that I best express myself with…
   Different tones of voice
   My eyes and facial expressions
   My hands and gestures

43. I prefer to get new information in the form of…
   Verbal information
   Written information or images
   Hands on practice

44. I prefer a teacher to teach with…
   Writing on the chalkboard, use of visual aids, and assigned readings
   Required activities, labs, and skill practice
   The lecture method with informative explanations and discussions

45. When I want to learn something new, I usually…
   Want someone to explain it to me
   Want to try it out or make a model of it
   Want to read about it

46. At a party, most of the time I like to…
   See how everyone looks and watch the people
   Dance, play games, or take part in some activities
   Listen and talk to people

47. I find lecture classes to be…
   Interesting when the instructor breaks up the lecture with activities
   Interesting when the instructor has a good speaking style
   Interesting when the instructor uses strong images or handouts

48. I remember best…
   What I hear
   What I see
   What I do
<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>49. I like labs better than learning from lectures or a textbook.</td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Neutral</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>50. I find visual instructions easier to follow than verbal instructions.</td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Neutral</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>51. I can find the mistakes in my written work easily.</td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Neutral</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>52. I am comfortable adding spoken numbers mentally.</td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Neutral</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>53. I would rather listen to a book on tape than read it.</td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Neutral</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>54. I am good with my hands and enjoy working with them.</td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Neutral</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>55. I find graphs and diagrams useful to clarify concepts.</td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Neutral</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>56. I am comfortable following verbal directions when I am trying to find a place.</td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Neutral</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>57. I have to manipulate a formula to understand it.</td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Neutral</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>58. I do well on tests that require reading comprehension.</td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Neutral</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>59. I learn best when physical activity is involved.</td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Neutral</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>60. I find it helpful to discuss lesson materials with others.</td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Neutral</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
</tr>
</tbody>
</table>
Informed Consent

This survey is being conducted by Sheryl Wetzel, a graduate student with Florida State University’s College of Information, as research for her thesis on learning preferences and learning strategies. Dr. Gary Burnett is the Graduate Advisor for this student, and will be the professor overseeing this research.

Your participation in this research is voluntary, and consists of answering a series of online questions about your learning preferences that will take approximately 10 minutes. By law, you must be 18 years old or older to participate in this research. By submitting your survey you are indicating your consent to participate, and that you are at least 18 years old. You may withdraw consent at any point by closing the Web page before completing and submitting the survey. There will be no penalty for non-participation. All answers will be kept completely anonymous, and information obtained during the course of the study will remain confidential to the extent allowed by law.

As a show of thanks for helping with this research, five $50 gift certificates to Borders will be purchased by the researcher and given out in a random drawing during the last month of the Spring 2007 semester. To be included in this drawing, answer the survey by March 30th, 2007, and include your name and email address with your responses to the survey.

Choosing to participate in the gift certificate drawing will not allow the researcher to tie your survey responses to your name or email address. To assure anonymity, the name and email information will be stored in a separate data file on the FSU server, and will be run through a randomization sort by the computer before the researcher can access the data. This will ensure your survey answers cannot be connected in any form to the name and email address data you submit. This personal data will be destroyed by the end of the Spring 2007 semester after the gift certificates have been mailed. If you are uncomfortable supplying your name and email address, you may complete the survey without including this data.

If you have any questions about your rights as a subject for this research you may contact the Chair of the Human Subjects Committee, Institutional Review Board, at 850-644-8633. If you have any questions regarding this research please contact Sheryl by email at saw0993@fsu.edu. Dr. Burnett can be reached at gburnett@mailer.fsu.edu.
APPENDIX C - HUMAN SUBJECTS RESEARCH APPROVAL

Office of the Vice President For Research
Human Subjects Committee
Tallahassee, Florida 32306-2742
(850) 644-8673 · FAX (850) 644-4392

APPROVAL MEMORANDUM

Date: 11/30/2006

To:
Sheryl Wetzel
2412 NW 106 Dr.
Gainesville, FL 32306

Dept.: INFORMATION STUDIES

From: Thomas L. Jacobson, Chair

Re: Use of Human Subjects in Research
A Comparison of Sensory Learning Mode to Adaptive Study Strategy Usage

The forms that you submitted to this office in regard to the use of human subjects in the proposal referenced above have been reviewed by the Secretary, the Chair, and two members of the Human Subjects Committee. Your project is determined to be Exempt per 45 CFR § 46.101(b) 2 and has been approved by an accelerated review process.

The Human Subjects Committee has not evaluated your proposal for scientific merit, except to weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval does not replace any departmental or other approvals, which may be required.

If the project has not been completed by 11/28/2007 you must request renewed approval for continuation of the project.

You are advised that any change in protocol in this project must be approved by resubmission of the project to the Committee for approval. Also, the principal investigator must promptly report, in writing, any unexpected problems causing risks to research subjects or others.

By copy of this memorandum, the chairman of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols of such investigations as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Protection from Research Risks. The Assurance Number is IRB00000446.

Cc: Gary Burnett
HSC# 2006.1023
APPENDIX D - SCORING CRITERIA

var 1 = 1st and/or highest scoring variable
var 2 = 2nd and/or middle scoring variable
var 3 = 3rd and/or lowest scoring variable

LEARNING MODE SCORING
MULTIPLE CHOICE QUESTIONS
(NOTE: 1/2 = 8 & ≥ 1/3 = 6)

Single Mode
If var 1 ≥ 1/2 and other var < 1/3

Dual Mode
If var 1 ≥ 1/2 and var 2 ≥ 1/3
If var 1 ≥ 1/3, var 2 ≥ 1/3, and var 3 ≤ 1/4

No Discernable Mode
All other cases

LIKERT SCALE QUESTIONS
(NOTE: Possible score of 8 on each single mode)

1 - Counts if score of 4 or more unless all three scores = 4 or more (for this case score "N")
2 - Exception to above rule when one variable = 8 and others below 6

COMBINED MULTIPLE CHOICE AND LIKERT SCORING

Single Mode
If var 1 ≥ 1/2 and ≥ next closest var x 2
If var 1 ≥ (var 2 + var 3) - 1
If var 1 ≥ (1/2 - 1) and other var < 1/3 of total for subject answers
If var 1 ≥ (1/2 - 2) and other var ≤ 1/4 of total for subject answers

Dual Mode
If var 1 ≥ 1/3, var 2 ≥ 1/3, and var 3 ≤ 1/4 of total for subject answers

No Discernable Mode
All other cases

STUDY STRATEGY MODE SCORING

Single Mode
var 1 ≥ 1/2 of total, var 2 < 1/3 of total, and var 3 < 1/3 of total
var 1 ≥ (var 2 + var 3) - 1

Dual Mode
var 1 ≥ 1/2, var 2 ≥ 1/3, and var 3 < 1/3
var 1 ≥ 1/3, var 2 ≥ 1/3, and var 3 < 1/4

No Discernable Mode
All other cases

(NOTE: Calculated for cases with 5 or more study strategies, else scored as no disc. mode)
APPENDIX E – AGE & GPA DEMOGRAPHICS

FSU Spring 2007 Demographics vs. Current Study by Age

Student Reported Current vs. Expected GPA
APPENDIX F – CROSSTABULATION BASED ON STUDENT AGE

Crosstabulation of Responses for Students Ages 18 - 19

<table>
<thead>
<tr>
<th>STUDY MODE</th>
<th>LEARNING MODE</th>
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Learning Mode Count Total
- 13 | 21 | 59 | 45 | 71 | 118 | 96

Mode % of Total Age Group Responses
- 3% 5% 14% 11% 17% 28% 23%

Match of Learning & Study Mode
- 15% 19% 17% 13% 58% 15% 3%

Crosstabulation of Responses for Students Ages 20 - 24

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Learning Mode Count Total
- 34 | 38 | 181 | 62 | 136 | 290 | 198

Mode % of Total Age Group Responses
- 4% 4% 18% 7% 15% 32% 21%

Match of Learning & Study Mode
- 12% 3% 22% 10% 49% 15% 7%
### Crosstabulation of Responses for Students Ages 25 - 29

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Mode % of Total Age Group Responses:
- 2% 6% 13% 8% 13% 41% 16%

Match of Learning & Study Mode:
- 17% 0% 29% 5% 58% 14% 8%

### Crosstabulation of Responses for Students Ages 30 - 39

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Mode % of Total Age Group Responses:
- 3% 1% 15% 5% 11% 36% 27%

Match of Learning & Study Mode:
- 0% 0% 24% 8% 68% 10% 5%
### Crosstabulation of Responses for Students Ages 40 - 49

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| Learning Mode Count Total | 2 | 2 | 10 | 8 | 11 | 42 | 24 |

| Mode % of Total Age Group Responses | 2% | 2% | 10% | 8% | 11% | 42% | 24% |

| Match of Learning & Study Mode | 0% | 50% | 30% | 13% | 55% | 24% | 8% |

### Crosstabulation of Responses for Students Ages 50 and Older

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| Learning Mode Count Total | 1 | 0 | 6 | 0 | 7 | 23 | 15 |

| Mode % of Total Age Group Responses | 2% | 0% | 12% | 0% | 13% | 44% | 29% |

| Match of Learning & Study Mode | 0% | 0% | 33% | 0% | 86% | 13% | 0% |
## APPENDIX G – CROSSTABULATION ON NUMBER OF STUDY STRATEGIES

### Crosstabulation for Students with 0 - 4 Study Strategies

<table>
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**Learning Mode Count Total**
- Total: 77

**Mode % of Total Responses for this Demographic**
- 4% 3% 24% 2% 15% 40% 12%

**Match of Learning & Study Mode**
- 0% 20% 3% 0% 88% 5% 0%

### Crosstabulation for Students with 5 - 9 Study Strategies

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**Learning Mode Count Total**
- Total: 382

**Mode % of Total Responses for this Demographic**
- 4% 3% 18% 5% 14% 37% 20%

**Match of Learning & Study Mode**
- 16% 4% 24% 8% 48% 16% 5%
### Crosstabulation for Students with 10 - 14 Study Strategies

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| Learning Mode Count Total | 15 | 42 | 75 | 79 | 103 | 191 | 177 |

| Mode % of Total Responses for this Demographic | 2% | 6% | 11%| 12%| 15%| 28%| 26% |

| Match of Learning & Study Mode | 7% | 10%| 32%| 13%| 54%| 16%| 7%  |

### Crosstabulation for Students with 15 - 19 Study Strategies

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| Learning Mode Count Total | 2  | 3 | 7 | 12 | 16 | 23 | 25 |

| Mode % of Total Responses for this Demographic | 2% | 3% | 8% | 14%| 18%| 26%| 28% |

| Match of Learning & Study Mode | 0% | 0%| 14%| 8% | 75%| 4% | 4%  |
APPENDIX H – CROSS TABULATION ON REPORTED CURRENT GPA

Crosstabulation for Student GPA of "None" or "1st Semester"

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Learning Mode Count Total:
- Total: 3, 4, 12, 6, 9, 25, 21

Mode % of Total Responses for this Demographic:
- 4%, 5%, 15%, 8%, 11%, 31%, 26%

Match of Learning & Study Mode:
- 0%, 25%, 17%, 0%, 89%, 16%, 10%

Crosstabulation for Student GPA of "2.0 or Less"

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Learning Mode Count Total:
- Total: 2, 1, 3, 1, 2, 5, 3

Mode % of Total Responses for this Demographic:
- 12%, 6%, 18%, 6%, 12%, 29%, 18%

Match of Learning & Study Mode:
- 50%, 0%, 0%, 100%, 100%, 0%, 33%
### Crosstabulation for Student GPA of "2.1 - 2.5"

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**Learning Mode Count Total**

| Total | 3 | 0 | 11 | 9 | 13 | 18 | 14 |

**Mode % of Total Responses for this Demographic**

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**Match of Learning & Study Mode**

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### Crosstabulation for Student GPA of "2.51 - 3.0"

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**Learning Mode Count Total**

| Total | 6 | 14 | 37 | 29 | 45 | 83 | 57 |

**Mode % of Total Responses for this Demographic**

<table>
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**Match of Learning & Study Mode**

| Match of Learning & Study Mode | 0% | 7% | 19% | 0% | 56% | 13% | 7% |
**Crosstabulation for Student GPA of "3.01 - 3.5"**

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| Learning Mode Count Total | 17 | 25 | 73 | 45 | 91 | 167 | 111 |

| Mode % of Total Responses for this Demographic | 3% | 5% | 14% | 9% | 17% | 32% | 21% |

| Match of Learning & Study Mode | 18% | 4% | 23% | 13% | 48% | 16% | 5% |

---

**Crosstabulation for Student GPA of "3.51 - 4.0"**

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| Learning Mode Count Total | 30 | 34 | 166 | 57 | 121 | 351 | 220 |

| Mode % of Total Responses for this Demographic | 3% | 3% | 17% | 8% | 12% | 36% | 22% |

| Match of Learning & Study Mode | 7% | 9% | 23% | 12% | 58% | 15% | 5% |
## Crosstabulation for Student GPA of "Unknown"

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### Mode % of Total Responses for this Demographic

|       | 8% | 0% | 11% | 0% | 11% | 44% | 23% |

### Match of Learning & Study Mode

|       | 100% | 0% | 0% | 0% | 50% | 0% | 0% |

82
## APPENDIX I – CROSSTABULATION BASED ON FSU COLLEGE OF MAJOR

### Crosstabulation for College of Arts & Sciences Students

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**Mode % of Total Responses for this Demographic:** 3%, 3%, 13%, 7%, 14%, 33%, 28%

**Match of Learning & Study Mode:** 0%, 0%, 55%, 20%, 57%, 22%, 5%

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**Match of Learning & Study Mode:** 0%, 0%, 23%, 14%, 82%, 23%, 5%
## Crosstabulation for College of Law Students

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Learning Mode Count Total: 2 3 11 0 5 16 6

Mode % of Total Responses for this Demographic:
- A: 5%
- AK: 7%
- AV: 25%
- K: 0%
- N: 12%
- V: 37%
- VK: 14%

Match of Learning & Study Mode:
- A: 0%
- AK: 0%
- AV: 18%
- K: 0%
- N: 60%
- V: 6%
- VK: 17%

## Crosstabulation for College of Medicine Students

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Learning Mode Count Total: 0 1 4 2 3 12 10

Mode % of Total Responses for this Demographic:
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- AV: 13%
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- N: 9%
- V: 38%
- VK: 31%

Match of Learning & Study Mode:
- A: 0%
- AK: 0%
- AV: 25%
- K: 0%
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- V: 8%
- VK: 0%
### Crosstabulation for College of Motion Picture, Television & Recording Arts Students

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- **Learning Mode Count Total**: 0, 1, 1, 1, 3, 5, 11
- **Mode % of Total Responses for this Demographic**: 0%, 5%, 5%, 5%, 14%, 23%, 50%
- **Match of Learning & Study Mode**: 0%, 100%, 0%, 0%, 67%, 20%, 0%

### Crosstabulation for College of Music Students

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- **Learning Mode Count Total**: 4, 4, 12, 3, 6, 15, 15
- **Mode % of Total Responses for this Demographic**: 7%, 7%, 20%, 5%, 10%, 25%, 25%
- **Match of Learning & Study Mode**: 25%, 0%, 33%, 0%, 50%, 13%, 0%
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### Crosstabulation for College of Social Sciences Students

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| Learning Mode Count Total | 7 | 2 | 8 | 7 | 13 | 36 | 22 |

| Mode % of Total Responses for this Demographic | 7% | 2% | 6% | 7% | 14% | 38% | 23% |

| Match of Learning & Study Mode | 14% | 0% | 13% | 14% | 69% | 11% | 0% |

## Crosstabulation for College of Visual Arts, Theatre & Dance Students

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| Learning Mode Count Total | 1 | 4 | 8 | 6 | 10 | 21 | 29 |

| Mode % of Total Responses for this Demographic | 1% | 5% | 10% | 8% | 13% | 27% | 37% |

| Match of Learning & Study Mode | 0% | 25% | 25% | 17% | 50% | 10% | 10% |
APPENDIX J – DEEP VERSUS PASSIVE LEARNING BY DEMOGRAPHIC

All Responses

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Responses by Access Mode

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<td>39%</td>
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</tr>
<tr>
<td>Passive</td>
<td>326</td>
<td>61%</td>
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<tr>
<td>Total</td>
<td>532</td>
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<tr>
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<tbody>
<tr>
<td>Deep</td>
<td>43</td>
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## Responses by Degree Type

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</tr>
<tr>
<td>Deep</td>
<td>34</td>
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<td>83</td>
<td>53%</td>
<td>143</td>
<td>34%</td>
</tr>
<tr>
<td>Passive</td>
<td>23</td>
<td>40%</td>
<td>57</td>
<td>48%</td>
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## Responses by Age

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<tr>
<td>Deep</td>
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<tr>
<td>Passive</td>
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## Responses by Reported GPA

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<td>% of Demographic</td>
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<td>38%</td>
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<td>257</td>
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RESOURCES


student's beliefs about self and strategies. In C.E. Weinstein, E.T. Goetz, & P.A.
Alexander, (Eds.), Learning and study strategies: Issues in assessment, instruction, and
evaluation (pp. 41-61). San Diego: Academic Press, Inc.

concepts. Theory into Practice, 24 (2), 131-134.

Purdie, N. & Hattie, J. (1999). The relationship between study skills and learning outcomes: A

The impact of learning style preferences in the classroom. Journal of Secondary Gifted
Education, 14 (4), 197-208.


Robertson, H.M, Priest, B. & Fullwood, H.L. (2001). Assist learners who are strategy-
inefficient. Intervention in School & Clinic, 36 (3), 182.

styles. College Teaching, 47 (4), 123.


Goetz, & P.A. Alexander, (Eds.), Learning and study strategies: Issues in assessment,

Schommer, M. (1998). The role of adults’ beliefs about knowledge in school, work, and
everyday life. In M.C. Smith, & T. Prouchet, (Eds.), Adult learning and development:
Perspectives from educational psychology (pp. 127-143). Mahwah, N.J.: Lawrence
Erlbaum Associates, Inc.

(Eds.), Adult learning and development: Perspectives from educational psychology (pp. 89-106). Mahwah, N.J.: Lawrence Erlbaum Associates, Inc.


University Press.


BIOGRAPHICAL SKETCH

Sheryl Wetzel grew up in the Smokey Mountain foothills of Tennessee. After moving to Florida she completed an Associate degree in Accounting at Brevard Community College in 1984. She returned to college in 1999 and completed her Bachelor of Science degree in Information Studies with a minor in Computer Programming from Florida State University in December of 2004.

Deciding to follow her lifelong dream of teaching, Sheryl decided to continue her education at Florida State University by pursuing a Master's of Science in Information Technology Management with a minor in the Psychology of Adult Learning. Sheryl plans to continue her education through the pursuit of a PhD in the Psychology of Adult Learning.

Sheryl's current work includes teaching computer skills to adults with little or no computer experience. She enjoys her role in helping students overcome their fear of computers and build their self-efficacy towards learning. Sheryl plans on continuing to apply the knowledge gained through her educational endeavors towards helping older adults adjust to today's technology rich society.