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Self-Regulated Learning as a Critical Attribute for Successful Teaching and Learning

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Abstract

The purpose of this scholarship of teaching and learning was to define and assess the level of self-regulation skills undergraduate students possess. Participants completed the Motivated Strategies for Learning Questionnaire (MSLQ). Through the analysis of the MSLQ, students reported having high expectations for themselves. Yet, students were found to not use cognitive learning skills and self-regulation practices consistently, which suggests a low level of self-regulation. Subsequently, students exhibit maladaptive and counterproductive behaviors like procrastination and disengagement. From this exploratory study a number of future studies were identified that have the potential for increasing the level of self-regulation in higher education.

Self-Regulated Learning as a Critical Attribute for Successful Teaching and Learning

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The purpose of this scholarship of teaching and learning was to define and assess the level of self-regulation skills undergraduate students possess. Participants completed the Motivated Strategies for Learning Questionnaire (MSLQ). Through the analysis of the MSLQ, students reported having high expectations for themselves. Yet, students were found to not use cognitive learning skills and self-regulation practices consistently, which suggests a low level of self-regulation. Subsequently, students exhibit maladaptive and counterproductive behaviors like procrastination and disengagement. From this exploratory study a number of future studies were identified that have the potential for increasing the level of self-regulation in higher education.

INTRODUCTION

At a recent commencement ceremony I attended, the keynote speaker addressed the graduating high school students informing them that the world is ever changing and that they will likely retire from a career that has not yet been invented. That idea is both extremely exciting and terrifying at the same time. How do we, as educators, prepare a learner for a career that has not yet been invented? Are traits of being nimble and adaptable in an ever changing chaotic environment teachable? The quick response is yes, these are teachable traits. More specifically, one way to address this challenge is to create lifelong learners. Nilson (2013) believes that "only lifelong learners will be able to keep up with the explosive growth of knowledge and skills in their career and to retool into a new career after their previous one runs its course" (p. 1). Creating a lifelong learner is not as simple as teaching learners a few tried and true study skills. It is about supporting the learner as he or she goes through a transformative journey from a novice learner to an intrinsically motivated lifelong learner. Nilson (2013) notes that the learner will gain insight about him or herself by getting intimate with their ability to exert full effort, practice self-control, and critically assess the path that they should take in order to achieve maximum results. They will also need to overcome personal challenges like risk-aversion, setbacks, distractions, and the desire to procrastinate. This, in addition to those tried and true study skills, results in a self-regulated lifelong learner (Nilson, 2013).

The purpose of this scholarship of teaching and learning was to define and assess the level of self-regulation skills undergraduate students possess. The sample groups are from multi-disciplinary undergraduate courses in a four-year university located in the north Pacific. Participants completed the Motivated Strategies for Learning Questionnaire (MSLQ), which was developed by Paul Pintrich in 1989 (Pintrich, & De Groot, 1990). This questionnaire was designed to assess college students' motivational orientation and their use of different learning strategies for college courses. The assessed sub-groups are: (a) Self-efficacy; (b) Intrinsic value; (c) Test anxiety; (d) Cognitive strategy use; and (e) Self-regulation. Through the analysis of the MSLQ, the data will provide the foundation for future research and possible intervention programs to assist learners in improving their self-regulation skills with the intention of improving their academic performance and to become a self-regulated lifelong learner.

LITERATURE REVIEW

"Procrastination is opportunity's assassin" (Dunn, 2013, p. 33). The term procrastination is used frequently amongst teachers at all levels to describe the behaviors of students. Dunn (2013) reports that it is a challenge that numerous authors have written about in books, academic journals, and pop-culture literature. In terms of education, academic procrastination is the purposeful and needless delay in completing academic tasks that is detrimental to academic outcomes (Shaw et al., 2007; Dunn 2013). Exploration and inquiry on this topic discovered that as anxiety about an academic task increased, so did fear and indecisiveness, subsequently resulting in an increase in academic procrastination (Onwuegbuzie, 2004; Rakes & Dunn, 2010; Dunn, 2013). Steel (2007) and Klassen et al. (2007) ascertained that self-regulation and intrinsic motivation significantly decreased academic procrastination by increasing a learner's perceived control, self-efficacy, and motivation. The literature supported that claim by noting that lower intrinsic motivation resulted in lower motivation, which led to learners dedicating less time to an academic task (Pintrich & De Groot, 1990; Brownlow & Reasinger, 2000; Conti, 2000; Ryan & Deci, 2000; Lee, 2005; Klassen et al., 2007; Artino, 2007). The dedication of less time is the behavioral manifestation that can be observed as low self-regulation. If self-regulation improves, intrinsic motivation should also improve with anxiety about the academic task decreasing. This claim is supported by Pintrich (1999) who found that learners who hold adaptive motivational beliefs have a higher tendency to use self-regulated learning strategies, which resulted in higher academic performance when compared to those that had a less-adaptive mindset.

"Self-regulated learning refers to learning that occurs largely from the influence of student's self-generated thoughts, feelings, strategies, and behaviors, which are oriented toward the attainment of goals" (Schunk & Zimmerman, 1998, p. viii). Schunk and Zimmerman (1994, 1998) described a self-regulated learner as a person who actively engages their learning environment, uses resources effectively, organizes and rehearses key information, and holds positive motivational beliefs about their capabilities and the overall value of learning.

According to Zimmerman (1998, 2000, 2008), self-regulation consists of three top-down and bottom-up phases. The first phase is forethought. This is where the learner, utilizing top-down processing by setting learning goals, activates prior knowledge and plans on how to achieve those learning goals. The second phase is performance. During this phase the learner utilizes bottom-up processing by monitoring one's progress by being aware of one's cognitions, motivations, and behaviors (Schunk, 2005). The third and final phase is self-reflection. Here, the learner assesses one's performance and determines what worked and what could be improved for better learning to occur next time (Zimmerman, 2000). In summary, an effective self-regulated learner is "goal-driven, motivated, independent, and a metacognitively active participant in establishing his or her own learning" (Azevedo, 2005, p. 202). In addition, effective self-regulated learners have high self-efficacy, establishes a productive work environment and makes use of available resources, which includes seeking the help of others (Artino, 2008). Empirical findings in the self-regulation literature strongly supports its importance and that self-regulation skills are essential for effective learning and academic performance (Schunk & Zimmerman, 1994, 1998; Hargis, 2000; Artino 2007, 2008).

Pintrich and DeGroot (1990) determined that motivational orientations and learning strategies were critical components to the academic achievement in university level students. "In an attempt to assess the levels of motivation and the uses of learning resources and strategies of college students, Pintrich, Smith, Garcia, and McKeachie (1993) developed an 81-item instrument entitled Motivated Strategies for Learning Questionnaire (MSLQ) (Alkharusi, et al., 2012, p. 568). The MSLQ was based on a general cognitive view of motivation and learning strategies (Pintrich, et al., 1991). The development of the MSLQ started informally from 1982 and formally from 1986 when the National Center for Research to Improve Postsecondary Teaching and Learning (NCRIPTAL) was founded. This collaborative project was finalized in 1991 with the publication of the MSLQ manual (Pintrich et al., 1991). Psychometric analyses was conducted in three waves with n sizes of 326, 687, and 758 respectively. The MSLQ was refined after each wave that resulted in the 81-item full version of the MSLQ (Pintrich et al., 1991). The full version of the MSLQ consisted of 15 scales and was based on the conceptual model of college student motivation and self-regulated learning (Pintrich et al., 1993).

Pintrich and De Groot (1990) conducted a factor analysis of the 81-item MSLQ and developed a more manageable and simplified version of the MSLQ. The factor analysis from Pintrich and De Groot (1990) resulted in a 44-item MSLQ that consisted of two components, motivational beliefs with three associated subscales, and a component of self-regulated learning strategies with two associated subscales. The psychometric properties of the 44-item MSLQ was assessed and tested. The result was empirical data supporting its use as a valid and reliable instrument (Liu, et al., 2012; Erturan Ilker et al., 2014).

The purpose of this scholarship of teaching and learning was to assess the level of self-regulation skills undergraduate students possess through the administration and analysis of the 44-item MSLQ questionnaire. The sample consists of multi-disciplinary and diverse undergraduate students in a four-year university located in the north Pacific. The assessed subscales are: (a) Self-efficacy; (b) Intrinsic value; (c) Test anxiety; (d) Cognitive strategy use; and (e) Self-regulation. Through the analysis of the 44-item MSLQ, the data will provide the foundation for future research and possible intervention programs to assist learners in improving their self-regulation skills with the intention of improving their academic performance and to become a self-regulated lifelong learner.

METHOD

This Institutional Review Board (IRB) approved exploratory research study intended to define and assess the level of self-regulation skills undergraduate students at this institute of higher education possess. This preliminary study will provide the foundation for future research and possible intervention programs to assist students in improving their self-regulation skills with the intention of improving their academic performance. In order to assess the level of self-regulatory learning, the research question developed for this exploratory research study asked, what level of self-regulation do undergraduate university students possess?

RESEARCH DESIGN

All participants were initially briefed on the purpose of this study. They were then provided with the informed consent form via Google Forms to review and electronically indicate their willingness to participate in this study. If a student decided that they did not want to participate, they were informed via the Google Form to close the webpage and discontinue. If the student agreed to participate, they were allowed to proceed to the next page on the Google Form to complete the MSLQ questionnaire. The anticipated length of time needed to complete the MSLQ was approximately 10 - 15 minutes.

Recruitment Strategy

Post-secondary students (18 years or older) from this researcher's and a participating professor's undergraduate courses were sampled for this exploratory research study. The only exclusion criteria were students considered to be a minor (under the age of 18). Students who decided to opt out of the study did not receive any type of penalty or loss of points.

Sample

The sample consisted of 161 multidisciplinary undergraduate students from an institute of higher education located in the north Pacific. The sample consisted of 68 first year students, 33 sophomores, 30 juniors, 28 seniors, and 2 unclassified students. The student population at this research site consisted of 68% females and 32% males. Sixty-seven percent is Asian/Pacific Islander, 17% White, non-Hispanic, 6% Hispanic, 4% African-American, and 6% other. The diversity within the sample groups was representative of this data.

Data Analysis

Outcomes were measured using the Motivated Strategies for Learning Questionnaire (MSLQ) – 44 items using a 7-

point Likert-type scale. "The MSLQ is a self-report instrument designed to assess college students' motivational orientations and their use of different learning strategies for a college course" (Pintrich, 1991, p. 6). The results from the MSLQ were scored and reported based on Pintrich's (1991) official *Manual for the Use of the Motivated Strategies for Learning Questionnaire (MSLQ)*. Further analysis utilized descriptive statistics and one-way analysis of variance (ANOVA) to compare and analyze the differences in the mean scores.

Confidentiality

Participants were not audiotaped, photographed, or videotaped. No identifying information was collected. The MSLQ was distributed using Google Forms. Participants utilized a URL address to access the questionnaire to ensure anonymity. The only possible identifier is participants were asked for which course they based their questionnaire responses on. Because each course ranged from 10 - 40 students and 9 courses were used, there is minimal risk to participant identification.

The Google Form was created using this researcher's official Google account provided by the institute of higher education. Access to the data requires a login and is password protected. There were no paper copies of the MSLQ distributed.

Informed Consent

This researcher and the participating professor introduced the study in each class. Students were able to ask questions at that time. The researcher and the participating professor provided each student a link to a Google Form, which included the informed consent form and the questionnaire. Students needed to agree with the informed consent form prior to gaining access to the MSLQ questionnaire. No participants were minors. When introducing this study to each class, the researcher and participating professor emphasized that no penalty of any kind will be received if a student wished to opt out of this study.

Potential Risks to Participants

This exploratory action research study was not more than minimal risk. Research will take place in an established educational institution and setting. It will only involve completing a questionnaire. In order to minimize risk, an informed consent was provided with an opt-out statement ensuring that no harm will result if a student chooses not to participate or decides to discontinue his or her participation in this study.

Potential Benefits to Participants

This exploratory study intends to define and assess the level of self-regulation skills undergraduate students possess. This preliminary study will provide the foundation for future research and possible intervention programs to assist students in improving their self-regulation skills with the intention of improving their academic performance.

RESULTS

The Motivated Strategies for Learning Questionnaire (MSLQ) that was used for this exploratory action research study consisted of 44 self-rating items. Those 44 items were grouped into two scales: (A) Motivational Beliefs, and (B) Self-Regulated Learning Strategies. The scale of Motivational Beliefs consists of three subscales: (A) Self-Efficacy (the results is shown in Table 5), (B) Intrinsic Value (the results is shown in Table 6), and (C) Test Anxiety (the results is shown in Table 7). Self-Regulated Learning Strategies consists of two subscales: (A) Cognitive Strategy Use (the results is shown in Table 8), and (B) Self-Regulation (the results is shown in Table 9). Each participant scored themselves using a 7-point Likert scale ranging from 1 (not at all true of me) to 7 (very true of me). For the purpose of this study, each question was analyzed and reviewed by classification (e.g., first year, sophomore, junior, senior, and unclassified).

A one-way analysis of variance (ANOVA) was conducted to compare the MSLQ question responses between the five different student classifications (first year, sophomore, junior, senior, and unclassified). Each individual question (44 questions) was the dependent variable while the student classification was the independent variable (i.e., factor). Refer to Table 1 (http://diwamoto8.wix.com/darrenhiwamoto#!projects/cm8a) for the descriptive statistics. A confidence interval of 95% was used for this analysis. The results showed significant mean differences between student classifications for 18 out of 44 questions. Refer to Table 2 (http://diwamoto8.wix.com/darrenhiwamoto#!projects/cm8a) for the results.

Because significance was discovered in 18 out of 44 questions, follow-up tests were conducted to evaluate pairwise differences among the mean scores. The Levene Statistic was used to test for homogeneity of variances. Refer to Table 3 (http://diwamoto8.wix.com/darrenhiwamoto#!projects/cm8a) for the results. For MSLQ items where the p value was found to be significant ($p < .05$) equality-of-variance was violated, whereas where the p value was found to not be significant ($p > .05$) than equality-of-variance was determined to not be violated. The Tukey HSD post hoc test was used for items where the equality-of-variance assumption was not violated to conduct comparisons between the classification groups. The Dunnett test was used for items where the equality-of-variance assumption was violated in order to conduct comparisons between the classification groups. Refer to Table 4 (http://diwamoto8.wix.com/darrenhiwamoto#!projects/cm8a) for the results.

In looking more closely at the MSLQ results, participating students expected to do well in their classes (m=5.91 out of a 7 point Likert scale), especially during the first year. That expectation slightly lowered through their sophomore and junior years, but then increased again during their senior year. Students believed that they were good students (m=5.76 / 7 point Likert scale), able to do an excellent job on assigned tasks (m=5.77 / 7 point Likert scale), and confident that they will receive a good final grade in class (m=5.84 / 7 point Likert scale). MSLQ results also

showed that test anxiety scores were relatively low. Test anxiety were lowest in first year students, but increased during their sophomore year. Test anxiety decreased as juniors and remained at the same level through their senior year. The MSLQ data displayed a trend that showed as students mature and progress through the classifications (first year to senior year), their expectations on course work changed. First year students preferred easier coursework while seniors preferred work that challenged them. MSLQ data indicated that higher classified students were more able to align coursework with the real-world, thus making learning more meaningful to them (m=5.93 / 7 point Likert scale).

In specifically reviewing the self-regulation subscale, only 1 out of 9 questions within that subscale had a significant difference between classifications. This suggests that the majority of beliefs pertaining to self-regulation and academic preparation do not change as students progress through the classifications in higher education.

DISCUSSION AND CONCLUSION

The research question for this exploratory study asked, what level of self-regulation do undergraduate university students possess? Responding to this research question required a multi-perspective response. This is in part because the MSLQ is a self-assessment. Subsequently, the answers came from comparing trends versus one statistical finding.

The data suggests that this generation of students in higher education have high self-confidence, which reduces their level of anxiety, which did not motivate them to self-regulate. Because there were only 1 out of 9 questions pertaining to self-regulation that showed a significant difference in the mean scores when comparing classifications, this suggests that their mindset towards academic preparation does not change over the course of their academic journey. This finding inferred that students of this generation believe in their ability to do well, were not overly worried about failing, but conversely, did not rate their study skills high. This apparent false sense of self-efficacy (i.e., overconfidence) appeared to be reinforced by a belief that academic preparation through the use of self-regulation skills were not a priority or that they would come to understand the course content when a high-stakes assignment nears. This is despite the lack of long-term preparation because they believed in their existing ability. Although they felt confident in themselves and their abilities as a student, cognitive strategies and self-regulation practices were rated low. This implies that students fall back on study skills learned in grade school and do not innately adapt their preparation techniques to university-level work.

This was supported in the analysis of the self-efficacy subscale where confidence in their study skills were rated the lowest. It was found that students primarily reference two tools in preparation for exams: (1) the text, and (2) notes from class. Their primary method of studying is to read through the text and their notes repetitively. Strategies like establishing personal learning goals, taking practice quizzes, answering chapter questions, summarizing their readings and notes, and reflecting on

what they just learned, are not often used, which are characteristics of those with a high level of self-regulation. This finding and including the data that suggested that self-regulation remained the same from when a student enters higher education as a first year student through to their senior year was concerning. Despite the concern, this does make sense considering students are not taught how to effectively study in higher education. It is assumed since they are in higher education that they already possess these skills. Reflection and the analysis of the findings from this exploratory action research study imply that this assumption is inaccurate and university students could increase their overall academic performance by improving their self-regulation skills.

In conclusion, the MSLQ data suggests that students were found to possess a low level of self-regulation. They have high expectations of themselves and they presume that they have the intrinsic motivation and belief in themselves to do well in the classroom. However, students were found to not use the cognitive learning skills and self-regulation practices on a regular basis, which suggests a low level of self-regulation at all classification levels at this research site. Because of this low level of self-regulation, students exhibit maladaptive and counterproductive behaviors like procrastination and disengagement. The vast majority of students want to do well in the class, but their preparation does not support their aspirations. In response, we as educators cannot assume our students know how to learn at the university level. We must coach our students so their behaviors (i.e., self-regulation skills) align with their academic goals.

LIMITATIONS

One limitation that stood out in this study was that the MSLQ is a self-reporting instrument. Because of this, interpreting the results need to be done with a critical eye as the social desirability bias is likely to occur.

Another limitation was that this exploratory action research study was limited by its relatively small sample size of sophomores, juniors, seniors, and unclassified students. Utilizing a larger sample size in those classifications, and obtaining participants from other institutions of higher education would substantially increase the transferability and generalizability of this study.

Overall, generalizability of this study is limited due to the following reasons: (1) this study recruited participants from a small private religious institute of higher education; (2) gender, age, and ethnicity data were kept anonymous; and (3) the participants were self-selecting.

The MSLQ was only offered online. Students that are not comfortable with online surveys or are not computer-literate would have been at a technical disadvantage when attempting to complete the MSLQ.

Another possible limitation was that a comparison variable was not used to determine the strength in the relationship between the MSLQ findings and academic performance. The reason a comparison variable was not used was because the purpose of this exploratory study was to measure the level of self-regulation skills used on this campus to determine a baseline for future intervention programs.

RECOMMENDATIONS FOR FUTURE RESEARCH

As this was an exploratory action research study, a number of recommendations for future research was identified. Follow up studies could include inquiry into the apparent elevated level of self-efficacy in the millennial generation, the relationship between self-esteem and self-regulation, and a more focused inquiry into self-regulation and lifelong learning. Along the lines of recent publications, it would be interesting to see the relationship between Duckworth et al.'s (2007) study on grit and self-regulation, and Dr. Amy Cuddy's (2015) study on presence and its relationship to self-efficacy and self-regulation.

From a cross-cultural perspective, future research should look into how different ethnicities and cultures define and practice self-regulation. For instance, cultures, like those found amongst Pacific islanders learn better in informal settings (Philips, 1983; Dudley, 1990; Buck, 1993; Benham & Heck, 1998; Tengan, 2008). It would be very interesting to see how these variables related to diversity influence self-regulation and overall academic performance. A future study that specifically targets diverse populations would be highly beneficial to the field.

In order to remove self-reporting instrumentation bias, a future study that develops a self-regulation rubric to empirically assess student self-regulating behaviors through the creation of an artifact would be rich in informative data.

Being that baseline data has been established through this exploratory action research study, an intervention program focusing on the improvement of self-regulation skills should be implemented. The literature has shown an alignment between the behavioral manifestation of self-regulation and the underlying motivational beliefs and self-efficacy. Thus, it is hypothesized that if self-regulation improves, intrinsic motivation and self-efficacy will also improve.

Because many courses in higher education are now being offered online, any intervention program designed to increase self-regulation skills should be robust and flexible enough to be used in both an online and traditional in-person environment. One recommendation is to develop a self-regulation module that must be completed prior taking an exam. The module will consist of metacognitive self-regulatory tasks that will promote content mastery and long-term memory retention (Atkinson & Shiffrin, 1971).

A second recommendation is to develop a virtual coach that will assist students with time management challenges. A virtual coach would be an automated system that will link online material to an existing learning management system (LMS). The virtual coach will be able to assess the length of time accessing course material as well as the length of time between each access. Similar to fitness technologies, which have grown exponentially in popularity, the user would receive on-demand real-time feedback on their progress using cloud technology. The utilization of badges or trophies to gamify learning could also be implemented to increase self-regulating behaviors pertaining to academic achievement. A technology that has been identified as having the potential for this is Amazon's Alexa©

virtual assistant application. Amazon has opened up their Alexa© Voice Service to third-party developers at no cost. This would allow a third-party developer to link the self-regulation virtual coach to Amazon's cloud utilizing Alexa© as the user-interface. The level of sophistication would only be limited by one's creativity and the skillset of the software programmer.

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Table 5. Results of the Self-Efficacy Subscale				
Self-Efficacy Questions	Mean (7 pt scale)	SD	Total N size	Significant Findings at 0.05 confidence level
Q2 Compared with other students in this class I expect to do well	5.68	1.26	161	First year (n=68) and sophomores (n=33): mean difference of .822; p=.013. Sophomores (n=33) and seniors (n=28): mean difference of -1.189; p=.001 Juniors (n=30) and seniors (n=28): mean difference of -.917; p=.003
Q6 I'm certain I can understand the ideas taught in this course	5.87	1.17	161	No significant differences between classifications
Q8 I expect to do very well in this class	5.91	1.16	161	No significant differences between classifications
Q9 Compared with others in this class, I think I'm a good student	5.76	1.25	161	First year (n=68) and sophomores (n=33): mean difference of .789; p=.023.
Q11 I am sure I can do an excellent job on the problems and tasks assigned for this class	5.77	.99	161	No significant differences between classifications
Q13 I think I will receive a good grade in this class	5.84	1.20	161	No significant differences between classifications Unclassified was not factored due to low n size (n=2).
Q16 My study skills are excellent compared with others in this class	4.93	1.32	161	No significant differences between classifications
Q18 Compared with other students in this class I think I know a great deal about the subject	5.01	1.28	161	No significant differences between classifications
Q19 I know that I will be able to learn the material for this class	5.76	1.13	161	No significant differences between classifications

Table 6. Results of the Intrinsic Value Subscale

Intrinsic Value Questions	Mean (7 pt scale)	SD	N size	Significant Findings at 0.05 confidence level
Q1 I prefer class work that is challenging so I can learn new things	5.09	1.30	161	First year (n=68) and seniors (n=28): mean difference of -.90; p=.012. Sophomores (n=33) and seniors (n=28): mean difference of -1.25; p=.001
Q4 It is important for me to learn what is being taught in this class	5.96	1.17	161	No significant differences between classifications
Q5 I like what I am learning in this class	6.01	1.20	161	No significant differences between classifications. Unclassified was not factored due to low n size (n=2).
Q7 I think I will be able to use what I learn in this class in other classes	5.82	1.37	161	No significant differences between classifications. Unclassified was not factored due to low n size (n=2).
Q10 I often choose paper topics I will learn something from even if they require more work	5.24	1.31	161	No significant differences between classifications
Q14 Even when I do poorly on a test I try to learn from my mistakes	5.99	1.10	161	No significant differences between classifications
Q15 I think that what I am learning in this class is useful for me to know	5.93	1.28	161	Sophomores (n=33) and seniors (n=28): mean difference of -.97; p=.025
Q17 I think that what we are learning in this class is interesting	5.99	1.16	161	No significant differences between classifications
Q21 Understanding this subject is important to me	5.71	1.23	161	Juniors (n=30) and seniors (n=28): mean difference of -.95; p=.024. Unclassified was not factored due to low n size (n=2).

The results of the Test Anxiety subscale is as follows:

Table 7. Results of the Test Anxiety Subscale

Test Anxiety Questions	Mean (7 pt scale)	SD	Total N size	Significant Findings at 0.05 confidence level
Q3 I am so nervous during a test that I cannot remember facts I have learned	3.93	1.62	161	First year (n=68) and sophomores (n=33): mean difference of -1.160; p=.005. Sophomores (n=33) and juniors (n=30): mean difference of 1.476; p=.002.
Q12 I have an uneasy, upset feeling when I take a test	3.93	1.79	161	First year (n=68) and sophomores (n=33): mean difference of -1.203; p=.010. Sophomores (n=33) and juniors (n=30): mean difference of 1.476; p=.007.
Q20 I worry a great deal about tests	4.76	1.78	161	No significant differences between classifications
Q22 When I take a test I think about how poorly I am doing	3.94	1.82	161	First year (n=68) and sophomores (n=33): mean difference of -1.083; p=.038. Sophomores (n=33) and juniors (n=30): mean difference of 1.252; p=.047.

Table 8. Results of the Cognitive Strategy Use Subscale				
Cognitive Strategy Use Questions	Mean (7 pt scale)	SD	N size	Significant Findings at 0.05 confidence level
Q23 When I study for a test, I try to put together the information from class and from the book	5.57	1.31	161	Sophomores (n=33) and seniors (n=28): mean difference of -1.077; p=.011.
Q24 When I do homework, I try to remember what the teacher said in class so I can answer the questions correctly	5.75	1.27	161	No significant differences between classifications
Q26R It is hard for me to decide what the main ideas are in what I read	3.98	1.71	161	No significant differences between classifications
Q28 When I study I put important ideas into my own words	5.47	1.19	161	No significant differences between classifications
Q29 I always try to understand what the teacher is saying even if it doesn't make sense	5.53	1.08	161	No significant differences between classifications
Q30 When I study for a test I try to remember as many facts as I can	5.58	1.25	161	No significant differences between classifications
Q31 When studying, I copy my notes over to help me remember material	4.94	1.78	161	No significant differences between classifications
Q34 When I study for a test I practice saying the important facts over and over to myself	5.53	1.42	161	No significant differences between classifications
Q36 I use what I have learned from old homework assignments and the textbook to do new assignments	5.60	1.38	161	No significant differences between classifications
Q39 When I am studying a topic, I try to make everything fit together	5.39	1.24	161	No significant differences between classifications
Q41 When I read materials for this class, I say the words over and over to myself to help me remember	4.80	1.63	161	No significant differences between classifications
Q42 I outline the chapters in my book to help me study	4.25	1.90	161	No significant differences between classifications
Q44 When reading I try to connect the things I am reading about with what I already know	5.81	1.22	161	No significant differences between classifications Unclassified was not factored due to low n size (n=2).

Table 9. Results of the Self-Regulated Subscale				
Self-Regulation Questions	Mean (7 pt scale)	SD	N size	Significant Findings at 0.05 confidence level
Q25 I ask myself questions to make sure I know the material I have been studying	5.33	1.37	161	No significant differences between classifications
Q27R When work is hard I either give up or study only the easy parts	4.77	1.69	161	No significant differences between classifications
Q32 I work on practice exercises and answer end of chapter questions even when I don't have to	3.92	1.85	161	No significant differences between classifications
Q33 Even when study materials are dull and uninteresting, I keep working until I finish	5.19	1.36	161	No significant differences between classifications
Q35 Before I begin studying I think about the things I will need to do to learn	5.22	1.49	161	First year (n=68) and sophomores (n=33): mean difference of .848; p=.046. Sophomores (n=33) and seniors (n=28): mean difference of -1.083; p=.030.
Q37R I often find that I have been reading for class but don't know what it is all about	4.14	1.78	161	No significant differences between classifications
Q38R I find that when the teacher is talking I think of other things and don't really listen to what is being said	4.34	1.78	161	No significant differences between classifications
Q40 When I'm reading I stop once in awhile and go over what I have read	5.12	1.36	161	No significant differences between classifications
Q43 I work hard to get a good grade even when I don't like the class	5.95	1.20	161	No significant differences between classifications