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Metacognitive Learning and the First-Year Student

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“Without change, there would be no butterflies. ...” – Anonymous

“It does not matter how slow you go as long as you do not stop.” – Confucius
Abstract

Students who are making the transition from high school to college do so with many hopes, fears, and expectations. Some of these students come to college with an unrealistic idea of what will work for them academically and what they will actually need to do to succeed (Upcraft, Gardner, Barefoot, & Associates, 2005). When thinking about how to help students to succeed academically metacognition receives attention as a way to assist students in their learning. Metacognition means the action of thinking about thinking and covers several learning skills that are related to thinking and learning (Sengul & Katranci, 2012). Metacognition and metacognitive learning have helped students become aware of their own learning strengths and weaknesses (Chick, 2018). The purpose of this study was to research the effects of students’ use of metacognitive learning strategies, specifically examining academic success and student confidence in their learning abilities. Students completed a Metacognitive Awareness Inventory (MAI) at the beginning and end of the research to assess their learning abilities and strategies. These students were supplied with the learning strategies of: (a) concept mapping, (b) directed paraphrasing, (c) Know-Wonder-Learn (K-W-L), (d) one sentence summary, and (e) a sheet discussing metacognitive exam preparation skills to use in their selected course or courses. The research analysis involved information received during student interviews and student journaling. Overall it was discovered that when students were provided with metacognitive learning strategies, actively and correctly used them, they did see academic improvement.

Keywords: Metacognition, first-year students, college, learning strategies
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Chapter 1: Introduction

As students transition from high school to college, they have a host of expectations, hopes, and fears (Upcraft, Gardner, Barefoot, & Associates, 2005). Many students come to college unprepared or overestimate their ability to succeed academically. The difference between the reality of what it takes to succeed and what students imagine will work for them has been called the “freshman myth” (Upcraft et al). When faculty are considering student learning, one area that is receiving attention for its ability to assist students to learn effectively at a college level is metacognition.

Metacognition or metacognitive learning is an examination of how one learns (Chick, 2018). Over time there have been many definitions for metacognition and ways of describing how it would be used to enhance learning. Sengul and Katranci (2012) give one definition of metacognition stating it, “… means thinking about thinking, generally covers various skills that are inter-related to thinking and learning, which are critical thinking, reflective thinking, problem-solving and making a decision” (p. 2178). From a slightly different perspective, Schraw and Dennison (1994) state, “Metacognition refers to the ability to reflect upon, understand, and control one’s learning” (p. 460). Simpler definitions for metacognition are “thinking about thinking” or “learning how to learn”. Metacognition can also be significant to the enrichment of social structure and attainment of knowledge, and alters the thought that first-year students already understand their own learning capacity (Larmar & Lodge, 2014). Metacognitive practices can assist students in becoming aware of strengths and weaknesses in their learning (Chick, 2018).

Metacognition can include self-regulation, which is having the ability to plan, monitor, and correct learning when needed. The concept of self-regulation can refer to the ability of a
learner to reflect on their own abilities (Tanner, 2012). Self-regulation is considered by some researchers to be an overarching concept, but others contend that metacognition and self-regulation are the same (Nilson, 2013). Metacognition and self-regulation can help students become aware of strengths and weaknesses in their learning, and if students are aware of their own strengths and weaknesses, then they are able to adjust and be more adaptive learners (Pintrich, 2002).

As shown below, in Larmar and Lodge’s (2014) dual path model of enhancement of metacognitive student performance, retention and engagement are emphasized, while metacognition is linked to a love of lifelong learning. The model outlines factors that are an extension of metacognition such as focus on cognitive processes, building current student knowledge, and reflecting on how the student learns. All of these factors link back to metacognitive learning (Larmar & Lodge).

![Dual path model for enhancing metacognitive capital in commencing university students](image)

(Larmar & Lodge, p. 100)
Metacognition can be generally explained as the concept that students who learn to monitor and control their cognition will be able to break cognition down into knowledge and regulation. Metacognitive learning is not a new educational concept, and it is a concept that can be traced as far back as Socrates and Dewey (Tanner, 2012). In other words, metacognition is what an individual knows about their own cognitive learning process (Young & Fry, 2008). Schraw and Moshman (1995), considered there to be three subcomponents to metacognitive learning: declarative, procedural, and conditional. These subcomponents entail what we know about how we learn, knowing what learning strategies work for us, and knowing under what conditions they work best (Young & Fry). Young and Fry also researched metacognitive assessments and measured their relation to academic achievement. Specifically, they used an assessment of the students’ knowledge monitoring ability (KMA), which they asserted to be a good judge of student success, to measure metacognitive regulation. The researchers define metacognitive regulation as the actual activities that we do to facilitate learning and memory, and it is broken down into planning, monitoring, and evaluating (Young & Fry). Pedersen (2017) states that many college students are aware of self-regulating learning strategies but rarely use these to help in their learning. Instead, they opt for trial and error methods. However, much of the research on metacognitive learning does not specifically relate to its usage with first-year college student learning but rather its usage with all levels of college students (El-Hindi, 1996; Young & Fry).

Statement of the Problem

The reasons that students give for not using learning strategies are: (a) not having enough time, (b) being unable to apply them effectively to their learning, (c) believing that there will be too much work, or (d) failing to see the benefit of the learning strategies (Pedersen, 2017).
most logical solution is for those individuals who are involved in teaching first-year students to work to engage students where they are academically, as well as, intellectually and emotionally, while continuing to provide students with a strong course material (Erickson, Peters, & Strommer, 2006). “If preparation predicts student success, student success acts as the sign and seal of preparation” (Erickson, Peters, & Strommer, p. 6). When students do well in high school and appear prepared for college then struggle or fail in their college work, it is easy to blame the student’s high school preparation ability. However, Erickson, Peters, & Strommer states that instruction at the college level does matter.

During the first year of college, students are well supported through the use of instruction in study skills and other learning experiences. The goal of this early instruction is to assist these students about what their role is in the learning process (Larmar & Lodge, 2014). Even with early instruction, students tend not to use the strategies they are taught (Pedersen, 2017). The first-year in college can often be difficult because students experience many firsts such as living away from home, taking care of their own finances, and having to balance study and social events (Pedersen).

If students are asked for their definition of learning as first-year student in college, they may define learning as memorizing facts and being able to answer test questions correctly. “In short, students in early development positions take understanding and thinking to mean remembering the thoughts of others” (Erickson, Peters, & Strommer, 2006, p. 64). Students at this point in their education do not see learning as developing their own understanding of subjects or knowledge but as learning something to please their instructor or learning something to pass a test in class (Pintrich, 2002). “Metacognitive knowledge of all these different strategies enables students to perform better and learn more” (Pintrich, p. 222), even with this knowledge,
strategies are rarely used properly. This is where instructors can step in to help with learning more about metacognitive learning strategies.

Faculty can also be instructed in the use of metacognitive learning and can then work with their students and integrate these strategies into a course. The main purpose of faculty is to facilitate the “acquisition of knowledge” and to provide the student with the information they need to know for the course. Faculty have the opportunity to work with students and can use metacognition to help students to recognize learning strategies and when to use each strategy depending upon subject matter. Erickson, Peters, and Strommer (2006) suggested that asking a student to reflect on how effective their study habits are in a course is the first stage in a student acquiring the ability to be in charge of their learning.

While memorization can be an effective part of learning, it should be combined with other forms of learning, such as Bloom’s Taxonomy, metacognition, and self-regulation, to enhance and to give purpose to what is being taught (Erickson, Peters, & Strommer, 2006). Specifically, Bloom’s could be effective because it defines the levels of student learning; those levels include creating, evaluating, analyzing, applying, understanding, and remembering the material being taught (Forehand, 2011).

In summary, college students that possess strong metacognitive skills have a higher chance of succeeding in college. The students will find as they continue in college that the skills that were productive in high school may not be adequate for their college-level learning. The available research on metacognition shows differing definitions and uncertainty about the role of metacognitive learning in the classroom learning and student studying methods.
Purpose and Significance of the Study

This research focused on first-year students and on how they can use these activities to learn how to learn, and improve their grades. This research explored the introduction of metacognitive learning strategies to first-year college students to enable them to have a better understanding of their personal learning process.

In this study there was a group of first-year students who were provided metacognitive strategies and information about how the use of metacognitive learning strategies can have a positive impact on their learning. During this study, the courses that the strategies used in were not prearranged or limited to certain subjects, but the students were required to select a course or courses and track their progress. The student population used in this research were students that are 18 years of age or older and could be in any major. These students were in their first or second semester of physical attendance at Augusta University. Student selection was not based solely on class standing, and they could be enrolled full or part time. The course that the student used the strategy was selected by the student according to their schedule.

This research is unique to other research in that it provided the students with a mentor or coaching environment rather than it being in a group or classroom. This allowed for early intervention if the student did not understand the strategies and the students were spoken with individually. Any questions or issues were addressed as they used the strategies. This method is not something that the researcher discovered in any of the literature on metacognition or metacognitive learning. In an article by El-Hindi (1996) students received metacognitive instruction but in a classroom setting, while in another article a personal digital assistant (PDA) was used (Nett, Goetz, Hall, & Frenzel, 2012), yet others took tests to determine metacognitive
capital (Magno, 2009). While this research does provide good information about metacognitive learning it does not investigate one-on-one interview techniques.

By taking part in this research students received a unique one-on-one experience with the researcher instead of something presented in a group or via electronic methods. These students have gained information that is specific to their need, they have someone they can ask questions of in the future as they continue to use the activities, and they have a mentor that they are comfortable discussing their educational goals with.

The Metacognitive Awareness Inventory (MAI) was developed by Schraw and Dennison (1994) and is a 52-item list used to measure the awareness of someone’s metacognitive abilities. The MAI focuses on two components of metacognition, and how they are related to learning (Schraw & Dennison). The students in this research were asked to complete the worksheet at the first and final meeting with the researcher. This allowed the students to acknowledge how they learn and how they can learn better. Once they completed the activities, with the journaling of results, the researcher used the journal entries to gain understanding about how the activities helped the students in the research group. The students were asked to use these in class and during their study time. If students had the opportunity to learn more about metacognition in their first-year experience course or a seminar, they were asked to also journal about what they were taught. Samples of metacognitive strategies that could be employed by students outside of the classroom are: (a) skimming reading assignments using headings and subtitles, (b) creating summaries or diagrams from the reading, (c) using the instructor’s PowerPoint to summarize what the instructor is teaching in their own words, (d) using flashcards with their own definitions, and (e) reflecting on their performance. (Steiner, 2018).
The results of the Metacognitive Awareness Inventory (MAI) were reviewed and used by students with learning activities that can improve the way they understand and perform in their learning. Over a four month period these students were given learning activities and were instructed to keep a journal either online or on paper to detail the activity, how it was used, and whether they found it helpful. Students were also asked if they saw a difference in their understanding and course grades, and if they believed this positive result was due in part to the use of the learning activity.

**Research Questions**

1. In what ways do metacognitive learning strategies help first-year students learn more effectively?
2. Do metacognitive learning strategies change the way students view their learning?
3. How do the challenges the students face affect their use of metacognitive learning strategies?

**Limitations**

When working with first-year students there are limitations retrieving the desired information. Since this was a phenomenological and qualitative study, there could have been a lack of provided information because students may not have been able or willing to journal effectively. The research would be more detailed if there was a longer amount of time available to monitor students as they continued to use the learning strategies. Only being able to work with the students for the months of January, February, March, and April made it harder to identify a definitive positive long-lasting impact that would be noticeable to the student. The ultimate goal for this research was to help students to learn better, and the only way to check the results of the research was for the students to honestly report grades to the researcher. Getting the students to
participate, give honest responses to the prompts, and meet with the researcher at least once a month were the primary challenges for this study.

Just as students needed to be motivated to learn, they also needed to be motivated to try to improve that learning by working through the activities. For students to be willing to make an effort to take part in any sort of academic assistance it is necessary to have motivation so they can adjust their behavior in a metacognitive way (Hammann & Stevens, 1998). The motivation to participate in the study and to work through these strategies was another challenge. The students involved in the research needed to understand that what they were doing would fit into their current and long term goals, and that the strategies are relevant to what was being learned then and will be in the future. When students are able to connect the activity to what they learned and how that learning is connected to the relevance of their overarching goal they are more motivated and engaged (Jones, 2018).

Definitions

For the purposes of this research, these terms will be defined as follows:

1. **Metacognition** is defined as “thinking about thinking, generally covers various skills that are inter-related to thinking and learning, which are critical thinking, reflective thinking, problem-solving and making a decision” (Sengul & Katranci, 2012, p. 2178).

2. **Metacognitive knowledge** is described as what we know about our own cognitive process, and there are three components of knowledge:
   a. **Declarative knowledge** – what we know about how we learn
   b. **Procedural knowledge** – familiarity about the different strategies that will work best for our learning
c. *Conditional knowledge* – understanding about the environments under which we can implement various cognitive strategies

(Young & Fry, 2008)

3. *Metacognitive Awareness Inventory (MAI)* is a 52-question worksheet that can help a student understand how they learn and learn in a more effective manner.

4. *First-Year Students* can have many different attributes. First-year students have no age limit but the most common age was between 18 and 25 years of age. They are usually in their first or second semester at a college or university.

5. *Adult learners/students* are considered students who are 25 years old or older, work full-time, have a family, and/or are returning to school after an extended absence.

6. *Self-regulated learners* are learners that are able to monitor and manage their own cognitive processes along with control over their learning environment.

**Overview**

Metacognition is described in many ways and is described by Sengul and Katranci (2012) as, “Metacognition, which means thinking about thinking, generally covers various skills that are inter-related to thinking and learning, which are critical thinking, reflective thinking, reflective thinking, problem-solving and making a decision” (p. 2178). Schraw and Dennison (1994) echo this sentiment by stating that metacognition discusses the student being able to reflect, understand, and control their own learning. The research currently available shows that metacognitive learning is not a newly discovered concept but one that has been around since the time of Socrates.

Keeping in mind the changes that students experience as they transition from high school to college, this research demonstrated how metacognitive learning can help first-year students
focus on their learning and how they learn. Current research presents metacognitive learning as having a positive effect on student learning no matter their academic level. The goal of this study was to reinforce this past research and to provide strategies that students in the research would be able to use during and after the study in the classroom and during the time they studied to enhance the learning experience.
Chapter 2: Literature Review

Overview

In this chapter, the literature is reviewed to show the history of metacognition and how it is used to assist first-year students. There are several different areas of research literature discussed as it relates to metacognition, how it relates to college students, and specifically how it relates to first-year students. The adjustment of students to college is addressed, including how students perceive these changes and differences in their environment. There is also an explanation of metacognition and metacognitive learning as described in the available research, and how this research can help first-year college students to become better learners, while also looking at any research that shows evidence of metacognition’s positive or negative outcomes. Finally, this chapter will include information about the different learning strategies available for use by the students as well as by instructors.

Adjustment of the First-Year Student

In an article by Marina and McGuire (2008), the authors discuss a report from The Centre for the Advancement of University Teaching, in which its authors assert that the freshmen year should consist of integrated, interdisciplinary, and inquiry-based learning (p. 21). The Centre also asserted that the first year of college:

- Is a transition in the student’s life socially as well as academically;
- Should provide a link between high school and home and should excite the student; and,
- Should be intellectually motivating so the student will not think of college as a series of unrelated learning requirements (Marina & McGuire, p. 21).
When students graduate from high school and begin their time in college they are expected to quickly adjust to the new way of life. For this reason, it is very important that there be a partnership between high schools and the university systems (Nunez Rodriguez, DiSanto, Varelas, Brennan, Wolfe, & Ialongo, 2017). Nunez Rodriguez and colleagues, discussed the critical transition that students face coming from high school to college and did a yearlong study involving high school teachers and faculty from a large community college. The goal of this study was to foster understanding of the different cultures that exist in high school and college along with student skill development. The participants in the study all agreed that there needs to be a balance of learning responsibilities between faculty and students. This article also discussed participating in the study as it pertains to teaching content, student skill development, syllabus development, lesson plans, deadlines, recognition of non-academic factors, and classroom management differences (Nunez Rodriguez et al.).

According to Appleby (2006) there are three strategies to help freshmen adapt to college life: (a) expressions of how courses are different in college from those in high school in content and instruction; (b) assisting students in identifying the value of knowledge, skills, and attitudes (KSA) as they adapt to their new learning environment; and (c) engaging students in assignments and activities to develop and strengthen KSA’s. Appleby’s research involved speaking with 24 freshmen students enrolled in a learning community about their observed differences between high school and college. Summing up the student’s comments showed that they believe the work is harder in college than in high school, the locations where the work is done are different, and that students need to be able to learn on their own. (Appleby) One of the quotes from the article states, “College knowledge is self-taught” (Appleby), demonstrates that a student can understand that adapting to college learning will be difficult.
Another part to the adjustment of students to college life is psychosocial and this entails the emotional stress and strain the transition, the increased academic demands, and the new social relationships that will be established. If a student has difficulty transitioning it can have a lasting effect on their family, the student’s self-esteem, academic performance and overall emotional adjustment (Salami, 2011). Students in college have different expectations for living independently, and different students can react differently to the challenges it presents. According to Dwyer & Cummings (2001) stress distresses the physical health as well as mental health of the student while Kerr, Johnson, Gans and Krumrine (2004) found no relationship between these (Salami). “Stress is the demand made on people to which they respond and affects their physical, psychological and behavioral characteristics” (Salami, p. 242). This article purports the importance of self-esteem, emotional intelligence, perceived stress, and social support of a student has a great deal to do with the student’s adjustment to college life (Salami).

Overall, the consensus from these articles show that there are many factors dealing with transition to college from high school that can affect a student’s learning. Students must begin to learn that there are expectations in college that need to be met, such as study skills, living independently, time management, and being able to study properly (Pedersen, 2017). Ideally, the students would be better served if they can begin college better prepared for the academic difficulties ahead of them. If there is no pre-college preparation, the best we can do is to support them and provide them with the tools they need to help them meeting the academic requirements and expectations ahead of them (Upcraft, Gardner, & Associates, 1989).

**Metacognition Defined**

According to Merriam-Webster (2019), *metacognition* is defined as “awareness or analysis of one's own learning or thinking processes”. While Merriam-Webster’s definition is a
widely accepted one, there are others that are similar. “Metacognition, in its most simple form, is having the ability to learn, reflect, and apply information” (Stephens, 2017). In a 1998 article by Schraw, he defines it as a student “thinking about how they perform that skill” or thinking about thinking (Schraw, 1998, p. 123). Another definition from Tarricone, (2011) states that metacognition is, “knowledge and awareness of processes and the monitoring and control of such knowledge and processes” (p. 1). Metacognition and self-regulation tend to be thought of as being the same thing, but according to Nilson self-regulation is more of a broad concept and metacognition being an aspect of the concept (Nilson, 2013). While self-regulation involves monitoring and managing cognitive processes, metacognition involves the student learning and understanding about how an assignment is to be completed (Nilson).

Application of metacognitive strategies can have many positive effects on learners as Papaleontiou-Louca’s (2008) article details. “The educational implication of the application of metacognitive strategies such as self-awareness and self-monitoring is to develop independent learners who can control their own learning and learn how to learn for life” (Papaleontiou Louca, 2008, p. ix). John Flavell has been called the “father of the field” of metacognitive research. Since the early development of metacognition, it has been expanded to include not only cognition but to also to include the purposes, and objectives of learning, an intentionally and purposefully monitoring, and a regulation of the knowledge processes (Papaleontiou-Louca). Papaleontiou-Louca also makes the assertion that a person’s self-evaluations are a reflection about how they view their abilities, their knowledge, and how their view affects them as a person and as a learner. How the student views themselves as a person and learner is also a reflection of how the student relates to their own awareness, aptitude, and drive.
Metacognitive Learning

Metacognitive learning principles are a process of reflecting and directing the student’s learning (Ambrose et al., 2010). According to Henderson & Dweck, (1990), research has suggested there is a pattern connecting a student’s beliefs in their own intellect, their study tactics, and learning activities (Ambrose et al). When students believe that whatever they do will have no effect they are less likely to learn or perform well, while other students who think that skills can be learned, are more willing to make an effort to learn various skills and improve their performance (Ambrose et al). The student assesses the task, evaluates their own strengths and weaknesses, makes a plan, applies what strategies they have planned, monitor their progress, reflect, and adjust if needed. The student can then restart the process over again as necessary. The way students think about their own intelligence and learning can influence how this cycle proceeds (Ambrose et al).

When first-year students and metacognitive learning are thought of together, and since research states that metacognition enhances student engagement, we can hypothesize that metacognitive learning provides a positive learning experience (Larmar & Lodge, 2014). “It is therefore argued that metacognitive capital is a central factor that underpins identified variables that are traditionally attributed to student retention and engagement” (Larmar & Lodge, p. 97). Faculty cannot assume that students enter college with metacognitive skills that enable them to adapt to a much higher level of learning (Larmar & Lodge). Schraw and Dennison (1994) state that being a metacognitive learner enables all students to direct and improve their learning.

The revised Bloom’s Taxonomy uses verbs such as recognizing, inferring, implementing, organizing, checking, and planning, to describe cognitive processes, in a similar way that metacognitive knowledge does (Forehand, 2011). When students learn names and dates it is
surface learning, but when they learn how those names and dates relate to one another it becomes conditional knowledge. Conditional knowledge is the third of the three subprocesses of the knowledge about cognition that expedite the thoughtful part of metacognition (Schraw & Dennison, 1994). Declarative knowledge is knowing about, what, and that, procedural knowledge is knowing how, and conditional knowledge is about the when and why (Young & Fry, 2008). These types of knowledge are all tied back to metacognition and can be used when teaching students metacognitive learning strategies, and demonstrating how they work.

In a study by El-Hindi (1996), first-year student volunteers from underrepresented populations participated in a program prior to their first year at the university. These students were taught metacognitive strategies while in the program related to reading and writing. Strategies involved in recognizing a purpose, considering prior knowledge, skimming the text, and making a prediction about what they read (El-Hindi, 1996). This research showed that reading and writing can be enhanced by using metacognitive awareness through direct training. “Metacognitive skill is at the heart of learners who are actively engaged and in control of their own learning” (El-Hindi, p. 226). Also by using metacognitive instruction methods, the students’ skill level was also increased and the students gained more knowledge from the course text (El-Hindi).

For college students to consider a concept something that is helpful, they need to also consider it to be useful and see that it fits into experiences that the student has had in the past, or explains occurrences in a new or unique way (Blank, 2000). Blank also discussed what is referred to as the “Metacognitive Learning Cycle” as shown in the figure below.
Students who possess a better understanding of their own cognition perform at a different level than those who do not, and the ability for students to recognize their learning abilities will encourage students to become efficient, self-regulated, and lifelong learners (Hidayah, Adji, Setiawan, & Maharani, 2016). Metacognitive learning is believed to play an important role in many types of learning facets such as “comprehension, communication, attention, memory and problem solving” (Hidayah et al). As such, students with awareness of metacognitive skills are more likely to perform better. For this reason, observation and supporting students’ metacognitive development is vital to the success of their college careers (Hidayah et al).

**Potential Benefits of Metacognition**

The ability for a student to take on self-regulated and metacognitive learning is not something that easily takes place; it takes time and an effort on the part of the student. Even though this process will take time, there are many benefits to the student, which are well supported by research. According to Nilson (2013), the research supports that self-regulated learning enhances the following:

1. Student performance/achievement (learning) in courses and course units.
2. The amount and depth of student thinking.
3. Students’ conscious focus on their learning.
4. The development of reflective and responsible professionalism. (p. 11)

An increase in metacognitive skills also increases the ability to create and maintain successful learning, as well as improve achievement levels and problem solving skills (Sengul & Katranci, 2012). “Metacognitive practices help students become aware of their strengths and weaknesses as learners, writers, readers, test-takers, group members, etc” (Chick, 2018). Students tend to gain a higher level of awareness in how they think about tasks and learning situations presented to them (Chick). The research done by Wagener (2016) dealing with students in French universities, found that since students have to adapt to new ways of organizing their lives in college and that the systematic use of metacognitive learning can actually help students. Also the use of metacognitive learning can be easy and would not require drastic changes for the instructor nor student (Wagener, 2016). Students who are taught how to use these strategies are not always successful but this could be because the student is more focused on learning the strategy rather than understanding the end goal (Wagener).

According to a study done at a university in Italy, metacognition can be a good predictor of student achievement and it may help decrease the rate of student drop outs since “academic self-efficacy and study skills were among the best predictors of college outcomes” (Costabile, Cornoldi, De Beni, Manfredi, & Figliuzzi, 2013, p. 165). Costabile et. al. (2013) also state that in Italy, despite evidence of metacognition being important to student success, there have not been any efforts to promote metacognition as it relates to student success. These researchers used a metacognitive training course, finding that it did influence the metacognition and learning of the students in these groups (Costabile et al., 2013).
Metacognitive Learning Strategies

As quoted in and referenced by Cohen (2012), metacognition includes strategies that are appropriate to the situation and cognitively matching the task at hand. Metacognition is also closely related to self-monitoring and self-regulation and all three can be used to help students assess their abilities related to learning (Cohen). “Measurement of metacognition is naturally difficult because metacognition is not an explicit behavior. Metacognition is not internal process only; on the contrary, individuals are not aware of these processes” (Akturk & Sahin, 2011, p. 3734). Once students learn these strategies they will become a natural internal part of the learning process for the students.

Metacognition and its assessments also tend to be subjective since they also involve the feelings of the student and their motivation to achieve or excel. (Lin-Agler, Moore, & Zabrucky, 2004) For students to put effort into an academic task, they must first be motivated to engage in the task and likewise motivation is needed for students to metacognitively control their actions. “Similarly, a student’s self-efficacy, another important motivational facet of academic behavior, influences how students approach and engage in learning tasks” (Hammann & Stevens, 1998, p. 3). A student who feels they have choices and the ability to make decisions about their learning will feel motivated and empowered in their learning (Jones, 2018).

At Miles College, in Fairfield, Alabama, there is a Metacognition Lab that teaches students different metacognitive strategies to increase the academic success and retention (Chekwa, McFadden, Divine, & Dorius, 2015). The purpose of this lab is to teach students methods so they can be aware of and begin to monitor their cognitive skill and overcome their any perceived weaknesses (Chekwa et al). The students themselves noticed that the instruction in metacognition has benefits and among the student comments were statements that showed the
students felt more confident, felt more relaxed as they studied, learned how to take notes, and to understand why they got the answer they got (Chekwa et al). For these reasons among others, the lab has show great success, as evidenced by “…students who participated in the lab having on average more than an 8% increase in their semester GPAs” (Chekwa et al., p. 110).

Metacognitive learning strategies, such as “directed paraphrasing,” asks students to write what they have learned in their own words to assess what they have learned (Centre for Innovation and Excellence in Learning: Ten Metacognitive Teaching Strategies, 2018). “Concept Mapping” shows the relationship among terms, and gives students a way to organize their thoughts, think about connections, and reflect on what they have learned. (Vanides, Yin, Tomita, & Araceli Ruiz-Primo, 2005). These activities can also be used by faculty in their classrooms to assist with assessing what their students are learning and how well they are learning. The “Ticket-Out-The Door” and “One Minute Paper” require students to demonstrate to the instructor that they are able to learn the subject matter. This is done by writing something about what students believe they have learned in the form of a short paragraph or by answering a couple questions about that day’s lesson. These can be used by the instructor to further explain and evaluate material discussed in class. In both of these, the student will demonstrate to the instructor what they believe they have learned and also helps the instructor determine how much students understand and receive immediate student feedback.

Outside of the classroom, students are also able to perform metacognitive exercises and may already do them without realizing that they are metacognitive in nature. These can be ongoing self-assessments such as selecting work from the week previous rewriting the lesson in language they can easily understand, reflecting on the abilities they are developing with the
lesson, and/or evaluating how they are in mastering skills. (Tucker, 2018) Study groups are another good way for students to evaluate what they learn.

Samson (2018) states:

Peer instruction may offer some of the richest opportunities for metacognitive teaching. Reciprocal (peer) teaching forces the instructor to use a whole series of metacognitive processes such as determining what the learner already knows, deciding what is to be taught/learned and how; monitoring comprehension and evaluating the outcome in terms of increased comprehension, which in turn encourages the instructor to reflect upon his or her own thinking processes. By asking the students to defend their answer to a question to another student you are, in effect, moving the role of "teacher" to the students. (website-abstract)

Faculty can encourage students to teach the material to one another in their group so students can evaluate what they have learned and review what may be difficult for students to understand.

**Summary**

As the literature has shown, first-year college students face challenges when they begin college and these adjustments range from changing how they learn (i.e. needing learn how to learn on their own) (Appleby, 2006), to having to be independent and live on their own for the first time (Pedersen, 2017). The use of metacognition and metacognitive learning strategies, which have been identified as methods of learning how to learn, can benefit these first year students as they enter college and may help them to become self-regulated lifelong learners (Hidayah et al., 2016). Metacognitive learning is shown to also be connected to Bloom’s Taxonomy and from this can show that students who are in touch with themselves and their own learning can be successful (El-Hindi, 1996).
The benefits of metacognitive learning for college students are shown by the literature to consist of enhancing student learning, and causing students to be more conscious of the depth of how and what they learn (Nilson, 2013). By doing all this, students are more likely to be successful in college and that is proven by the creation and use of the Metacognition Lab at Miles College and its use of strategies to help students learn (Chekwa et al., 2015). This study intends to demonstrate that what the literature supports about the positive results of metacognition is true. While metacognition is just a piece of the puzzle for students, this research will get the students involved in thinking about their learning and help them to feel more engaged and become a more self-regulated learner as they progress through college.
Chapter 3: Methods

This was a phenomenological and qualitative study that explored the experiences that a student has while using metacognitive learning strategies, and whether or not students view the activities positive/helpful or negative/not helpful. During the research, the researcher had several meetings and interviewed students who were actively using metacognitive learning strategies provided to them by the researcher. The interviews were about how the student used the strategies and whether or not they thought they helped. As the researcher reviewed the literature and used the strategies herself, saw where these strategies can be helpful. There was also the possibility that students could have been using a strategy without even being aware of that they were using it.

This phenomenological and qualitative study was guided by the following research questions:

1. In what ways do metacognitive learning strategies help first-year students learn more effectively?
2. Do metacognitive learning strategies change the way students view their learning abilities?
3. How do the challenges that students face affect their use of metacognitive learning strategies?

Research Approach: Phenomenological and Qualitative Case Study

Qualitative research studies have individual interviews, so that a researcher has a better opportunity for a higher level of interaction with the study participants (Bui, 2014). Qualitative research adds depth to topics, provides better participant feedback, and provides a more holistic view of the research problem (Bui). By using this type of research study, the researcher demonstrated that using student interviews allowed more understanding of how the students used
the strategies, viewed their learning, and how the strategies helped them. It also showed how taking time to work on metacognitive learning strategies with students can assist in their learning processes and show them how they can use the information to become better learners. It also showed students how they currently see themselves as learners and ways in which they can improve, learn deeper, and develop a love of learning. As part of this study, the researcher interviewed these students eight times over the course of four months of active research.

**Study Setting**

The study took place at Augusta University on the Summerville Campus. Augusta University (AU) is a combination of two area universities and is the State of Georgia’s first chartered academy, founded in 1783 (Augusta University: History of Augusta University, 2019). It is home to the Medical College of Georgia, the oldest college in Georgia and is a public research university, that also includes a training medical center (Augusta University, 2019). The university currently has four separate campuses in the Augusta area: Summerville Campus, Health Sciences Campus, Riverfront Campus, and Forest Hills Campus. Each has its own function which is liberal arts, health/medical, cyber, and athletics, respectively. In the Fall of 2018 AU was home to over 9,000 students (over 1,000 of these new freshmen in Fall 2018), 10 college and schools, and 149 majors (Augusta University).

Solicitation of volunteers took place primarily on the Summerville Campus. The Summerville Campus houses many of the core courses that first year students are required to have so they may progress to their major courses of study. On the Health Sciences Campus there is a freshman dorm called Oak Hall which also has areas for student events and meetings. These gave the researcher access to the first-year student population and the various meetings that involved this particular group.
Study Participants

For this study, students were required to be in their first or second semester of physically attending courses at Augusta University. The students for this study were 18 years of age or older, so no students were minors and could personally give consent to participate in the study. They were required to be actively enrolled in at least two courses. This particular group of students were selected because they were relatively new to the college environment. These students were high school graduates that were just beginning to develop their methods of learning at the college level or non-traditional students who are returning to begin college after an absence from school.

The number of students in the study was five. These students used metacognitive learning strategies, were supposed to journal about their experiences, and participate in a series of interviews, then discuss their views and results with the researcher. The students were encouraged to continue using the strategies they worked with during the study, especially when students believed that they helped the students to improve their learning. The monitoring of the way students’ used these strategies demonstrated how they helped students when the strategies were used actively and properly.

Procedures: Data Collection

The procedures for data collection were:

1. Individual student meetings lasting 30-45 minutes were held on campus in available student meeting spaces or in the researcher’s office.

2. Students completed a Metacognitive Awareness Inventory (MAI) at the beginning of the research so they could have a better understanding of how
they learn and how the metacognitive learning strategies have changed how they learn.

3. Follow-up individual meetings were held with the students to discuss their progress and collect data about the students’ use of the learning strategies. There was approximately two-three weeks between these student meetings after the initial meeting.

4. Collection of information from the students via the use of journals kept by them as they used strategies so they could also see their progress.

5. At the final meeting students took the MAI again so they could see if they noticed any differences in the way they thought about learning.

The prompts and strategies were explained fully to those students who were volunteering so they could have the best understanding of what they were doing for the research. The students were also able to contact the researcher at any point with questions that they had about the strategies or how they were supposed to use them, or how much they were supposed to journal for each.

Data Instruments

The researcher used the Metacognitive Awareness Inventory (MAI) shown in Appendix A. The MAI consists of 52 items that required students to answer the true or false statement about themselves and how they are in the role of a learner. The MAI measured metacognitive awareness of an individual and was constructed by Gregory Schraw and Rayne Sperling Dennison. Dr. Dennison (Sperling) has given permission for the researcher to use the MAI for the purposes of this research as shown by the email (Appendix B). “The MAI has been denoted to have high internal consistency of the two factors, knowledge of cognition, and regulation of
cognition” (Kallio, Virta, Kalle, & Kallio, 2018, p. 103). The MAI is a self-reporting, easier way to measure which students could benefit from metacognitive strategies and are helpful for theoretical research. (Kallio et al.) Researchers have used the MAI to study the knowledge and regulation of cognition and it has been correlated by test performance and scores along with online response measurements (Kallio et al.). The MAI was completed by the students who volunteered for the study at the beginning of the study and again at the end of the study so the researcher and student could compare the results and know the students’ thoughts about whether or not their cognition had changed.

Students were given a series of learning strategies during the meetings with the researcher and they were encouraged to use them in class, during their pre-class preparation, and study time. These strategies were provided to help students to reflect on, to understand, and, in the end, to control their learning (Schraw & Dennison, 1994). While these strategies were used starting in just one course, they can be expanded and adjusted for the student to be able to use in all of their courses during the semester and in any future courses. These strategies included concept mapping, a K-W-L (know-want-learn) chart, and directed paraphrasing. Concept mapping is a way of showing the relationship or connection among terms or concepts, while K-W-L charts discuss what they think they know, what they know, and what they have come to know. Directed paraphrasing is a way that students write, in their own words so they can assess how well they comprehend the material they are learning (Centre for Innovation and Excellence in Learning: Ten Metacognitive Teaching Strategies, 2018).

The students were instructed to keep a journal, either online or in a notebook form, that would describe their use of each of the strategies. There was a list of prompts provided to the students to describe their experience and to help guide them to use the strategy as they used it for
their work (Appendix C). Also included with the journal entry was information about what the student thought about a particular strategy and the way that they saw that the strategy helped them or did not help them.

Students met with the researcher as soon as possible once they agreed to participate in the research. They received and reviewed information and requirements for the study and signed an IRB approved consent form (Appendix D). The student also told the researcher which type of journal (paper or electronic) they were keeping. The researcher also answered any questions the student may have had before completing the MAI. There were individual meetings every two to three weeks with the researcher and students involved with the research where the journal entries could be reviewed and discussed. At the end of the research there was a final interview to review what the student had been doing with their journals and whether they felt they had benefited from the learning strategies. These interviews were recorded with a small audio recorder and transcribed to make sure the students’ opinions were recorded correctly. When the students were asked to journal about each activity, they were told to do this either electronically or in a notebook, using the prompts provided by the researcher, so the researcher had more information on how the strategies were used. The information students provided was helped the researcher gauge the students’ participation and their overall view the results of the activities. The student opinions also showed the degree to which they provided the student with help to better understand how they are learning.

The interviews with the student consisted of meeting with them in an area that was quiet and private where the student could discuss what they thought about the learning strategies. During the first interview, the initial interview protocol was used (Appendix F) and during subsequent meetings the follow-up interview protocol was used (Appendix G) to help receive the
most in depth information from the students as possible. To close out the research a final interview protocol (Appendix H) was used. All of the information provided during these interviews was transcribed so it could be easily outlined in the research.

In the hope of increasing possible volunteers and enlarging the participant group, the researcher also solicited the assistance of faculty representatives for student groups on campus who work with students in their first or second semester of college.

**Limitations**

There was the risk that the student: (a) did not use the strategies correctly, (b) did not find them helpful, (c) believed that they took too long to do, or (d) did not use them at all. Because of this the researcher may have had limited or incomplete information from which conclusions can be drawn. The researcher could have selected different learning strategies that would have made a difference in the result that were received from the students.

In this research, the researcher was more directly involved with the students due to the individual meetings. The environment of mentorship or coaching that was created may have impacted the results of the research. Other research involved classroom or electronic interactions with students and this research does not so students had one-on-one attention from the researcher.

Finally, one of the possible limitations was that the students would not report their results honestly. There was no real way to know for sure if the students used the activities and were journaling what their actual results were. The students also did not journal regularly about their activities so this limited the amount of information available to the researcher about how the strategies were used. The researcher depended on the accuracy of the students’ recordings of which strategies they used and whether or not the strategy did or did not work for them.
Analysis of Data

Information collected from the student journals and interviews was analyzed separately to describe how the student used the strategies and what they learned about how they learn. The researcher interviewed the students and reported how the students viewed themselves as learners prior to, during, and after the research study. The main strategies that were being used were Concept Mapping, Metacognitive Skills for Exam Preparation, and K-W-L or Know, Wonder, Learn depending upon the type of course the students wanted to use the strategy in. The strategy that was used most often has been Concept Mapping, which was being used in different science courses such as Anatomy and Physiology or Environmental Science. The K-W-L was one that the students involved in the research felt would be good to be used in an English or History course. For this reason, many of the students did not use this strategy but opted for the concept mapping because of the course they chose to use the strategy in.

Data and Participant Protection

The researcher used a code list to help protect student confidentiality. Any paper-based journal entries were transcribed via computer and saved to the institution’s secured R drive and only be accessible to personnel involved in the study. Only the researcher had access to the available study data. Audio recordings of subjects were transcribed by the researcher and then destroyed to eliminate audible identification of participants/students, and the recordings were also uploaded into the R drive. The information that was included in the research data or associated with the data was a sign-up sheet (which will be destroyed after contacting interested individuals). The responses to the interview protocol responses was recorded on a recorder, transcribed, moved to the R drive, and then deleted from the recorder. Once transcribed the recordings were removed from the R drive.
The research information includes:

- Sign-up sheet information which was initially stored in a locked cabinet in my home office after contacting everyone it was shredded. A sample of the sign-up sheet is attached as Appendix I.

- Journal Entry responses - Paper responses were transported in a locked briefcase to the researcher’s home office, scanned into the computer and then stored on the R drive. Any paper documents were shredded. Electronic responses were placed into a word document so that the e-mail address is not included in the document. Information was only identifiable by the student’s individual student code and then stored on the R drive. The journal prompts that were provided to students are attached as Appendix C.

- Interview Protocol Responses (Appendices F, G, H) was recorded on a digital recorder first, moved to the R drive and deleted from the initial recorder. These were then transcribed and the recording deleted from the R drive.

- The identity code sheet has been typed up and stored electronically on the R drive. (Appendix J)

The data from this research was stored on the R drive and after the completion of the research it was deleted. Any paper documents were transported in a locked case until they were transcribed electronically and uploaded into the R drive. Electronic documents were stored on the R drive and only accessed by the researcher.

The Augusta University IRB approval letter and approved student/participant consent form are included as Appendix K and D. There was also an approval of amendments made to the consent form and recruitment script. A PowerPoint also created by the researcher and used for
student volunteer recruitment is attached as Appendix M. Also included is a letter of support for the research from the Dr. Elizabeth Huggins, Director of the First and Second Year Experiences at Augusta University as Appendix N.

The researcher requested modifications to the IRB consent form so that a gift card could be given to the student who assisted with the research and other recruitment information could be approved. This request was approved, and the modified consent form is attached as Appendix E and the approval letter is attached as Appendix L.

Students were given information about Concept Mapping that provides basic instructions on creating and using concept maps (Appendix O). Since a couple of the students had problems deciding how to use concept maps the researcher selected information from the University of North Carolina at Chapel Hill to provide further explanation (Appendix P). The researcher strived to assist students for successful use of these strategies. Each activity was fully explained to the students and they were given examples. This helped the students to become more engaged and they found ways to adjust the activities to help them to use the strategies in a successful way.
Chapter 4: Results

Introduction

The chapter demonstrates the results of students’ use of metacognitive learning strategies as being helpful and providing positive results for them in their study time, class time, and homework assignments. There were five students that actively participated in the research. Interviews were every two or three weeks for 20-30 minutes each. Students also participated in an initial 30-45-minute meeting and concluded with a final 30-45-minute meeting to summarize their opinions and takeaways from the research activities. These students were age 18 or older, in their second semester of college, and had volunteered for the research presented during events such as Freshman Council or the Pre-Nursing Honors Society meetings. Each of these students were given two or three select strategies to use and were tasked to journal how they used them and whether they worked for them in their selected course. Each student is very different in how they view their college careers, family lives, and support systems. For example, one student worked two jobs, was taking five courses, and volunteering, and another student was a military veteran, attending college on the Post 911 GI Bill, and does not have to work, only go to school. With this group, the researcher found that there were students who used the strategies effectively and were very engaged, while others chose to use them very little and those saw minimal results.

This chapter also focuses on the student responses to the research questions and the different strategies that these students used during the research as well as the student’s background and story. This section will focus on the way students believed the strategies helped them to learn in different, more effective ways. The strategies can change the students’ view of their learning, then challenge the students’ way of learning. The results will be described from
the information collected through student interviews, from information provided by journal entries, and students’ drawings.

The student participant demographics were varied but primarily female health care majors and all of them are in their second semester of college. This information is demonstrated in Table 1: Student Demographics below.

Table 1

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<th>Student Demographics</th>
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<tr>
<td>Gender</td>
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<tr>
<td>Major</td>
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<tr>
<td>Number of courses enrolled</td>
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<tr>
<td>Course where strategies used</td>
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Strategies Used by Students and Defined

1. Concept Mapping is a visual representation of copious amounts of information, shows a holistic representation of a concept, demonstrates connections of data, and can map data relationships (Northern Illinois University, 2019).

2. Directed Paraphrasing is when a student takes information that they have learned and “translates” it into something that is in their own words to be able to assess the student’s ability to understand course concepts (VIU Centre for Innovation and Excellence in Learning, 2019).

3. Know – Wonder – Learn (K-W-L) Chart allows the students to examine their perceptions of certain material. The K-W-L Chart allows students to see what they already know,
what they want to know, and what they learn (VIU Centre for Innovation and Excellence in Learning, 2019).

4. One Sentence Summary is a method that entails a student writing their translation of something that they have recently learned to find out the student’s “ability to comprehend/transfer concepts” (VIU Centre for Innovation and Excellence in Learning, 2019).

5. Developing Your Metacognitive Skills – Exam Preparation sheet that is adapted from an article by Kimberly D. Tanner. This worksheet explains different strategies used for study and deep learning. There are nine different strategies used to exercise and enhance the learning abilities of students.

The student information will be divided into the following sections: student demographics, strategies used, feedback (positive and negative), and Metacognitive Awareness Inventory (MAI) results (initial and final).

**Student Stories**

This section includes information about the five students that were part of the research on metacognitive learning, along with quotes about the students’ use of the learning strategies, and their thoughts. Although there were a couple of the students were not using the strategies to the degree that the researcher desired, they did make an attempt to use the strategies as the students felt they were able.

Student number 1957 is a medically retired Navy veteran attending college on the post 9-11 GI Bill. This student spent a lot of time discussing how she wanted help studying and taking notes in class. The student found that she had trouble understanding the material in classes and taking notes during her environmental biology course. She took the time to explain that because the instructor did not take the time to make the content interesting she found herself not
interested in the material. For example, she mentioned that “her [the instructor’s] PowerPoints are three or four slides with just a list of words on each, no explanation, only the words”. Since the student talked about needing help with note taking during class and she intended to use the strategy in a science course, the researcher suggested that the student try concept mapping and K-W-L charting. In the proceeding meetings, student 1957 explained that she had been having some personal problems and was slow to use the activities. Towards the end of the study, this student also used concept mapping to write a paper in her English composition class and found it a good way to, “let me see my thoughts on paper and connect my thoughts better”. She also saw herself as more academically successful after learning these strategies.

Student number 2733 was a male student who was in his second semester of college and lived in a freshman dorm on the university campus. He was a pre-nursing major and showed to be a very engaged student in his activities at the university. During the initial meeting, the researcher asked if he had ever heard of metacognitive learning, and he said he thought so but wasn’t sure. In the discussion that followed, the researcher discovered that the student had done and was currently doing Directed Paraphrasing by writing paragraphs of information from the PowerPoint or lesson in his own words. He felt that “this [directed paraphrasing] helps me understand what the instructor is teaching”. Again the researcher provided the student with the concept mapping strategy and reviewed K-W-L charting, but the student did not feel like it worked as well for him as the concept mapping did in the beginning. The other four students used the concept mapping for science, but this particular student talked about using concept mapping not only in his science course but to also write a paper for one of his English courses. The other students primarily used concept mapping in science courses because of the need to break down concepts to understand the underlying information. Student 2733 used the mapping
to write his paper because he said he “is not a fan of creating and using outlines” but prefers having a more detailed picture of what he is writing about. This student was very active in his use of the strategies but was not very good at journaling about how he used and felt about the activities. At the end of the research this student did provide the researcher with journal entries done during his time with the research. He did explain his opinions in great detail during interviews.

Student number 2968 was a female student who was in her second semester as a pre-nursing student. She felt that she did good academically and was a pre-nursing scholar. When the researcher spoke with her about her courses, she told the researcher that her Anatomy and Physiology I course is the most challenging. The student does the readings the teacher assigns, follows the PowerPoint and takes notes, but still feels as though she has trouble putting the content into context. The researcher suggested that she work with concept mapping for this particular course and also provided the student with information about testing skills. When the student used the activity, she found that because of the way the lesson was presented it is not complicated enough to use the concept mapping but will work better on later lessons. She felt that it would be helpful as she got further into the material but not so much at the time of the study. The student is using direct paraphrasing, self-testing, group study, and has created her own flip chart to help with her studying. One the day of the last interview, the student had just taken a test that morning and felt that using the exam preparation helped her, so she felt very good about how she did on the test.

For the next meeting, the researcher suggested that the student try a strategy called the One Sentence Summary. The One Sentence Summary is a way for students to summarize knowledge and concepts that they learn during a lesson. This is something that the student had
done off and on during her courses to make sure she is understanding the content. The student and researcher discussed using a modified version of the One Sentence Summary by writing a sentence or two first about what she understands then do the same thing for something that she does not understand. This allowed the student to review the material that she did understand and do more work on what she did not.

Student number 4684 was a female student in her second semester as a Kinesiology major with a pre-physical therapy major. The student felt that she did well academically in courses that she has a genuine interest in and that writing came easy to her. The student was primarily interested in help with being able to studying and time management. She works two jobs with the university as a student worker and also volunteers at the local children’s hospital. The student feels she is a hard worker but admits to being so tired in class that she falls asleep at times. Even though she had very little time, the student was still very interested in working with the strategies because she felt they could help her learning now and in the future. One of the things that the student expressed about her learning is that she believed she overanalyzes the subject matter, and it prevented her from other making connections.

This student was particularly active with the research and asked to continue to use the strategies and other information given to her after the research had ended. When the researcher explained the different learning strategies to the student, the student decided that she could use the strategies in her Anatomy and Physiology course, and her Environmental Biology course. The researcher agreed and provided information about concept mapping, study strategies, and K-W-L charting. The student worked with all three of these and felt that the K-W-L charting was not helpful for the courses she decided to use it in. Her impression was that K-W-L would be better used in either a History or English course where information is divided up in a simple
manner. The student found that the concept mapping worked perfectly in both of her science courses because the information needed to be broken down more than what she has done in the past. The researcher believed that the student made a real effort to use the strategies and felt they will help her to view her learning differently and she will become a deeper learner.

Figure 3.

Concept Map created by Student 4684

Student number 4699 was a female in her second semester of college. She was a pre-nursing major and is also a Peer Educator at the university wellness center. She was currently enrolled in four courses after dropping a biology course. The student was very organized and stated that she learned best by actually doing the work rather than someone showing her how to do something. She viewed herself as an average student but did enjoy learning and attending classes.
During the initial interview, the researcher and student talked together, and the student felt she could do well with concept mapping in her Anatomy and Physiology course. The student said that her instructor for this course provided a study guide and PowerPoints for each section that they were working on at the time. During class she listens and makes notes on the PowerPoint and after class the student works on what was taught by creating flash cards then reviewing them. During the next interviews, the researcher made note that the student was very by the book and had a difficult time understanding how a student could use a concept map. An explanation was provided that there is no right or wrong way to use the concept map, but the student felt she had to exactly follow the example provided (Appendix P). When the student was working with the journal prompts, she believed that it was something she only had to do it one time, not each time a strategy was used. The researcher endeavored to explain to the student that the strategy can be adjusted to fit how the student best learned. Student 4699 was not very talkative during interviews nor did she appear to be engaged in the activities.

**Student Feedback**

Four of the five students were very engaged in the idea of a developing new ways to learn the material in their courses. Only three had ever heard of or worked with any sort of metacognitive learning prior to this study. Two of these students had the chance to do activities in high school classes and they were not even aware that what they were doing then were considered metacognitive strategies. The two activities the students spoke about using in high school were Ticket-Out-The-Door and Directed Paraphrasing. The Ticket-Out-The-Door is a method used by instructors to clarify concepts for students. Students received one or two questions written on a note card close to the end of the class period and were required to answer the question(s) then turn the card in as they left the classroom. Student 4699 told the researcher
that they never knew when the class would get the questions or who in the class would get them. As a result, the students were apt to pay much closer attention just in case it was their day to get a card.

Positive feedback from the students showed that the strategies were used in different and similar ways by students who the researcher worked with during the research period. Student 2733 expressed how much he enjoyed working with the concept map and how he is going to continue using it to help in many of his courses. He started out using it in his science course then began to describe how he used it to write a book analysis paper. He wrote the main theme of the book and then expanded to the sides with character names, plots, and personalities so he could make more sense of the book itself. Student 4684 said that by using concept mapping she was able to dig deeper into the concepts in her Anatomy and Physiology class. Even though she had a good instructor, the concept map showed her new ways of breaking down the material into a visual representation of the information. Student 4699 stated that the use of the concept mapping strategy allowed her to “see myself as more academically successful” once she became used to using it. She was also able to branch out the information and connect it back together in a more understandable way.

In the beginning of the research negative feedback mostly dealt with the K-W-L chart because the students wanted to use it in their sciences courses. The students felt that the use of the K-W-L chart took too much time to put together and did not see how it could help them to learn better. The students still attempted to use it in other classes but, they could not get the material they were studying to fit into the model. There was one student who used this method effectively by putting the chart together before studying then going over it again, answering questions he initially had and reorganized the chart. The rest felt that it did not help them in how
they study or did not completely understand how to perform the task in a way that they found helpful. The researcher suggested that students modify how they use the strategy so that they will be able to use it effectively in their chosen course. Two of them said that they would keep trying to use K-W-L in future courses.

**Metacognitive Awareness Inventory Results**

The use of the Metacognitive Awareness Inventory (MAI) was used to encourage students to think about and monitor their learning processes. Students involved in the research have taken the MAI at their first meeting with the researcher and took the MAI again so the researcher and students could compare the results and see if their results changed (Harford Community College, 2019). The expectation of the researcher was that the students who used the strategies effectively would demonstrate improvement from one MAI to another.

When the students did the initial MAI the area that showed the most inefficient results was the area of declarative knowledge which deals with how the students learned at the time and what influenced them. The most proficient area was conditional knowledge which involves students how knowing under what circumstances they learn best. The procedural knowledge category was the one that two students expressed they considered themselves proficient and three students were inefficient. Procedural knowledge is what students, as learners, know about the different strategies that work for them individually (Young & Fry, 2008).
Initial MAI Results

Table 2

Knowledge about Cognition

<table>
<thead>
<tr>
<th>Student Code</th>
<th>Proficient</th>
<th>Inefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>1957</td>
<td>Conditional Knowledge</td>
<td>Procedure/Declarative Knowledge</td>
</tr>
<tr>
<td>2733</td>
<td>Procedural Knowledge</td>
<td>Declarative Knowledge</td>
</tr>
<tr>
<td>2968</td>
<td>Conditional Knowledge</td>
<td>Procedural Knowledge</td>
</tr>
<tr>
<td>4684</td>
<td>Procedural/Conditional Knowledge</td>
<td>Declarative Knowledge</td>
</tr>
<tr>
<td>4699</td>
<td>Conditional Knowledge</td>
<td>Declarative Knowledge</td>
</tr>
</tbody>
</table>

For the regulation of cognition there are five categories:

- Planning involves goal setting and apportioning available resources before beginning to learn.
- Information Management (Strategies) involves processing information effectively.
- Comprehension (Monitoring) is the assessment of the student’s learning or strategy use.
- Debugging (Strategies) allows the student to correct understanding and performance errors.
- Evaluation involves the success of performance and strategy after learning has taken place (Schraw & Dennison, 1994).

The results that the researcher found when the students filled out their initial MAI are shown in the table below. A majority of the students showed an inefficiency in comprehension and evaluation which addresses student learning and strategy use and what happens with students’ evaluation of their learning.
Table 3

Regulation of Cognition

<table>
<thead>
<tr>
<th>Student Code</th>
<th>Proficient</th>
<th>Inefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>1957</td>
<td>Information Management, Comprehension Monitoring, Debugging</td>
<td>Planning, Evaluation</td>
</tr>
<tr>
<td>2733</td>
<td>Debugging, Planning, Evaluation</td>
<td>Comprehension, Information Management</td>
</tr>
<tr>
<td>2968</td>
<td>Information Management, Debugging, Planning</td>
<td>Comprehension, Evaluation</td>
</tr>
<tr>
<td>4684</td>
<td>Information Management, Debugging</td>
<td>Planning, Comprehension, Evaluation</td>
</tr>
<tr>
<td>4699</td>
<td>Comprehension, Evaluation</td>
<td>Information Management, Debugging, Planning</td>
</tr>
</tbody>
</table>

The following tables represent the same information but after the students have completed the learning strategies provided by the researcher. These results tend to show an improvement in the students’ knowledge about cognition from the initial meeting to the meeting at the end of the research when they completed the MAI again.

Final MAI Results

Table 4

Knowledge about Cognition

<table>
<thead>
<tr>
<th>Student Code</th>
<th>Areas Seen as Improved</th>
<th>Areas that Remained the Same</th>
</tr>
</thead>
<tbody>
<tr>
<td>1957</td>
<td>Procedural - Declarative – Conditional</td>
<td>None</td>
</tr>
<tr>
<td>2733</td>
<td>Conditional</td>
<td>Procedural - Declarative</td>
</tr>
<tr>
<td>2968</td>
<td>Procedural – Conditional</td>
<td>Declarative</td>
</tr>
<tr>
<td>4684</td>
<td>Procedural-Declarative-Conditional</td>
<td>None</td>
</tr>
<tr>
<td>4699</td>
<td>Procedural – Declarative</td>
<td>Conditional</td>
</tr>
</tbody>
</table>
Table 5

*Regulation of Cognition*

<table>
<thead>
<tr>
<th>Student Code</th>
<th>Areas Seen as Improved</th>
<th>Areas that Remained the Same</th>
</tr>
</thead>
<tbody>
<tr>
<td>1957</td>
<td>Information Management – Debugging – Planning – Comprehension – Evaluation</td>
<td>None</td>
</tr>
<tr>
<td>2733</td>
<td>Information Management – Planning – Comprehension</td>
<td>Debugging - Evaluation</td>
</tr>
<tr>
<td>2968</td>
<td>Information Management – Planning – Comprehension – Evaluation</td>
<td>Debugging</td>
</tr>
<tr>
<td>4684</td>
<td>Information Management-Planning</td>
<td>Debugging-Comprehension - Evaluation</td>
</tr>
<tr>
<td>4699</td>
<td>Information Management – Debugging – Planning - Evaluation</td>
<td>Comprehension</td>
</tr>
</tbody>
</table>

**Differences and Similarities in MAI Results**

Student 1957 has demonstrated that even though she was hesitant to try something new, once she did it helped her become better in her learning and she felt better when preparing for a recent test. This student has been going through personal problems and this has distracted her from her school work and learning activity use, but found that by working with the researcher and taking the time to work with learning strategies it helped her to refocus. The researcher noticed that by the end of the research the student expressed a higher level of confidence and more excitement about her learning.

Student 2733 showed improvement in a majority of the MAI categories but showed an inefficiency in evaluation. Evaluation deals with the student’s regulation of cognition and how they view their goals, how the student summarizes details, and how they approach a task. Student 2733 was the student who showed the most interest in expanding the use of the strategies and making them his own. He has also been working with his classmates, showing them how he used concept mapping and K-W-L to help him with his learning. He has even begun teaching his
classmates and other students how he used metacognitive learning strategies and how they work for him.

Student 2968 showed a marked improvement between the initial and final Metacognitive Awareness Inventory (MAI). The comments Student 2968 wrote on her MAI indicated that she felt she is now able to use the learning strategies more and that they were now more helpful than she initially thought they would be. When she first began using the concept map she admitted that she did not like creating the concept maps and had a hard time connecting the information. After the student used concept mapping a bit more and “started out more simple”, she began to enjoy using the strategy and expressed that she will continue to use it in the future.

Student 4684 did show an improvement between the two MAI but more so, she discussed how much she felt that the learning strategies helped her to see her learning in a new way. The use by the student of concept mapping and directed paraphrasing enabled her to visualize what she learned and was especially helpful right before a test. Direct paraphrasing helped her during her study time as she rewrote the notes she took in class. Right before her test she visualized that she would do well and “it helps with my confidence, then I do better on a test than I believed I would”.

Student 4699 indicated she wasn’t sure if the strategies would help her with the four classes that she was currently enrolled in. She took the time to review the strategies and put them into practice. By doing this, Student 4699 did see an improvement in how she studied and learned the material that her instructors gave her. At the end of the last interview with the researcher she stated that she was grateful for the opportunity to learn about metacognitive learning strategies. The researcher believed that this student did show a noticeable improvement
in her learning and will improve more as she continues to use the learning strategies in her education.

**Answering Research Questions**

1. **In what ways do metacognitive learning strategies help first-year students learn more effectively?**

   The use of metacognitive learning strategies such as concept mapping, are intended to assist students in organizing what they are learning in a way that makes sense to them. This is especially important for first-year students since most are coming from a high school learning environment into a college level learning environment for the first time.

2. **Do metacognitive learning strategies change the way students see their learning?**

   In the research, once the students began using the strategies there was a noticeable difference in their confidence levels and they had a new excitement for what they were learning and how they were learning it. The students appeared to be actually looking forward to going to class because they felt more prepared and able to understand the material better.

3. **How do the challenges the students face affect their use of metacognitive learning strategies?**

   The students were more hesitant to try the strategies at first but once they became familiar with them and used them, they began to enjoy using them and saw them more as a study tool. One of the students was having personal issues and she felt that this prevented her from using the strategies to what she felt was their true potential. Once her life calmed down she began to use the strategies and find them helpful. Another challenge observed by the researcher was that there was one student who was afraid of doing them wrong. This caused her to be hesitant and she did not contact the researcher for further instruction but instead waited until the
next meeting to express her concerns. There was also a student that worked two part-time jobs, volunteered, and was taking four classes. These are all outside activities that could have prevented them from fully working with the strategies but they found a way to do them and have benefited from their use.

**Summary**

Two of the students appeared to show a great deal of interest in learning and gaining the experience from the activities but did not seem to be as engaged as the others. These students’ journal rarely or not at all, and did not supply much information during the interviews even when the researcher asked questions about their use. One of these students had many things going on personally, yet asked to continue with the research, and the other appears to constantly fear that she is doing them incorrectly. Student 4699 wanted the researcher to validate that she was doing the strategies “right” or showed what she had done and asked if it was right or wrong. The researcher encouraged the student to continue working on the strategies and confirmed that there was really no right or wrong way of putting information in a concept map or do a K-W-L chart.

Even though the research group was small, with only five students, many things were seen as similar in ways of thinking and results. From the five students, there were four that told the researcher they saw results in the way they were learning, and that they were making an effort to perform the activities in a way that helped them break their work down. These students provided the researcher with a lot of feedback on how the learning activities were helping them; they journal about their results, one even adding pictures of what she had done with the activities to her journal. All five expressed that they intend to continue to use the strategies after the research was over and that they were glad to have had the chance to work with metacognitive learning.
On the whole, the students did not prefer to use the K-W-L strategy. Primarily due to the fact that they wanted to be able to do the activity in a science course and thought that the K-W-L was not a good fit for the course. One of the students did the activity in a different way and he did find it helpful in the method that he used it which was a before the lesson then after the lesson way. This allowed him to answer his own questions once he had been in class and reviewed the material the instructor provided.
Chapter 5: Discussions, Implications, and Recommendations

This chapter will discuss the results of students’ use of metacognitive learning strategies and what patterns emerged. As the researcher worked with the first-year students, it was noted that as these students were shown and taught metacognitive learning strategies, they were able to view learning in a different, more positive way. The challenge for universities and first-year experience programs is finding a way to provide opportunities for all first-year students to have the chance to learn these strategies. According to Lamar and Lodge (2014), “It simply cannot be assumed that students enter university with the metacognitive capital that enables them to adapt to the learning activities at a tertiary level within a reasonable time frame” (p. 97). The primary aim of this research was to demonstrate that when first-year students who have the opportunity to actively use metacognitive learning strategies in their course work, can improve how the students think about learning.

The article by Lamar and Lodge (2014), states that metacognition is arguably a central factor that helps first-year students adjust to college academics (p. 97). This study is among the others that have worked to explore the connection between metacognition and the success experienced by students who use these metacognitive learning activities in their learning. In a literature review by Akturk, the author concludes by using information presented by John Biggs (1988) stating that students who use metacognitive strategies have shown academic performance improvement (Akturk & Sahin, 2011).

A good example of a successful program that has used metacognition to help first-year students as well as all students is the Metacognition Lab at Miles College in Fairfield, Alabama. This lab uses metacognitive strategies and peer mentors to make a positive difference in student learning. As the article written by the Director of the Lab and one of the professors at Miles...
College states, “The mission of the Metacognition Lab continues to be centered on teaching students how to study and how to become lifelong learners” (Chekwa & Dorius, 2016, p. 66). The Metacognition Lab at Miles College has shown success with increased retention rates and a rise in grade point averages of students who came to the lab for one on one sessions (Chekwa & Dorius). One of the things that the researcher did was a form of mentoring or coaching as was done at Miles College and this did impact how the students interacted with and did the strategies.

The purpose of this study was to provide an opportunity for first-year students to become familiar with metacognitive learning strategies. By doing this the students were able to see how these strategies could help improve the success in their courses. This chapter will discuss the impact on student learning as shown by the interviews with the students as they used the activities in their learning. According to Magno (2009), “They supported this claim in the findings of their study where a strong relationship between components of metacognition and deep approach to learning was found” (p. 235). The limitations of the study will be discussed to demonstrate that even when students are provided with learning strategies, they may not always use them regularly or in a way that will be effective to their learning.

Discussion

When working with these five students the researcher learned how the students used the strategies, as well as why and when the strategies were helpful. During the interview, the researcher noticed that those who were actively using the strategies saw the greatest improvement. As Saundra McGuire’s (2008) book “Teach Yourself How to Learn,” explains metacognition is, “The ability to: think about your own thinking, be consciously aware of yourself as a problem solver, monitor, plan, and control your mental processing, and accurately
judge your level of learning” (p. 11). These actively involved students displayed these four characteristics in their learning and are now more excited about where their learning can go.

How does a student think about their own thinking? Student 4684 said that she, “now thinks more and deeper than before” and the researcher could tell she was excited about where the metacognitive learning strategies were taking her and they helped her to break information down. Student 2733, felt “more confident about what he is learning” and had even shown the strategies to others in his class and taught them how he used them. The researcher believed that both of these students understood the value of the learning strategies and wanted to share what they have learned with classmates. They now see their thinking in a totally different way than they did at the beginning of the research.

The research students are also deliberately mindful of themselves as problem solvers, and able to be aware of, plan, and be in control of their own intellectual development. When they discussed their use of the learning strategies, more than one of the students stated that they had “never thought about it like that before”. Strategies have provided the students with a new way of looking at what they are learning and given them a unique way to process the information they are given for a test or during a lecture.

At the beginning of the research, one student told the researcher that she wanted to improve her study skills and be able to learn more effectively in class. As the student had progressed through the strategies, she explained that use of the concept mapping and directed paraphrasing had helped her in her studying and learning. The student who the researcher was talking with stated, “I feel like it has made a big difference [in how I learn]”. The researcher was encouraged that this student has found a method of study that will help as she continues on in her education. Through this the researcher believes that this student’s procedural knowledge, or
knowledge about what different strategies or procedures work best for her (Young & Fry, 2008, p. 1), has increased and made her more excited in her learning.

Over the time that the researcher worked with the students she felt that the students have become more aware of how they were learning to start with and how much better they felt about learning after the research. Student 2968, “science is so much easier when it is broken into concept map pieces”. The researcher noticed a level of confidence from the students that was not present when the student interviews first started, and their confidence showed that when they worked to teach the researcher how they used the strategies and the students also bragged on how well the strategies worked.

As the students found that the strategies provided to them are helpful, and their confidence built up the students’ own ability to learn and do well on tests increased. Student 2968 was excited about learning and saw that studying did not have to be difficult or arduous in its nature but can be enlightening. According to Magno (2009), when learners possess high academic ability and are more confident, they are able to be successful with metacognitive strategies and their own monitoring. When the student sees a better grade on a quiz or test, they see what they are doing as part of that strategy is working and they want to continue on performing the strategy or find a way to learn more about these strategies.

As part of the research, the students used journaling to explain more about their experiences, see their progress, and decide in what ways the strategies could be more helpful in the future. In her journal, one of the students discussed using one of the Exam Preparation metacognitive skills for one of her exams. She used Exam Visualization (cognitive rehearsal) prior to the exams and believed that it helped because she was much less nervous than on previous exams and felt good after completing the exam. Exam Visualization is when the student
visualizes themselves taking the exam the night before, and sees themselves as confidently taking the exam in the classroom and feeling happy to have done so well afterward (Tanner, 2012).

Other research students who also used the Exam Preparation skills when they were preparing to take a quiz or test found that they saw an improvement in their score from the last test they took. The earlier tests that were taken were done prior to the students beginning to work with the metacognitive learning strategies. The students stated that they usually only read over their class notes and sometimes looked over the chapter or chapters that were on the test. Even though the students did not explain, in detail, what their previous study methods were, it did not appear that they were using any of the strategies discussed by the researcher, or explained on the Exam Preparation sheet.

While there were those students in the research that did use the strategies as they should be used and even expanded on the strategy’s use, there were those that even though they had instructions on the strategy they did not use it. The researcher understands that what might work for one student will not work for another, but the intention was that the students’ attempted to use the strategy to see helped them. Research shows that even though some students had this learning strategy information available to them, they did not use what they knew. Many of the students who did not use the strategies believed that they are too much work, and take too much time to figure out the best way to use them (Frontiers, 2017). This has been the case with Student 1957, because she had so many other things going on, she felt that it was taking too much time to journal or work on the strategy. Student 1957 only did minimal work with the strategies, even though she thought that they may help in the future.
As the researcher talked with the students, she found that some of them knew what metacognitive learning strategies were and had even used them previously in high school. Even though these students knew about these learning strategies they rarely used them. An article in *Science Digest* states, “… researchers are less sure how often students actually use the techniques, whether they can use them effectively, and whether they know which techniques are most appropriate in specific learning situations” (Frontiers, 2017). From what the researcher learned in the student interviews, some area high schools do give students metacognitive learning activities without the students knowing but still they are not used to their full benefit.

**Limitations**

When discussing limitations to this study, the researcher finds that there were three main limitations that have caused results to not be as conclusive as they would have been otherwise. These were a lack of active participation, not communicating effectively with the researcher, and not using the strategies for the intended purpose. These will be broken down in the following paragraphs to reveal where there was a lack of positive or negative participation by the student. The students involved in the research have expressed that they felt the strategies were helping them in their work but the researcher noticed that not all of the students were actively participating in the research.

The main limitation that was anticipated for this study was being able to locate an adequate number of students willing to actively participate in the study. While the students who the researcher worked to obtain as volunteers were already engaged at the university level, there were some students who did not participate fully. It is also possible that students who did wish to participate were prevented from participating because of schedule conflicts.
One of the limitations that the researcher noticed was that the students did not journal effectively. Journaling itself is a method of metacognitive activity but the students in this research did not journal regularly and this caused the researcher to lack information about how the students worked with the strategies. At the end of the research, two of the students did give journal entries to the researcher that did not have much information.

**Lack of Journaling**

As part of the research the students were asked to journal using prompts provided by the researcher during the initial research interview. The students were to journal each time that they used the particular learning activity that they were given. Students in the research were given the option to either write out their journal prompt responses, or type them out on the computer, then bring them with them to their appointment with the researcher, or email them to the researcher. The participation in this activity ranged from keeping very detailed journal entries where they answered two or more of the journal prompts to not providing any journal information at all. The results of how much the student used the strategies during their homework or study time is unknown without that piece of information. Of the five students involved in the research, only three are known to have been actively keeping a journal about which activity they used, how it was used, and how they felt it helped or did not help them.

The students involved in the research rarely participated in the journaling requirement. When journaling information was received it was at the very end of the research even when the students had been instructed to provide the journal entries during each meeting with the researcher. When the researcher pointed this out to the student they were meeting with the student would promise to email it to the researcher right after the meeting but this rarely to never happened. Having this piece of information would have been very helpful for the researcher and
would have added substantially to the research. A majority of the information the researcher received was from the one-on-one interviews. The journaling activity may have been too time consuming for some of the students due to work and school schedules so they decided not to do the journaling until the very end.

**Active Communication**

Communicating the results to the researcher in a clear way helped the researcher know how much the student used the activities and whether or not they were having success. All five students kept all scheduled meetings with the researcher but two of the students did not provide much information during the interviews. The students talked about how they did in their course of choice with the assigned learning strategy, but they were not very descriptive and the researcher had to constantly ask questions over and over again just to get a small amount of information.

When the student had not been completely engaged with the learning activity, they did not seem to have much to say about whether or not it assisted them in their studies. One of the students tended to be a bit of a perfectionist and, when she discussed the activity, she seemed to feel that she had done the activity incorrectly. Because she was so afraid it was incorrect, it made it difficult to communicate with the student about how she used and viewed the activity. Another of the students barely talked during interviews and appeared to be there only because she felt like she had to be. The researcher understood that the student had been having some personal issues so the student explained that she had not been able to do much with the strategies provided to her. Communication problems definitely caused issues for the researcher to learn whether or not the strategies were working in a positive or negative way for students.
Number of Research Students

The researcher believes that if she had a larger number of students in the research group, she could have been able to get more information. The information could have provided results that would have been more conclusive about the effectiveness of metacognitive learning strategies. The more information the students provided could have shown further positive or negative evidence and given the researcher more information about how the students used and expanded the strategies in their coursework.

Strategies Used Incorrectly

Students who did not follow the instructions on the strategy and how it was to be used may have reported their results incorrectly. The researcher knew that there were different ways to use a particular activity, such as concept mapping, which can be done in different ways, but other activities, such as K-W-L, are used in a particular way. If the student does not use the activity in the way of what they know, what they want to know, and what they have learned, the student may not have had success or may have experienced problems. Student 4699 appeared to be so afraid of doing the activity wrong that the researcher cannot be sure if she did the activity correctly or at all. The way this limitation was attempted to be corrected was to provide more information to the students about doing the activity properly, concept mapping (Appendix P).

Recommendations for practitioners and future research

The researcher believes that the use of metacognitive learning strategies can have a positive effect on student learning. While activities such as concept mapping, directed paraphrasing, Know-Want [Wonder]-Learn, Ticket-Out-The-Door, and one sentence summary can all be used in the classroom, their use in a one-on-one environment can yield positive evidence. The research could create metacognitive learning methods to be taught in classes by
instructors or in a student seminar environment. Since many universities have first-year experience courses/seminars, they provide a perfect catalyst to teach students about metacognitive learning strategies.

Another way that metacognitive learning can be made available to students would be to have a Metacognition Lab such as the one the researcher discussed at Miles College in Alabama. This would provide a mentorship or coaching opportunity where students can interact one-on-one with their mentor such as is the case with this research. This could be in a counseling environment to give students someone to discuss academic issues with and get direct feedback on learning metacognitive strategies.

Even though research studies on metacognition have lessened since the 1990’s because learning outcomes have already been set and there have been new learning strategies introduced (Magno, 2009), there is still much to learn. Engaging in further research would provide a better opportunity to work further with students and to gain a better understanding of how these learning strategies could help first-year students. Being able to follow a group of first year students from their first semester through graduation after they are introduced to metacognitive learning strategies would provide information about student progress with the strategies. This way would also provide researchers with the ability to observe the long term effects of metacognitive learning on students’ overall GPA, and how students view learning. The goal for this student research would be to assist students in developing a life long love of learning.

In the future, the research could be carried a step further by the creation of a metacognitive seminar to introduce all students to metacognitive learning strategies, and to also have it be combined with a student mentor program to include faculty, staff, and other students. At Augusta University there are other staff and faculty that are also interested in metacognition
but are working with instructors on how to teach metacognition to students. There is also a desire to begin research that would explore ways to develop a metacognition lesson directed toward first-year nursing student learning enhancement.

**Conclusion**

According to Rogaten and Moneta (2016), “Metacognition in the educational context typically refers to a form of higher order thinking characterized by the ability to self-regulate cognitive processes in learning” (p. 1100). The use of metacognitive learning at the college level has been shown by the research and by the students participating in this research study as being a learning method that can assist in a student’s academic endeavors. According to a study by Rezvan, Ahmadi, and Abedi (2006), when students are given the opportunity to work with metacognition in a counseling center environment it can improve happiness and academic achievement. The researcher has seen that when the research students have success in their courses there was a noticeable improvement in their self-esteem, and an increase their academic confidence.

In working with these five unique types of students, the researcher was allowed to see how these strategies are used by different students and the different results. Even though there is documented research that has taken place over the last twenty years, very few students are aware that the concepts of metacognition exist (Hartman, 2001). This research offers proof that when these strategies are actively used in a coaching or mentorship environment that students can experience success as they navigate through college courses while using metacognitive learning strategies. This research opens the door for future research and development of a program that has the potential to train first-year students, as well as other students, in metacognitive learning strategies.
When the researcher took the time to meet with the students one-on-one in a mentor or coaching type of environment it provided a unique point of view for the student as well as for the researcher. The ability to follow a small number of select students, using the mentor approach during their undergraduate college career could further illustrate how the use of metacognitive learning strategies does or does not help student success.
References


VIU Centre for Innovation and Excellence in Learning. (2019). Retrieved from Vancouver Island University web page: https://ciel.viu.ca/teaching-learning-pedagogy/designing-your-course/how-learning-works/ten-metacognitive-teaching-strategies


Metacognitive Awareness Inventory (MAI)

Think of yourself as a learner. Read each statement carefully. Consider if the statement is true or false as it generally applies to you when you are in the role of a learner (student, attending classes, university etc.) Check (✓) True or False as appropriate. When finished with all statements, apply your responses to the Scoring Guide.

<table>
<thead>
<tr>
<th></th>
<th>True</th>
<th>False</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I ask myself periodically if I am meeting my goals.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>I consider several alternatives to a problem before I answer.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>I try to use strategies that have worked in the past.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>I pace myself while learning in order to have enough time.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>I understand my intellectual strengths and weaknesses.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>I think about what I really need to learn before I begin a task</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>I know how well I did once I finish a test.</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>I set specific goals before I begin a task.</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>I slow down when I encounter important information.</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>I know what kind of information is most important to learn.</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>I ask myself if I have considered all options when solving a problem.</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>I am good at organizing information.</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>I consciously focus my attention on important information.</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>I have a specific purpose for each strategy I use.</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>I learn best when I know something about the topic.</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>I know what the teacher expects me to learn.</td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>I am good at remembering information.</td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>I use different learning strategies depending on the situation.</td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td>I ask myself if there was an easier way to do things after I finish a task.</td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>I have control over how well I learn.</td>
<td></td>
</tr>
<tr>
<td>21.</td>
<td>I periodically review to help me understand important relationships.</td>
<td></td>
</tr>
<tr>
<td>22.</td>
<td>I ask myself questions about the material before I begin.</td>
<td></td>
</tr>
<tr>
<td>23.</td>
<td>I think of several ways to solve a problem and choose the best one.</td>
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<td></td>
</tr>
<tr>
<td>25.</td>
<td>I ask others for help when I don't understand something.</td>
<td></td>
</tr>
<tr>
<td>26.</td>
<td>I can motivate myself to learn when I need to</td>
<td></td>
</tr>
<tr>
<td>27.</td>
<td>I am aware of what strategies I use when I study.</td>
<td></td>
</tr>
<tr>
<td>28.</td>
<td>I find myself analyzing the usefulness of strategies while I study.</td>
<td></td>
</tr>
<tr>
<td>29.</td>
<td>I use my intellectual strengths to compensate for my weaknesses.</td>
<td></td>
</tr>
<tr>
<td>30.</td>
<td>I focus on the meaning and significance of new information.</td>
<td></td>
</tr>
<tr>
<td>31.</td>
<td>I create my own examples to make information more meaningful.</td>
<td></td>
</tr>
<tr>
<td>32.</td>
<td>I am a good judge of how well I understand something.</td>
<td></td>
</tr>
<tr>
<td>33.</td>
<td>I find myself using helpful learning strategies automatically.</td>
<td></td>
</tr>
<tr>
<td>34.</td>
<td>I find myself pausing regularly to check my comprehension.</td>
<td></td>
</tr>
<tr>
<td>35.</td>
<td>I know when each strategy I use will be most effective.</td>
<td></td>
</tr>
<tr>
<td>36.</td>
<td>I ask myself how well I accomplish my goals once I'm finished.</td>
<td></td>
</tr>
<tr>
<td>37.</td>
<td>I draw pictures or diagrams to help me understand while learning.</td>
<td></td>
</tr>
<tr>
<td>38.</td>
<td>I ask myself if I have considered all options after I solve a problem.</td>
<td></td>
</tr>
<tr>
<td>39.</td>
<td>I try to translate new information into my own words.</td>
<td></td>
</tr>
<tr>
<td>40.</td>
<td>I change strategies when I fail to understand.</td>
<td></td>
</tr>
<tr>
<td>41.</td>
<td>I use the organizational structure of the text to help me learn.</td>
<td></td>
</tr>
<tr>
<td>42.</td>
<td>I read instructions carefully before I begin a task.</td>
<td></td>
</tr>
<tr>
<td>43.</td>
<td>I ask myself if what I'm reading is related to what I already know.</td>
<td></td>
</tr>
<tr>
<td>44.</td>
<td>I reevaluate my assumptions when I get confused.</td>
<td></td>
</tr>
<tr>
<td>45.</td>
<td>I organize my time to best accomplish my goals.</td>
<td></td>
</tr>
<tr>
<td>46.</td>
<td>I learn more when I am interested in the topic.</td>
<td></td>
</tr>
<tr>
<td>47.</td>
<td>I try to break studying down into smaller steps.</td>
<td></td>
</tr>
<tr>
<td>48.</td>
<td>I focus on overall meaning rather than specifics.</td>
<td></td>
</tr>
<tr>
<td>49.</td>
<td>I ask myself questions about how well I am doing while I am learning something new.</td>
<td></td>
</tr>
<tr>
<td>50.</td>
<td>I ask myself if I learned as much as I could have once I finish a task.</td>
<td></td>
</tr>
<tr>
<td>51.</td>
<td>I stop and go back over new information that is not clear.</td>
<td></td>
</tr>
<tr>
<td>52.</td>
<td>I stop and reread when I get confused.</td>
<td></td>
</tr>
</tbody>
</table>

**Metacognitive Awareness Inventory (MAI) Scoring Guide**

**Directions**
For each **True**, give yourself **1 point** in the Score column.
For each **False**, give yourself **0 points** in the Score column.
**Total** the score of each category and place in box. **Read** the descriptions relating to each section.

## Knowledge about Cognition

### Declarative Knowledge
- The factual knowledge the learner needs before being able to process or use critical thinking related to the topic
- Knowing *about, what, or that*
- Knowledge of one's skills, intellectual resources, and abilities as a learner
- Students can obtain knowledge through presentations, demonstrations, discussions

### Procedural Knowledge
- The application of knowledge for the purposes of completing a procedure or process
- Knowledge about *how* to implement learning procedures (e.g., strategies)
- Requires students know the process as well as when to apply process in various situations
- Students can obtain knowledge through discovery, cooperative learning, and problem solving

### Conditional Knowledge
- The determination under what circumstances specific processes or skills should transfer
- Knowledge about *when* and *why* to use learning procedures
- Application of declarative and procedural knowledge with certain conditions presented
- Students can obtain knowledge through simulation

<table>
<thead>
<tr>
<th>Declarative Knowledge</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. I understand my intellectual strengths and weaknesses.</td>
<td></td>
</tr>
<tr>
<td>10. I know what kind of information is most important to learn.</td>
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</tr>
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<td>12. I am good at organizing information.</td>
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<td>16. I know what the teacher expects me to learn.</td>
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<td>20. I have control over how well I learn.</td>
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<td>32. I am a good judge of how well I understand something.</td>
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<td>46. I learn more when I am interested in the topic.</td>
<td></td>
</tr>
</tbody>
</table>

**Total** 8

<table>
<thead>
<tr>
<th>Procedural Knowledge</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. I try to use strategies that have worked in the past.</td>
<td></td>
</tr>
<tr>
<td>14. I have a specific purpose for each strategy I use.</td>
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<td>27. I am aware of what strategies I use when I study.</td>
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<tr>
<td>33. I find myself using helpful learning strategies automatically.</td>
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</table>

<table>
<thead>
<tr>
<th>Conditional Knowledge</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>15. I learn best when I know something about the topic.</td>
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<td>18. I use different learning strategies depending on the situation.</td>
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<td>35. I know when each strategy I use will be most effective.</td>
<td></td>
</tr>
</tbody>
</table>

**Total** 4

**Total** 5
# Regulation of Cognition

## Planning
- Planning, goal setting, and allocating resources prior to learning

## Information Management Strategies
- Skills and strategy sequences used to process information more efficiently (e.g., organizing, elaborating, summarizing, selective focusing)

## Comprehension Monitoring
- Assessment of one's learning or strategy use

## Debugging Strategies
- Strategies to correct comprehension and performance errors

## Evaluation
- Analysis of performance and strategy effectiveness after a learning episode

<table>
<thead>
<tr>
<th>Information Management Strategies</th>
<th>Score</th>
<th>Comprehension Monitoring</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. Slow down when I encounter important information.</td>
<td></td>
<td>1. I ask myself periodically if I am meeting my goals.</td>
<td></td>
</tr>
<tr>
<td>13. I consciously focus my attention on important information.</td>
<td></td>
<td>2. I consider several alternatives to a problem before I answer.</td>
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<td>30. I focus on the meaning and significance of new information.</td>
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<tr>
<td>48. I focus on overall meaning rather than specifics.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>10</strong></td>
<td><strong>Total</strong></td>
<td><strong>7</strong></td>
</tr>
</tbody>
</table>

## Debugging Strategies

<table>
<thead>
<tr>
<th>Score</th>
<th>Evaluation</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>25. I ask others for help when I don't understand something.</td>
<td>7. I know how well I did once I finish a test.</td>
<td></td>
</tr>
<tr>
<td>40. I change strategies when I fail to understand.</td>
<td>19. I ask myself if there was an easier way to do things after I finish a task.</td>
<td></td>
</tr>
<tr>
<td>44. I re-evaluate my assumptions when I get confused.</td>
<td>24. I summarize what I've learned after I finish.</td>
<td></td>
</tr>
<tr>
<td>51. I stop and go back over new information that is not clear.</td>
<td>36. I ask myself how well I accomplish my goals once I'm finished.</td>
<td></td>
</tr>
<tr>
<td>52. I stop and reread when I get confused.</td>
<td>38. I ask myself if I have considered all options after I solve a problem.</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5</strong></td>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>
Appendix B

RE: Metacognitive Awareness Inventory Usage Request

Sperling, Rayne Audrey <rsd7@psu.edu>
Wed 11/14/2018 2:55 PM
To: Janelle Mangrum <jmangru3@students.kennesaw.edu>
Janelle,

I wish you good luck with your study. You may certainly use the MAI in your research. Please properly cite the work, use the instrument in accord with research guidelines for human subjects and APA ethics. If you change any items please make sure to properly document those changes in any write ups of your work.

Best,
Rayne

From: Janelle Mangrum <jmangru3@students.kennesaw.edu>
Sent: Friday, October 19, 2018 2:19 PM
To: gregory.scraw@unlv.edu; Sperling, Rayne Audrey <rsd7@psu.edu>
Subject: Metacognitive Awareness Inventory Usage Request
Importance: High

Good Afternoon,

My name is Janelle Mangrum and I am a graduate student at Kennesaw State University getting a Master’s degree in First-Year Studies. My thesis is on Metacognition and the First-Year Student. As part of my research I wanted to ask your permission to use the Metacognitive Awareness Inventory from your article, "Assessing Metacognitive Awareness" from 1994’s issue of Contemporary Educational Psychology. I would like to ask my research participants to do the MAI at the beginning and the end of my research work with them as a before and after picture. My thesis committee chair is Dr. Deborah Smith at Kennesaw State.

I believe your article tracks with my research and will be helpful. Right now I am working to get my IRB application submitted so I can begin my research.

Your assistance is much appreciated.

Sincerely,
Janelle R. Mangrum
KSU, MS in First Year Studies
May 2019 Graduate
Journal Prompts

After trying out the learning strategy, please discuss the following statements. We will discuss your responses at our next meeting.

This learning activity is one I would use again because...

I learned how to _____ better by using the activity

I perceive myself as ____ academically successful after learning these strategies

While doing this activity, I was able to understand the subject matter better by ...

This activity is able to be adapted for more than one subject by ...

By doing the activity, I feel more engaged in my own learning because ...

My biggest challenge in using this activity was...

From using this activity, I learned more about how I can ...

Working with metacognitive learning strategies has helped me by ...

In working with these metacognitive learning strategies, I have noticed a change in my grades in that ...

Other thoughts, comments, etc.
Augusta University
Research Informed Consent Document
Metacognitive Learning and the First-Year Student

Principal Investigator:
Janelle R. Mangrum
Augusta University, Staff

Principal Investigator telephone number
(available 24/7 and for emergencies):
706-631-1312

You are being asked to take part in this research study about Metacognitive Learning and First-Year Student because you are a college freshman in your first or second semester of college, are over the age of 18, and taking at least two classes.

The purpose of this document is to:
- Explain your rights and responsibilities
- Explain the purpose of the study
- Describe what will happen if you decide to take part in this study
- Explain the potential risks and benefits of taking part in the study

Participation in research studies is voluntary. Please read this consent form carefully and take your time making your decision. As I discuss this consent form with you, please ask me to explain any words or information that you do not clearly understand.

Why is this study being done?
The purpose of this study is to discover the effects of metacognitive learning activities on first-year college students learning. I anticipate being able to demonstrate that by showing students different ways to enhance their ability to learn, they will perceive themselves as more academically successful.

How long will I be in this study?
Your active participation in this study is expected to take approximately 4 months. You can choose not to be in the study or stop participating at any time without penalty or loss of any rights or benefits you are entitled to. Participating in this study will not affect your status as an employee or student. Please talk to me first before you stop participating in the study.

What will happen to me in the study?
At the beginning and end of our work, you will be asked to complete a Metacognitive Awareness Inventory (MAI) to investigate how you learn. You will be provided two or three learning activities to work with and discuss during a total of four one-on-one meetings during the months of January, February, and March with me that I expect to last no longer than 30-45 minutes. I will ask your permission to record our meetings, and these recordings are for my use only and will be destroyed at the conclusion of the study. To protect your identity, you will be assigned a four-digit code. You will also
be asked to keep a journal in either paper form or electronic form about your experiences with these activities. It may take you approximately two hours to evaluate your learning activity and to do your journal entry.

**Statement of consent for audio recording**
I give my consent to be recorded during my participation in this research study. These recordings will only be used for analyses and research documentation. I have a right to revoke my consent to be recorded at any time to Janelle Mangrum, jmangrum@augusta.edu. I may request cessation of recording at any time during the process. If I wish to revoke this consent, it will apply to the use of recordings in the future but will not apply to any previously made audio recording. My recording will be maintained in a protected and secure manner as part of my confidential research record.

___ (Participant Initials) I will allow audio recordings taken of me.

___ (Participant Initials) I do not want audio recordings taken of me.

**What are the risks of being in this study?**
There is the possibility of a loss of confidentiality. To lessen the likelihood of this happening recorded and electronic data will be stored on a secure drive provided by the university and any paper journal entries will be stored in a locked cabinet until they are transcribed, uploaded into a secure drive, and then shredded. There may be more risks that are not known or not expected.

**Will I benefit from this study?**
You may benefit from using metacognitive learning strategies that may help you enjoy greater academic success.

**What are my other choices if I do not take part in this study?**
You are not required to take place in this study.

**Who will see my study information?**
Only I will see your identifiable information. Your records may also be reviewed to meet federal or state regulations. Reviewers may include the Augusta University Institutional Review Board (the committee which oversees the safety of volunteers in research studies), institutional officials, and outside agencies.

**How will you keep my study information confidential?**
Study records that identify you will be kept confidential except as required by law. You will not be identified in study records or publications disclosed outside Augusta University.

**What are my costs (what will it cost me) for taking part in the study?**
It will not cost you anything to take part in the study other than basic expenses like transportation.

Version Date: 12-13-2018
Will I be paid for participation in this study? 
You will not be paid for taking part in this study.

Who can answer my questions about this study? 
You can ask questions about this study at any time. Please contact me if you have questions about:
- Study procedures
- Leaving the study before it is finished
- Expressing a concern about the study
- Any other questions you may have about the study

Who can I contact to discuss my rights, problems, concerns, questions, or complaints I have as a study participant? 
Contact the Augusta University Institutional Review Board at (706) 721-1483.

STATEMENT OF CONSENT 
I have read this form, and the information in it was explained to me. My taking part in the study is voluntary. All of my questions were answered. I will receive a copy of this form for my records. I agree to take part in this study. I am not giving up my legal rights by signing this form.

Participant’s Name (print)

Participant’s Signature

Date /Time (00:00)

INVESTIGATOR STATEMENT 
I acknowledge that I have discussed the above study with this participant and answered all of his/her questions. They have voluntarily agreed to participate. I have documented this action in the participant’s research chart source documents. A copy of this signed document will be placed in the participant’s research chart, as applicable. A copy of this document will be given to the participant or the participant’s legally authorized representative.

Printed name of Investigator obtaining consent

Signature of Investigator obtaining consent

Date /Time (00:00)

Version Date: 12-13-2018
Augusta University
Research Informed Consent Document
Metacognitive Learning and the First-Year Student

Principal Investigator:
Janelle R. Mangrum
Augusta University, Staff

Principal Investigator telephone number
(available 24/7 and for emergencies):
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- Explain the potential risks and benefits of taking part in the study

Participation in research studies is voluntary. Please read this consent form carefully and take your time making your decision. As I discuss this consent form with you, please ask me to explain any words or information that you do not clearly understand.

Why is this study being done?
The purpose of this study is to discover the effects of metacognitive learning activities on first-year college students learning. I anticipate being able to demonstrate that by showing students different ways to enhance their ability to learn, they will perceive themselves as more academically successful.

How long will I be in this study?
Your active participation in this study is expected to take approximately 4 months. You can choose not to be in the study or stop participating at any time without penalty or loss of any rights or benefits you are entitled to. Participating in this study will not affect your status as an employee or student. Please talk to me first before you stop participating in the study.

What will happen to me in the study?
At the beginning and end of our work, you will be asked to complete a Metacognitive Awareness Inventory (MAI) to investigate how you learn. You will be provided two or three learning activities to work with and discuss during one-on-one meetings with me during the months of January, February, March and April that I expect to last no longer than 30-45 minutes. I will ask your permission to record our meetings, and these recordings are for my use only and will be destroyed at the conclusion of the study. To protect your identity, you will be assigned a four-digit code. You will also be asked to keep a

Version Date: 11.15.19, 1.29.2019
journal in either paper form or electronic form about your experiences with these activities it may take you approximately two hours to evaluate your learning activity and to do your journal entry.

**Statement of consent for audio recording**

I give my consent to be recorded during my participation in this research study. These recordings will only be used for analyses and research documentation. I have a right to revoke my consent to be recorded at any time to Janelle Mangrum, jmangrum@augusta.edu. I may request cessation of recording at any time during the process. If I wish to revoke this consent, it will apply to the use of recordings in the future but will not apply to any previously made audio recording. My recording will be maintained in a protected and secure manner as part of my confidential research record.

___ (Participant Initials) I will allow audio recordings taken of me.

___ (Participant Initials) I do not want audio recordings taken of me.

**What are the risks of being in this study?**

There is the possibility of a loss of confidentiality. To lessen the likelihood of this happening recorded and electronic data will be stored on a secure drive provided by the university and any paper journal entries will be stored in a locked cabinet until they are transcribed, uploaded into a secure drive, and then shredded. There may be more risks that are not known or not expected.

**Will I benefit from this study?**

You may benefit from using metacognitive learning strategies that may help you enjoy greater academic success.

**What are my other choices if I do not take part in this study?**

You are not required to take place in this study.

**Who will see my study information?**

Only I will see your identifiable information. Your records may also be reviewed to meet federal or state regulations. Reviewers may include the Augusta University Institutional Review Board (the committee which oversees the safety of volunteers in research studies), institutional officials, and outside agencies.

**How will you keep my study information confidential?**

Study records that identify you will be kept confidential except as required by law. You will not be identified in study records or publications disclosed outside Augusta University.

**What are my costs (what will it cost me) for taking part in the study?**
It will not cost you anything to take part in the study other than basic expenses like transportation.

**Will I be paid for participation in this study?**
For your participation in the study, you will receive a $10.00 giftcard for a local business.

**Who can answer my questions about this study?**
You can ask questions about this study at any time. Please contact me if you have questions about:
- Study procedures
- Leaving the study before it is finished
- Expressing a concern about the study
- Any other questions you may have about the study

**Who can I contact to discuss my rights, problems, concerns, questions, or complaints I have as a study participant?**
Contact the Augusta University Institutional Review Board at (706) 721-1483.

**STATEMENT OF CONSENT**
I have read this form, and the information in it was explained to me. My taking part in the study is voluntary. All of my questions were answered. I will receive a copy of this form for my records. I agree to take part in this study. **I am not giving up my legal rights by signing this form.**

________________________
Participant’s Name (print)

________________________
Participant’s Signature

________________________
Date /Time (00:00)
INVESTIGATOR STATEMENT

I acknowledge that I have discussed the above study with this participant and answered all of his/her questions. They have voluntarily agreed to participate. I have documented this action in the participant’s research chart source documents. A copy of this signed document will be placed in the participant’s research chart, as applicable. A copy of this document will be given to the participant or the participant’s legally authorized representative.

________________________________________
Printed name of Investigator obtaining consent

________________________________________
Signature of Investigator obtaining consent

Date /Time (00:00)
Appendix F

Initial Interview Protocol

Code: ________________________________

Date: ______________________________  Time: ______________________________

Major: ______________________________  Current Semester: __________________

First, thank you for agreeing to participate in this study. This interview is being conducted as part of my research into the effects of the use of metacognitive learning strategies by college students in their first or second semester. I hope you will find the learning strategies you utilize to be beneficial in your classes.

This interview is planned to last no longer than 30-45 minutes. We will cover what metacognition is and potential ways that it can assist you in your learning. I would also like your permission to record our conversation. The recording is for my use only and will be destroyed at the conclusion of the study. Anything we discuss will be confidential.

Do I have your permission to record our conversation? Answer ______

Thank you. Would you like to continue in this project? Answer ______

Thank you.

First of all, metacognition is defined as being aware of how you learn and the strategies that you can use to learn better and more effectively. Essentially, you will be learning how to learn.

1. Have you ever used any type of metacognition learning activities previously? If so, what were they and how effective did you think they were in helping you learn?

2. How do you currently view yourself as a learner? And overall academically?

3. What part of Metacognitive Awareness Inventory (MAI) did you find most helpful and informative?

4. Give me an example of what you learned about your learning style from the MAI.

5. Is there one class and/or assignment in that class in particular that you would like to focus on while participating in this research?

6. How do you currently prepare for the class?

7. What do you do during class to help yourself learn the material?

8. After each class, what, if anything, do you do to learn the material?

Let’s talk about and identify one metacognitive learning strategy you think might help you in your class. Between now and when we meet again to try out the strategy and then respond to the 11/28/18
Journal prompts (give participant the "Journal Prompts" document). Please make sure to bring or e-mail me your journal responses for our next meeting.

Thank you for your help with my research! Let's go ahead and set up our next meeting. Feel free to reach out to me if you have any questions between now and then.
Follow Up Interview Protocol  
(for sessions II and III)

Code: ________________________________

Date: ___________________________  Time: ________________________________

Major: ___________________________  Current Semester: ______________________

Learning Strategy Used: ____________________________________________________

In this interview we will review your journal entries done since our last interview, it should take about 30-45 minutes. I would also like your permission to record our conversation. The recording is for my use only and will be destroyed at the conclusion of the study. Anything we discuss will be confidential.

Do I have your permission to record our conversation? Answer _______
Would you like to continue in this project? Answer _______

Thank you.

Let’s also spend some time brainstorming and identifying a strategy that might continue to help you in your class. Now we will review the journal prompts together and answer the following questions.

In what way did you use the strategy?

How did the strategy you used work for you?

In what ways did you find the strategy to be most useful?

Do you have any suggestions for making it more useful?

Do you perceive yourself as more academically successful after learning different strategies?

For the next month I would like for you to try a different strategy and when we meet next time, we can again review the progress and continue with your journaling prompts. Please make sure to bring or e-mail me your journal responses for our next meeting.

Thank you for your help with my research! Let’s go ahead and set up our next meeting. Feel free to reach out to me if you have any questions between now and then.

11/28/18
Appendix H

Final Interview Protocol

Code: _____________________________________________________________

Date: ___________________________ Time: _____________________________

Major: __________________________ Current Semester: __________________

Learning Strategy Used: ____________________________________________

In this interview we will review your journal entries done since our last interview, it should take about 30-45 minutes. I would also like your permission to record our conversation. The recording is for my use only and will be destroyed at the conclusion of the study. Anything we discuss will be confidential.

Do I have your permission to record our conversation? Answer ________

Would you like to continue in this project? Answer ________

Thank you.

Now we will review the journal prompts together and answer the following questions.

In what way did you use the strategy?

How did the strategy you used work for you?

In what ways did you find the strategy to be most useful?

Do you have any suggestions for making it more useful?

Do you perceive yourself as more academically successful after learning different strategies?

I would like to ask that you take the Metacognitive Awareness Inventory (MAI) now, keeping in mind what you have learned over the time we have worked together.

Once you have completed it, we can review it and review the final results along with any suggestions you may have.

Thank you for your time and all the work you have done related to my research. I hope you have found learning about metacognitive strategies to be beneficial.

11/28/18
Metacognitive Learning and the First-Year Student

Instructions: Please sign up if you are interested in participating. I will then e-mail you for times to set up our first meeting. You may contact me 706-631-1312 or JMANGRUM@augusta.edu for questions.

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11/29/18
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(numbers to match first three letters of first name, number of Excel line, if two numbers they are added together)
Institutional Review Board Office
Augusta University
1120 15th St., CJ-2103
Augusta GA 30912-7621
Email: IRB@augusta.edu
Phone: 706-721-3110
http://www.augusta.edu/research/irboffice/

DATE: December 19, 2018

TO: Janelle Mangrum
FROM: Augusta University (AU) Committee B

PROJECT TITLE: [1352612-2] Metacognitive Learning and the First-Year Student
SUBMISSION TYPE: New Project (Response/Follow-Up)

ACTION: APPROVED
APPROVAL DATE: December 17, 2018
EXPIRATION DATE: December 16, 2019
REVIEW TYPE: Expedited Review

REVIEW CATEGORY: Expedited review category # 6 & 7

6- Collection of data from voice, video, digital, or image recordings made for research purposes.

7- Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Thank you for your submission of Response/Follow-Up materials for this New Project. The Augusta University (AU) Committee B has APPROVED your submission. This approval is based on an appropriate risk/benefit ratio and a project design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

This submission has received Expedited Review based on applicable federal regulations.

This project has been determined to be a Minimal Risk project. Based on the risks, this project requires continuing review by this committee on an annual basis. Please use the appropriate forms for this procedure. Your documentation for continuing review must be received with sufficient time for review and continued approval before the expiration date of December 16, 2019.

The approval includes the following documents:

- Questionnaire/Survey - metacognitive_awareness_inventory.docx (UPDATED: 12/12/2018)
- Augusta - Core Data Form - Augusta - Core Data Form (UPDATED: 11/29/2018)
All Principal Investigators must comply with the following:

- Conduct the research in accordance with the protocol, applicable laws and regulations, and principles and research ethics as set forth in the Belmont Report.

- Unless consent has been waived, conduct the informed consent process without coercion or undue influence, and provide the potential participant sufficient opportunity to consider whether or not to participate.
  - Use only the most current approved consent form bearing the Augusta University IRB stamp.
  - Provide non-English speaking subjects with a certified translation of the approved consent form in the subject's first language. The translation must be approved by the IRB unless other arrangements have been made and approved by the IRB.
  - Obtain approval from the IRB for use of recruitment materials and other materials provided to subjects.

- Obtain approval from the IRB for changes/modification in research.

- Report all reportable events to the IRB within 5 days, per IRB Policy: "Reportable Events."

- Ensure all applicable ancillary approvals are obtained prior to initiating the study. This includes:
  - Medical Center approval if Medical Center resources are used
  - Biosafety Approval, if applicable
  - Radiation Safety Approval, if applicable
  - Chemical Safety Approval, if applicable

For information regarding records retentions, please visit:


- VA Studies- refer to the VHA RCS 10-1, Section IV, Office of Research and Development, Sequence Number 7.6, Research Investigator Files.

If you have any questions, please contact the IRB office at 706-721-3110 or [irb@augusta.edu](mailto:irb@augusta.edu).

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Augusta University's records. If the reader of this message is not the intended recipient you are hereby notified that any dissemination, distribution or copying of this information is STRICTLY PROHIBITED.
DATE: February 19, 2019

TO: Janelle Mangrum
FROM: Augusta University (AU) Committee B

PROJECT TITLE: [1352612-3] Metacognitive Learning and the First-Year Student
SUBMISSION TYPE: Amendment/Modification

ACTION: APPROVED
APPROVAL DATE: February 18, 2019
EXPIRATION DATE: December 16, 2019
REVIEW TYPE: Expedited Review

Thank you for your submission of Amendment/Modification materials for this project. The Augusta University (AU) Committee B has APPROVED your submission. This approval is based on an appropriate risk/benefit ratio and a project design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

This submission has received Expedited Review based on applicable federal regulations.

This project has been determined to be a MINIMAL RISK project. Based on the risks, this project requires continuing review by this committee on an annual basis. Please use the appropriate forms for this procedure. Your documentation for continuing review must be received with sufficient time for review and continued approval before the expiration date of December 16, 2019.

The approval includes the following documents:

- Advertisement - Recruitment Script (UPDATED: 01/31/2019)
- Augusta - Amendment/Modification Form - Augusta - Amendment/Modification Form (UPDATED: 02/14/2019)
- Augusta - Core Data Form - Augusta - Core Data Form (UPDATED: 01/31/2019)
- Consent Form - J Mangrum-SBER Consent Template.docx (UPDATED: 02/14/2019)
- Other - J_Mangrum-AU_Research_Payment-Waiver_Request.pdf (UPDATED: 02/15/2019)
- Other - Metacognitive Learning and the First-Year Student.pptx (UPDATED: 01/29/2019)
- Protocol - IRB protocol.docx (UPDATED: 02/14/2019)

All Principal Investigators must comply with the following:

- Conduct the research in accordance with the protocol, applicable laws and regulations, and principles and research ethics as set forth in the Belmont Report.
• Unless consent has been waived, conduct the informed consent process without coercion or undue influence, and provide the potential participant sufficient opportunity to consider whether or not to participate.
  ◦ Use only the most current approved consent form bearing the Augusta University IRB stamp.
  ◦ Provide non-English speaking subjects with a certified translation of the approved consent form in the subject's first language. The translation must be approved by the IRB unless other arrangements have been made and approved by the IRB.
  ◦ Obtain approval from the IRB for use of recruitment materials and other materials provided to subjects.
• Obtain approval from the IRB for changes/modification in research.
• Report all reportable events to the IRB within 5 days, per IRB Policy: "Reportable Events."
• Ensure all applicable ancillary approvals are obtained prior to initiating the study. This includes:
  ◦ Medical Center approval if Medical Center resources are used
  ◦ Biosafety Approval, if applicable
  ◦ Radiation Safety Approval, if applicable
  ◦ Chemical Safety Approval, if applicable

For information regarding records retentions, please visit:

• Augusta University IRB Policy: Records Retention located on the IRB Website: http://www.augusta.edu/research/irboffice/irb/gru-irb-policies.php.
• VA Studies- refer to the VHA RCS 10-1, Section IV, Office of Research and Development, Chapter 8 Research Investigator Files: https://www.va.gov/vhapublications/RCS10/rcs10-1.pdf

If you have any questions, please contact the IRB office at 706-721-3110 or irb@augusta.edu.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Augusta University's records. If the reader of this message is not the intended recipient you are hereby notified that any dissemination, distribution or copying of this information is STRICTLY PROHIBITED.
Metacognitive Learning and the First-Year Student

Janelle R. Mangrum, Researcher
WHAT IS METACOGNITION?
EXPLORING THE METACOGNITION CYCLE
What is metacognition?

• Metacognition is defined as “thinking about thinking”
  - Basically it is about skills related to thinking and learning

• Metacognitive knowledge is:
  - What we know about how we learn
  - What different strategies work best for our learning
  - Understanding what environments and strategies we can best learn

(Young & Fry, 2008)
Metacognitive Learning

1. What will these practices do for me as a student?
2. Why should I participate in this research project?
3. What will I need to do?
4. When will I use the strategy?
5. How much time will it take?
6. How long will the research last?
Metacognitive Learning Strategy Examples

- Think Alouds
- Concept Mapping
- One Minute Paper
- K-W-L Chart
- Directed Paraphrasing
- Journaling
- Skimming the reading/note any connections
How do I become a part of the research?

- Sign in on the sheet provided
- Provide your first name and last initial along with your school email address.
- Be thinking about a first meeting date as soon after today as you can.
Now What?

- You will receive an email from me to confirm your participation and set up an initial meeting.
- During our first meeting we will review a consent form for you sign and you will receive a copy.
- Once the consent form is signed you will receive:
  - Metacognitive Awareness Inventory (MAI)
  - Journaling prompts
  - A Learning Activity to use
What will the information I give be used for?

- The reviews you give about the strategies will be used to determine how effective the strategies are and will be a large part of my thesis.

- I hope to use the information you provide to show the positive advantage of having a seminar on metacognitive learning.
Questions?
References

Ms. Janelle R. Mangrum  
Augusta University  
Augusta, Georgia 30912

November 27, 2018

Dear Ms. Mangrum,

Thank you for offering the students at Augusta University the option of participating in “Metacognitive Learning and the First-Year Student,” to be conducted by you and your research team. As I understand it, the study consists of providing learning strategies to First-Year students in their first or second semester of college which may help to improve their performance in the classroom.

I am happy to provide support to you as the Director of the First and Second Year Experiences and appreciate your involving our undergraduate students in research which will also assist them academically. Please contact my office to arrange the details regarding the study timeline. I look forward to working with you and your team.

Sincerely,

[Signature]

Elizabeth Whittaker Huggins, Ed.D.  
Director of First and Second Year Experiences  
Office of Academic and Faculty Affairs  
chuggins@augusta.edu
Concept Mapping

By integrating visuals with text, concept maps create a bird's eye view of the subject being presented, constructing a visual approach to communication.

Our brains are wired to take in complex information and make meaning of that information, especially when that information is presented visually. Concept maps can visually represent large amounts of information, provide a holistic representation of a concept, show connections and relationship among data, and enable you to plan and make choices by creating a road map of where you are going and where you have been. By integrating visuals with text, concept maps create a bird’s eye view of the subject being presented, constructing a visual approach to communication.

Concept mapping is a technique that represents information visually and is useful in translating complex ideas into easy-to-understand visual diagrams. Boxes, circles, and other shapes (sometimes called nodes) are connected by arrows and lines (connectors) that show connections and relationships of concepts and knowledge. Concept maps can be used to create advanced organizers of information in a visual way to help plan teaching and to help students learn. See the figure below for an example of a simple concept map on the topic of photosynthesis.

Figure 1.
Photosynthesis Concept Map
(Created using Inspiration ® Software)
The design of concept maps ranges in complexity depending on the topic (how it relates to the whole and what aspect of it is to be learned), a person's learning preference, and how much information a person needs to understand the concept. Some people need more information on a map than others to understand the concept, and it is important to understand how one assimilates information and how the creation of concept maps can benefit learning. Therefore, it is useful knowing some basic applications of concept maps in the classroom.

Applications of Using Concept Maps in Teaching and Learning

- **Efficient way for students to take notes.** Consider requiring students to "map" a designated number of textbook chapters for two points each that would count toward the final points. These points could count toward classroom participation. Anecdotal evidence has found that students are more apt to read assigned material which is to be mapped. Two points per map might be an appropriate number.

- **Prepare lecture or presentation notes.** Consider creating concept maps in lieu of written notes for quick and easy visualization.

- **Quickly record and visualize brainstorming and discussion sessions.** Show students how this could provide necessary practice time for those students learning how to create a concept map.

- **Visualize timelines (for projects and other activities).** Suggest the incorporation of images and symbols in addition to text for a more personalized map.

- **Adding relevant graphics to presentations and written papers.** Encourage use of graphics which can be effective when communicating messages but only if they are relevant to the content. Consider "mapping" content in PowerPoint presentations as an alternative to bullet points.

- **An alternative or addition to using outlines.** Stress to students that concept maps are excellent visual representations of content and can provide effective visual interest to outlined information.

Creating Concept Maps

Materials:

1. Pencil
2. Eraser or white out
3. Large piece of blank paper (flip chart paper works well)
4. Sticky notes (1.5x2" and 3x3" work well)
5. Colored pencils or markers
6. Source materials (books, journals, Web site URLs, lecture notes, etc.)

Create the Map

1. Consider the hierarchical structure of the map and where to place the question or word on the blank paper.
2. Begin with a question or key word or term. For example, "How does photosynthesis work?"

3. Write the question or word toward the top of the concept map.

4. Write down important related concepts below the central question or topic (these become sub-concepts). Work quickly to get ideas on paper. Draw a circle or rectangle around each sub-concept.

5. Stop and look at the map and begin to categorize the subtopics. Revise and / or remove unnecessary words. Use colored pencils or markers to thematically organize the sub-concepts by coloring in the shapes.

6. Draw arrows and / or lines to and from concepts to show their relationships.

7. Add a label on each arrow or line that describes the relationships between concepts. For example, in the Photosynthesis Concept Map on the previous page, the line between the “sun” icon and the sub-concept “leaf” is labeled “is absorbed through” to show the relationship between those two concepts. Labels need not be long and often short words such as those used in the Photosynthesis Concept Map work to connect concepts.

8. Review the completed concept map by asking the question, “Does this make sense to me?” remembering that concept maps can be as unique as the individual who created it.

**Summary**

Mapping concepts, ideas, class notes and plans is an effective technique to quickly present information in a visual way. Reviewing content on the concept map helps identify missing elements and redundant or unnecessary information to ensure the information presented is a meaningful whole. In addition to using paper and pen, a range of concept mapping software is available to quickly and efficiently visualize concepts. Many of these products are easy to use and available at a reasonable cost. See resources for a list of concept mapping software.

**Suggested Resources**

*Concept mapping resource guide* (n.d.).

[http://www.socialresearchmethods.net/mapping/mapping.htm](http://www.socialresearchmethods.net/mapping/mapping.htm)


Concept Maps

What are concept maps?

Concept maps are visual representations of information. They can take the form of charts, graphic organizers, tables, flowcharts, Venn Diagrams, timelines, or T-charts. Concept maps are especially useful for students who learn better visually, although they can benefit any type of learner. They are a powerful study strategy because they help you see the big picture—because they start with higher-level concepts, they help you chunk information based on meaningful connections. In other words, knowing the big picture makes details more significant and easier to remember.

Concept maps work very well for classes or content that have visual elements or in times when it is important to see and understand relationships between different things. They can also be used to analyze information and compare and contrast.

Making and using concept maps

Making one is simple. There is no right or wrong way to make a concept map. The one key step is to focus on the ways ideas are linked to each other. For a few ideas on how to get started, take out a sheet of paper and try following the steps below:

- Identify a concept.
- From memory, try creating a graphic organizer related to this concept. Starting from memory is an excellent way to assess what you already understand and what you need to review.
- Go through lecture notes, readings and any other resources you have to fill in any gaps.
- Focus on how concepts are related to each other.

Your completed concept map is a great study tool. Try the following steps when studying:

- Elaborate (out loud or in writing) each part of the map.
- List related examples, where applicable, for sections of the map.
- Re-create your concept map without looking at the original, talking through each section as you do.
Examples of concept maps

Example 1: This example illustrates the similarities and differences between two ideas, such as Series and Parallel Circuits. Notice the similarities are in the intersection of the 2 circles.

Example 2: This example illustrates the relationship between ideas that are part of a process, such as a Food Chain.

Example 3: This example illustrates the Causes and Effects for an event, such as The Civil War.
Example 4: This example illustrates the relationship between main idea, such as Climate Change, and supporting details.
**Example 5:** Outlining is a less visual form of concept mapping, but it might be the one you’re most familiar with. Outlining by starting with high-level course concepts and then drilling down to fill in details is a great way to determine what you know (and what you don’t know) when you’re studying. Creating an outline to start your studying will allow you to assess your knowledge base and figure out what gaps you need to fill in. You can use type your outline or create a handwritten, color-coded one as seen in Example 5.

**Works consulted**