Self-regulated Learning, Metacognition, and Soft Skills: The 21st Century Learner

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Abstract

Numerous studies have investigated the effect of metacognition and self-regulated learning on college students' achievement and retention. This study extended the research by examining the relationship between metacognition and "at-risk" student achievement and retention. Data were collected through personal interviews and the use of *The Motivated Strategies Learning Questionnaire.* Results were analyzed using analysis of variance and indicated that a relationship existed between metacognition and at-risk student success. However, students' metacognitive skills were often inadequate for ongoing academic success at the postsecondary level. The incorporation of soft skills in the literature on metacognition and academic achievement is suggested, and future research is called for to determine the significance of noncognitive skills in the metacognitive process.

Introduction

Through nontraditional, online, and hybrid programs students have greater access to postsecondary programs and education (Johnson, 1995). However, student skill levels in reading, writing, and college level math have not kept pace with the increased access to higher education. The result is students are entering postsecondary programs underprepared for the work, rigor, and expectations of higher education. They are not necessarily prepared or motivated for the type of critical thinking and analytical learning that is often associated with higher education, which may put them in the at-risk category. At-risk classification encompasses a variety of factors than can include low ACT/SAT scores, low high school grade point average, and generally weak and/or inconsistent academic skills (i.e., study habits and strategies, critical and analytical thinking skills, etc.). These at-risk students are often placed in developmental classes to increase their academic skills. According to Barbatis (2010), "Nationally approximately one-third of all students entering colleges or universities need remediation" (p. 14).

In addition, the millennial generation, Americas 18-29 year olds, has been exposed to a tremendous growth in technology which has created gaps in student learning (Millennials: Confident. Connected. Open to Change, 2010). For example, many students no longer read or have the concentration to focus on one area for hours at a time. Students do not have to search out information but can turn to their computers, iPads, and iPhones for instant information and gratification which has had a profound influence on how they approach learning. If students are used to immediate gratification and information, it may be more difficult for them to become self-regulated learners with metacognitive awareness because

they do not have to monitor their behavior but rather ingest information without great expenditure of motivation or work. Therefore their approach to learning may be less persistent and less goal-oriented because as the research has established, self-regulation and metacognitive skills are implicit in and contributors to these academic skills (Garrett, (Alman, Gardner, & Born, 2007; Schunk, 2005).

Self-regulated learning

Self-regulated learning is "the self-directive process by which learners transform their mental abilities into academic skills (Zimmerman, 2002, p. 65). Self-regulated learners often have effective study strategies, persistence, and the ability to determine what strategies are needed to do well in a content area. Researchers have also found that goals play an important role in self-regulated learning (Ridley, Schutz, Glanz, & Weinstein, 1992). Students who have specific goals and are self-regulated learners will more than likely reach their goals because they have effective study strategies, persistence, and the ability to determine what strategies are needed to meet these goals (Wolters, 1998; Schunk, 2005). According to Zimmerman, the skills inherent to self-regulated learning include setting specific goals, adopting strategies for attaining goals, using time management skills, monitoring performance, and managing social and physical contexts. Students who attend class regularly, hand in all assignments, and spend time studying effectively for tests will often do well in classes; however, students who are not self-regulated may not have the motivational or metacognitive skills to be effective academically. Based on students' attitudes and performance, instructors can often tell the difference between students who are self regulated learners and those who are not (Boekaerts, 1996; Zimmerman).

Metacognition

Metacognition, a component of self-regulated learning, also plays an important role in student performance. Metacognition is the ability to know what we know, know what we don't know, and know how to remediate what we don't know (Cao & Nietfeld, 2007). In a practical way, metacognition enables students to take control of their learning, to think reflectively, to understand assignments, and to know what strategies are needed to successfully complete assignments. Students can therefore "plan, monitor, and modify their cognition" (Pintrich & DeGroot, 1990, p.33). Students' awareness of what they know and the conscious use of learning strategies are necessary for academic success. Conversely, students who lack metacognitive awareness often "think" they know the material or have adequately studied for a test, when in actuality they have not because they may be unclear as to what material to study and/or how to study. Students sometimes confuse memorizing facts and information for performing deeper level analysis of concepts that is often the key to mastery of material and better academic performance. Research has noted that metacognition is not an automatic process but can be seen as a teachable skill and part of the larger concept of self-regulated learning (Zimmerman, 2002).

Study Purpose

The purpose of this study was to examine metacognition and its relationship to the success or failure (as determined by first and second semester college GPA and subsequent retention or dismissal) of at-risk students at a midsize private university in the Midwest.

Method

Participants

The participants in this study (N=105) were students placed in one or more developmental classes at the study university. Student placement in developmental classes is based on four criteria: student achievement on the ASSET test (the university's in-house placement test assessing English, reading, and math skills); a GPA below the regular university admittance GPA of 2.0; an ACT score below the regular admittance score of 20; and an in-house writing sample assessed by faculty members and academic support center personnel. The developmental classes at the university are designed to build students' skills in English, reading, math, and study strategies.

The 105 participants in this study included both males (32.4%) and females (67.6%). Student ethnicity in the sample was 70% white and30% non-white. Approximately forty-six percent of the participants were 18 and 19 year olds. Forty percent of the students ranged in age from 20-29 and the remaining participants ranged in age from 30-59 (13%). Sampled students' gender, ethnicity, and age were representative of the university's general population demographics.

Instrument

The Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich, Smith, Garcia, and McKeachie, 1991) was used to measure metacognition. The MSLQ contains 81 questions in total and is based on a seven point Likert scale that ranges from "not at all true of me" to "very true of me." The MSLQ contains two sections: a motivation section which addresses student motivation and students' goals and beliefs about their ability to succeed in

content courses, and a learning strategies section which includes 31 items that measure student use of metacognitive strategies and 19 items that measure student management of resources. The Cronbach alpha for the motivational scales is high at .90 and the alphas for the strategies scales average above .70 (Garcia & Pintrich, 1995). Pintrich and DeGroot (1990) have also reported acceptable validity and reliability ranges for the MSLQ.

Procedure

Participants in 14 developmental courses participated in the study during the fall semester. Participants were asked to sign a permission slip, complete demographic information (e.g., age, ethnicity, gender), and take The Motivated Strategies for Learning Questionnaire (MSLQ). The authors collected both fall and spring GPA's of the 105 at-risk students to examine their retention rates. The authors also conducted nine individual interviews from a random sample of the students who had participated in the fall data collection and who had achieved acceptable grades at the university. The authors developed questions based on the MSLQ focusing on metacognition. The students were asked the same questions in the same sequence. The questions included: "What do you do when faced with difficult material that you don't understand?"; "How do you study for a course you like versus one you dislike?"; "What do you do to concentrate in a class you don't like?", "How does your personal life affect you college work and experiences?"; "How would you complete the following statement: "I feel that I will be successful in college if …". The interviews were taped, transcribed, and coded and analyzed for high or low metacognitive skills.

Each sentence and phrase was analyzed for metacognitive responses such as interviewee examples of study strategies that they had used and that were effective for them.

After the initial coding, the authors asked two colleagues who were knowledgeable about the concept metacognition to code and analyze the interview responses. This collaboration revealed interrater consistency in the identification of metacognitive themes. The nine interviews were conducted during the spring semester of the study

Results

At the completion of the fall semester, seventy-nine students maintained a cumulative GPA of 2.0 or above and therefore maintained good academic standing. Seventeen students were dismissed from the university because they did not maintain a cumulative average of 2.0. Four students withdrew from the university for nonacademic reasons, and ten students were placed on probation, which meant that they needed to obtain a 2.0 cumulative GPA in the spring semester or be dismissed from the university. Four of the students who had been dismissed appealed their standing and were reinstated for spring semester. Therefore, at the end of the fall semester, 87 of the 105 students (82.8%) who participated in the study remained enrolled at the university (see table 1).

At the completion of the spring semester, eight additional students were academically dismissed because they did not obtain a cumulative GPA of 2.0. Six students withdrew or dropped out for nonacademic reason, and three students were readmitted. After two semesters, 76 of the original 105 students (72.4%) remained at the university (see table 1).

Table 1 *Attrition of Participating Students*

	Entering Freshman	Transfer Students	Total Students	Total, %
Fall	70	35	105	100 %
Dismissed	15	3	18	17.1
Withdrew	3	1		3.8
Probation	5	5	10	9.5
Reinstated	4	0		3.8

Total Remaining	56	31	87	82.8
Spring	45	31	87	82.8
Dismissed	5	3	8	7.6
Withdrew	2	4	6	5.7
Probation	3	2	5	4.8
Reinstated	3	0	3	2.9
Total Remaining	52	24	76	72.4

MSLQ

An analysis of variance (ANOVA) showed that metacognition had a significant effect on fall GPA, F (1, 99) = 5.44, .05 with p = .022 (see table 2).

Table 2 *Analysis of Variance for Fall GPA, Spring GPA, and Retention Based on Metacognition*

Metacognition	Df	Mean Sq.	F	Sig
Fall GPA	1,99	4.1	5.43	.022*
Spring GPA	1,81	1.17	1.65	.203
Retention	1,104	4.24	2.27	.136

* Significance at .05 level

Metacognition did not show an effect on spring GPA, F (1, 80) = 1.64, p.05 with p = .203. There was no significant difference in metacognition and retention based on participant age, gender, or ethnicity.

Interview Questions

All nine students illustrated some evidence of metacognition. The students were all aware of the times when they did not understand the material being presented and implemented strategies to figure out what they needed to know. However, students' metacognitive strategies were, for the most part, basic and included such things as re-reading material that was difficult to understand or asking peers for help. Although asking a friend for help may not be an efficacious solution to learning difficult material, it does indicate an awareness of lack of understanding and an attempt to remedy the problem. Study strategies

were not evaluated for their effectiveness; however, the fact that at-risk students exhibited metacognition, albeit simplistically, is noteworthy. During the interview process, students indicated that they did not use different strategies for different content areas but used the same strategies for all of their courses. The students also indicated that they did not use different strategies for different classes regardless of whether they liked a class or not. Typical strategies mentioned included rereading the material, rewriting notes, and reading aloud. Although these are all cognitive strategies, strategies are often more effective if they are tailored to a particular content area For instance students may need to use a specific strategy for studying math and a different strategy for studying psychology. For math a student might use 3 by 5 cards to memorize formulas. For psychology, a student might use a mapping strategy to see relationships between concepts and to compare and contrast theoretical perspectives.

Discussion

In this study, metacognition had a significant effect on at-risk students' first (fall) semester GPA but showed no effect on their spring GPA. The authors hypothesize that the significant effect of metacognition on fall GPA may be attributed to the fact that the majority of students possessed the basic metacognitive skills necessary to perform adequately in developmental courses and the easier course work that they experienced the first semester, but that they lacked the more extensive metacognitive skills necessary for success in college level courses and more complex material that they experienced the second semester. For instance, rereading material and asking a friend for help may have been sufficient for success in the at-risk students' developmental courses, but skills such as mapping, using time lines, and joining a study group may have been necessary for more difficult course work.

The qualitative interviews conducted in the study indicated that the at-risk students' metacognitive skills were often insufficient for achieving the grades they desired. The students reported that they found it difficult to comprehend materials presented in lecture classes, but other than asking peers for help, they did not have specific strategies to address their lack of comprehension. Furthermore, they did not indicate knowledge of higher metacognitive skills such as inductive and deductive reasoning. Students often need to "learn how to think" by solving actual problems and analyzing how they came to their solutions, identifying components of the problem, as well as recognizing overarching patterns and themes.

Limitations

The study occurred at a private university so care must be taken in generalizing findings to other populations. Further, sample size was small and replication with a larger population is suggested. Lastly, students in the study were identified as "at-risk" so findings may not pertain to other student populations**.**

Metacognition and At-risk Students

In the past, literature has supported the importance of metacognition as it related to the academic achievement and persistence of college students who were not at-risk. Self-regulated learning and metacognitive skills may be even more important for at risk students' academic success than for non at risk learners but may also be more difficult for the at risk learner to acquire given the skill deficiencies of this population. The at-risk students in this study seemed to need greater metacognitive awareness of their skills and more sophisticated and diverse work strategies, especially when faced with complicated course work. Simply re-reading material does not guarantee that the student will comprehend the information any better the second or third time around. Instead, students need to learn a variety of strategies

(e.g., prediction, mapping, recitation, rehearsal) and then critically assess what strategies work best for them.

Conclusion

In order to help students become more metacognitively aware of their capabilities, educators need to be aware of and implement strategies to increase these student skills. Providing timely and constructive feedback on papers and tests can be one such strategy. Written feedback on papers and assignments that present a truthful appraisal of at-risks students' work will aid students in becoming realistic about their actual abilities. Furthermore, at-risk students may wait in anticipation for the feedback that they will receive because they need the reassurance that they are performing adequately. Conversely, feedback will also facilitate metacognition for those at-risk students who believe that they did excellent work when, in fact, they performed poorly. Feedback may also be important for at-risk students in providing external, positive reinforcement to stimulate their motivation toward academic performance. To this end, one-on one conferences may be useful in helping students become aware of their progress and helping them develop metacognitive skills.

The authors also suggest that at-risk students need instructors who integrate metacognitive strategies into their content. Teaching at-risk students how to cognitively approach learning content can be as important as the content itself. Teachers can integrate metacognitive strategies into their content through the use of various methods. They can incorporate interactive methods such as group work, presentations, and hands-on-activities, as well as reciprocal teaching methods (i.e., solving problems out loud, overtly demonstrating covert critical thinking skills and the process of analysis). When students participate in the learning process, they are activating their ability to think critically. As students begin to think

critically, they enhance their metacognition because they have to evaluate what they know (Nietfeld, Cao, and Osborne, 2005).

An additional factor related to cognitive performance that may be worthy of investigation along with metacognition and self-regulated learning is that of soft skills, or the noncognitive skills that support cognitive performance and achievement.

Soft Skills and Metacognition: A New Direction

Soft skills include work ethics, positive attitude, social and language skills, and the motivation to learn (Harris & Rogers, 2008). Soft skills have been used in technical programs and in business to help students and employees become more effective workers, and in fact, much of the literature on soft skills pertains to the work place, technical (IT) programs, and educational programs outside of the U.S (see Joseph, Ang, Chang, & Slaughter, 2010). However, soft skills have been relatively absent from the literature pertaining to mainstream U.S. education.

It is the authors' suggestion that soft skills can be viewed as a noncognitive component of cognitive achievement and a part of metacognitive thinking. For example, students who do not turn in their work on time, who miss class, who are not interested in learning, and who have no apparent goals other than the idea of getting a college degree may be lacking essential soft skills which may inhibit access to cognitive achievements (i.e., grades, program completion, graduation). Students who do not posses soft skills may not read assignments carefully, may not attend class regularly, and may not hand in assignments because they don't understand the relationship between these actions and academic performance or the consequences of these actions on their academic success. Students who lack soft skills often believe that they know the material for the class and therefore feel they

do not have to go to class or believe that even without completing assignments they can still pass the course. From a metacognitive perspective, these students may not know what they know and what they do not know or realize the importance of discerning the difference between the two. Researching the relationship between soft skills and metacognition may be a worthy pursuit in identifying the arsenal of skills that comprise and contribute to learning, academic success, and eventual career satisfaction. As Wats and Wats noted, "Soft skills underpin effective performance in the workplace and are seen as a foundation for work readiness" (2009, p. 1).

Summary

With few exceptions (see Sperling, Howard, Staley, & DuBois, 2004) research has found a consistent link between metacognition and self-regulated learning as part of the cognitive skills that undergird academic achievement (Zimmerman, 2002). This same literature, however, has not included the study of soft skills, which may also be a vital contributor to the academic success and achievement of students. Students need basic cognitive and noncognitive skills to aid them in meaningful academic goal attainment. Future research should explore new and varied strategies and combinations therein, to help students attain successful academic careers. An area of interest that needs further research is the relationship of soft skills to metacognition and self-regulated learning. It would seem likely that understanding the importance of soft skills and its relationship to metacognition and self-regulated learning may be an important link to learning more about student performance and about enhancing students' ability to learn.

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