Gender Differences in Self-Regulated Learning

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Abstract: Self-regulated learning is a relatively new construct in the domain of educational psychology but its theoretical relevance and important practical implications have already been well established. The study explored the extent to which the self-regulated learning strategies of metacognition, elaboration, critical thinking, organization, rehearsal, time and effort management, help seeking and peer learning vary with gender. The Motivated Strategies for Learning Questionnaire (MSLQ) was administered to 198 undergraduate students at a large university in Northeastern U.S. The obtained data were analyzed through multivariate analysis of variance. The study uncovered several statistically significant differences. Female students tended to overreport the use of rehearsal, organization, metacognition, time management skills, elaboration, and effort. No statistically significant gender differences were found with respect to studying with peers, help seeking, and critical thinking skills.

The study attempts to link self-regulated learning to gender. Self-regulation of learning is a relatively new construct in the domain of educational psychology but its theoretical relevance and important practical implications have been already well established. Most of the work on self-regulation has focused on the description of the self-regulatory process and the observed improvement of students' self-regulatory skills after educational or training interventions. While advances in understanding of self-regulated learning could be definitely acknowledged, there are still questions that have remained largely unanswered. One of these questions concerns the extent to which self-regulation in learning could be considered a "learnable" characteristic or a characteristic that could be tied to already existing individual differences. Stated differently, the degree to which self-regulated learning is partly explained by status variables such as gender has not been thoroughly explored. The purpose of the current investigation is to determine if a set of identified in previous research self-regulated learning strategies (metacognition, elaboration, critical thinking, organization, rehearsal, time and effort management, help seeking and peer learning) varies as a function of gender.

Self-regulated learning defined

Self-regulated learning has become a popular construct in education and educational psychology in the recent years. Several models of self-regulated learning have been proposed, the majority of which stem from Bandura's (1986) socio-cognitive theory of human functioning. An underlying assumption of Bandura's theory is that people are proactive, self-determined and self-regulating entities, rather than passive and shaped by their surroundings (Pajaras & Valiante, 2002). The self-regulated learning theories of Zimmerman (2000) and Pintrich (2000) represent the most prominent continuation of Bandura's theoretical paradigm.

According to Zimmerman et al.(1997) self-regulated learning can be described as a cyclical and multi-componentional process. Zimmerman (2000) hypothesizes that there are three related phases: a forethought, a performance, and a self-reflection phase. Self-regulation of learning is conceptualized as encompassing skills such as: setting goals for learning; applying strategies for accomplishing those goals; monitoring one's performance; and restructuring one's environment in order to attain one's goals (Zimmerman, 1995; Zimmerman & Schunk, 2001). The process is considered cyclical because feedback obtained from prior learning experience is used to make adjustments to goals and strategies for subsequent learning endeavors (Puustinen & Pulkkinen, 2001). Research in support of Zimmerman's theory has found that self-regulating learners set proximal attainable goals; are not performance but learning oriented; have an understanding that different learning tasks require different strategies; use the most appropriate strategies effectively; possess high self-efficacy; control their performance through strategies such as imaginary, self-instruction, and attention focusing; are able to observe the intermediate outcomes of their learning process; are able to accurately attribute the outcome of learning to the causes of performance; and finally, are open to adapt their learning strategies to the immediate requirements of each particular learning situation (Zimmerman & Schunk, 2001).

The theory of self-regulation proposed by Pintrich (1995) shares common features with Zimmerman's theory. Pintrich(1995) characterizes self-regulated learning as incessant adjustment of one's cognitive activities and processes to the demands of a particular learning situation (Pintrich et al, 1991). Self-regulated learning is assumed to follow a time ordered sequence consisting of four phases: forethought, monitoring, control and reflection. Each phase includes a number of distinctive self-regulatory activities which represent four general domains: cognitive, motivational and affective, behavioral and contextual. Similarly to Zimmerman,

Pintrich (2000) emphasizes that the role of planning and goal setting (mastery or performance oriented) is critical in self-regulated learning.

In most of the advanced theories of self-regulated learning, self-regulation in academic setting has been conceived as a malleable process, rather than unchangeable and genetically rooted. Pintrich (1995) posited, for example, that students are able to learn to self-regulate in academic settings through self-reflection and experience. Therefore, it is incumbent upon parents and teachers to cultivate these skills in students from a very early age (Coppola, 1995). Numerous training and intervention studies have lent support to the conceptions that self-regulation can be successfully taught to students of all grade level and the skills acquired through self-regulated learning lead to notable improvement in student academic performance (Zimmerman & Schunk, 2001). However, the idea that some of the self-regulatory processes could be related to already existing individual differences has not been as frequently pursued in research as training and intervention studies.

Gender differences in self-regulated learning

A handful of studies dealing explicitly with gender differences in self-regulated learning was identified. Although the studies tend to consistently point to the presence of some gender differences, the trend of the findings remain inconclusive.

In a qualitative investigation, by the means of interviews with 5, 8, and 11 graders Zimermann and Martinez-Pons (1990) examined whether genders can be differentiated with respect to the use of 14 self-regulatory learning strategies. The authors discovered that girls tend to employ self-monitoring, goal setting, planning and structuring of their study environment much more often than boys. Pokay and Blumenfeld (1990) reported that, as compared to high school boys, high school girls use more metacognitive, cognitive and subject specific self-regulatory strategies. Similarly, Wolters (1999) established that female students use more learning strategies than boys. Niemivirta (1997) also found gender differences favoring girls; female students tended to use less superficial learning strategies such as rote memorization than male students.

The study of self efficacy – the most frequently examined component of self-regulation - has produced mixed and contradictory findings. Wigfield, Eccles and Pintrich (1996) found that whereas in elementary school years boys and girls are equally confident in their mathematics knowledge and skills, as they progress through the educational system, gender difference in

mathematics self-efficacy begin to emerge such as male students begin to rate themselves as more self-efficacious than female students. In contrast, Zimermann and Martinez-Pons (1990) found no gender differences in mathematics self-efficacy. With respect to verbal self-efficacy, however, the authors uncovered gender differences favoring male students.

Scope of the study

The present study was motivated by the need for more research on gender and its role in self-regulated learning. The purpose of the paper was to determine whether self-regulatory learning strategies differ as a function of gender. The study focused on nine self-regulatory skills which were identified by Pintrich et al.(1993) and, as reported by the authors, were based on a general model of learning and information processing. These self-regulatory strategies are grouped in three broad categories: cognition, metacognition, and resource management. Brief definitions of the concepts are provided below.

Four learning strategies constitute the cognitive area of self-regulatory skills. These are rehearsal, organization, elaboration and critical thinking skills. *Rehearsal*, the most basic learning strategy for processing of information, represents a verbal repetition of a material with the goal of memorization. *Elaboration,* a higher order learning skills, is operationally defined as paraphrasing and summarizing. *Organizations* include strategies such as outlining, taking notes and connecting different aspects of the material studied. The learning strategy of *critical thinking*, as the name implies, consists of critical evaluations of ideas and application of knowledge to new situations (Pintrich et al., 1993). *Metacognition* is often considered a central component of self-regulated learning. It is defined as the individual's awareness, knowledge and control exercised over cognitive processes (Pintrich et al., 1991). Finally, the resource management category of self-regulatory strategies include managing time and study environment, effort management, peer learning and help seeking. *Management of time and study environment* refers to choosing a physical environment conducive to learning, which is free of distractions and allows the student to stay focused on the task at hand (Zimmerman & Risemberg, 1997). The strategy of *effort regulation* is close in meaning to volition and include an ability to deal with seatbacks and failure in the process learning; allocating more effort to unsuccessfully performed tasks (Chen, 2001). *Peer learning* is using a study group or friends to help learn and help seeking refers to looking for help form others – peers and instructors – in event of encountered learning difficulties (Pintrich et al., 1993).

Method

Participants

A total of 198 undergraduate students enrolled in 10 basic Education courses at a large university in Northeastern US were recruited for participation in the study. Seventy eight (39%) of the participating students were male and 120 (61%) were female. Less than 2% of the participants were international students.

Instrument

The Motivated Strategies for Learning Questionnaire (MSLQ) was used for the purposes of the study. The MSLQ was developed by Pintrich, Smith, Garcia and MicKeachie (1993) as a measure of self-regulated learning and is one of the most widely used self-regulation questionnaires both nationally and internationally. It consists of 81 questions designated to capture two broad dimensions of self-regulation: motivation and learning strategies. Responses are provided on a 7-point continuous Likert type scale anchored by 1 (not at all true of me) and 7 (very true of me). The motivation section of the questionnaire consists of six subscales and the learning strategies section consists of nine subscales. Since the interest in the study was in metacognitive, cognitive and management skills and their relationship with gender only the 9 self-regulatory subscales of the questionnaire were used. These subscales were: Metacognition (representing the metacognitive construct of self-regulation); Elaboration, Critical thinking, Organization and Rehearsal (representing the cognitive aspect of the self-regulated learning); and Environment and Time management, Effort management , Peer learning and Help seeking (representing the management component of self-regulation). Based on the study sample, the internal consistency (Cronbach's Alpha) of the subscales ranged from .69 to .93.

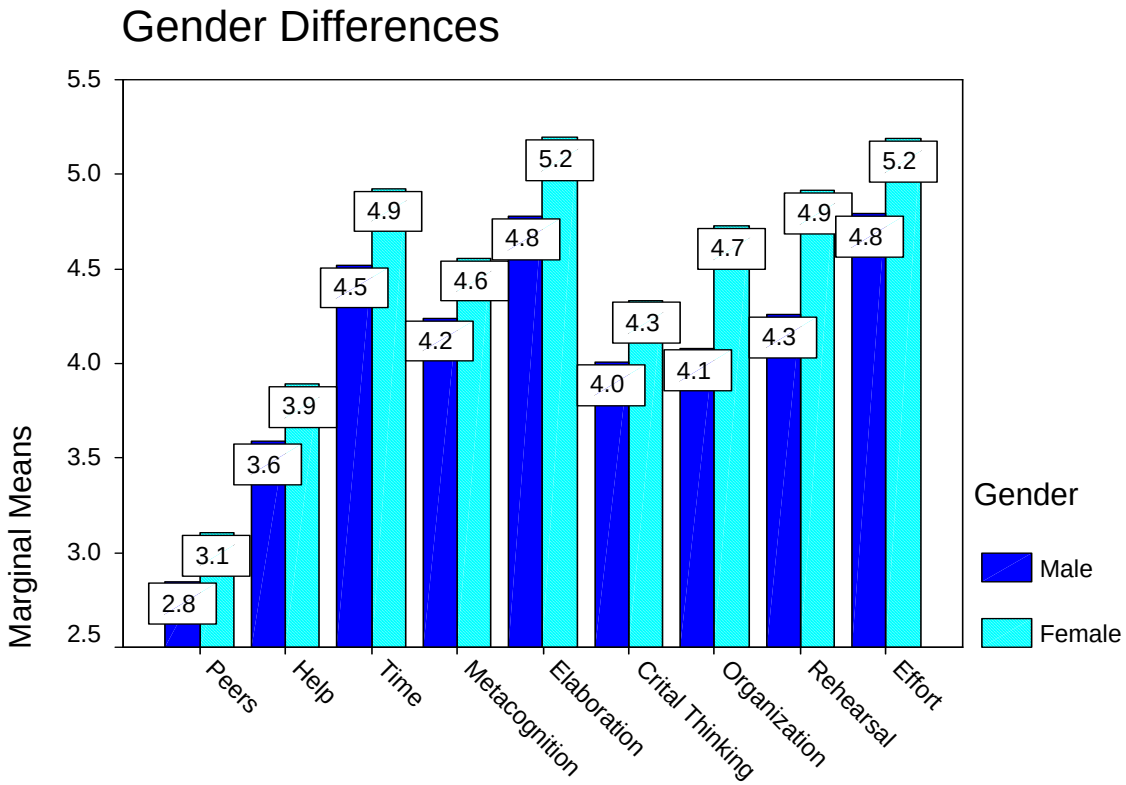
Procedure

Prior to conducting the study institutional permission was obtained. The participants were administered MSLQ during their regular classroom time. Partial credit for completing the survey was given by some of the instructors teaching the respective courses. The data were collected over four consecutive semesters.

Results

A one-way between subjects multivariate analysis of variance was performed on the 9 dependent variables of self-regulation skills: peer learning, help seeking, time and effort management, metacognition, organization, elaboration, critical thinking, organization, and

rehearsal. The independent variable was gender. With the use of Wilk's criterion, the combined dependent variables were significantly affected by gender, $F(1,188) = 2.49$, $p=.01$. The results reflected a modest association between gender and the combined dependent variables, partial $\eta^2 = .12$. The examination of the univariate F-tests revealed that female and male undergraduate students mostly deferred with respect to use of rehearsal $F(1,188) = 14.10$, $p<.001$; organization $F(1,188) = 12.63$, $p<.001$;metacognition $F(1,188) = 5.91$, $p<.02$; time management skills $F(1,188) = 6.719$, $p<.01$; elaboration, $F(1,188) = 7.635$, $p<.01$; and effort $F(1,188) = 5.667$, $p<.02$. No statistically significant differences were found with respect to studying with peers $F(1,188) = 1.324$, $p>.05$ help seeking $F(1,188) = 2.400$, $p>.05$, and critical thinking skills $F(1,188) = 2.565$, $p>.05$.



Conclusion

The purpose of the study was to investigate gender differences in the use of self-regulated learning strategies. The study uncovered robust gender differences in the use of six strategies. Female students surpassed male students in their ability to use rehearsal, organization, metacognition, time management skills, elaboration, and effort. In addition, the performed

multivariate analysis revealed that undergraduate female and male students differed mostly with respect to the use of the strategies of rehearsal and organization. The analysis did not indicate statistically significant differences regarding help seeking, peer learning, and critical thinking skills.

Several alternative explanations of the study findings can be espoused.

The results of the study might reflect the fact that male and female students demonstrate differential propensity to using these strategies in their learning. The results of the study are consistent with findings from previous research demonstrating that female students tend to surpass male students in terms of strategy use (e.g. Niemivirta,1997; Pokay & Blumenfeld, 1990; Zimermann & Martinez-Pons; 1990; Wolters, 1999).

Another possibility could be that female undergraduate students might have been more reflective upon their learning experiences and consequently more aware of the strategies they consistently use in the process of learning. They might have also demonstrated a greater willingness to report of the use of these strategies.

The results, might as well suggest that the representatives of the two genders, have responded differently to the questionnaire. The gender differences found might be a function of stereotypical beliefs that girls are expected to behave in a certain way in academic setting. Girls are expected to be conscientious, organized, and to skillfully manage their learning environment. This hypotheses echoes the arguments made by researchers that gender differences in "academic variables may be a function of stereotypic beliefs about gender that student hold, rather than of gender itself" (Pajaras & Valiante, 2002, p.216). Pajaras and Valiante (2002) have found that when gender role stereotypes are controlled for, gender differences in academic variables tend to be non-existent. More specifically, the authors established that gender differences in self-efficacy beliefs, an important aspect of self-regulation, disappear when gender stereotypes or the beliefs people hold about gender are taken into account. Stated differently, gender stereotypes mediate the effect of gender on self-regulatory skills.

In conclusion, the results of the study favoring female students in the use of self-regulatory learning strategies are puzzling and require further investigation. More research on the role of gender in self-regulation is needed to clarify the exact nature of the relationship between the two variables.

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