

Thinking about Thinking: Metacognitive Self-Regulation and Gender Differences

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Abstract



Learning is a complex process which requires crucial skills in learners like self-regulatory skills of planning, monitoring and evaluation. The purpose of the current study was to determine the awareness level of these important skills of students. The University of Peshawar's B.Ed (Hons) program (2014–2015) was the sole focus of the study. There were 102 male and 127 female B.Ed (Hons) students in the study's population. A ninety student multistage stratified random sample was chosen. The Schraw & Dennison (1994) questionnaire items were used to collect the data. The results were tabulated, calculated as a percentage, and further interpreted in simple language. Other statistical tools, such as the *t*-test and descriptive statistics, have also been used.

Our Data elicited that pupils employ metacognition for memorization rather than understanding process in learning. Data found females better at goal-oriented learning, planning and comprehending strategies. Students were found to be proficient in self-reflection, self-assessment, appraisal, and self-motivation during the learning process.

Keywords: Meta-cognitive Self-Regulation, Meta-cognitive Awareness Inventory, Gender

Introduction

Learning is an interesting as well as cyclic process which includes different steps such as revision of previous work and awareness about mistakes for the purpose of improvement. Students who did not get learning as cyclic process mostly associate success to good luck and failures to lack of ability.²

One of the most important and necessary processes for understanding information, monitoring and regulating our thinking process is “Executive process” of learning which is also named Meta-cognition. Meta-cognition play important role in introducing learners as independent learners by keeping them on right track through giving knowledge and control of own mental processes as well as enabling them to regulate themselves for new challenges.³

Metacognitively aware students can express their needs in best way which helps them in self-regulation and self-management. Because of self-management, these students got more importance and value when appear as candidates for recruitments.^{4,5} Meta-cognitive awareness empower the students to be competent, regulate own cognitive process which results in high academic achievements, purpose oriented learning and students independence.^{6,7}

Meta-cognitive awareness help the students in identification of their negative points and overcoming all these points but if student are poor skilled in Meta-cognition they will be obviously dependent and not fruitful learners.⁸ Meta-cognition is referred as “*thinking about thinking*” or “*cognitions about cognitions*”.⁹

“*Meta-cognition is the awareness or analysis of one's own learning or thinking processes*”.¹⁰

“*Meta-cognition is the ability to reflect on one's own performance*”(National Research Council, 2000)¹¹.

Meta-cognition is an interesting term which enables the learners to know what, when, how, and why to use a mental process? ¹²Meta-cognitive skills play the role of supporter and activator for learning process by controlling, monitoring and evaluating mental processes.¹³ Education is a process which brings optimistic change in humans behaviour and Meta-cognition is supported in mastering the learners in this optimistic changes and maximizing their strengths .^{14, 15, 16} If performing a task needs cognitive skills then Meta-cognition is the mirror of HOW it is performed.¹⁷ Meta-cognition is

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an umbrella term which covers two components knowledge of cognition and regulation of cognition. These both have value in active and fruitful learning.¹⁸

The government is concentrating its efforts on higher education in Pakistan, with a particular emphasis on Khyber Pakhtunkhwa. In Khyber Pakhtunkhwa, public universities are divided into three establishment phases: pre-2000, 2000-2009, and 2009-2018. Five public universities were founded in the province before the year 2000. Of them, Peshawar University is the oldest and the first in Khyber Pakhtunkhwa, Pakistan, to have an Institute of Education and Research dedicated to teacher training. The current study's objective is to evaluate undergraduate students' awareness of metacognition. Additionally, the department's perceptions of male and female students will be contrasted.

Objectives of the Study

This study pursues the research objectives, mentioned below:

- To explore students' awareness of Meta-cognitive Self-regulation in learning.
- To compare awareness of females with male students' at departmental level.

Hypotheses of the Study

- There is no awareness of Meta-cognitive Self-regulation in learning of students.
- There is no difference in Awareness of Meta-cognition level of female and male students.

Methods and Procedure

Nature of the Study

It is descriptive research which involves collection, evaluation, and interpretation of data about University of Peshawar B.Ed (Hons) program students' awareness of self-regulation in the learning process.

Population

Students enrolled in the B.Ed (Hons) program at Institute of Education and Research made up the study's population (table 1). The pupils were divided into 102 males and 127 females according to gender.

Sample of the Study

Multistage stratified random sample was used by researchers in order to select a representative sample. In the first stage of sampling, university of Peshawar was selected as it is the oldest university (having teacher training institution) in five public sector universities established before 2000. In the second stage of sampling, the Institute of Education and Research was selected. For the third sample stage, BS education students in their current semesters were selected. Under the semester system, four semesters are run concurrently; 22 students, 11 male and 11 female, were randomly selected from each semester in an equal distribution. A total of 90 students were selected from IER, 45 of whom were male and 45 of whom were female (Table 2).

Instrument Used

In 1994, Schraw and Dennison created the Meta-cognitive Awareness Inventory, which is a valid and trustworthy tool with an internal consistency of 0.93 to 0.88.

This inventory comprised two components: meta-cognitive knowledge and self-regulation. It is adopted by researcher with little modification by collecting questions under main headings of self-regulation. True and false scales are there in the inventory. The test is split into three cutoff values to classify students' performance as High, Average and Low achievers. The semester system grading is used to determine the cutoff values for High Average and Low Achievers (75% and above, 50%-75% and below 50%). In the Demographic section, data on the student's name, department name, class, and final semester results were gathered.

Data Analysis

Data was gathered using items from the questionnaire. These were then totalled, calculated as a percentage, and further explained in simple languages. The t-test was used to analyze the data once it was fed on SPSS. After analyzing the data, findings and conclusions were made.

Results and Discussion

Descriptive statistics were used to identify awareness of Metacognition and an independent-samples t-test were conducted to compare awareness of Metacognition of female and male (Table III). Our data exhibited that Awareness of Planning in metacognitive self-regulation is given by 83% of pupils while female were more aware than male; female (Means \pm SD =4.5 \pm 0.69267) and male (Means \pm SD =4 \pm 1.03328) conditions; $t(88) = 2.876$ $p < 0.05$.

64% students were aware of monitoring in metacognitive self-regulation with significance difference female; (Means \pm SD =3.9 \pm 1.23215) and male (Means \pm SD =3.3 \pm 1.20897) conditions; $t(88) = 2.245$ $p < 0.05$.

For assessment of established Goals we have got 65% students out of sample, while comparing female assess their goals and performance more than male, female ; (Means \pm SD =4.1 \pm 1.07) and male (Means \pm SD =2.9 \pm 1.38097) conditions; $t(88) = 4.69$ $p < 0.05$.

64% pupils have the Ability of awareness of Information Management Strategies, comparatively female have high mean score than male, female; (Means \pm SD =3.9 \pm 0.9034) and male (Means \pm SD =3.1 \pm 1.28) conditions; $t(88) = 3.323$ $p < 0.05$.

For awareness of Debugging Strategies we have got 65% students out of sample, while comparing female assess their goals and performance more than male, female ; (Means \pm SD =4.1 \pm 1.07) and male (Means \pm SD =2.9 \pm 1.38097) conditions; $t(88) = 4.69$ $p < 0.05$.

The use of Strategies for memorization is 75% in sample pupils with significant difference in male and female. 43% which is low percentage of pupils use meta-cognitive Strategies for understanding while comparing female with male, the mean score of female (3.48) is significantly higher than the mean score of male (2.8) in the use of meta-cognitive Strategies for Understanding. The t - statistics $t(88) = 2.15$ $p < 0.05$ confirms a statistically significant difference between the mean scores which show that female mostly use meta-cognitive Strategies for understanding.

Discussion

Schraw & Dennison¹ described a number of regulatory skills in the literature of their research but three in them are most required essential self-regulatory skills. Five sub-components that support the process aspect of regulation of cognition are planning, information management techniques, comprehension monitoring, debugging strategies, and evaluation.^{19,20,21,22,23,24,25}

The present study is conducted to explore the awareness of these Metacognitive skills of BED (hons) students at Institute of Education and Research, University of Peshawar. Furthermore it will compare the awareness of Metacognition of females with male students'.

Childhood and adolescence are the stages for improving planning. Our results identify pupils with good planning skills as they were purpose oriented, having problem solving abilities, gave attention to the instruction while in establishing goals before study their percentage is high (83%). Development of self-regulative skill; monitoring is not fast in even adults. Our results are in consistence with it as half of the sample students monitored performance during learning, manage time, use strategies for understanding while high percentage of students use strategies for memorizing.²⁶

Evaluating is also an important skill which can be explained as re-evaluation of one's goals and learning. Our study exhibited average results (50%-65%) for self-assessment, self-reflection, assessment of level of learning, ability of summarization, and evaluation of established goals.

Our results exhibited that significant differences exist between females and male. Females are more planned by the use of skills, monitoring themselves and managing time. Strategies are used for memorization by female and for understanding their percentage is low. Self-assessment and assessment of established goals is also indicated with significant difference. Our results are in consistence with the research that girls are more planned, having monitoring skills, set goals and keep records.²⁷ Previous studies reported that female students had higher meta-cognitive self-regulation skills compared to male students.^{28, 29, 30}

Our results show that two components, self-reflection and ability of summarizing are in accordance with Pajares and Graham (1999)³¹ work who found no differences between female and male students in terms of self-regulative skills. Data concluded that self-regulative strategies are used comparatively more for memorizing information than understanding of the subject and female score more on the measures of self-regulative skills than male

Recommendations

- Teachers must receive in-service training. The education department has to provide training to instructors so they can discuss metacognition and how to use it to improve learning. Both the absence of such strategies and the teacher's level of expertise greatly impair the latter's ability to apply Metacognitive strategies in the classroom.
- It is suggested that future research look at other areas, such as application of metacognitive strategies as well as its impact on other variables.

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TABLE 1: Total population available for sampling

| Semester | Male | Female | Total |
|-----------------|------|--------|-------|
| 2 rd | 19 | 34 | 53 |
| 4 th | 26 | 20 | 46 |
| 6 th | 39 | 42 | 81 |
| 8 th | 18 | 31 | 49 |
| Total | 102 | 127 | 229 |

TABLE 2: Selected sample out of total population

| Semester No | Male | Female | Total |
|-----------------|------|--------|-------|
| 2 nd | 11 | 11 | 22 |
| 4 th | 11 | 11 | 22 |
| 6 th | 12 | 12 | 24 |
| 8 th | 11 | 11 | 22 |
| Total | 45 | 45 | 90 |

TABLE III : The statistical analysis of the respondents

| Statements | gender | N | Mean | Std. Deviation | df | t | P value | percentage |
|-----------------------|--------|----|------|----------------|----|-------|---------|------------|
| Declarative knowledge | Female | 45 | 4.2 | 0.83666 | 88 | 3.485 | 0.001 | 74% |
| | male | 45 | 3.6 | .85694 | | | | |
| Procedural knowledge | Female | 45 | 4.1 | .88649 | 88 | 2.023 | 0.046 | 71% |
| | male | 45 | 3.8 | .77720 | | | | |
| Conditional knowledge | Female | 45 | 3.4 | 1.19848 | 88 | 1.165 | .247 | 50% |
| | male | 45 | 3.1 | 1.15383 | | | | |
| Planning | Female | 45 | 4.5 | .69267 | 6 | 2.876 | .005 | 83% |
| | male | 45 | 4.0 | 1.03328 | | | | |
| Monitoring | Female | 45 | 3.7 | 1.23624 | 88 | 2.245 | .027 | 64% |
| | male | 45 | 3.9 | 1.23215 | | | | |
| Assessment | Female | 45 | 3.3 | 1.20897 | 88 | 4.690 | .0000 | 65% |
| | male | 45 | 4.1 | 1.07215 | | | | |
| | | 45 | 2.9 | 1.38097 | | | | |

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|-----------------------------------|--------|----|-----|---------|----|-------|-------|-----|
| | Male | | | | | | | |
| Debugging strategies | Female | 45 | 4.1 | 1.07215 | 88 | 4.690 | .0000 | 65% |
| | male | 45 | 2.9 | 1.38097 | | | | |
| Information Management Strategies | Female | 45 | 3.9 | .90342 | 88 | 3.323 | .001 | 64% |
| | male | 45 | 3.1 | 1.28433 | | | | |
| Strategies use for Memorization | Female | 45 | 4.2 | .89499 | 88 | 2.540 | .013 | 75% |
| | male | 45 | 3.7 | 1.23624 | | | | |
| Strategies use for Understanding | Female | 45 | 3.4 | 1.53083 | 88 | 2.151 | .034 | 43% |
| | male | 45 | 2.8 | 1.19257 | | | | |
