Assessing Metacognitive Knowledge through Gender Lens

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Abstract

The present study was conducted to assess students' awareness of metacognitive knowledge, commonly referred to as knowledge of one's own mind, and to further relate it to gender. The University of Peshawar's BS education program was the sole focus of the study (2014-15). Population of the study included 102 male and 127 female B.Ed (Hons) students. 102 male and 127 female B.Ed (Hons) students made up the study's population. A 90-student multistage stratified random sample was chosen. The data was gathered using Schraw & Dennison 1994 [1] designed questionnaire items; these were then tabulated, converted to percentages, and further explained in simple language. Descriptive statistics and t-tests, among other statistical tools, have also been used.

Our result identifies pupils with best declarative knowledge while development of conditional and procedural knowledge is not fast. The study concluded that female students were good in knowledge of own intellectual strengths, self-ability to organize information, teacher expectations, fruitful learning in case of interest in topic, Self-motivation during learning and were more capable of purpose oriented study and uses strategies for understanding. Students are aware of selection of strategies, use of strategies and reuse of strategies. The study found that mostly pupil are aware of strategies for memorizing information, not for understanding new information.

Keywords: Metacognitive Knowledge, Gender, Declarative knowledge, Conditional Knowledge, Procedural Knowledge

Introduction

Many students find that university life is a time of concern about adapting and failing, even while it also presents worthwhile chances for multifaceted growth in the cognitive and psycho-social domains. However, not all students benefit or have their growth supported equally by their university experience. Among the primary causes of this is the dynamic structure of the consequences of university life, which also varies according to student actions that go beyond the particulars of these experiences (Pintrich, 2000)[2].

Educational experiences are valuable resources for the development of some students, but for others, these factors can result in experiences that further undermine rather than enhance their well-being. This is because of how students handle the opportunities they face in academic life as well as their beliefs, attitudes, and behaviors regarding learning materials (Piumatti & Rabaglietti, 2005)[3]. The main reason why students have trouble is because they don't see learning as a cycle. Youngsters also start to link luck to success and incompetence to failure.[4]

Students who are aware of their cognitive processes are the best candidates for employment since these abilities are more highly regarded.[5] for self-regulation, the first step is to be enriched with knowledge about one's own cognitive processes. Self-regulated students are capable of understanding and regulating themselves through expressing their own needs. [6]

The use of metacognitive strategies enables students to control their own learning, which leads to high academic achievement. [7] A variety of opportunities for student choice in the educational process, student government, and goal-oriented learning are characteristics that encourage students to be independent learners. [8]

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Lacking the necessary skills or lacking awareness of metacognition, students frequently hesitate and rely on others to guide their learning. Such pupils can be empowered by being given metacognitive understanding, which helps them identify their areas of weakness and solve problems.[9] "*thinking about thinking*" or "*cognitions about cognitions* "refers to the awareness, understanding, and control of the mental operations necessary for learning.[10]

"Meta-cognition is the awareness or analysis of one's own learning or thinking processes".[11]

"Meta-cognition is the ability to reflect on one's own performance" (National Research Council, 2000)[12].

Metacognition provides us with guidance on when, how, and why to employ particular mental processes. It makes reference to our knowledge of how we think and our ability to monitor, control, and organize our cognitive processes.[13] Metacognitive students have a range of skills and are knowledgeable about when to use them during the course of the learning process. Students who engage in metacognition exercises improve their capacity to adjust to new information and come up with solutions. Such pupils see education as a process they must actively manage and engage in. The degree to which students actively participate may affect how well they learn and comprehend. It implies that by controlling, observing, and evaluating mental processes, metacognitive awareness and use facilitate learning. [14]Education is life, empowering pupils to be masters of their own behavior, thought processes, and learning Self-awareness and self-control result in positive changes in the student. [15, 16] Students that struggle with learning disabilities and experience difficulties and barriers in the classroom grow more independent, acquire situational management skills, and learn to play to their strengths. [17]

The Garner found that while metacognition should be used to understand how a task was carried out, cognitive skills are crucial for task performance. [18]Knowledge of cognition and regulation of cognition are two subcategories of metacognition identified by researchers. When we talk about knowledge of cognition, we mean awareness of cognition and skills that are crucial for effective intentional learning. Planning, monitoring, and evaluating one's learning are further uses for this knowledge.[19]

Higher education in Pakistan, especially in Khyber Pakhtunkhwa, is the government's main concern. Khyber Pakhtunkhwa establishes public universities in three stages: before 2000, between 2000 and 2009, and between 2009 and 2018. Prior to the year 2000, five public universities were established in the province, with Peshawar University being the oldest and first one to have a teacher preparation programme (IER). The goal of the current study is to gauge undergraduate students' knowledge of metacognitive knowledge and how it can be used to improve learning. In order to make learning simple, effortless, and efficient, it will also estimate the value of meta-cognitive knowledge. It will also compare awareness of male and female students.

The Study's Objectives

The following research goals are being pursued in this study:

1.   To determine whether students are aware of their metacognitive knowledge in learning.
2.   To compare male and female students' meta-cognitive knowledge in learning.

Hypotheses of the Study

1.   There is no awareness of meta-cognitive knowledge of students in learning.
2.   There is no difference in Meta-cognitive knowledge of female and male students.

Procedure and Methods

Methodology

This research is descriptive in nature. It entails gathering, analyzing, and interpreting information regarding BS. Education students' awareness of metacognitive knowledge in learning. Students enrolled in the B.Ed (Hons) program at the Peshawar University's Institute of Education and Research made up the study's population (table 1). The distribution of the students' genders was 102 male to 127 female.

A representative sample was chosen by the researcher using a multistage stratified random sample. As the oldest university (with a teacher training institution) among the five public sector universities founded before 2000, Peshawar University was chosen for the sampling's initial stage. Institute of Education and Research institute was chosen in the second round of sampling. Running semesters of BS education students were chosen for the third stage of sampling. In a semester system, four semesters run concurrently, and 22 students (11 men and 11 women) were chosen at random

from each semester out of an equal allotment of students. 90 pupils total were chosen from the IER, 45 of them were male and 45 of whom were female (Table 2).

Data was gathered using items from questionnaire. These were then tabulated, converted to percentages, and then translated into simple languages. Using the t-test, data will be entered into SPSS and analyzed. Conclusions and findings will be drawn after that.

Instrument Used

Inventory of metacognitive awareness known as the Metacognitive Awareness Inventory was created by Schraw & Dennison in 1994. This Inventory is a valid and reliable tool (internal consistency) (0.93 to 0.88). Metacognitive knowledge and self-regulation were the two parts of this inventory. For the meta-cognitive knowledge portion of meta-cognition, researchers have accepted it. 13 sections of the questionnaire contain 17 items of metacognitive knowledge. Two scales—true and false—make up the inventory. To categorize student performance into High, Average, and Low achievers, the test is separated into three cutoff levels. The semester system of grading is used to determine the cutoff values for High Average and Low Achievers (75 percent and above, 50 percent -75 percent and below 50 percent). In the demographic area, details such as the student's name, the department's name, the class, and the results from the previous semester were gathered.

Results and Discussion

Descriptive statistics were used to identify awareness of meta-cognitive knowledge(Table 3)and an independent-samples t-test were conducted to compare awareness of meta-cognitive knowledge of female and male (Table 4).Our data exhibited that (74%) of the students understand own intellectual strengths and weaknesses. while comparing the gender response difference to own understanding, we found that Female were more aware of own intellectual strengths and weaknesses; female (Means $\pm$SD =4.2 $\pm$0.836) and male(Means $\pm$SD=3.6$\pm$0.856) conditions; t (88) =3.485 $p < 0.05$.

We found that 71 % of students' have knowledge about important topic to learn while comparing genders there was significant difference between male and female; female(Means $\pm$SD =4.1$\pm$0.88) and male (Means $\pm$SD=3.8$\pm$ 0.777) conditions; t (88) =2.023 $p < 0.05$.

Awareness About self-ability to organizing information is given by 83% of pupils while female give more attention 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 $p < 0.05$.

We found that 54% students have knowledge about teacher expectation from them to learn,75% of the students know about their remembering power. While comparing the gender response difference, we found significant difference.

54% have knowledge of how well they learn and understand things and 55% do Fruitful learning when they have interest in topic while we found statistical significant difference between the mean scores of male and female $p<0.005$.

43% which is low percentage of pupils use Strategies that work best in past 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 reuse of 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 Strategies for Understanding.64% pupils have specific purpose when use any strategy, 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 $p< 0.05$.

50% of students know about how to select and how to use relevant strategy with no significance difference while 64% motivated themselves for learning 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 $p < 0.05$.

64 % students use intellectual strengths to compensate weaknesses. We found no significant difference between male and female and for Knowledge about effective strategy we have got 65% out of sample students have Knowledge about effective strategy, while comparing female have Knowledge about effective strategy 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 $p< 0.05$.

Discussion

Schraw & Dennison[1]described a number of regulatory skills in the literature of their research but three in them are most required skill for the application of which the knowledge of cognitive processes is essential. This knowledge is known as metacognitive knowledge and its application is self-regulation.

Metacognitive knowledge consists of declarative knowledge, procedural knowledge and conditional knowledge. Self-regulation has three skills which are: planning, monitoring, and evaluation.[20]

The present study is conduced to explore the awareness of metacognitive knowledge of BEd (hons) students at IER Peshawar University. Furthermore it will compare the awareness of metacognitive knowledge of female with male students' at university level.

Childhood and adolescence are the stages for improving metacognitive knowledge. Our result identify pupils with good declarative knowledge as they were Aware of own intellectual strengths and weaknesses, having Knowledge about important topics to learn, Aware About self-ability to organizing information, teacher expectations and fruitful learning in case of interest in topic while in case of memory use their percentage is high (75%).

Development of conditional knowledge and procedural knowledge is not fast in even adults. Our results are in consistence with it as half of the sample students are aware of Selection and use of strategies, when they learn well, when to use which strategy, reuse of strategies. Conditional knowledge is important which can be explained as awareness about when to use which cognitive processes for learning. Our study exhibited average result (50%-65%) for Self-motivation, self-adjustment, interest level of learning. Use strategies for understanding is very low (43%) of sample while high percentage of students use strategies for memorizing.[21]

Our results exhibited that significance difference exist between female and male. Female are more Aware of own intellectual strengths and weaknesses, having Knowledge about important topics to learn, Aware About self-ability to organizing information, teacher expectations and fruitful learning in case of interest in topic while in case of memory use significant difference is indicated. Our results are in consistence with the research that girls are more aware of cognitive processes that is why they are more planned, having monitoring skills, set goals and keep records.[22]

Previous studies reported that female students had higher meta-cognitive skills compared to male students.[23, 24, 25]

Our results show that two components, Selection and use of strategies and Use of intellectual strengths to compensate weaknesses are in accordance with Pajares and Graham (1999)[25] work who found no differences between female and male students in terms of metacognition components.

Conclusion

Data concluded that metacognitive knowledge are use comparatively more for memorizing information than understanding of the subject and female score more on the measures of metacognitive knowledge than male. Present research was conducted on BED (Hons) Pupils of education only , so suggestion for future researches is that should be conducted on other fields of education system(social sciences and science) and its effect on academic performance will be also investigated.

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TABLE 1: TOTAL POPULATION AVAILABLE FOR SAMPLING

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

TABLE 2: SELECTED SAMPLE OUT OF TOTAL POPULATION

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

TABLE 3: STATISTICAL ANALYSIS AND OF THE RESPONDENTS

Statements	gender	N	Mean	Std. Deviation	df	t	P value	percentage
Awareness of own intellectual strengths and weaknesses.	Female	45	4.2	0.83666	88	3.485	0.001	74%
	Male	45	3.6	.85694				
Knowledge about important topics to learn	Female	45	4.1	.88649	88	2.023	0.046	71%
	Male	45	3.8	.77720				
Awareness About self-ability to organizing information	Female	45	4.5	.69267	88	2.876	.005	83%
	Male	45	4.0	1.03328				
Teacher expectation about learning	Female	45	3.7	.97442	88	2.247	.027	54%
	Male	45	3.3	.99595				
Memorization	Female	45	4.2	.89499	88	2.540	.013	75%
	Male	45	3.7	1.23624				
Knowledge of how well they learn and understand thing	Female	45	3.7	1.13128	88	2.508	.014	54%
	Male	45	3.1	1.30074				
Fruitful learning in case of interest in topic	Female	45	3.7	1.28629	88	1.946	.055	55%
	Male	45	3.1	1.41885				
Strategies reuse for Understanding	Female	45	3.4	1.53083	88	2.151	.034	43%
	Male	45	2.8	1.19257				
Specific purpose when use any strategy	Female	45	3.9	.90342	88	3.323	.001	64%
	Male	45	3.1	1.28433				
Selection and use of strategies	Female	45	3.4	1.19848	88	1.165	.247	50%
	Male	45	3.1	1.15383				
Self-motivation	Female	45	3.9	1.23215	88	2.245	.027	64%
	Male	45	3.3	1.20897				
Use of intellectual strengths to compensate weaknesses	Female	45	3.7	1.27247	88	1.302	.196	64%
	Male	45	3.3	1.31694	88			
Knowledge about effective strategy	Female	45	4.1	1.07215	88	4.690	.0000	65%
	Male	45	2.9	1.38097				