

## ASSESSING POSTGRADUATE STUDENTS' CRITICAL THINKING ABILITY

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### ABSTRACT

*This paper addresses to assess the critical thinking ability of postgraduate students. The target population was the male and female students at University level in Pakistan. A small sample of 45 male and 45 female students were selected randomly from The Islamia University of Bahawalpur, Pakistan. Cornell Critical Thinking Test Series, The Cornell Class-Reasoning Test, Form X developed by Ennis (1964) were used to assess the students' critical thinking ability. SPSS version 20 was used to analyze the data. The percentage was calculated to assess the students' critical thinking ability. The t-test was used to make comparison of the students' ability on gender bases. The analysis, based on t-value, revealed an insignificant difference between the critical thinking ability of male and female students. Recommendations were furnished in order to improve the students' critical thinking skills.*

*Keywords: Critical Thinking Ability, Class Reasoning, Postgraduate Students.*

### INTRODUCTION

Critical thinking is an approach of reasoning that helps to defend one's beliefs and unwillingness (Tama, 1989). Hickey (1990) defined critical thinking as a strategy of analytical thinking for the purpose of evaluating a statement intelligently. Mertes (1991) added that it is a conscious process that helps to interpret or evaluate information to formulate thoughtful beliefs and actions. Therefore, it is a rationally well-managed process stating relationship between two or more objects or statements that help to make a decision (Mayer & Goodchild, 1990; Scriven & Paul, 1992). Ennis (1992) stated that critical thinking is a deliberate action of what to believe or do. Critical thinking works as a tool for this process of self-evaluation (Hurley, 2010).

There are various critical thinking skills that assist in promoting critical thinking abilities among students studying at a higher level. Marchigiano, Eduljee, and Harvey (2011) listed the critical thinking skills such as (a) to recognize the problem, (b) to identify doable means to resolve the problems, (c) to collect pertinent and solid information, (d) to understand language with clarity and accuracy, (e) to interpret data appropriately, (f) to gather

evidence and evaluate, (g) to identify possible and logical relationship between objects, (h) to draw conclusion, (i) to make generalizations, and (j) to develop beliefs.

### Review of Related Literature

Critical thinking is a burning issue at higher education Institutions or University level. A considerable number of institutions are showing their keen interests to develop the skill of critical thinking among their faculty and students. They justify that, the critical thinking ability can boost up the capabilities of the teachers and students as well. In this way, a number of issues related to classroom teaching, the disciple and examination can be resolved skillfully (Lochhead & Clement, 1979). The teachers will be able to evaluate their students' performance in a better way excessively (Siegel, 1988). For this purpose, the western universities took initiative in early 1980 and included different contents in the curricula to develop students' critical thinking abilities (Atkinson, 1997; Davidson, 1998, 2009; Day, 2003). Many critical thinkers and educationists believe that critical thinking is a dynamic, structured and well-organized process of communication, problem solving, evaluation, analysis, synthesis and reflection

(Cheung, & Hew, 2004; Jeong, 2003). Bailin (2002), and Byrne and Johnstone, (1987) justified that the critical thinking ability assists students to analyze a problematic and tricky situation, choose appropriate problem solving strategy, evaluate scientifically and make decisions wisely, and synthesize the challenging situation pragmatically.

Critical thinking skill is one of the important aspects of curriculum contents at higher education institutions to develop students' critical abilities. Our society is becoming more and more complex with the passage of time; therefore, it requires individuals to take tangible decisions to resolve multifarious situations (Behar-Horenstein, & Niu, 2011). Developing critical skills is also a desirable attribute of graduates in the 21st century to cope with the complicated issues existing in our society (Davies, 2011). Critical thinking assists develop and apply analytical skills in real life situations (Noblitt, Vance, & Smith, 2010).

With reference to the present study, the previous studies (Farrington, DiGregorio, & Page, 1999; Gorinski, & Abernethy, 2003) conducted on critical thinking revealed that the students' higher level of critical thinking help them analyze and synthesize critical, challenging, and puzzling situations prudently. The students can integrate the pieces of information appropriately. With regard to the critical thinking ability among male and female postgraduate students, a study carried out by Facione, Sanchez and Facione (1999) found no significant difference between the scores of male and female students. However, as regards the dispositional differences among male and female students, a research conducted by Walsh and Hardy (1999) at university level revealed that female scores were higher than their male counterparts. The current study is an effort to find out the critical thinking level among Postgraduate students and make a gender-based comparison of critical thinking ability.

## Objectives

The objectives of the present study is aimed:

1. To find out the postgraduate students' level of critical thinking and

2. To make a comparison of male and female students' critical thinking ability.

## Method and Procedure

The population for this study was the Postgraduate students at University level. A small sample consisting of ninety students (45 male and 45 female students) from Master of Education (M.Ed.), Master of Arts in Education (MA Education) and Bachelor of Education (B.Ed.) studying in The Islamia University of Bahawalpur, Pakistan were selected randomly. Thirty students were selected randomly from each program mentioned above. The students enrolled in semester I and II were chosen for the sample. Their age ranged between 19 and 25 years with a mean of 23.7 years. In order to examine and compare the difference between mean scores of male and female students, t-test was applied.

## Research Instrument

The 'Cornell Critical Thinking Tests, The Cornell Class-Reasoning Test, Form X' developed by Ennis (1964) was partially adopted to collect the data from the respondents. This test was designed to assist teachers, parents and administrators predict students' future performance in honors and advanced placement classes, college admission, state proficiency exams, critical thinking classes and even in a career situation. However, it can be employed to test students' higher order thinking capability and measure their critical ability since it is a comprehensive instrument to gauge the critical ability of the students studying at a higher level (Mortier, 2008). Written permission from the author was taken before using the instrument. Actually the Cornell Class-Reasoning Test, Form X' consisted of 76 items, however, only 40 items were taken for this study since the instrument was too lengthy and time consuming. The reliability of the instrument was established at 0.918 Cronbach's Alpha that indicates very high reliability.

## Data Collection and Analysis

As stated earlier, only 40 items were taken from the instrument to find the students' critical ability. The instrument was administered personally in the classroom to collect data. The respondents responded on a Likert-

type scale with three response options, namely 'Yes', 'No', and 'May Be'. One of the three response options were correct. The response rate was 100 percentage. The results were tabulated in a consolidated Table 1 to find out the overall critical thinking level of the respondents and the results were presented in Table 2.

According to Table 1, the majority (50 or more than 50%) of the students gave correct answers of only 17 items (item 2, 3, 4, 5, 6, 7, 9, 13, 15, 20, 21, 22, 24, 25, 29, 33 and 39) out of 40 items (Table 1). It can be said that, the participants gave the correct answers of 42.50% items. Whereas the respondents gave wrong answers of 23 items

Item. No (Refer to Appendix A)	YES	NO	MAYBE	Correct Answer
1	14 (46.67)*	7 (23.33)	9 (30.00)	NO
2	27 (90)	0 (00.00)	3 (10.00)	YES
3	21 (70)	4 (13.33)	5 (16.67)	YES
4	7 (23.33)	4 (13.33)	19 (63.33)	MAYBE
5	22 (73.33)	4 (13.33)	4 (13.33)	YES
6	21 (70.00)	4 (13.33)	5 (16.67)	YES
7	6 (20.00)	19 (63.33)	5 (16.67)	NO
8	14 (46.67)	7 (23.33)	9 (30.00)	YES
9	14 (46.67)	15 (50.00)	1 (3.33)	NO
10	14 (46.67)	7 (23.33)	9 (30.00)	MAYBE
11	9 (30.00)	12 (40.00)	9 (30.00)	NO
12	10 (33.33)	9 (30.00)	11 (36.67)	MAYBE
13	18 (60.00)	4 (13.33)	8 (26.67)	YES
14	12 (40.00)	12 (40.00)	6 (20.00)	NO
15	18 (60.00)	7 (23.33)	5 (16.67)	YES
16	13 (43.33)	3 (10.00)	14 (46.67)	MAYBE
17	14 (46.67)	9 (30.00)	7 (23.33)	YES
18	9 (30.00)	14 (46.47)	7 (23.33)	NO
19	9 (30.00)	14 (46.67)	7 (23.33)	YES
20	21 (70.00)	2 (6.67)	7 (23.33)	YES
21	15 (50.00)	7 (23.33)	8 (26.67)	YES
22	7 (23.33)	19 (63.33)	4 (13.33)	NO
23	8 (26.67)	10 (33.33)	12 (40.00)	MAYBE
24	20 (66.67)	8 (26.67)	2 (6.67)	YES
25	6 (20.00)	19 (63.33)	5 (16.67)	NO
26	10 (33.33)	16 (53.33)	4 (13.33)	YES
27	11 (36.67)	5 (16.67)	14 (46.67)	MAYBE
28	14 (46.67)	10 (33.33)	6 (20.00)	YES
29	5 (16.67)	21 (70.00)	4 (13.33)	NO
30	10 (33.33)	13 (43.33)	7 (23.33)	NO
31	6 (20.00)	16 (53.33)	8 (26.67)	MAYBE
32	11 (36.67)	14 (46.67)	5 (16.67)	NO
33	18 (60.00)	9 (30.00)	3 (10.00)	YES
34	9 (30.00)	19 (63.33)	2 (6.67)	YES
35	10 (33.33)	11 (36.67)	9 (30.00)	NO
36	8 (26.67)	11 (36.67)	11 (36.67)	NO
37	14 (46.67)	6 (20.00)	10 (33.33)	MAYBE
38	7 (23.33)	13 (43.33)	10 (33.33)	MAYBE
39	18 (60.00)	9 (30.00)	3 (10.00)	YES
40	7 (23.33)	12 (40.00)	11 (36.67)	MAYBE

\*Note: Calculated values stated in the parentheses indicate percentage

Table 1. Postgraduate students' overall critical thinking level

(item 1, 8, 10, 11, 12, 14, 16, 17, 18, 19, 23, 26, 27, 28, 30, 31, 32, 34, 35, 36, 37, and 38) out of 40 items. It revealed that they gave the wrong answers of 57.50% items. It can be concluded that the majority of the respondents gave wrong answers of more than 50% questions.

According to Table 2, the majority (50 or more than 50%) of male students gave the correct answers of 21 (52.5%) items out of 40 items. Contrarily, the majority (more than 50%) of female students gave the correct answers of only 15 (37.5%) items (Table 2).

Table 2 shows the comparison of male and female postgraduate students' scores in critical thinking level. As stated earlier, t-test was used to examine the difference between the mean scores of male and female students. So it is evident that the calculated value of t-statistics (0.00519) is very less and lies in the acceptance region of the distribution. Hence, it gives way to the acceptance of the null hypothesis. Therefore, it is concluded that the difference between the mean score of critical thinking ability in both genders is insignificant.

## Conclusion

Critical thinking is the capability to evaluate the confused and perplexing situation (Smith & Stitts, 2013). It assists students to resolve the perilous educational and social issues. With reference to the results of the present study, the critical thinking level of the postgraduate students is not too good. They could not answer more than 50% items. As regards the critical thinking of male and female students, based on t-test, to the difference between critical thinking of both genders is insignificant. These results are consistent with the findings of the previous studies conducted by Baker and MacIntyre (2000), Facione, Sanchez and Facione (1999), Lewinsohn, Gotlib, Lewinsohn, Seeley, and Allen (1998) and Onwuegbuzie, Bailey, and Daley (1997). On the other hand, the findings of a study conducted by Walsh and Hardy (1999) revealed that the scores of female students are greater than that of male students.

## Recommendations

Critical thinking ability is significantly important for students to resolve their Educational and Social issues. Moreover, it

# RESEARCH PAPERS

is one of the important skills that should be taught to students studying at a higher level. Therefore, the researchers would like to furnish some recommendations.

Firstly, the teachers should make deliberate efforts to enhance their students' critical thinking ability. They should arrange such activities in the classroom that might inculcate critical thinking abilities amongst their students.

Secondly, the students should pay full attention to be more and more proficient in developing their critical thinking abilities so that they may resolve challenging issues in education and social life as well.

Thirdly, the administration of institutions and policy makers should add relevant contents in syllabi in line with the critical thinking skills to enhance students' critical thinking

Item. No (Refer to Appendix A)	Male Students			Female Students			Correct Answer	t-value
	YES	NO	MAYBE	YES	NO	MAYBE		
1	7 (46.67)*	2 (13.33)	6 (40.00)	7 (46.67)	5 (33.33)	3 (20.00)	NO	
2	14 (93.33)	0 (0.00)	1 (6.67)	13 (86.67)	0 (00.00)	2 (13.33)	YES	
3	12 (80.00)	2 (13.33)	1 (6.67)	9 (60.00)	2 (13.330)	4 (26.67)	YES	
4	3 (20.00)	3 (20.00)	9 (60.00)	4 (26.67)	1 (6.67)	10 (66.67)	MAYBE	
5	12 (80.00)	1 (6.67)	2 (13.33)	10 (66.670)	3 (20.00)	2 (13.33)	YES	
6	13 (86.67)	2 (13.33)	0 (00.00)	8 (53.330)	2 (13.330)	5 (33.33)	YES	
7	1 (6.67)	11 (73.33)	3 (20.00)	5 (33.33)	8 (53.33)	2 (13.33)	NO	
8	9 (60.00)	2 (13.33)	4 (26.67)	5 (33.33)	5 (33.33)	5 (33.33)	YES	
9	3 (20.00)	11 (73.33)	1 (6.67)	11 (73.33)	4 (26.67)	0 (00.00)	NO	
10	6 (40.00)	4 (26.67)	5 (33.33)	8 (53.33)	3 (20.00)	4 (26.67)	MAYBE	
11	4 (26.67)	7 (46.67)	4 (26.67)	5 (33.33)	5 (33.33)	5 (33.33)	NO	
12	6 (40.00)	2 (13.33)	7 (46.67)	4 (26.67)	7 (46.67)	4 (26.67)	MAYBE	
13	12 (80.00)	3 (20.00)	0 (00.00)	6 (40.00)	1 (6.670)	8 (53.33)	YES	
14	5 (33.33)	7 (46.67)	3 (20.00)	7 (46.67)	5 (33.33)	3 (20.000)	NO	
15	8 (53.33)	4 (26.67)	3 (2.00)	10 (66.67)	3 (20.00)	2 (13.33)	YES	
16	9 (60.00)	1 (6.67)	5 (33.33)	4 (26.67)	2 (13.33)	9 (60.00)	MAYBE	
17	6 (40.00)	7 (46.67)	2 (13.33)	8 (53.33)	2 (13.33)	5 (33.33)	YES	
18	2 (13.33)	10 (66.67)	3 (20.00)	7 (46.67)	4 (26.67)	4 (26.67)	NO	
19	4 (26.67)	8 (53.33)	3 (20.33)	5 (33.33)	6 (40.00)	4 (26.67)	YES	
20	10 (66.67)	0 (0.00)	5 (33.33)	11 (73.33)	2 (13.33)	3 (20.00)	YES	
21	8 (53.33)	4 (26.67)	3 (20.00)	7 (46.67)	3 (20.00)	5 (33.33)	YES	0.00519
22	2 (13.33)	13 (86.67)	0 (00.00)	5 (33.33)	6 (40.00)	4 (26.67)	NO	
23	3 (20.00)	5 (33.33)	7 (46.67)	5 (33.330)	5 (33.33)	5 (33.33)	MAYBE	
24	13 (86.67)	2 (13.33)	0 (00.00)	7 (46.67)	6 (40.00)	2 (13.33)	YES	
25	4 (26.67)	10 (66.67)	1 (6.67)	2 (13.33)	9 (60.00)	4 (26.67)	NO	
26	6 (40.00)	8 (53.33)	1 (6.67)	4 (26.67)	8 (53.33)	3 (20.00)	YES	
27	5 (33.33)	4 (26.67)	6 (40.00)	6 (40.00)	1 (6.67)	8 (53.33)	MAYBE	
28	7 (46.67)	7 (46.67)	1 (6.67)	7 (46.67)	3 (20.00)	5 (33.33)	YES	
29	2 (13.33)	12 (80.00)	1 (6.67)	3 (20.00)	9 (60.00)	3 (20.00)	NO	
30	1 (6.67)	10 (66.67)	4 (26.67)	9 (60.00)	3 (20.00)	3 (20.00)	NO	
31	2 (13.33)	8 (53.33)	5 (33.33)	4 (26.67)	8 (53.33)	3 (20.00)	MAYBE	
32	3 (20.00)	11(73.33)	1 (6.67)	8 (53.33)	3 (20.00)	4 (26.67)	NO	
33	10 (66.67)	4 (26.67)	1 (6.67)	8 (53.33)	5 (33.33)	3 (20.00)	YES	
34	3 (20.00)	10 (66.67)	2 (13.33)	6 (40.00)	9 (60.00)	0 (00.00)	YES	
35	6 (40.00)	5 (33.33)	4 (26.67)	4 (26.67)	6 (40.00)	5 (33.33)	NO	
36	2 (13.33)	8 (53.33)	5 (33.33)	6 (40.00)	3 (20.00)	6 (40.00)	NO	
37	9 (60.00)	2 (13.33)	4 (26.67)	5 (33.33)	4 (26.67)	6 (40.00)	MAYBE	
38	2 (13.33)	9 (60.00)	4 (26.67)	5 (33.33)	4 (26.67)	6 (40.00)	MAYBE	
39	7 (46.67)	5 (33.33)	3 (20.00)	11 (73.33)	4 (26.67)	0 (00.00)	YES	
40	2 (13.33)	7 (46.67)	6 (40.00)	5 (33.33)	5 (33.33)	5 (33.33)	MAYBE	

Table 2. Comparison of Male and Female postgraduate students in critical thinking level

abilities since the critical thinking skills valuably help them think critically in order to meet the standards and challenges of the 21st century learning.

## Acknowledgments

The authors could not find words to express their gratitude and profound admiration to thank Robert Ennis, who allowed them to use his comprehensive and standardized instrument, namely Cornell Critical Thinking Test Series; The Cornell Class-Reasoning Test and Form X for the present research.

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## Appendix A

Adopted Instrument: Cornell Critical Thinking Test Series; The Cornell Class-Reasoning Test, Form X developed by (Ennis, 1964) with written permission

Item. No	Statement	YES	NO	MAYBE
1	Suppose you know that the sparrow is over the hawk. Then would this be true? The hawk is over the sparrow.			
2	Suppose you know that Jane is standing near Betsy. Then would this be true? Betsy is standing near Jane.			
3	Suppose you know that California is near New York. Then would this be true? New York is near California.			
4	Suppose you know that The pit is inside of the mouth of the fox. The cherry is inside the mouth of the fox. Then would this be true? The pit is inside the cherry.			
5	Suppose you know that X is next to Y. Then would this be true? Y is next to X.			
6	Suppose you know that all the cars in the garage are Mr. Smith's. All Mr. Smith's cars are Fords. Then would this be true? All of the cars in the garage are Fords.			
7	Suppose you know that All John's pencils are blue. Then would this be true? At least some of John's pencils are not blue.			
8	Suppose you know that all the books about sailing are Bill's. All the green books are Bill's. Then would this be true? At least some of the green books are about sailing.			
9	Suppose you know that none of Jane's dolls have hats. Then would this be true? None of the dolls that have hats are Jane's.			
10	Suppose you know that all the red books are John's. Then would this be true? All John's books are red.			
11	Suppose you know that all of Mary's books are about horses. None of the books on the shelf is about horses. Then would this be true? At least some of Mary's books are on the shelf.			
12	Suppose you know that all Jean's pencils are red. All the pencils on the table are red. Then would this be true? At least some of the pencils on the table are Jean's.			
13	Suppose you know that At least some of the children in the Martin family take out books from the library. All people who take out books from the library have library cards. Then would this be true? At least some of the children in the Martin family have library cards.			

- 14 Suppose you know that at least some of Fred's pencils are green. Then would this be true? None of Fred's pencils are green.
- 15 Suppose you know that none of Sue's books is about animals. Then would this be true? None of the books about animals is Sue's.
- 16 Suppose you know that at least some of Kate's pencils are blue. All the pencils in the box are blue. Then would this be true? At least some of Kate's pencils are in the box.
- 17 Suppose you know that none of the fifth grade boys is on the football team. John is a fifth grade boy. Then would this be true? John is not on the football team.
- 18 Suppose you know that all the members of the school band have been in Boston. No one in Frank's class has been in Boston. At least some members of the school band are in Frank's class.
- 19 Suppose you know that all X's are Y's. Then would this be true? At least some X's are not Y's.
- 20 Suppose you know that All boys are painters. All children are painters. Then would this be true? At least some children are boys.
- 21 Suppose you know that all the second grade children are out on the playground. Then would this be true? All the children out on the playground are in the second grade.
- 22 Suppose you know that at least some of the books on the table are about stars. None of Bob's books is about stars. Then would this be true? All of the books on the table are Bob's.
- 23 Suppose you know that all the boys in John's class are football players. Fred is a football player. Then would this be true? Fred is not in John's class.
- 24 Suppose you know that all the pets of the Greens won some prize in the pet show. Fido is one of the Greens' pets. Then would this be true? Fido won a prize in the pet show.
- 25 Suppose you know that Eileen is one of the children on the playground. Then would this be true? Eileen is not one of the children on the playground.
- 26 Suppose you know that all cats can fly. All animals that can fly are black. Then would this be true? All cats are black.
- 27 Suppose you know that All the things in the trunk are Bill's. The brown baseball bat is Bill's. Then would this be true? The brown baseball bat is in the trunk.
- 28 Suppose you know that None of Bob's books are on the table, but there are books on the table. Then would this be true? At least some of the books on the table are not Bob's.
- 29 Suppose you know that all Mary's pencils are yellow. Then would this be true? At least some of Mary's pencils are not yellow.
- 30 Suppose you know that all pencils are heavy. Nothing made of wood is heavy. Then would this be true? At least some pencils are made of wood.
- 31 Suppose you know that at least some of the green pencils are Dick's. Then would this be true? All Dick's pencils are green.
- 32 Suppose you know that all dogs are brown. Then would this be true? At least some dogs are not brown.
- 33 Suppose you know that all the cookies Jane made for the fair had nuts in them. All the cookies with nuts in them were sold. Then would this be true? All the cookies Jane made for the fair were sold.
- 34 Suppose you know that all brown animals have four legs. Then would this be true? All animals with four legs are brown.
- 35 Suppose you know that all members of the football team weigh over 150 pounds. Henry does not weigh over 150 pounds. Then would this be true? Henry is on the football team.
- 36 Suppose you know that all of John's candy is in the box. All of the candy that is not chocolate is also not in the box. Then would this be true? At least some of John's candy is not chocolate.
- 37 Suppose you know that all the papers in the box are torn. None of John's papers is in the box. Then would this be true? None of John's papers are torn.
- 38 Suppose you know that all of the boys are singing. Then would this be true? All of the people who are not singing are also not boys.
- 39 Suppose you know that all the math homework is due today. None of John's homework is due today. All the homework for Mr. Miller's class is math homework. Then would this be true? None of John's homework is for Mr. Miller's class.
- 40 Suppose you know that all the pencils in the box are green. All Sue's pencils are sharp. All the green pencils are Sue's. Then would this be true? At least some of the pencils in the box are not sharp.

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