LOGIC RETAINING POWER AMONG GENDERS AND EFFECT OF TIME CONSTRAINTS ON THE PERFORMANCE OF UNDERGRADS UNIVERSITY STUDENTS

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https://doi.org/10.26782/jmcms.2021.04.00008

Abstract

Logic has a vital role throughout human history. It considers important for the mental development and performance of the student. The present study was conducted to evaluate the proficiency and logic retaining power and the effect of time constraints on undergraduate university students. Tests comprised of three categories Arithmetic, Algebra, and Geometry. Each section was comprised of 10 questions with four possible answers to respond within the 10 minutes duration. The test was divided into two different questionnaires. One hundred and seventy-five students both males and females took part in the survey and undergo mathematical logic tests. Scores, responding time and differences among the gender profound that males were more logical as compared to females to retain the mathematical logic and performed the assigned task in 23% less time and achieved 20% more scores. Whereas, the significant correlation found among the understanding level of logic, gender gap and the performance among the undergrad's university students (r = 0.963; P<0.05), which depend upon the factor of time constraints as well as the self-concept and concentration about the topic.

Keywords: Logic Retaining Power, Time constraints, Genders difference, Undergrads university students.

I. Introduction:

Understanding mathematical logic (ML) and the clear concept is determined very essential for achieving a high score in undergrad university students (UUS). Rather they opt for natural sciences, physical sciences, or social sciences. The clear concept of ML may consider very effective for dominating the students throughout the educational performance and it is also building the mental power for decision in their professional carrier.

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In the modern era, mathematics is an integral part and necessary tool for the development of science and every walk of life feels its impact [XI]. Gender differences for the understanding of ML are highly variable especially during the educational period for getting a high GPA [III, VI]. This is the area where male dominance is very lucid. However, for making positive competition among the gender gap, most of the researchers conducted comparative studies to address this issue [IX, XII]. A significant dominance of males to build the ML was found as compared to females [X] and the reason for the degree of differences for the building of ML was higher self-efficacy among the male than female students [VII]. The effects of time constraints (TC) during the attempt of questions may affect achieving good grades [IV, XII, I]. Whereas, few students were spent the entire time solving the questions [II].

II. Hypothesis Development:

The present study was conducted to evaluate the Logic Retaining Power (LRP) and the effect of time constraints (TC) during the attempt of questions in their educational carrier and its effects on their performance in achieving the grades. We proposed the following hypothesis:

- $H_0 = \mu_m = \mu_f = $ There is no significant difference in mean of LRP among genders during the exam performance
- $H_1 = \mu_m \neq \mu_f = $ There is a significant difference in the mean of LRP among genders during the exam performance

III. Materials and Method:

175 students (95 males and 80 females) from the Department of Business Administration and Commerce, and the Department of Computer Science and Information Technology, SMIU-Karachi took part in the logic test voluntarily and their scores were recorded for further analysis. The test was based on multiple-choice questions (MCQs) containing three different sections of mathematics. The first section comprises Basic Arithmetic (BAr), whereas, the second was Basic Algebra (BAl) and the third was on Geometrical Concepts (GC). Each section was comprised of 10 questions with four multiple choices. The test was divided into two different questionnaires one was taken before the break and the second was after the break of 5 minutes to observe the effect of Time Constraints (TC) in the LRP during their academic performance in undergraduate studies.

In the first phase, students were assigned the task to solve the first questionnaire containing the three different tests within the time limit of 30 minutes and they were instructed to solve each section within the stipulated time limit of 10 minutes. After a break of five minutes, they were again undergone to solve the second test with a time limit of 15 minutes, and they were advised to solve each section within 5 minutes.

Mean and Standard deviation of scores obtained by the participating males and females students were calculated (eq-1-4) and the Mathematical formula of Karl Pearson’s Coefficient of Correlation was used for computing the degree of association (eq-5). Whereas, the mean difference between the gender scores was computed (Eq-6).
\[ \sigma_m = \sqrt{\frac{1}{n-1} \sum_{i=1}^{n} (x_i - \mu_m)^2} \]  

(1)

\[ \sigma_f = \sqrt{\frac{1}{n-1} \sum_{i=1}^{n} (x_i - \mu_f)^2} \]  

(2)

\[ \mu_m = \frac{\sum X_m}{n} \]  

(3)

\[ \mu_f = \frac{\sum Y_f}{n} \]  

(4)

\[ \rho_{m,f} = \frac{\sum (x_i - \mu_m)(y_i - \mu_f)}{(n-1)\sigma_m\sigma_f} \]  

(5)

\[ \mu_d = \mu_f - \mu_m \]  

(6)

IV. Statistical Analysis:

Recorded scores of 175 participating students (95 males and 80 females) from the Department of Business Administration and Commerce, and the Department of Computer Science and Information Technology, SMIU-Karachi were analyzed using the Pearson correlation analysis and paired sample t statistics were applied for the validation of the proposed hypothesis.

V. Results and Discussion:

The average grade in test-1 obtained by the male students during the total time limit of 30 minutes, 10 minutes allocated for each section (BAr, BA1, and GC) was 23.19 ± 5.61 and the female students were 6.50 ± 1.62, whereas, their mean difference in score was found to be 1.89.

The test-2 was conducted after the five minutes’ break and the average score obtained by the male students was during the total time limit of 15 minutes for all three sections, 5 minutes for each section (BAr, BA1, and GC) was 7.86 ± 1.97 and 6.84 ± 1.65 for females with a mean difference of 1.02. (Table-1). All the students were required to fill the pre-test and the post-test surveys (based on the Likert scale). It contained a few questions related to their previous knowledge about mathematics and asked for their thoughts regarding performance in the given test.

Paired sample t-statistics was applied to validate our hypothesis that the pre and post-sample means were drawn from the same university students. The result was obtained 4.18 with a critical region of 2.26 (\(\alpha=0.05\), two-tailed test) for the hypothesis that there is no significant difference in mean of LRP among genders during the exam.

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performance was rejected. That is, it was concluded that there is a significant difference in the mean of LRP among the genders during the examination and their performance at the undergraduate university level.

Furthermore, the mean score achieved and time taken in different tests revealed that males are more logical to respond to the questions quickly than females. Males candidates obtained 20% more marks in 23% less time to complete their assigned tasks (Table-1, 2). The differences among the gender profound that males were more logical as compared to females to retain the logic. It is due to the sexes' brains are wired differently, in which males' brains are generally having more connections within each hemisphere and between the front and back of the brain which enables them to more logical. Whereas, in women, the stronger connections usually run from side to side between the left and right hemispheres that cause more intuitive and better memories for words and faces (Tanya, 2013). We found a significant association among the understanding level of logic, gender gap and the performance among the university students \((r = 0.963; P<0.05)\), Graph-1, which depend upon the factor of time constraints as well as the self-concept and concentration about the topic.

**Table 1: Mean Scores achieved in different tests during time constraints.**

| Test     | Male Mean \(\mu_m\) | Female Mean \(\mu_f\) | Mean Difference in Score \(\mu_d\) |
|----------|----------------------|------------------------|----------------------------------|
| Test 1 (BAr) | 8.39 | 6.50 | 1.89 |
| Test 2 (BAI) | 7.86 | 6.84 | 1.02 |
| Test 3 (GC)  | 6.94 | 4.13 | 2.81 |
| Total        | 23.19 | 17.47 | 5.72 |
Table 2: Mean Times consumed in three tests (BAr, BAl, GC)

| Time in Minutes | Male | Female | Mean Difference in Time |
|-----------------|------|--------|-------------------------|
| Mean \(\mu_m\) | \(\sigma_m\) | Mean \(\mu_f\) | \(\sigma_f\) | \(\mu_d\) |
| Test 1 (BAr)    | 5.85 | 1.34   | 9.5                     | 1.54       | -3.65     |
| Test 2 (BAl)    | 8.00 | 1.50   | 9.5                     | 1.44       | -1.5      |
| Test 3 (GC)     | 6.80 | 1.15   | 8.6                     | 1.45       | -1.8      |
| Total           | 20.65| 3.99   | 27.6                    | 4.43       | -6.95     |

**Graph 1:** Association among the understanding level of logic, gender gap performance among the students.

VI. Conclusion:

Our study revealed that the male students are dominating in our society regarding the logic retaining power and performed the assigned task in 23% less time and achieved 20% more scores. Whereas, a significant correlation was found among the understanding level of logic, gender gap and the performance among the undergrad's university students \((r=0.963; P<0.05)\). Moreover, in our study, the effect

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of time constraints on the performance and the building of ML as well as the clear concepts are found to be higher in males as compared to females of undergrads university students.

Conflict of Interest:
Authors declared: No conflict of interest regarding this article

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