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# University Students' Critical Thinking Skills with Reference to their Age and Gender

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## Abstract

The aim of this quantitative study was to survey the critical thinking skills of university students studying at different public universities in Lahore based on their gender and age. The sample was chosen using a multi-stage sampling technique. Data gathered from 475 students enrolled in various semesters at five public universities. Watson Glaser Critical Thinking Appraisal (WGCTA) was used to assess students' critical thinking abilities. T-test was employed to evaluate data in order to answer the study questions. The results of study are evident that variable of age had a small effect on students' critical thinking skills whereas these skills did not differ regarding their gender. The study is beneficial to further explore the reasons for differences with progression in the age. The policymakers and experts can plan to inculcate curriculum at the lower level of education for the enhancement of critical thinking. The study might also help them to make relevant and desirable changes in curriculum and pedagogy.

***Keywords:*** *University Students, Critical Thinking, Critical Thinking Skills, Age, Gender*

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## Introduction

Critical thinking skills must be developed in students for success in their academic life and beyond. Critical thinkers navigate an information-rich world. Finding faults does not refer to being a critical thinker rather critical thinker evaluates evidence from various sources and draws reasoned conclusions. As a university student, based on the outcome of your analysis, you may decide that certain evidence is unconvincing or you may disagree with that but always you must be able to explain why you came to this point of view. Thus describing what you hear or read-only does not encompass critical thinking. It involves the synthesis, analysis, and evaluation of what has been learned in order to develop your own reasoning.

The importance of critical thinking is not age and gender-dependent so, critical thinking is important for all human beings whether male or female as well as for all age groups. Studies conducted on both undergraduate and postgraduate students witnessed and necessitate critical thinking. The techniques and processes to develop an argument remain same whereas the types of evidence may differ.

Thinking has been admitted as a cognitive process that is organized, purposeful, and active to give and enhance meaning to a given situation (Cüceloğlu 1996).Critical thinking has been considered as a cognitive process which is active and systematic. If our thinking process is well developed, it can help us to understand the problems around us, and applying what we've learned.

One of the domains of higher-order thinking skills is critical thinking (HOTS). (Heong et al., 2011; Yee et al., 2011.; Sulaiman et al., 2017; Yee, Lai, Tee, & Mohamad, 2016). For future success, higher-order thinking has been proven a crucial predictor. In the field of education, critical thinking abilities are vital because they help pupils to gain a competitive command of subject matter/a more refined grasp of knowledge (Vaske, 2001; Dwyer et al. 2014; Forawi, 2016). In the current era of advancement in education, thinking only is not equate skill to grasp the meaning of knowledge in depth. So, to gain a deep understanding of knowledge with ease of transferability, and a higher ability to apply knowledge to solve different problems Higher Order Thinking is important (Çokluk & Yılmaz, 2006; Gülveren, 2007). Higher Order Thinking Skills develop a strong base for good thinking and problem-solving and help us to apply the learned knowldge in our real-life situations and becomes a source for enhancing the quality of education.

One of the key educational goals should be to improve learners' critical thinking abilities. Critical thinking can also serve as a guiding function that leads the individual to solutions to social problems. The ever-increasing accumulation of information cannot be

conveyed through education. People must gather information to solve their problems on their own and critical thinking as vital skill (Gülveren, 2007).

Students must be equinted with discourses and critically judged in an information-oriented culture. Students must be able to compare different points of view to have access to accurate information. Students should learn to take a broad view of a topic and combine information from several sources to address challenges in a specific area. Focusing on an issue, analysis of discussions or debates, asking and responding to explanatory and stimulating questions, examining the accuracy and reliability of data, evaluation of conclusions and predictions, and communicating with others, all are constituents of critical thinking (Aybek, 2007).

One of the fundamental abilities of students is Critical thinking that students must have in order to succeed in their studies. Students with a good critical thinking can understand the concepts independently without the help of any teacher. Students whose level of critical thinking skills is higher outperform as compared to students with low level of critical thinking skills for learning outcomes (Ennis, 2011; Yee et al. 2016).

As per Aizikovitsh-Udi and Cheng (2015), critical thinking is crucial for contemporary life and provides long-term benefits. It helps students regulate their learning skills and enables individuals to be creatively involved in their chosen profession. Critical thinking is necessary for students to solve every day and academic problems. Today's world needs people with many skills such as understanding and applying thinking in different situations effectively and creatively, researching, problem-solving. Critical thinking is an aspect of thinking that has been accepted as a means of overcoming difficulties and facilitating access to information in life (Duron et al., 2006).

Many research studies even proved that critical thinking skills are not only important at college level but also at schools level so critical thinking must be a part of all educational institutions (Paul & Elder , 2009). To be successful in life as well as in global market, graduates of colleges and universities must be able to solve problems and think critically. In the present era, employers prefer to select employees with critical thinking abilities to produce good results (Law & Kaufhold, 2009). Further according to Kirkwood (2003) talked about the importance of using critical thinking skills for college and university students in terms of preparing for life and advocating for their personal and social problems. According to Healy (1990), "critical minds are a society's most precious natural resource, and time and effort for cultivating them are well worth". Therefore, university students today should not only think, but also think differently and not only memorize the knowledge in their head, but also seek the best skills and learning opportunities among different skills and learning opportunities.

Age, language skills, memory and problem-solving skills all intervene to create the difference of critical thinking skills with reference to gender. Gender influences how female and male behave, think and reason (Erkoc & Kert, 2013; Peretomode & Bello, 2018). When comes to description of ideas, female and male pupils have different perceptions (Harish, 2013; Piaw, 2014). The results of the study conducted by Rachmatullah & Ha (2019) proved that male and female university students use different cognitive processes to solve problems. According to Fetalvero (2019) and Zhu (2007), ways to solve problems are influenced by gender, age, experience, and educational differences. Besides these, psychological, biological, and environmental factors also play an important role in gender differences.

In Pakistani cultural context, it is a myth/misconception that male student's problem solving, decision making and critical thinking abilities are much better than female students but it is not proved by the results of the study. Somehow, it is also evident by some other studies conducted to observe critical thinking skills of male and female. As per study conducted by Rachmatullah et al. (2019), male teachers were better performimg in developing critical thinking skills while female teachers were better for developing problem solving skills but the outcomes of the study conducted by Javed and Nawaz, (2015), prove that the critical thinking of female and male students is insignificant.

Critical thinking skills play a vital role in all types of daily life problem. Critical thinking skills are taken into account as the heart of the learning process as it emphasizes developing thinking skills (Sulaiman, Rahman, & Dzulkifli, 2008). Students find critical thinking skills and knowledge helpful in everyday life. However, it has been noticed that many students studying at the university level, are not able to solve problems because their critical thinking skills are not well developed. It is observed, especially in the context of Pakistan, that students lack in critical thinking ability at various levels. The present study is intended to compare the critical thinking skills of university students (with reference to their age and gender) studying in different public universities of Lahore. The study explored how students' critical thinking skills differed.

Assessing the critical thinking skills of the students which they acquire in their academic life and applying these skills to their daily life is critical to any institution and public policy as instruction is being made responsible for students learning outcomes. Therefore, the findings of the present study will be useful for policymakers, curriculum developers, teachers, and administrators who are responsible for helping students to develop the critical thinking abilities they need to be productive members of society. The study's findings will be helpful in making desired improvements in curriculum, pedagogy, planning, and teaching.

## Objective of the Study

The specific objective of the study was to "compare the university students' critical thinking skills with reference to their age and gender"

## Research Question

Do university students' critical thinking skills differ in terms of their age and gender?

## Methodology

The nature of the study was quantitative by using the survey method. For sample selection, multi-stage sampling was used. On the first stage, five universities (two public universities, two medical colleges, and one engineering university) were selected conveniently whereas on the second stage, 475 students who were enrolled in different academic programs and were at different stages of their degree programs (by keeping in mind, all of the perspectives which can affect the critical thinking skills of the students) were selected using stratified random technique. Among participants (312) were female (65.7 %) and (163) were male (34.3 %). The age of 263 students (55.4 %) was older than 20 years whereas the age of 212 students (44.6 %) was less than 20 years. The researcher herself visited the institutions for collecting data. The response rate was 475 students out of 600.

## Instrumentation

To assess the students' critical thinking, the Watson-Glaser Critical Thinking Appraisal (WGCTA) was used. It is a standardized instrument that has been widely used to measure students' critical thinking skills at the college and university level (Watson & Glaser, 1980). The test consists of five sections: Inferences; Assumptions; Deductions; Interpreting Information; and Evaluation of Arguments. The test manual gives both the internal consistency and the reliability of the test as 0.81. Past research studies had already been established the validity of these tools in the context of Pakistan (you need to give reference of those studies).

## Data Analysis

**Table 1**

*Age Wise Comparison of University Students' Critical Thinking Skills*

| WGCTA:S Scales | Age | *M* | *SD* | *df* | *t* | *p* | Effect Size |
|---|---|---|---|---|---|---|---|

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Inference | Less than 20 years | 16.30 | 3.50 | 473 | -1.114 | .266 | - |
| | Older than 20 years | 16.66 | 3.49 | | | | |
| Assumption | Less than 20 years | 8.12 | 2.28 | 473 | -2.170 | .031* | 0.2 |
| | Older than 20 years | 8.60 | 2.46 | | | | |
| Deduction | Less than 20 years | 3.39 | 1.33 | 473 | -1.174 | .241 | - |
| | Older than 20 years | 3.52 | 1.23 | | | | |
| Interpretation | Less than 20 years | 3.70 | 1.53 | 473 | -2.252 | .025* | 0.2 |
| | Older than 20 years | 4.02 | 1.56 | | | | |
| Evaluation | Less than 20 years | 7.76 | 2.76 | 473 | -2.327 | .020* | 0.2 |
| | Older than 20 years | 8.36 | 2.78 | | | | |
| O:CT | Less than 20 years | 39.27 | 6.84 | 473 | -2.917 | .004* | 0.3 |
| | Older than 20 years | 41.16 | 7.19 | | | | |

*Note:* O: CT= Overall Critical Thinking

The mean WGCTA score of university students aged less than 20 years and more than 20 years was compared using an independent sample t-test. Table 1 reveals that, in addition to overall CT, the mean score of university students' critical thinking with age older than 20 years is considerably higher than that of university students younger than 20 years on three out of the five subscales. This difference was significant on Assumption Recognition, t (473) = -2.170, p=.031, with a small effect size (0.2). University students above the age of 20 (M= 8.60, SD= 2.46) scored higher than university students under the age of 20 (*M*=8.12, *SD*=2.28). The mean difference was significant, *t* (473) = -2.252, *p*=.025 and *t* (473) = -2.327, *p*=.020 with small effect size (0.2) respectively. University students' older than 20 years (*M*= 4.02, SD=1.56), (*M*= 8.36, SD=7.78) scored higher than those university students' whose age was less than 20 years (*M*= 3.70, *SD*= 1.53), (*M*= 7.76, *SD*= 2.76). . Furthermore, university students over the age of 20 (M= 41.16, SD=7.19) outperformed than the university students under the age of 20 (M= 39.27, SD= 6.84) on the overall CT. This difference was remarkable, t

(473) = -2.917, *p*=.004 (0.3) with a small effect size (0.3). The two groups did not differ significantly in their ability to infer and deduce.

**Table 2**

*Gender -Wise Comparison of University Students' Critical Thinking Skills*

| WGCTA:S Scales | Gender | *M* | *SD* | *df* | *t* | *P* |
|---|---|---|---|---|---|---|
| Inference | Male | 16.60 | 3.36 | 473 | .651 | .516 |
| | Female | 16.38 | 3.56 | | | |
| Assumption | Male | 8.47 | 2.51 | 473 | .888 | .375 |
| | Female | 8.26 | 2.30 | | | |
| Deduction | Male | 3.47 | 1.36 | 473 | .243 | .808 |
| | Female | 3.44 | 1.26 | | | |
| Interpretation | Male | 3.86 | 1.62 | 473 | .128 | .898 |
| | Female | 3.84 | 1.51 | | | |
| Evaluation | Male | 8.21 | 2.88 | 473 | 1.075 | .283 |
| | Female | 7.92 | 2.71 | | | |
| O:CT | Male | 40.61 | 7.61 | 473 | 1.117 | .265 |
| | Female | 39.85 | 6.75 | | | |

*Note:* O: CT= Overall Critical Thinking

The mean scores of male and female university students' critical thinking skills on WGCTA were compared using an independent sample t-test (The results of the above Table reveal that there is no statistically remarkable difference between male and female students' mean scores in the Watson and Glaser Critical Thinking Appraisal (WGCTA) subscales, as well as in overall critical thinking skills.

## Discussion

Results of present study found that university students over the age of 20 are better at critical thinking skills than under the age of 20. Whereas Kürüm (2002), found that university students' critical thinking skills vary with age but contradictory to our study he found that younger students have better critical thinking skills than older one. Same has been witnessed by Emir, (2012) hat critical thinking skills decrease with age.

The present study, did not find any significant difference between male and students' critical thinking abilities. The reason may be the somewhat similar thinking characteristics of both genders. As per Clinton et al. (2014), language and spatial reasoning can be reasons of these differences instead of meta-skills (sub-dimensions of critical thinking). It can, therefore be inferred that there is no gender disparities for students' critical thinking skills found. Additionally as there is no evidence found for

difference in subscales of critical thinking skills e.g., inference, hypothesis recognition, interpretation, deduction, and evaluation of argumentative skills which are directly associated with episodic memory and language. In a study conducted by Shukla and Dungsungnoen (2016), the researchers looked at whether higher-level thinking skills altered considerably between the genders. The researchers have found that some of the critical thinking skills such as examining others' perspectives, questioning, and reasoning were found to have no significant gender differences.

According to a counclusion of the present study i.e., gender has not a considerable impact on critical thinking. This is also demonstrated by the findings of Javed and Nawaz's investigation (2015), that students' critical thinking is insignificant with regards to gender. The outcomes of some other studies conducted by Özdemir (2005), Akar (2007); Çelik, et. al (2018), and Şen (2009), also found that gender does not have a considerable impact on thinking skills. These results are also aligned with the findings of the previous studies conducted by Onwuegbuzie, DaRos, & Ryan, (1997), and Baker and MacIntyre (2000).

On the other hand, a study by Emir (2012) found that male university students have a much higher average score than female university students. Furthermore, several pieces of research show that female students have far better critical thinking skills than male students (Yıldırım, 2005; Zayif, 2008; Gülveren, 2007). The results of a study conducted by Walsh and Hardy (1999) also revealed the difference in generd where female scored higher than male. So, there is a need for further research in this area.

## Recommendations

Based on the findings and conclusions of this study, the following suggestions can be made: the curriculum should include more exercises aimed at boosting critical thinking skills for elementary and secondary education as less aged were found weak critical thinking skills. Critical reading, writing, listening, observation, and communication approaches and tactics should be taught at all levels. (Elementary to University Education). More Studies, with though rugh investigation on students other than university, using different and several tools should be undertaken for studying students' critical thinking. Also the factors which may affect these skills should be included as part of study.

Some activities should be included in the elementary and secondary school curriculum which help pre-university students on "how to employ their critical thinking skills in all aspects of their lives, not only academically". In pre-service trainings in their profession career, teachers should be made aware of how to teach critical thinking

abilities and the methods and approaches to employ these skills so that they can equip their children with critical thinking skills.

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