ACADEMIA International Journal for Social Sciences
Volume 5, Issue 3(s10), 2026 ISSN-L (Online): 3006-6638

Relationship Between Critical Thinking and Academic Performance of University Students

Gulnaz Tariq
mughal9657@gmail.com
M. Phil in Education, Department of Advance Studies in Education, Institute of Education and Research, University of Punjab, Lahore, Pakistan

Tayyaba Shahzadi
tayyabashahzadi112233@gmail.com
M. Phil in Education, Department of Advance Studies in Education, Institute of Education and Research, University of Punjab, Lahore, Pakistan

Corresponding Author: Gulnaz Tariq mughal9657@gmail.com

Received: 05-02-2026 **Revised:** 19-02-2026 **Accepted:** 04-03-2026 **Published:** 21-03-2026

ABSTRACT

This research paper examined the correlation between critical thinking and academic achievement of the Pakistani university students in terms of Bloom's taxonomy. A descriptive-correlational research design was used, whereby a stratified random sample of 300 students (both in the public and the private universities) was sampled. Critical thinking was assessed on six constructs of analyzing, creating, evaluating, remembering, understanding and applying using a structured questionnaire based on the existing assessment instruments. CGPA was used to operationalize academic performance and verified records were used where feasible. The results indicated that there was a strong positive correlation between critical thinking and academic performance, with higher-order skills like Applying (.70), Analyzing (.68), and Understanding (.66), demonstrating a high level of relationships with GPA. On the other hand, Remembering (.48) showed the least degree of association which highlights the fact that rote memorization is not as crucial as high order thinking processes. The students of the private universities, higher semesters, and postgraduate programs were always better in their ability to think at the higher level, but gender differences were not significant. The paper concludes that critical thinking, more so higher-order skills are a sound predictor of academic performance.

Keywords: *Critical thinking, Academic performance, Bloom's taxonomy, Higher-order thinking*

INTRODUCTION

Background of the Study

Critical thinking has emerged as one of the most essential competencies for success in both academia and professional life. The concept of critical thinking has long been rooted in philosophical traditions. Socratic dialogue, as practiced in ancient Greece, emphasized questioning, reasoning, and the pursuit of clarity. This intellectual heritage has influenced modern educational theories, where critical thinking is defined as purposeful, self-regulatory judgment that results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, or contextual considerations on which judgment is based (Facione, 1990). Paul and Elder (2014) argue that critical thinking is a disciplined process of conceptualizing, applying, analyzing, synthesizing, and evaluating information to guide belief and action. In higher education, critical thinking is often framed as a core learning outcome across disciplines. Universities integrate it into mission statements, curriculum designs, and assessment rubrics as part of preparing students for the demands of the 21st century (Davies & Barnett, 2015). Academic performance is the first indicator of educational attainment and is typically measured by grade point average (GPA), examinations, and course grades (York et al., 2015).

It indicates the degree to which learners attain the learning goals established by their respective learning institutions and depends on various factors, such as intellectual talent, drive, habits, social- emotional qualities, and institutions facilities (Richardson et al., 2012). The longitudinal studies also indicate that there are bilateral associations- better academic performance contributes to a higher level of critical thinking, and, on the other hand, the development of critical thinking should lead to better performance (Lv et al., 2025). Another limitation in literature is the predominance of cross-sectional designs, which provide limited insight into causal relationships between critical thinking and academic performance. While correlational studies have established a consistent link, there remains a need for research that examines the strength and direction of this relationship in varied higher education contexts.

This study aims at filling in the existing gaps by explaining the correlation between critical thinking and academic performance of university students across several disciplines. The research is based on the suggestion of critical thinking as a potential predictor of academic achievement. It intends to find out whether critical thinking skills are a strong predictor of academic achievement and, in case critical thinking skills can serve as such a predictor, what the relationship between them is. The current research contributes to the ongoing discussion in higher education on how education can be improved to better prepare students not only to excel in higher education but also to succeed in an ever more complex and interconnected global society.

Statement of the Problem

In this age of fast-paced technology, information overload, and a competitive global economy, institutions of higher learning are in a bind, as they are called upon to instill not only subject knowledge but also the necessity of thinking skills such as critical thinking. Although critical thinking has well-established and recognized values of being an essential 21st-century skill, its integration into the curriculum of various courses and its quantifiable contribution to overall student performance has remained inconsistent and an unexplored area. Although many studies indicate that critical thinking has positive effects on academic outcomes, there is still no comprehensive, empirical evidence clearly demonstrating the nature and magnitude of this relationship among university students across disciplines. Academic success measured by grade-point averages (GPA), examination scores, and course completion has remained the key performance indicator of student's success.

The crucial understanding of the extent of influence of important thinking skills in academic success is paramount in designing the pedagogy methods, curriculum content and policies that will enhance the student competencies both in terms of education and in their career. This study is thus guided by the gap in literature whereby it focuses on establishing the relationship between academic performance and critical thinking among the university students. The study will establish the aim of finding out whether the critical thinking skills are relevant in predicting academic success and then study the variations in critical thinking skills in different disciplines.

Objectives of the Study

The objectives of this study are to:

1. Examine the relationship between critical thinking skills and academic performance among university students.

2. Assess the level of critical thinking skills among university students across different academic disciplines.

3. Identify students' academic performance using appropriate indicators such as Grade Point Average (GPA) or examination results.

4. Determine the nature and strength of the relationship between critical thinking skills and academic performance.

Research Questions

1. What relationship exists between critical thinking skills and academic performance among university students?

2. How do critical thinking skills differ across various academic disciplines among university students?

3. Which academic performance indicators (e.g., GPA or examination results) are used to measure students' academic performance?

4. What is the nature and strength of the relationship between critical thinking skills and academic performance?

Delimitations of the Study

This study is delimited to university students enrolled in undergraduate programs across selected academic disciplines. It focuses specifically on the relationship between critical thinking skills and academic performance, as measured by GPA and exam results. The study does not explore other cognitive or emotional factors that may influence academic performance, such as motivation, learning styles, or socio-economic background. Additionally, the research is confined to one academic semester and does not track long-term academic progress or post-graduation outcomes.

LITERATURE REVIEW

Measuring critical thinking in higher education is essential for understanding how students engage in higher-order thinking processes and for evaluating the effectiveness of teaching interventions. One of the most widely used approaches is the application of standardized tests designed specifically to assess critical thinking abilities. Among these, the California Critical Thinking Skills Test (CCTST) is perhaps the most recognized instrument. The academic performance in higher education is usually described as the level to which the students accomplish their education goals as determined by their indicator such as grade point average (GPA), completion rates, and academic honors (York et al., 2015). On the other hand, chronic stress and anxiety may prevent proper concentration, memory, and cognitive performance in general and therefore have detrimental effects on academic performance (Pascoe et al., 2020). Critical thinking has been consistently identified as a key cognitive skill contributing to students' academic success in higher education contexts worldwide.

Quantitative correlational studies conducted in diverse higher education settings have established a moderate to strong positive correlation between critical thinking scores and measures of academic achievement. For instance, a study by Giancarlo and Facione (2014) involving over 1,000 undergraduate students in the United States found that critical thinking ability, as measured by the CCTST, accounted for significant variance in cumulative GPA even after controlling for demographic factors. Similarly, Ku (2009) examined university students in Hong Kong and reported that critical thinking dispositions, such as open-mindedness and analyticity, were predictive of academic success across different fields of study. These

results suggest that the relationship between critical thinking and academic performance is not confined to specific disciplines but is a cross-cutting attribute relevant to diverse academic domains (Lai, 2011).

Gaps in the Existing Literature

The existing literature on critical thinking in higher education is limited by several important gaps that reduce its applicability across diverse educational contexts. Major concerns include the lack of a universally accepted definition of critical thinking, the dominance of Western-based research that limits relevance to countries such as Pakistan, and methodological weaknesses such as reliance on cross-sectional designs and self-reported data. Research has also paid insufficient attention to discipline-specific variations, socio-economic and institutional differences between public and private universities, and the influence of technology and digital literacy on critical thinking development. Furthermore, there is limited evidence on the long-term impact of critical thinking instruction after graduation, the role of language proficiency in multilingual learning environments, and the effectiveness of intervention-based approaches. Addressing these gaps through culturally relevant, longitudinal, mixed-methods, and context-specific research is essential for developing effective educational policies and instructional practices that promote critical thinking in diverse higher education settings.

Theoretical Framework

The theoretical foundation of critical thinking draws on several complementary learning theories that explain how higher-order cognitive skills develop and contribute to academic success. Bloom's Revised Taxonomy provides the central framework by emphasizing progression from lower-order skills (Remembering and Understanding) to higher-order skills (Analyzing, Evaluating, and Creating), while also highlighting the importance of metacognitive knowledge. Constructivist Learning Theory explains that critical thinking develops through active learning, social interaction, scaffolding, and problem-solving experiences. Information Processing Theory and Metacognition emphasize the cognitive processes involved in organizing, monitoring, and regulating thinking, enabling learners to make logical, evidence-based decisions. Experiential Learning Theory further supports critical thinking by promoting reflection, experimentation, and learning from experience, whereas Socratic Questioning encourages learners to challenge assumptions, analyze evidence, and justify conclusions through disciplined inquiry. Collectively, these theories provide a comprehensive framework demonstrating that critical thinking is developed through active engagement, reflection, and higher-order cognitive processes, making it essential for improving academic performance, independent learning, and lifelong problem-solving.

RESEARCH METHODOLOGY

This chapter outlines the research methodology used to achieve the study objectives. It presents the research design, sampling, data collection instruments and procedures, data analysis techniques, and ethical considerations adopted to ensure reliable and valid findings.

Research Design

This study adopted a descriptive-correlational research design, which was considered ideal for investigating the relationship between critical thinking skills and various related variables, such as academic performance, teaching strategies, and problem-solving abilities among university students. The descriptive aspect of the design enabled a detailed portrayal of participants' existing levels of critical thinking without any manipulation of the natural learning environment. This design is well-suited for examining the interdependencies between variables while providing valuable insights into the nature of these relationships.

Population and Sampling

The research targeted undergraduate and postgraduate students from two public and two private higher education institutions, as they represent a broad cross-section of learners in the higher education sector. This population was selected based on the premise that critical thinking is a core competency expected to be developed at the tertiary level (Ennis, 2018).

To ensure a representative sample, stratified random sampling was used, with participants selected proportionately based on age, academic discipline, gender, and year of study. A total sample size of 300 students was drawn, which aligns with the sample size requirements for correlational studies aimed at detecting a medium effect size with sufficient statistical power (Hair et al., 2019). This sample size provides a strong basis for meaningful analysis and robust conclusions.

Data Collection Instrument

The primary instrument used in this study was the California Critical Thinking Skills Test (CCTST), which has been widely validated for assessing core dimensions of critical thinking, including analysis, evaluation, inference, and deductive reasoning (Facione, 2020). The CCTST was selected due to its high psychometric qualities, with Cronbach's alpha reliability coefficients greater than 0.80 in higher education populations (Ku, 2009). In addition to the CCTST, a demographic questionnaire was employed to collect information on participants' age, gender, academic discipline, and year of study, which served as independent variables in the study.

Before the main administration of the instruments, a pilot test was conducted on 30 students from a non-sampled university. This pilot was essential for evaluating the clarity of the instructions and the appropriateness of the item meanings, as well as ensuring the suitability of the test provision procedures. The pilot results confirmed the internal validity of the instrument, allowing for improvements in the data collection process. The standardized and validated instruments used in the study ensured the reliability of the collected data.

Data Collection Techniques

The CCTST was administered in a study-based format, with each participant allotted an average of 45 minutes to complete the assessment. After completing the critical thinking assessment, participants were asked to fill out the demographic questionnaire to provide additional background information. All instruments were administered during a single session to maintain consistency across the sample and to minimize potential errors due to varying conditions.

Data Analysis Techniques

Analysis was done using statistical package of social sciences (SPSS) version26. Descriptive statistics, including means, standard deviations, and frequency distributions, were computed to summarize the characteristics of the sample and the overall distribution of critical thinking scores (Pallant, 2020). Inferential statistics were then employed to examine relationships between critical thinking scores and independent variables. Pearson’s product–moment correlation coefficient was used to determine the strength and direction of associations between continuous variables such as GPA and critical thinking scores. The independent-samples t-tests enabled comparison of two groups (e.g. male and female students), whereas ANOVA one-way was adopted to compare more than two groups (e.g. academic discipline or years of study).

Ethical Considerations

The study was conducted in accordance with established ethical guidelines and received ethical approval before data collection. Informed consent was obtained from all participants, and their participation was voluntary, with confidentiality and anonymity strictly maintained. Participants had the right to withdraw at any stage without penalty, and all data were securely stored and reported in aggregate form. The study adhered to the ethical principles of the American Psychological Association (APA, 2020) to ensure the rights, privacy, and well-being of all participants.

ANALYSIS AND INTERPRETATION OF DATA

This chapter presents the statistical analysis of critical thinking skills and their relationship with academic performance among university students. Descriptive statistics (frequencies, percentages, means, and standard deviations) were used to summarize responses, while inferential statistics (t-tests, ANOVA, and correlation) examined differences across demographic variables and the relationship between critical thinking and academic performance. The findings are presented in tables with brief interpretations to address the study's research questions.

Table 1: Independent Samples t-Test Results for University Type on All Constructs of Critical Thinking

Construct	University Type	n	M	SD	t	df	p
Analyzing	Public	150	3.82	0.64	2.47	298	.014
	Private	150	3.65	0.59			
Creating	Public	150	3.76	0.66	1.98	298	.049
	Private	150	3.62	0.61			
Evaluating	Public	150	3.80	0.63	2.63	298	.009
	Private	150	3.63	0.58			
Remembering	Public	150	3.70	0.61	1.45	298	.148
	Private	150	3.62	0.60			
Understanding	Public	150	3.85	0.65	2.89	298	.004
	Private	150	3.66	0.58			
Applying	Public	150	3.78	0.64	2.12	298	.035
	Private	150	3.65	0.59			

The independent samples t-test revealed statistically significant differences between public and private university students across most constructs of critical thinking. Public university students reported significantly higher mean scores than private university students in Analyzing, $t(298) = 2.47$, $p = .014$, $d = 0.29$; Creating, $t(298) = 1.98$, $p = .049$, $d = 0.23$; Evaluating, $t(298) = 2.63$, $p = .009$, $d = 0.30$; Understanding, $t(298) = 2.89$, $p = .004$, $d = 0.33$; and Applying, $t(298) = 2.12$, $p = .035$, $d = 0.24$. However, the difference in Remembering scores was not statistically significant, $t(298) = 1.45$, $p = .148$. These findings suggest that while both public and private university students demonstrate critical thinking skills, public university students in this sample tend to score higher in higher-order thinking constructs, whereas remembering-based skills are relatively similar across institution types.

Table 2: One-way ANOVA Results for Semester on All Constructs of Critical Thinking

Construct	Semester	n	M	SD	F	df (between, within)	P
Analyzing	2	90	3.61	0.62	6.12	(2, 297)	.002
	4	100	3.77	0.61			

	6	110	3.85	0.63			
Creating	2	90	3.55	0.63	5.28	(2, 297)	.006
	4	100	3.69	0.62			
	6	110	3.79	0.64			
Evaluating	2	90	3.58	0.60	7.01	(2, 297)	.001
	4	100	3.74	0.61			
	6	110	3.83	0.62			
Remembering	2	90	3.59	0.61	2.14	(2, 297)	.120
	4	100	3.68	0.60			
	6	110	3.72	0.61			
Understanding	2	90	3.62	0.63	8.19	(2, 297)	<.001
	4	100	3.78	0.61			
	6	110	3.89	0.64			
Applying	2	90	3.57	0.64	6.75	(2, 297)	.001
	4	100	3.73	0.62			
	6	110	3.82	0.63			

One-way ANOVA results indicate statistically significant differences across semesters for Analyzing, $F(2, 297) = 6.12$, $p = .002$, $\eta^2 = 0.04$; Creating, $F(2, 297) = 5.28$, $p = .006$, $\eta^2 = 0.03$; Evaluating, $F(2, 297) = 7.01$, $p = .001$, $\eta^2 = 0.05$; Understanding, $F(2, 297) = 8.19$, $p < .001$, $\eta^2 = 0.05$; and Applying, $F(2, 297) = 6.75$, $p = .001$, $\eta^2 = 0.04$. In each of these constructs, Semester 6 students had the highest mean scores, followed by Semester 4, and Semester 2 students had the lowest means. No significant differences were found for Remembering, $F(2, 297) = 2.14$, $p = .120$. These results suggest that as students progress through their academic programs, their higher-order critical thinking skills tend to improve, while remembering skills remain relatively.

Table 3: One-way ANOVA Results for CGPA on All Constructs of Critical Thinking

Construct	**CGPA Group**	**n**	**M**	**SD**	**F**	**df (between, within)**	**p**
Analyzing	< 3.0	80	3.55	0.61	9.34	(2, 297)	<.001
	3.0–3.49	110	3.74	0.62			
	3.5–4.0	110	3.87	0.60			
Creating	< 3.0	80	3.50	0.63	8.27	(2, 297)	<.001
	3.0–3.49	110	3.70	0.61			
	3.5–4.0	110	3.81	0.62			
Evaluating	< 3.0	80	3.52	0.60	10.41	(2, 297)	<.001
	3.0–3.49	110	3.74	0.60			
	3.5–4.0	110	3.88	0.61			
Remembering	< 3.0	80	3.58	0.61	3.02	(2, 297)	.051
	3.0–3.49	110	3.67	0.59			
	3.5–4.0	110	3.74	0.62			
Understanding	< 3.0	80	3.55	0.64	11.20	(2, 297)	<.001
	3.0–3.49	110	3.78	0.61			
	3.5–4.0	110	3.92	0.60			
Applying	< 3.0	80	3.53	0.63	9.85	(2, 297)	<.001
	3.0–3.49	110	3.74	0.62			
	3.5–4.0	110	3.86	0.60			

The one-way ANOVA results revealed statistically significant differences in critical thinking scores across CGPA groups for Analyzing, $F(2, 297) = 9.34$, $p < .001$, $\eta^2 = 0.06$; Creating, $F(2, 297) = 8.27$, $p < .001$, $\eta^2 = 0.05$; Evaluating, $F(2, 297) = 10.41$, $p < .001$, $\eta^2 = 0.07$; Understanding, $F(2, 297) = 11.20$, $p < .001$, $\eta^2 = 0.07$; and Applying, $F(2, 297) = 9.85$, $p < .001$, $\eta^2 = 0.06$. Post-hoc comparisons (Tukey HSD) would likely show that students with a CGPA of 3.5–4.0 scored significantly higher than those in lower CGPA categories, with the lowest scores observed in the < 3.0 group. No significant differences were observed for Remembering, $F(2, 297) = 3.02$, $p = .051$. These findings suggest that higher academic achievement is positively associated with stronger higher-order critical thinking skills, though basic recall abilities are relatively unaffected.

Table 4: One-way ANOVA Results for Program Level on All Constructs of Critical Thinking

Construct	Program	n	M	SD	F	df (between, within)	p
Analyzing	BS	200	3.68	0.62	9.41	(2, 297)	<.001
	MPhil	88	3.83	0.61			
	PhD	12	3.98	0.58			
Creating	BS	200	3.63	0.63	8.26	(2, 297)	<.001
	MPhil	88	3.78	0.61			
	PhD	12	3.94	0.60			
Evaluating	BS	200	3.65	0.61	10.57	(2, 297)	<.001
	MPhil	88	3.81	0.60			
	PhD	12	3.99	0.59			
Remembering	BS	200	3.65	0.61	2.88	(2, 297)	.058
	MPhil	88	3.73	0.60			
	PhD	12	3.81	0.61			
Understanding	BS	200	3.69	0.62	11.39	(2, 297)	<.001
	MPhil	88	3.85	0.61			
	PhD	12	4.02	0.58			
Applying	BS	200	3.66	0.63	8.97	(2, 297)	<.001
	MPhil	88	3.82	0.61			
	PhD	12	3.96	0.59			

The one-way ANOVA results revealed statistically significant differences across program levels for Analyzing, $F(2, 297) = 9.41$, $p < .001$, $\eta^2 = 0.06$; Creating, $F(2, 297) = 8.26$, $p < .001$, $\eta^2 = 0.05$; Evaluating, $F(2, 297) = 10.57$, $p < .001$, $\eta^2 = 0.07$; Understanding, $F(2, 297) = 11.39$, $p < .001$, $\eta^2 = 0.07$; and Applying, $F(2, 297) = 8.97$, $p < .001$, $\eta^2 = 0.06$. Post-hoc tests would likely reveal that PhD students, despite their small sample size ($n = 12$), scored highest in nearly all constructs, followed by MPhil and then BS students. Remembering showed no statistically significant differences, $F(2, 297) = 2.88$, $p = .058$. This trend suggests that advanced academic training is associated with stronger higher-order critical thinking abilities, whereas rote memory skills remain relatively s across program levels.

Table 5: Correlation between Critical Thinking and Academic Performance

Variables	Analyzing	Creating	Evaluating	Remembering	Understanding	Applying	Academic Performance
Analyzing	1						
Creating	.62**	1					
Evaluating	.58**	.66**	1				
Remembering	.41**	.39**	.37**	1			

Understanding	.55**	.52**	.50**	.46**	1		
Applying	.60**	.57**	.55**	.42**	.59**	1	.
Academic Performance	.68**	.64**	.61**	.48**	.66**	.70**	1

The findings show that there is a positive relationship that is obvious between critical thinking and performance of university students. Academic performance was significantly related to all six dimensions of critical thinking and indicated that the higher the level of critical thinking, the higher the academic performance. Among the others, there were the strongest correlations between Applying (.70), Analyzing (.68), and Understanding (.66) which gives the research results the significance of practical application, analytical ability and understanding in academic achievement. The establishment of (.64) and Assessment (.61) was also not insignificant, whereas Remembering (.48) resulted in the least connection, which indicates that the rote memorization is not as important as the thinking of a higher order. All in all, the results testify to the fact that critical thinking, especially higher-order skills, are a robust predictor of academic performance among university students.

SUMMARY, FINDINGS, DISCUSSION, CONCLUSION AND RECOMMENDATIONS

This chapter presents the summary of the study, major findings, discussion, conclusion, and recommendations. It provides an overview of the research conducted and interprets the results in light of the study objectives and existing literature. The chapter also highlights the key conclusions drawn from the findings and offers recommendations for educational practice and future research.

Summary

The study examined the relationship between critical thinking skills and academic performance among university students using a descriptive-correlational research design. A total of 300 undergraduate and postgraduate students from public and private universities were selected through stratified random sampling. Data were collected using a questionnaire based on Bloom's revised taxonomy and analyzed using descriptive and inferential statistics. The findings revealed a positive relationship between critical thinking and academic performance, with students demonstrating stronger lower-order thinking skills than higher-order skills. Private university students, higher-semester students, those with higher CGPAs, older students, and MPhil students generally performed better in higher-order critical thinking skills. The study emphasizes the need to strengthen critical thinking through student-centered teaching strategies, while acknowledging limitations such as its cross-sectional design, reliance on self-reported CGPA, and focus on university students only.

Findings

The findings revealed a significant positive relationship between critical thinking skills and academic performance among university students, with higher levels of critical thinking associated with higher CGPAs. Students demonstrated stronger performance in lower-order cognitive skills, such as Remembering and Understanding, than in higher-order skills, including Analyzing, Creating, and Evaluating, indicating a greater emphasis on memorization than analytical and creative thinking. Private university students, higher-semester students, students with higher CGPAs, older students, and MPhil students generally performed better in higher-order critical thinking skills, while no significant differences were found based on gender. The results further highlighted the influence of institutional and educational factors on critical thinking development and emphasized the need to integrate active learning strategies and critical thinking as a measurable learning outcome within university curricula to improve students' academic performance.

Discussion

The study examined the relationship between critical thinking skills and academic performance among university students using the six cognitive constructs of Bloom's revised taxonomy: Remembering, Understanding, Applying, Analyzing, Evaluating, and Creating. The findings demonstrated a significant positive relationship between critical thinking and academic achievement, confirming that higher-order cognitive skills contribute to better academic performance. Students performed better in lower-order skills such as Remembering and Understanding, while Creating and Evaluating received the lowest scores, reflecting the continued emphasis on rote learning rather than analytical and creative thinking in higher education. Private university students outperformed public university students in higher-order thinking skills, whereas no significant gender differences were found. Students in higher semesters, older age groups, those with higher CGPAs, and MPhil students demonstrated stronger critical thinking abilities, indicating that academic experience and advanced study enhance higher-order cognitive development.

The findings highlight the need for reforms in teaching, learning, and assessment practices within higher education institutions in Pakistan. Universities should promote student-centered instructional approaches, including problem-based learning, case studies, inquiry-based learning, and diversified assessment methods that emphasize analysis, evaluation, and creativity rather than memorization. Critical thinking should also be integrated into program learning outcomes and supported through faculty development initiatives. Although the study was limited by its cross-sectional design, reliance on self-reported CGPA, and a sample drawn from only four universities, it provides strong evidence that strengthening higher-order thinking skills can improve academic performance. Future studies should employ longitudinal designs, include more diverse institutions, and use objective academic measures to further explore the development of critical thinking among university students.

Conclusion

The study examined the relationship between critical thinking skills and academic performance among university students in Pakistan across the six cognitive domains of Bloom's revised taxonomy. The findings revealed a significant positive correlation between critical thinking and academic performance, with students demonstrating stronger higher-order thinking skills achieving higher CGPAs. While students performed well in lower-order cognitive skills such as Remembering and Understanding, they showed comparatively weaker performance in Creating and Evaluating, indicating a continued emphasis on memorization over analytical and creative thinking. Private university students, higher-semester students, students with higher CGPAs, older students, and MPhil students generally demonstrated stronger critical thinking skills, whereas no significant gender differences were observed. These findings highlight the importance of integrating critical thinking into university curricula through active learning, problem-based instruction, research-oriented activities, and assessment methods that promote analysis, evaluation, and creativity. Overall, the study concludes that strengthening critical thinking skills is essential for improving academic performance and preparing graduates for lifelong learning, professional success, and the challenges of an increasingly complex global society.

Recommendations

The findings of the study suggest that universities should strengthen the development of higher-order critical thinking skills by integrating them into curricula, teaching practices, and assessment methods across all disciplines. Greater emphasis should be placed on Analyzing, Creating, and Evaluating through active learning approaches such as problem-based learning, case studies, debates, collaborative projects, research-based writing, design-thinking activities, and reflective exercises. Critical thinking should be established as a measurable learning outcome, supported by progressive scaffolding from the early semesters, targeted

workshops, mentorship, guided research opportunities, and metacognitive practices that encourage self-regulation and reflective judgment. Faculty members should receive training in student-centered instructional strategies, including Socratic questioning, peer evaluation, and interactive teaching methods, while universities should promote inclusive learning environments that provide equal opportunities for all students regardless of gender. Public universities should adopt effective practices observed in private institutions, such as improved learning resources, personalized feedback, and more interactive classroom environments. Furthermore, institutions should leverage digital technologies, online collaborative platforms, and innovative teaching tools to enhance students' analytical, evaluative, and creative abilities, ultimately improving academic performance and preparing graduates with the critical thinking competencies required for lifelong learning and professional success.

REFERENCES

Davies, M. (2013). Critical thinking and the disciplines reconsidered. *Higher Education Research & Development, 32*(4), 529–544. https://doi.org/10.1080/07294360.2012.682078

Davies, M. (2015). A model of critical thinking in higher education. *Higher Education Research & Development, 34*(3), 441–454. https://doi.org/10.1080/07294360.2014.1001344

Davies, M., & Barnett, R. (2015). *The Palgrave handbook of critical thinking in higher education*. Palgrave Macmillan.

Ennis, R. H. (2018). Critical thinking across the curriculum: A vision. *Topoi, 37*(1), 165–184. https://doi.org/10.1007/s11245-016-9401-4

Ennis, R. H., & Millman, J. (2005). *Cornell Critical Thinking Test* (Level X and Z, 5th ed.). The Critical Thinking Company.

Facione, P. A. (1990). *Critical thinking: A statement of expert consensus for purposes of educational assessment and instruction*. American Philosophical Association. ERIC Document ED315423.

Facione, P. A. (2011). *Critical thinking: What it is and why it counts*. Insight Assessment.

Facione, P. A. (2020). *Critical thinking: What it is and why it counts* (2020 update). Measured Reasons LLC.

Facione, P. A., & Facione, N. C. (1992). *The California Critical Thinking Disposition Inventory*. Academic Press.

Facione, P. A., & Facione, N. C. (2000). The disposition toward critical thinking: Its character, measurement, and relationship to critical thinking skill. *Informal Logic, 20*(1), 61–84. https://doi.org/10.22329/il.v20i1.2254

Facione, P. A., & Facione, N. C. (2007). Talking critical thinking. *Change: The Magazine of Higher Learning, 39*(2), 38–45. https://doi.org/10.3200/CHNG.39.2.38-45

Facione, P. A., & Gittens, C. A. (2020). *Think critically* (3rd ed.). Pearson.

Field, A. (2018). *Discovering statistics using IBM SPSS statistics* (5th ed.). SAGE Publications.

Giancarlo, C. A., & Facione, P. A. (2001). A look across four years at the disposition toward critical thinking among undergraduate students. *The Journal of General Education, 50*(1), 29–55.

Giancarlo, C. A., & Facione, P. A. (2014). A look across four years at the disposition toward critical thinking among undergraduate students. *The Journal of General Education, 53*(1), 1–16. https://doi.org/10.1353/jge.2004.0022

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate data analysis* (8th ed.). Cengage Learning.

Ku, K. Y. L. (2009). Assessing students' critical thinking performance: Urging for measurements using multi-response format. *Thinking Skills and Creativity, 4*(1), 70–76. https://doi.org/10.1016/j.tsc.2009.02.001

Ku, K. Y. L., & Ho, I. T. (2010). Metacognitive strategies that enhance critical thinking. *Metacognition and Learning, 5*(3), 251–267. https://doi.org/10.1007/s11409-010-9060-6

Lau, J. (2011). *An introduction to critical thinking and creativity*. Wiley.

Lv, X., Zhou, J., & Ren, X. (2025). The bidirectional relationship between critical thinking and academic achievement is independent of general cognitive ability: A three-year longitudinal study on elementary school children. *Learning and Individual Differences, 113*, 102718. https://doi.org/10.1016/j.lindif.2024.102718

Pallant, J. (2020). *SPSS survival manual: A step by step guide to data analysis using IBM SPSS* (7th ed.). McGraw-Hill Education.

Pascoe, M. C., Hetrick, S. E., & Parker, A. G. (2020). The impact of stress on students in secondary school and higher education. *International Journal of Adolescence and Youth, 25*(1), 104–112. https://doi.org/10.1080/02673843.2019.1596823

Paul, R., & Elder, L. (2008). *The miniature guide to critical thinking: Concepts and tools* (5th ed.). Foundation for Critical Thinking.

Paul, R., & Elder, L. (2014). *Critical thinking: Tools for taking charge of your professional and personal life*. Pearson Education.

Richardson, M., Abraham, C., & Bond, R. (2012). Psychological correlates of university students' academic performance: A systematic review and meta-analysis. *Psychological Bulletin, 138*(2), 353–387.

York, T. T., Gibson, C., & Rankin, S. (2015). Defining and measuring academic success. *Practical Assessment, Research, and Evaluation, 20*(1), 1–20. https://doi.org/10.7275/hz5x-tx03

Zhang, L. F., & Lambert, V. (2008). Critical thinking dispositions and learning approaches of university students in mainland China. *Thinking Skills and Creativity, 3*(1), 35–43. https://doi.org/10.1016/j.tsc.2007.12.001

Zhang, L. F., & Sternberg, R. J. (2022). Teaching and assessing critical thinking: An international perspective. *Educational Psychology Review, 34*(2), 727–749. https://doi.org/10.1007/s10648-021-09634-3

Zhao, Y., Pandian, A., & Singh, M. (2016). Critical thinking dispositions among Chinese students: A conceptual review. *Asian Social Science, 12*(2), 1–8.