Students' Cognitive Test Anxiety on Academic Performance in Traditional and Virtual Learning Environments: A Comparative Study of Punjab University and Virtual University Students

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Abstract

A learning environment is specifically crafted to optimize student outcomes by establishing conditions that facilitate effective teaching and meaningful learning experiences. This necessitates consideration of diverse learner characteristics and contextual factors to maximize educational impact. This research investigates the impact of cognitive anxiety during tests, and associated expected performance of students in online distance learning programs in comparison with traditional learning programs at the undergrad level. Within the quantitative paradigm, this research adapts two models; Additive Model of Zohar (1998) and Learning-Testing Cycle of Schutz & Davis (2000). A group of 210 students from Virtual University and a group of 208 students from Punjab University were purposively selected. Further, a test of Pearson Coefficient of correlation and regression was conducted to analyze the correlation among variables; Cognitive Test-Anxiety, academic performance and learning environments. Findings indicate a negatively significant correlation between Cumulative Grade Points Average (CGPA) and Cognitive Text Anxiety. These findings suggest that the undergrad students of University of Punjab show more Cognitive Test-Anxiety than Virtual University which leads to low academic performance rate among Punjab University students. The accumulative results show that online learning programs are helpful in dropping Test-Anxiety. The Government of Pakistan should encourage these online programs in order to promote efficient learning. Further, counselling programs conducted by the educational bodies can reduce test anxieties in traditional learning environments.

Keywords: Cognitive Test-Anxiety (CTA), Academic Performance (AP), Punjab University (PU), Virtual University (VU)

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Introduction

Background of the Study

A learning environment is intentionally crafted to optimize student outcomes by establishing conditions that facilitate effective teaching and meaningful learning experiences. These environments incorporate various components, including instructional strategies, resources, physical settings, and social interactions, all designed to enhance student engagement, motivation, and academic performance. By aligning these elements with students' needs and learning objectives, educators can cultivate an atmosphere conducive to deep understanding and skill development.

Furthermore, selecting a specific learning environment necessitates consideration of diverse learner characteristics and contextual factors to maximize educational impact. This may involve the use of technology-enhanced settings, collaborative spaces, or individualized learning approaches that accommodate different learning styles and paces. Ultimately, the objective is to create an inclusive and supportive space where students can actively participate, receive timely feedback, and develop critical thinking abilities, thereby achieving the highest possible performance outcomes.

Provision of course materials to the students by using internet and computers has become a common practice around the world (Duchastel, 1996). Pakistan is also developing different innovative methods of teaching and effective learning to cope with the world. Early models of distance education in Pakistan were rooted in correspondence-based methods, including letters, occasional workshops, and assignments. Distance learning was essentially a communication process between teachers and students separated by space, relying on available channels of communication. This model provided an alternative to conventional classroom learning, particularly for those unable to attend in person. Besides traditional mode of learning, Pakistan is developing and promoting distance learning programs since early 70s when the first Open Distance Learning (ODL) was launched. It was the first distance learning educational institution in Asia and later stands second in the world after UK Open University (Jumani & Khan, 2009). According to statistics (2017), there are approximately 170 distance learning institutes across the country which include Allama Iqbal Open University (AIOU) and Virtual University (VU).

Distance learning vs. Traditional Learning

Distance learning gained traction as a more inclusive mode of education. Shahzad (2017) highlighted its role in providing affordable and flexible opportunities for working professionals and students in remote

areas. Traditional learning, by contrast, remained limited to those who could physically access institutions, thereby excluding marginalized groups. The expansion of distance learning thus addressed equity concerns in higher education. With the rapid emergence of Information and Communication Technologies (ICT), distance learning evolved into online learning. E-learning introduced diversity in teaching methodologies, enabling more customized and productive instruction (Jumani et al., 2011). Modern institutions in Pakistan now employ Open and Distance Learning (ODL) frameworks, integrating Learning Management Systems (LMS), Student Information Systems (SIS), and secure e-assessment platforms. These tools have transformed student engagement, offering asynchronous communication channels such as moderated discussion boards and email.

Comparative studies reveal mixed outcomes regarding student performance. Akpen (2024) indicates that online learning significantly influenced academic performance with some students reporting improved flexibility and learning outcomes, while others struggled with motivation and digital literacy. Traditional learning continues to be valued for its immediate feedback and structured environment but online platforms provide autonomy and self-paced learning opportunities. Despite advancements, challenges persist in Pakistan's online educational landscape. WIFI connectivity issues, incomplete digital facilities in rural areas, and varying levels of ICT literacy hinder the effectiveness of online learning. Scholars argue that hybrid models combining both the traditional and online approaches may offer a balanced solution, ensuring both, accessibility and quality.

A number of distance learning institutes in Pakistan are offering economical and convenient education. The prime vision of many distance learning institutions is to provide education to professionals who specifically belong to remote areas. Previous studies have revealed students' perceptions about online distance learning with respect to traditional learning. Many online learning institutions are compatible to the traditional institutes. Jumani and Khan (2009) explored the perceptions of Pakistani postgraduate scholars regarding the efficacy of distance learning. The findings indicate a prevailing consensus that distance education is qualitatively comparable to traditional academic systems. Distance learning institutions provide workshops and assignments which help them for the preparation of their final assessment. Online lectures and assessment materials are compatible to the traditional face-to-face lectures. Educators strive to deliver high-quality online lectures to facilitate student comprehension. Some online learning institutions offer software that enables students to communicate with their instructors

regarding their queries. These innovations foster the belief that online learning environments possess comparable potential to traditional learning settings. However, equivalent potential in content does not necessarily imply that these two distinct environments exert identical effects on students. Online and traditional learning environments differ significantly, particularly during examinations. These differing settings have varied impacts on students' cognitive processes (Jumani & Khan, 2009).

The way assessments are administered shows a considerable difference between traditional and virtual universities. Traditional institutes mostly follow paper-based assessments which are conducted under strictly supervised classroom environment. Conversely, in virtual institutions, assessments are conducted online with different exam decorum following often remote or automated proctoring protocols to maintain exam integrity (Woldeab & Brothen, 2019). Both the formats can affect students' test-related beliefs differently. Cassady and Gridley (2005) examined that the students who completed assessments online reported a lower perceived test threat, which suggests that the mode of how assessments are conducted can inform how students may experience evaluation. Similarly, online proctoring may introduce its own amount of pressure to the students. A study demonstrates that supervision during online exams can heighten the test anxiety, and that students with high trait test anxiety score lower than the other venues, especially in online proctored settings (Sarmiento Barbieri et al., n.d.; Woldeab & Brothen, 2019). Differences in how assessments are designed, conducted and supervised are therefore important contextual factors for understanding how cognitive test anxiety and academic performance differ across learning environments.

Anxiety vs. Cognitive Test-Anxiety

The primary purpose of academics for students is to achieve good grades. However, students come across certain issues which hinder their performance ultimately disturbing student's learning cycle. Test-Anxiety is one of the problems which interferes in learning and test taking situations of a student. Anxiety, in general psychology, refers to ideas present in various types of psychology, counseling, educational psychology, and clinical psychology in particular. (Spielberger, 1966, 1972; Krohne & Laux, 1982; Tuma & Maser, 1985; Schwarzer, 1984; Sarason & Spielberger, 1975). Research scholars strive for identifying the factors that cause anxiety proposing multiple techniques to reduce its effect (Tuma & Maser, 1985; Schwarzer, 1984; Sarason & Spielberger, 1975). However, in theory, anxiety remained hypothesized as a reaction to anxious states and as a possibility of negative outcomes (Shechter &

Zeidner, 1990). Rost and Schermer (1989) classified anxiety as anticipated feelings for any task, fear, danger, threat, distress and uneasiness. Sarason and Sarason (1990) have listed the factors of anxiety. Anxious individuals appraise the situations as threatening, tough or challenging. Further, for any task, anxious individuals perceive themselves as inadequate and inefficient. Another important factor indicates the focus of anxious individuals on undesirable outcomes. Preoccupied thoughts also led the anxious individuals to show inadequate performance in cognitive task activities. Furthermore, anxious individuals have fear of facing failure.

Test-Anxiety is psychological impairment which happens during evaluative conditions. Cognitive Test-Anxiety is stated as the individuals' mental reactions and interactive communication before and after the assessment chores (Cassady, 2004). Learners having high level of Cognitive Test-Anxiety must have some common thoughts. They compare their performance with the peers. During performance, they have low confidence level and have fear of failure. They think that they are not prepared and they have fear that they are the cause of sorrow for their parents. They feel worried during evaluative conditions. If a student has high Cognitive Test-Anxiety then he/she could not perform well in exams and if a student does not have Cognitive Test-Anxiety then he/she can perform well. Cassady (2004) has proved that students depicting high cognitive anxiety during exams have low test achievements. According to Rost and Schermer (1989), the term Test-Anxiety relates to the anxiety related to learning, testing and training situations. Spielberger, Anton and Bedell (1976) assert that the irrelevant and complex thoughts during task, ineffective study behavior and high level of physiological arousal, are the major classifications of Test-Anxiety. It is a cognitive as well as emotional change. It devours a direct effect on students' performance.

It represents both cognitive and emotional changes and it marks a direct impact on students' performance. Test anxiety is a psychological impairment that occurs during evaluative conditions. Cognitive test anxiety is defined as individuals' mental reactions and interactive communication before, ongoing, and after evaluative tasks. Individuals with high levels of cognitive test anxiety often share common thoughts, such as comparing their performance with peers, experiencing low confidence, and fearing failure. They may feel unprepared and worry about being a source of disappointment for their parents. Such individuals experience heightened anxiety during evaluative conditions. Students with high cognitive test anxiety likely to show poor performance in exams, whereas those without it tend to perform well. Cassady (2004) demonstrated that students exhibiting high cognitive anxiety during exams achieve lower test scores.

Recent studies (Butler-Henderson & Crawford, 2020; Holden et al., 2021) indicate that online assessment style differs from traditional assessment styles in delivery, supervision, and how students experience evaluation. Systematic reviews categorize student perceptions, anxiety, interface design, technical problems, and academic integrity as core concerns in online examinations (Butler-Henderson & Crawford, 2020; Holden et al., 2021). Test anxiety in online exams is now identified as a distinct experience. Dikmen (2022) developed a scale specific to online exams, and some students report feeling more anxious in online than paper-based exams, often because of technical problems and interface design. Findings are mixed, however. Distance learning did not directly affect test anxiety in one pandemic-era study, but motivation for online classes was linked to lower anxiety, and the exam environment moderated the anxiety-procrastination-achievement pathway for learners with disabilities. Theobald et al. (2022) also found that test anxiety did not predict exam performance once prior knowledge was controlled. These mixed findings make it important to compare cognitive test anxiety across virtual and traditional learning environments.

Cognitive Test-Anxiety is determined as beliefs and thoughts which can cause negative effects during the preparation or while taking exams (Cassady, 2004b). It is usually the psychological fear or obstacle of attempting the test in different situations. These cognitive obstacles include observing the repercussions of failure, comparing self-achievements to peers' achievements, low confidence level during performance, excessive worry over evaluation, emotions of unpreparedness and facing problems in retrieving information (Sarason, 1986). The Cognitive Test-Anxiety scale of Cassady & Johnson, (2002) was adapted for this research and twenty-seven items were decreased into 21-item considering the context of the study. Moreover, a Likert scale having 4 options ("Not at all-typical of me," "Only somewhat-typical of me," "Quite-typical of me," "Very-typical of me") was changed it into a five-point Likert-Type scale ("Never," "rarely," "sometimes," "often," "always,"). All these adaptations have been done only for the students' convenience because some words were very difficult even the Likert-Type scale was very difficult to comprehend easily. This adapted instrument had validated high internal consistency (alpha > .90). Academic performance for science students was measured using their Cumulative Grade Point Average (CGPA) from their prior semesters.

Rationale

Academic achievement, often assessed by the Cumulative Grade Point Average (CGPA), is intrinsically linked to the optimization of the

learning environment. While pedagogical frameworks are designed to enhance these outcomes, the environment is frequently compromised by psychological barriers, notably test anxiety, reduced motivation, and low self-efficacy. Although online distance learning (ODL) is frequently regarded as a flexible instructional medium, its effectiveness must be assessed in terms of its capacity to alleviate these adverse psychological factors. Existing literature, beginning with foundational studies such as Buchanan (2000), presents a developing yet inconclusive body of evidence regarding the impact of digital media on student performance. A significant gap persists in understanding whether the transition to online testing systems alleviates or exacerbates test anxiety compared to traditional, invigilated settings. The studies conducted on test anxiety (Cassady and Gridley, 2005) show that cognitive test anxiety and perceived test threat can differ between online and traditional assessment formats. However, little research has directly compared how cognitive test anxiety varies between virtual and traditional university settings, or how assessment practices in each setting may explain these differences. The present study addresses this gap. Specifically, this issue is quite relevant in the Pakistani academic context, where the intersection of digital infrastructure and learner anxiety remains under-researched. Consequently, this study employs a comparative approach to evaluate the influence of online versus traditional testing environments on student anxiety, providing a data-driven assessment of how medium-specific variables affect the psychological state and subsequent performance of learners.

Research Questions

For exploring the purpose of the current study, following questions were addressed:

1. To what extent is there a statistically significant correlation between cognitive anxiety and academic performance?
2. How does the impact of cognitive anxiety on students' academic performance differ between online and traditional learning environments?

Research Hypothesis

Hypotheses of this research study are as follows:

H1. There is a significant correlation between cognitive anxiety and academic performance

H2. There is a significant correlation between the cognitive test anxiety of students in online learning programs and that of students in traditional learning programs.

Research Methodology

Research Design

This study utilizes a comparative correlational research design. The primary variables of interest were Cognitive Test Anxiety (CTA) and Academic Performance. This design was selected to measure the forte and course of the link between these variables across two distinct educational modalities: traditional (face-to-face) and virtual (online) learning environments. By calculating correlation coefficients, the study aimed to determine the degree to which levels of cognitive anxiety fluctuate in relation to performance outcomes within these different institutional settings.

Research Paradigm

This research is situated within the positivist paradigm. Positivism assumes an objective reality that can be evaluated and analyzed with empirical observation. This study adopts a deductive approach, testing the established theoretical framework supported by scholars such as Sarason (1984) and Cassady (2004) which suggests an inverse relationship between test anxiety and academic achievement. By utilizing standardized measurement scales and objective performance data, the research seeks to verify specific hypotheses regarding the effect of anxiety on student's success in a value-free and systematic manner.

Research Method

This research adopts a quantitative research method to facilitate systematic data collection and statistical analysis. This method allowed for the numerical testing of hypotheses derived from the theoretical framework. The data were examined utilizing Pearson Product-Moment Correlation (r) to identify the linear relationship between Cognitive Test Anxiety and academic performance. Additionally, Linear Regression analysis was used to determine the extent to which anxiety serves as a predictor of performance across both traditional and virtual environments. This statistical approach ensures a high degree of objectivity and generalizability of the findings. Cognitive Test-Anxiety and academic performance were two major variables of this research. The scores of Cognitive Test-Anxiety scale and academic performance were correlated. Scores were expressed as correlational coefficient which indicated the degree of correlation amongst Cognitive Test-Anxiety scale and academic performance. These scores were correlated in different settings such as; online and traditional settings.

Theoretical Framework

This research utilizes the theoretical framework called Additive Model proposed by Zohar (1998). According to this model, the consequences of anxiety on achievements are due to two additive elements; individuals' anxiety about test and variables specific to situation. Some common situational factors can be; particular situation that causes the perception of high level of threat during exam, low confidence level for any specific task, inability to retrieve information, thought of being not prepared for exam. So, students showing high anxieties will face poor achievements only then, when people are triggered for low-anxiety by the situation.

This research has opted online and traditional learning situations to assess how the difference in situations causes different cognitive test anxieties and then ultimately different performances of students. According to Schutz & Davis (2000), Learning-testing cycle is a recursive model which includes three dimensions; preparation, performance and reflection of test. Any negative or positive influence during this learning and testing cycle can change the whole process. Learners who have high anxiety levels or negative perceptions during exams could not perform well in any of these three phases. The experiences students face during any of these phases can influence their achievements. This particular research has explored the students' behaviors and experiences during the performance phase under different assessment conditions. This framework helped to investigate the benefits and drawbacks of online programs.

Data Collection Procedures

Undergraduate and post-graduate students of arts and sciences programs were the members of this investigation. Participants were drawn purposively from the two major public universities of Lahore; Punjab University and Virtual University. As the Virtual University is one of the largest E-learning University in Lahore, so it was selected purposively. The university uses Open and Distance Learning (ODL) methods used in different mediums. According to Virtual University of Pakistan (n.d.), university employs a quality software that includes Learning Management System (LMS), exam software, virtual information system and other software for students' record and for interaction with students through the software particularly through LMS. This software provide links to syllabi of courses, outlines of courses, instructional resources, communication outlets, web-based assessment packages, online assignments, quizzes and tests. Students all over the world can contact their teachers through emails, LMS and Moderated Discussion Board (MDB).

For comparison with traditional learning, Punjab University was selected which is another largest public University of Lahore. Punjab University follows traditional way of teaching and learning since it was established. The purpose of selecting these universities was that these both universities are one of the largest universities of Lahore respective to their learning environments. As these both universities are the biggest stakeholders in their respective environments so the results obtained from the sample helped the researcher to generalize to the population. Two Hundred and Eight (N = 208) students of Punjab University and Two Hundred and Ten (N = 210) students of Virtual University were selected. The participants in this study were all volunteers. Sampling was convenience based. The researcher visited the campuses and the students, to whom researcher met accidentally, were requested to participate. The students, who were willing to participate voluntarily, were preferred for data collection. Almost all the accidently met students were agreed to contribute. Only few students were there who refused just because that was their exams timing and they were rushing towards the examination rooms.

Instruments

This study employed Cumulative Grade Point Average (CGPA) as a metric to evaluate the academic standing of science students based on their performance in all previous semesters. Cognitive-Test-Anxiety scale was employed to check the level of anxiety. This measuring tool was validated in previous researches which were conducted by Cassady and Johnson (2004) in different years. Both universities carry out semester system. All students got their results in CGPA form. CGPA of the students represents the average performance. Depending upon the content of the course, each course is given certain number of "credits" and "units". CGPA credits move from 0 to 4. High achievers have their CGPA near to 4. For this particular research, the researcher has asked the current CGPA of students which they have got so far during their last semesters.

Data Analysis and Results

Demographic Information of Students

Table 3.1 Demographic information of students

Variables	No. of Students	Percentage of Students
Gender		
Male	200	50
Female	218	50
University		
University of the Punjab	208	50
Virtual University	210	50

Data was collected from around 420 students with equal ratio of male students (50%) and female students (50%). Around 208 (50%) students from University of the Punjab and 210 (50%) students from Virtual University actively participated and responded to the research questions voluntarily.

Cognitive Test-Anxiety Scale

Table 3.1 Comparison of students' responses of University of the Punjab and Virtual University on Cognitive anxiety test

Sr#	Statements of cognitive Test-Anxiety	*PU*		*VU*		t-test	
		M	*SD*	*M*	*SD*	T	P
1	I lose sleep over worrying about examinations	2.8	1.4	2.56	1.40	1.94	0.053
2	While taking an important examination I find myself wondering whether the other students are doing better than I am.	2.8	1.3	2.87	1.29	0.88	0.381
3	I tend to freeze up on things like intelligence tests and final exams	2.7	1.2	2.45	1.32	1.79	0.074

Sr#	Statements of cognitive Test-Anxiety	*PU*		*VU*		t-test	
		M	*SD*	*M*	*SD*	T	P
4	I am more nervous about tests than the average college student	2.3	1.3	2.13	1.35	1.45	0.148
5	During tests, I find myself thinking of the consequences of failing	2.4	1.4	2.27	1.24	1.08	0.281
6	At the beginning of a test, I am so nervous that I often can't think straight.	2.4	1.3	2.13	1.29	2.16	0.031
7	I have more difficulty than the average college student in learning assigned chapters in textbooks.	2.2	1.3	2.32	1.29	.74	0.459
8	My mind goes blank when I am pressured for an answer on a test.	2.7	1.4	2.63	1.39	0.65	0.516
9	During tests, the thought frequently occurs to me that I may not be too bright	2.4	1.2	2.47	1.20	-.54	0.589
10	During a course examination, I get so nervous that I forget facts I really know.	2.5	1.2	2.50	1.14	0.04	0.965
11	After taking a test, I feel I could have done better than I actually did.	3.4	1.3	3.17	1.40	1.80	0.073
12	I worry more about doing well on tests than I should.	2.9	1.2	2.68	1.29	1.71	0.088

Sr#	Statements of cognitive Test-Anxiety	*PU*		*VU*		t-test	
		M	*SD*	*M*	*SD*	T	P
13	Before taking a test, I feel nervous and confused	2.9	1.3	2.48	1.37	2.90	0.004
14	While taking a test, I feel nervous and confused.	2.5	1.1	2.40	1.25	0.86	0.388
15	During tests, I have the feeling that I am not doing well.	2.6	1.2	2.59	1.18	0.22	0.828
16	When I take a test that is difficult, I feel defeated before I even start.	2.4	1.2	2.32	1.19	0.79	0.427
17	I am not good at taking tests.	2.5	1.2	2.11	1.18	3.06	0.002
18	When I first get my copy of a test, it takes me a while to calm down to the point where I can begin to think straight.	2.8	1.1	2.83	1.31	0.01	0.989
19	I feel under a lot of pressure to get good grades on tests.	3.1	1.4	3.04	1.53	0.30	0.761
20	I do not perform well on tests.	2.4	1.1	2.23	1.17	1.60	0.110
21	When I take a test, my nervousness causes me to make careless errors.	2.8	1.3	2.44	1.40	2.40	0.017

Table (3.2) displays comparative test values of the selected students. This independent sample t-test was conducted in order to compare Cognitive Test-Anxiety of Virtual University and Punjab University students (Table 3.2). Each item in scale was observed under both online and traditional settings. Not a significant difference was unfolded in scores for Virtual University students and Punjab University students (t =1.94, p = 0.053) with regard to the first statement that due to excessive worry of

examinations they lose proper sleep. No significant difference (positive/negative) ($t = 0.88$, $p = 0.381$) was observed while addressing the second statement of the test showing concern about other students' performance. However, a minor difference among both universities was observed, that is, for students of Virtual University ($M = 2.87$, $SD = 1.29$) and for students Punjab University ($M = 2.8$, $SD = 1.4$). The difference in scores was not significant for Virtual University students and Punjab University students ($t = 1.79$, $p = 0.074$) with regard to the third statement that they tend to freeze up during examinations. Furthermore, no significant difference was observed in scores for Virtual University students and Punjab University students ($t = 1.45$, $p = 0.148$) under the fourth statement that they are more nervous than their fellows. The difference in scores, for Virtual University students and Punjab University students, was insignificant ($t = 1.08$, $p = 0.281$) when they responded to the fifth statement regarding fear of failure. A difference of 0.27 was observed in scores among the students of Virtual University and Punjab University regarding sixth statement concerning their reflection of the test.

Another, insignificant difference in scores was observed under seventh statement ($t = 0.74$, $p = 0.495$). The findings show not a significant difference in the scores of Virtual university and Punjab University students ($t = 0.65$, $p = 0.51$) when they responded to the statement that whether their minds go blank due to exam pressure or not. The analysis of the statement 8 represented no significantly positive/negative difference in scores of Virtual university students ($M = 2.47$, $SD = 1.20$) and Punjab University students ($M = 2.4$, $SD = 1.2$; $t = 0.54$, $p = 0.589$). Students of both the universities have the same views about their having negative thoughts while taking an exam. Most of the students think that they are not too intelligent. The findings indicated no significant differences when students reported difficulties with information retrieval during examinations. The scores for Virtual University students ($M = 2.50$, $SD = 1.14$) and Punjab University students ($M = 2.5$, $SD = 1.2$; $t = 0.04$, $p = 0.965$) were not significantly different. Additionally, the difference in scores between Virtual University students ($M = 3.17$, $SD = 1.40$) and Punjab University students ($M = 3.4$, $SD = 1.3$; $t = 1.80$, $p = 0.073$) suggested that students felt they could have performed better post-examination with minor differences. Furthermore, the analysis revealed an unnoticeable difference between Virtual University ($M = 2.68$, $SD = 1.29$) and Punjab University students ($M = 2.9$, $SD = 1.2$; $t = 1.71$, $p = 0.088$) regarding their concern about tests. However, a significant mean difference of 0.42 was observed, indicating that Punjab University students exhibited higher levels of nervousness and anxiety prior to examinations ($M = 2.9$, $SD = 1.3$) compared to Virtual University students

(M = 2.48, SD = 1.37; t = 2.90, p = 0.004). No significant difference was found in the scores of Virtual University students (M = 2.40, SD = 1.25) and Punjab University students (M = 2.5, SD = 1.1; t = 0.86, p = 0.388) concerning feelings of confusion and nervousness during tests.

The comparison of scores between students from Virtual University (M = 1.18, SD = 0.22) and Punjab University (M = 2.6, SD = 1.2; t = 0.22, p = 0.828) revealed no statistically significant difference. Students from both institutions reported experiencing negative emotions during examinations, expressing concerns about their performance. Similarly, the difference in scores between Virtual University students (M = 2.32, SD = 1.19) and Punjab University students (M = 2.4, SD = 1.2; t = 0.79, p = 0.427) was not statistically significant. Participants indicated that they often feel incapable of performing well in challenging tests even before commencing the examination. A statistically significant negative mean difference of 0.39 was observed in the scores of Virtual University and Punjab University students. Notably, a greater proportion of Punjab University students held a negative self-perception regarding their test-taking abilities (M = 2.5, SD = 1.2) compared to their counterparts from Virtual University (M = 2.11, SD = 1.18; t = 3.06, p = 0.002).

The comparison of scores between students from Virtual University (M = 2.83, SD = 1.31) and Punjab University (M = 2.8, SD = 1.1; t = 0.01, p = 0.989) revealed no significant difference in their self-reported physiological disturbance upon initially viewing their exam papers, which temporarily impairs their ability to think clearly. Similarly, there was an insignificant difference in scores between Virtual University students (M = 3.04, SD = 1.53) and Punjab University students (M = 3.1, SD = 1.4; t = 0.30, p = 0.761) regarding the pressure to achieve high grades. Furthermore, when students indicated that they do not perform well on tests, no significant difference was observed between the scores of Virtual University (M = 2.23, SD = 1.17) and Punjab University students (M = 2.4, SD = 1.1; t = 1.60, p = 0.110). However, a significant mean difference of 0.36 was noted in the scores, with Punjab University students exhibiting a higher level of nervousness, leading to careless errors during tests (M = 2.8, SD = 1.3) compared to Virtual University students (M = 2.11, SD = 1.40; t = 2.40, p = 0.017).

Comparison of students, Punjab University and Virtual University, on CGPA and CTA

Table 3.1Comparison of students, University of the Punjab and Virtual University, on CGPA and CTA

	Mean	T statistic	p-value

GPA	PU	2.9105	-1.931	0.054
	VU	3.0373		
CTA	PU	55.4519	2.267	0.024
	VU	52.6095		

P-value of both variables i.e. CGPA and Test anxiety, was significant at 10 percent and 5 percent level of confidence. This allows to reject null hypothesis for the sample test i.e. mean value of variables was same. This indicated that mean value of CGPA and test anxiety in students of PU and VU was different. Mean value of CGPA of students of PU was 2.9105, and for students if VU it was 3.0373. Moreover, test anxiety for students of PU was 55.45, and for students of VU was 52.6095. Above results indicated that mean value of anxiety in students of PU was higher due to which mean value of CGPA of students of PU was lower. Similarly, mean value of anxiety of students of VU was lower as compared to students of PU, due to which mean value of CGPA of students of VU was higher as compared to students of PU.

Hence, it can be concluded that higher anxiety values could decrease CGPA values.

Regression Analysis between CTA and CGPA

	Coefficient	P-value	R-Square	T-test
T-Anxiety	-0.0516	0.000	0.8863	57

Dependent variable; CGPA

Above table shows the regression analysis where test anxiety acts as an independent variable and CGPA as dependent variable. Coefficient of independent variable remains negative, which denotes that if value of test anxiety increases by one unit, CGPA would decrease by 0.0516 units. P-value of this coefficient was highly significant at 1 percent level of confidence. Model also has high R-square i.e. 88.63 percent, it denotes that cognitive test anxiety explains 88.63 percent of change in the CGPA.

Discussion

Hypothesis 1

There is a significant correlation between Cognitive Test-Anxiety and academic performance. The present results display that Cognitive Test-Anxiety was significantly interrelated to academic performance. They show a negative relationship between the variables with a low academic

performance where there was a high Cognitive Test-Anxiety. The hypothesis is in line with the existing literature (Cassady & Johnson, 2002). "High Cognitive Test-Anxiety students have low academic performances. Cognitive anxiety has more significant relation with academic performance than emotionality" (Cassady & Johnson, 2002). The similarity in findings may be clarified by the following reasons: Students with high Cognitive Test-Anxiety spend more time in thinking negatively. They nourish fear of failure and build on this emotion extensively. Furthermore, during the exams, students also compare their performance with their fellows. They have fear that whatever they are writing during examination is not accurate and keep on cross verifying. They have nervousness. Due to these destructive thoughts, their cognitive ability to perform in the test suffers a lot. They hardly make positive affirmations which can lead to the positive results. The students do not think positive. Their thoughts about themselves and about their performance, are very negative. So due to this influence of Cognitive Test-Anxiety, the students' performance goes down.

Hypothesis 2

There is a substantial difference in Cognitive Test-Anxiety of students enrolled in online learning programs and traditional learning programs. The second hypothesis was about the mean scores' differences of students' Cognitive Test-Anxiety learning in online programs and students learning in traditional programs. The finding reveals a substantial high difference in Cognitive Test-Anxiety of students learning in Virtual University and students learning in Punjab University. Virtual University students have less Test-Anxiety as compared to Punjab University. Our findings are according to existing literature. Online exams proved it-self as an effective instructional activity to promote students to perform well (Bull & McKenna. 2011). Student who belonged to elementary schools with FCAT Explorer scored substantially higher than the students who belonged to elementary Schools who did not use FCAT. Another research study conducted by Yazdi and Zandkarimi (2013) supports these results. The effect of e-learning with academic achievement, psychological dimensions and virtual presence depicted reduction in the Test-Anxiety, which further resulted in an increase in the academic achievement scores of students in high school.

This hypothesis also supports the hypothesis 1. The students with high cognitive Test-Anxiety showed less academic performance. Punjab University students have high cognitive Test-Anxiety and low-academic performance. Virtual University students have low cognitive Test-Anxiety and high-academic performance. The similarities in the findings could

easily be determined because in order to provide conducive and effective learning environment to the students is the prime objective of any online learning environment. Students leaning in Virtual University feel mental relaxation. The majority of them choose Virtual University because most of them belong to the working class from the very early age and they cannot attend regular classes. Therefore, in order to continue their higher studies with their jobs, they select Virtual University for higher studies. They do their quizzes and assignments when they are free. They can also fix their date sheets of exams according to their schedule. They have more learner autonomy than Punjab University students. These autonomous learning environments enhance their cognitive abilities and they perform well. On the other hand, Punjab University students have to attend regular classes. Their schedules of assessments and final examinations are set by the teachers or departments. Though, many of them are also doing part-time jobs with their studies. This hectic daily routine makes their minds stressful and their performance ultimately suffers.

The study's aim was to find the affiliation between Test-Anxiety, academic performance and gender in online and traditional settings. Both the hypotheses were stated on the basis of two different theories. In one theory, Zohar (1998) states that the consequences of anxiety on achievements are due to two additive elements; individuals' anxiety about test and variables specific to situation. This research opted online and traditional learning situations as two different situations to check how the different situations cause different cognitive test anxieties and then ultimately different performances of students. Results of this study support the Zohar's (1998) model as different learning and testing situations had a fair impact on the learners' cognitive test anxiety. Virtual university students had less cognitive test anxiety as compared to Punjab University students. Furthermore, this change in cognitive test anxiety had a great impact on academic performance as well. With the decrease in the cognitive test anxiety, high performance was indicated in Virtual university students

Another theoretical model was learning testing cycle of Schutz & Davis (2000), in which they assert that learning-testing cycle is a recursive model which includes three dimensions; preparation, performance and reflection of test. Any negative or positive influence during this learning and testing cycle can change the whole process. Learners who have high anxiety levels or negative perceptions during exams could not perform well in any of these three phases. The experiences students face during any of these phases can influence their achievements. Results of this study support the stated theory as a strong negative correlation was found

between cognitive test anxiety of students and their academic performances.

Conclusion

The basic purpose of the study was to assess the effect of online learning programs on students' Test-Anxiety and academic performance. The researcher wanted to investigate whether online distant learning is helpful in reducing the Cognitive Test-Anxiety or not. Findings revealed an inverse correlation between Cognitive Test-Anxiety and academic performance. Virtual University students have low Cognitive Test-Anxiety and high-academic performance (CGPA) and Punjab University students have high Cognitive Test-Anxiety and low-academic performance (CGPA).

The following are the study's limitations:

- The sample of the study consisted of only one city of Pakistan. If data was collected from different cities, then the results might be different.
- To assess the effect of online learning programs, only one online distant learning university was selected which is Virtual University. If more than one online distant universities were used for the research then the results might be more accurate.
- The researcher could not get access of the students' enrollment data of both universities in order to have a probability-based sample for research so non-probability sampling technique was used.
- The analysis was based on data collection tool, i.e. questionnaire, and it is possible that in filling the questionnaire many students might not give sincere answers.

Cognitive Test-Anxiety shows a vital role in students' academic performance. Online distant learning programs are much effective in reducing Cognitive Test-Anxiety. This particular study has investigated the relationship between Cognitive Test-Anxiety of students and their academic performance under online and traditional settings but for this vast notion, this study is not enough. Further researches should be conducted to expand this concept and its understanding for stakeholders. Future researches should be conducted:

- To scrutinize the effect of Cognitive Test-Anxiety on different age groups of learners and on different departments as well.

- To check the difference in the impact of Cognitive Test-Anxiety among males and females
- To compare public and private online learning programs in order to check their efficacy.
- To check the difference in impact of Cognitive Test-Anxiety on professional and non-professional students.
- For data collection, a variety of methods can also be used other than questionnaire like interviews.
- Factors other than the cognitive test anxiety should be discussed which affect the academic performance.
- Some suggestions can be given to the stakeholders:
- The Government of Pakistan should open more innovative and effective online distant learning programs in order to cope with the modern world.
- The stakeholders of traditional institutions can arrange counselling workshops for their students which would help them in their anxiety reduction.

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