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Electronic test and its relationship with test's anxiety and academic achievement: Experiment at Qatar University

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Abstract: Test anxiety is a real problem that a group of students suffer from in their different stages of education, and it is a source of concern not only for students but also for their whole families. Thus, this paper aims to investigate the impact of electronic tests on students' anxiety and their academic achievement at Qatar University. A quantitative approach was used to test the hypotheses of this study, and a questionnaire was designed and distributed to the study sample, which consisted of 400 female students at Qatar University. In addition, a quasi-experimental study was adopted, where female students were split into an experimental group with an electronic test as well as a control group using a traditional test. The results showed that there are negative attitudes among students towards electronic tests. The results also found that the electronic tests raised the level of test anxiety among Qatar University students in contrast to the traditional tests. Moreover, the study found that students had higher academic achievement on traditional tests than on electronic tests. Finally, more attention must be directed towards addressing electronic test anxiety, in addition to designing or building remedial counseling programs to reduce levels of electronic test anxiety among female students at Qatar University.

Keywords: Electronic, Test, Anxiety, Quasi-experimental

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INTRODUCTION

As a result of the recent technological development and knowledge explosion, educational institutions face many major challenges that may hinder the educational process (Chang et al., 2022). Consequently, it affects academic outputs negatively unless researchers in the field of education address such disturbing phenomena and seek to employ technical developments to address educational issues (Jaoua et al., 2022). E-learning is one of the most important productions of the current century, as it has a tangible reality in many educational systems that keep pace with scientific and technological progress, which has brought about changes in all aspects of the learning process, including educational evaluation, as it is an important part of the educational system (Fernandez et al., 2022). Student assessment is a systematic process that requires the collection of objective and honest data from multiple sources using various tools in the light of specific objectives in order to reach quantitative estimates and descriptive evidence on which to base judgements or make appropriate decisions (Klein et al., 2021). Accordingly, the process of shifting from assessment in its traditional sense to electronic assessment has become a goal for many universities in order to benefit from education and

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information technology as a mechanism for improving learning and student performance (Nguyen et al., 2023).

Electronic tests are considered one of the modern means of measuring and evaluating the outcomes of the educational process using computers and smart mobile devices, as they constitute an effective alternative to traditional paper-based tests, characterised by flexibility and efficiency in all stages of their application (Sabet et al., 2020). Moreover, this technology gives students the necessary reports and evaluations after each test they take, which makes the test more valuable and useful as students can identify their educational level, strengths and weaknesses, and develop their academic achievement (Al Rawashdeh et al., 2021). However, many students suffer from anxiety and fear before electronic tests, as test anxiety causes severe psychological distress that occurs during test times, negatively affecting learning and performance in situations that cannot be overcome (Tahoon, 2021). Thus, test anxiety is a pervasive problem for many students who are so disturbed by the stress associated with taking tests that they experience significant declines in academic achievement in assessment situations (Prakasha & Hemalathaa, 2021). During electronic tests, students who experience test anxiety are likely to experience frequent and intense elevations in anxiety as an emotional state, where the autonomic nervous system is activated, leading to thoughts unrelated to the test that distract attention and students' achievement (Dikmen, 2023). Based on that, this paper aims to fill this gap by investigating the impact of electronic tests on students' anxiety and their academic achievement at Qatar University.

LITERATURE REVIEW

Electronic Tests

Electronic tests are identical to traditional paper exams, except that this type of test is performed by computer, where students read the questions directly from the screen and answer them using the available input tools (Babitha et al., 2022), and can be remotely. There are many benefits to electronic testing, as it allows the assessment of students' academic knowledge and their understanding of the curriculum and also stimulates creativity to come up with new ideas and solutions (Sabet et al., 2020). The electronic test also provides many different electronic questions that can be implemented in the same test, such as multiple choice, fill in the blank, true and false, and essay questions (Roy et al., 2022). This is what makes the electronic system spread quickly and effectively in most educational institutions, including schools and universities (Selwyn et al., 2023). Moreover, Khan et al. (2021) explained that students can easily access their exams through the Internet, which reduces pressure on the infrastructure of the educational institution and relieves the effort of observers and faculty members. On the other hand, electronic tests are not without drawbacks, as Alshammari et al. (2022) indicated that students were exposed to problems while conducting electronic tests, such as the spread of anxiety and tension between students and their parents. This is also followed by a dispersion in the concentration of the students and a decrease in their performance in the exam, as they have some negative feelings such as frustration, despair, and a sense of helplessness (Tahoon, 2021).

Several studies have discussed the accuracy of traditional tests. As the traditional tests provide or give the educational teacher a vision of how to do and work to modify the curriculum in order to improve the learning process, it is important to show the impact that the changes of the curriculum has had on the education stakeholders (Altae, 2020). Traditional tests are limited to measuring the lower level of the multiple and various levels of learning, as the level of knowledge depends mainly on the method of memorization and retrieval, and

accordingly, the multiple and various higher levels such as analysis, evaluation, synthesis, and understanding are neglected (Krishan et al., 2020). The traditional tests are characterized by weakness in the validity of their content, as well as weakness in the link and connection between the measurement processes and the set of educational objectives (Slack & Priestley, 2023). On the other hand, electronic tests contain many advantages, as they are a safe, reliable, interactive system that saves time and effort and can be used on many different electronic devices. However, the proper implementation of electronic tests requires a lot of preparation, planning, and ensuring the technological infrastructure necessary for the success of the system. Moreover, Romaniuk and Łukasiewicz-Wieleba (2021) explained that electronic tests require high costs to establish an electronic assessment system and provide a training environment for faculty members and students so that they can benefit from this system.

Preparing electronic tests for digital contents is not an easy matter, but there is a set of foundations and standards that must be considered when designing them to achieve the goals for which they were set. The reliability of electronic tests is one of the most important criteria, which means that students perform the same or obtain the same result if they face various questions at different times and places (Abdelsalam et al., 2024). In other words, a test is considered stable when the same result is achieved in different tests (Hoang et al., 2023). Furthermore, Afandi et al. (2021) presented some of the general criteria that must be taken into account in the design and construction of electronic tests, some of which are related to the test itself, such as the clarity of the questions and their wording, the test instructions, the determination of the time for the learner to solve the test, and the mark of each question. Additionally, Dawson et al. (2024) illustrated the importance of issuing the test in many electronic ways, taking into account the fonts, their sizes and clarity on the screen, and designing the help screen to help students solve problems, just as it is necessary to invite the password, name and basic data of the students. Moreover, the element of securing electronic tests is one of the basic matters that must be taken into account when designing and producing electronic tests, as securing the electronic test requires a set of procedures, which include protecting the database of learners' answers (Ngqondi et al., 2021). This is achieved by limiting access to the teacher and instructional designer through the User name and Password. In addition to preventing cheating during the test, which is done by entering the learners through ID numbers, so that the answer time is appropriate to the size of the question (Noorbehbahani et al., 2022). On the other hand, feedback is one of the important elements that the teacher considers when designing and producing electronic tests. In this regard, the researcher clarified that electronic tests provide different forms of feedback, as the electronic tests include multimedia textual feedback (yes or no), the use of sound to provide audible feedback, or the use of animated graphics to provide a form that provides feedback (Khalaf et al., 2020).

Test Anxiety

The subject of test anxiety occupies an important aspect in modern psychological and educational studies and research in general. Test anxiety has been defined as a psychological state or an emotional phenomenon that affects the student before and during the test, and arises from his fear of failure or not obtaining satisfactory results, which may affect mental processes such as attention, concentration, remembering and thinking (Fréchette-Simard et al., 2023). Test anxiety is a state of generalized anxiety and is characterized by a heightened sense of self-awareness with a sense of hopelessness often manifested in low test achievement (Thomas et al., 2022). Also, Dikmen (2023) defined test anxiety as that state that the student reaches as a result of an increase in the degree of tension or fear of performing the test, and the accompanying disturbances in the emotional, cognitive and physiological aspects. According to the

cognitive theory, the cognitive side is responsible for the lack of performance among anxious students in the assessment situation (Németh & Bernáth, 2023). Although the emotional side appears in the anxious students, but in a different way, this means that the emotions of the anxious students are stronger and more intense than they are in the non-anxious students (Trigueros et al., 2020). According to Putwain and Aveyard (2018), anxious students spend a large part of the exam time focusing on stimuli that are not related to the task to be accomplished. Therefore, these students spend most of the exam time presenting self-critical ideas, believing in shady opportunities to succeed in the exam. The student's attention is then divided between critical thoughts and the task to be performed, which in fact requires all attention and focus. As for the behavioural aspect, the anxious student differs from others in the way of studying, reviewing, preparing for the exam, and even in the way of answering the exam questions (Putwain & von der Embse, 2021). As the student in this case gets upset when he thinks about the consequences of failure and fears of losing appreciation from others (Krispenz et al., 2019). The student who suffers from exam anxiety thinks in an irrational and illogical way, so that these thoughts carry in their contents many negative thoughts that are self-important. There are several strategies that can be used to reduce test anxiety, as (Alamri & Nazir, 2022) stated that families have a major role to play in preparing students to deal with tests and alleviating their psychological stress and anxiety. This is done by providing them with time management skills, correct study habits, and how to deal with the curricula according to their nature. To reduce anxiety over electronic tests, (Coohey et al., 2023) suggested learning relaxation techniques, such as deep breathing, progressive muscle relaxation, or imagining positive outcomes, to help students maintain calm and confidence immediately before and during an exam. Altae (2022) indicated that students can perform effectively in an optimized learning environment, which can be achieved by implementing inclusive learning practices to reduce distractions. Dikmen (2023) also pointed out the importance of getting enough sleep, as the brain needs sleep and rest well in order to relax and activate cognitive processes such as attention and remembering. As for intermittent sleep or a lack of hours of sleep, it causes an imbalance in the activity of neurotransmitters in the brain.

Academic Achievement

Academic achievement is the main goal and indicator of the success of educational institutions in achieving their goals, as it is one of the most important learning outcomes, and it is viewed as a basic criterion by which the student's level of benefit can be determined during his/her academic stages (Le, 2022). Academic achievement is the ability to acquire a large amount of information and skills that the student can absorb during the educational period (Abdullah et al., 2022). It is also still almost the primary means for judging the quantitative and qualitative results of the educational process, so educational institutions are keen on students achieving a high level of academic achievement, because high achievement indicates the adequacy of those institutions and their ability to achieve their goals (Yağcı, 2022). In addition, academic achievement has an important role in students' academic development as it assesses their progress, helps develop their self-skills and expands their perceptions, academic knowledge and other skills that contribute to students' self-development during the educational stage (Fernandez et al., 2022). Moreover, Nácher et al. (2021) stated that academic achievement makes students search for themselves and their abilities, as adolescents who achieve academic success have a high level of self-esteem and a lower level of anxiety or depression. In this regard, Martínez et al. (2019) illustrated that the psychological state affects the level of the student's academic achievement, therefore, if the student's circumstances are difficult, this

weakens his/her ability to achieve and increases the difficulty of his/her adaptation to the school environment, and thus affects his/her academic achievement, and vice versa.

Research Problems and Questions

Test anxiety, electronic exams in particular, represents a psychological state that students go through during the tests and arises from the fear of failing the exam, as the results of this condition may be negative in most cases, which is reflected in students' academic achievement in particular and in their study and its continuity in general (Tahoon, 2021). Some studies have shown that students with a high degree of test anxiety suffer from physical problems such as severe sweating, stomach pain, and palpitations during exams (Alshammari et al., 2022) (Prakasha & Hemalathaa, 2021). In addition, Mastour et al. (2022) mentioned that students with test anxiety suffer from negative thoughts and worry about their performance and academic achievement, as they may fail to focus on the main subject and cannot easily remember what they have learned. Some believe that test anxiety is a positive factor that raises the level of academic achievement for a large number of students (Aydin, 2019). While it may have a negative impact on other students, which leads to a low level of academic and cognitive achievement, experience and social adaptation (Brumariu et al., 2023). Based on that, this research raises the following main questions: (1) Is there any impact of traditional test on test anxiety among Qatar University students?; (2) Is there any impact of electronic test on test anxiety among Qatar University students?; (3) Is there any impact of traditional test on academic achievement among Qatar University students?; and (4) Is there any impact of electronic test on academic achievement among Qatar University students?

Research Hypotheses

To answer the research questions, the following hypotheses were formulated: H1: There is no statistically significant impact of traditional vs. electronic tests on test anxiety and academic achievement among Qatar University students. The following sub-hypotheses emerged from this hypothesis: H1A: There is no statistically significant impact of traditional tests on test anxiety among Qatar University students. H1B: There is no statistically significant impact of electronic tests on test anxiety among Qatar University students. H1C: There is no statistically significant impact of traditional tests on academic achievement among Qatar University students. H1D: There is no statistically significant impact of electronic tests on academic achievement among Qatar University students. Additionally, other hypotheses are H2: There is no statistically significant difference between traditional and electronic tests in test anxiety among Qatar University students. H3: There is no statistically significant difference between traditional and electronic tests in academic achievement among Qatar University students.

METHODS

In order to achieve the objectives of the study and to complete its stages, this research relied on the quantitative approach to describe the phenomenon under study, as it is one of the methods of analysis that is based mainly on sufficient and accurate information about a specific subject or phenomenon in a known and specific period or periods of time to obtain practical results and then analyze and interpret them in a manner consistent with the actual data of the phenomenon. The researcher designed a questionnaire (anxiety trait scale) to measure the students' anxiety about the electronic tests. The anxiety trait scale was built and designed in several stages, where previous studies and related scales that were previously used in scientific research were reviewed. After that, the study scale was prepared in its initial form, and then it

was applied to a group of arbitrators specialized in educational and social sciences in Qatari universities. Based on the opinion of the arbitrators, some items were deleted, modified, and added to be presented in their final form and distributed to the study sample, as the scale consisted of (30) items corresponding to responses according to the five-point Likert scale. Also, the questionnaire consisted of two open-ended questions, which aimed to explore the problems facing the implementation of electronic tests as well as investigate the most important solutions that contribute to the success of applying electronic tests and reduce anxiety among students at Qatar University. In addition, a pilot study was conducted to determine the extent of understanding the items and instructions of the anxiety trait scale, as the sample consisted of 50 female students in the College of Education at Qatar University. The objectives of the pilot study were to verify the clarity of the instructions, understand the nature of the items, and estimate the time it took to answer the scale.

The study sample was asked to determine their answers to the test items by choosing the appropriate response (strongly agree, agree, neutral, disagree, and strongly disagree). The questionnaire was distributed to female students of the College of Education at Qatar University, as the study sample consisted of 400 female students. To clarify the effect of the anxiety scale on academic achievement, a quasi-experimental study was adopted, as female students were split into an experimental group with an electronic test as well as a control group using a traditional test. After that, the data were analyzed statistically by the SPSS program in order to test the hypotheses. Whereas, simple regression analysis was used to test the first hypothesis, and one-way ANOVA was used to test the second and third hypotheses.

Table 1. Demographic Characteristics of Respondents (N= 400).

Variable	N (%)
Specialization/Program: Primary Education	
Arabic Studies	65 (34.6%)
Early Childhood	23 (12.2%)
Mathematics\Science	41 (21.8%)
English Language	59 (31.4%)
Specialization/Program: Secondary Education	
Arabic Studies	41 (19.3%)
Islamic Studies	27 (12.7%)
Social Studies	55 (25.9%)
English Language	36 (17.0%)
Mathematics	28 (13.2%)
Chemistry	9 (4.1%)
Biology	16 (7.5%)
Nationality	
Qatari	266 (66.5%)
Non-Qatari	134 (33.5%)
General GPA	
2- 2.4	43 (10.7%)
2.5- 2.9	88 (22.0%)
3.0 – 3.4	159 (39.7%)
3.5–3.7	93 (23.3%)
3.8 - 4	17 (4.3%)

The Table 1 shows the demographic characteristics of the respondents (N= 400). The respondents had primary education (47.0%, n = 188) and secondary education (53.0%, n = 212). With regard to primary education, the highest percentage of female students majored in Arabic

studies (34.6%), followed by English language and mathematics/science with a percentage of (31.4%) and (21.8%), respectively, and finally early childhood with a percentage of (12.2%). As for secondary education, the highest percentage of female students majored in social studies (25.9%), followed by Arabic studies with a percentage of (19.3%), while the lowest percentage was chemistry (4.1%). Regarding nationality, the largest sample of female students was Qatari, with a percentage of (66.5%), while the percentage of non-Qataris was (33.5%). Finally, most of the female students have a general GPA of 3.0 to 3.7.

RESULTS AND DISCUSSION

Assessment of Reliability and Validity

For the purposes of the current study and to ensure the validity of the virtual scale, the questionnaire, the electronic test, and the traditional test were presented in its initial form to (10) arbitrators with specialization in the field of curricula, teaching methods, counseling psychology, and measurement and evaluation in Qatari universities. They were asked to judge the accuracy and integrity of the linguistic formulation, the clarity of the paragraph and its relevance to the final objective of the scale, as some paragraphs have been deleted, amended or added according to the opinions of the arbitrators. In this research, the Cronbach alpha equation was applied to verify the reliability of the research tools. As shown in the Table 2, all the research tools represented in the questionnaire, the electronic test, and the traditional test have obtained high percentages, exceeding 60%, which means the consistency and suitability of these tools for the purposes of the study.

Table 2. Cronbach's Alpha for the Research Tools.

Scale	Item number	Cronbach's Alpha (%)
Questionnaire (anxiety trait scale)	30	0.920
Electronic Test	5	0.895
Traditional Test	5	0.876

Descriptive Statistics

This section presented a descriptive analysis that showed female students' perceptions towards electronic test, as shown in the Table 3. Where the results showed that the level of anxiety of the electronic exam among the students was high, as the total mean was (3.872), and the total standard deviation was (1.033). In addition, the highest mean for statement 13, which states "When submitting electronic exams, I do not find much fun and enjoyment", while the lowest mean for statement 4, which states "I feel nervous when I submit an electronic test".

Table 3. Anxiety Trait Scale.

	Statement	Mean	SD
1.	I get anxious whenever I have to submit an online test.	3.77	.941
2.	I am not calm while submitting the electronic test.	4.12	1.001
3.	Electronic exams stress me out despite my academic abilities.	3.81	1.031
4.	I feel nervous when I submit an electronic test.	3.66	1.038
5.	I am anxious and afraid of making mistakes with the online test.	3.98	1.157
6.	I avoid any electronic test.	4.12	1.025
7.	I get upset and get excited when I hear about online exams.	3.73	.969
8.	I get tired and exhausted when I take electronic exams.	3.75	.988
9.	I do not enjoy responding to online exams items.	3.78	1.026
10.	I am not tempted to offer online tests to see results right away.	3.69	1.001
11.	I feel uncomfortable while submitting electronic exams.	4.02	1.031

Statement	Mean	SD
12. I feel dissatisfied with my performance in the online exams.	3.74	1.038
13. When submitting electronic exams, I do not find much fun and enjoyment.	4.45	1.157
14. I do not wish to submit online exams.	3.98	1.097
15. I prefer traditional exams to online exams.	3.73	1.025
16. My feeling of distress and tension increases with the electronic tests.	3.75	1.023
17. I do not feel comfortable with electronic tests.	3.77	1.017
18. I am often in awe of online exams.	3.69	1.128
19. I do not like being evaluated by electronic tests.	3.73	1.019
20. I do not tend to be tested by electronic tests.	3.99	1.063
21. I do not feel fair with online exams.	3.69	1.192
22. I feel unfair when I am evaluated by electronic tests.	4.07	.974
23. Online exams lower my spirits.	3.91	.953
24. I do not feel euphoric when I get my score as soon as I finish the online exams.	3.75	1.026
25. I shivered while doing the electronic test.	3.77	.995
26. I wish all electronic tests would turn into traditional ones.	4.11	.831
27. I hate online exams because they miss the opportunity for final review before submission.	3.73	1.022
28. My nervousness increases when performing electronic tests.	4.11	1.031
29. I am often not enthusiastic about submitting electronic tests.	3.96	1.018
30. I avoid courses that use electronic tests.	3.79	1.143
Total Mean and Standard Deviation	**3.872**	**1.033**

Testing Research Hypotheses

Testing First Hypothesiss

In this research, simple regression analysis was used in order to test the first hypothesis, which illustrates the impact of the traditional vs. electronic tests on test anxiety and academic achievement among Qatar University students *(H1)*.

Table 4. Results of Simple Regression Analysis – The Impact of the Traditional Vs. Electronic Tests on Test Anxiety and Academic Achievement among Qatar University Students.

Model	R	R^2	F	β	Sig.
Traditional Tests & Test Anxiety	.621	.385	11.280	.621	.541
Electronic Tests & Test Anxiety	.598	.674	33.259	.459	.003
Traditional Tests & Academic Achievement	.614	.712	39.458	.486	.000
Electronic Tests & Academic Achievement	.587	.338	12.368	.754	.623

The Table 4 shows the non-significance of the impact of the traditional tests on test anxiety among Qatar University students, leading to acceptance of the first sub-hypothesis (H1A), as the value of sig. is (0.541) that is higher than (0.05), which means that there is no statistically significant impact of the traditional tests on test anxiety among Qatar University students. While, the results illustrated the significance of the impact of the electronic tests on test anxiety among Qatar University students, leading to rejection of the second sub-hypothesis (H1B), as the value of sig. is (0.003) that is lower than (0.05), which means that there is statistically significant impact of the electronic tests on test anxiety among Qatar University students. In addition, the Table 4 shows the significance of the impact of the traditional tests on academic achievement among Qatar University students, leading to rejection of the third sub-hypothesis (H1C), as the value of sig. is (0.000) that is lower than (0.05), which means that there is statistically significant impact of the traditional tests on academic achievement among Qatar University students. While, the results illustrated the non-significance of the impact of the electronic tests on academic achievement among Qatar University students, leading to accep-

tance of the fourth sub-hypothesis (H1D), as the value of sig. is (0.623) that is higher than (0.05), which means that there is no statistically significant impact of the electronic tests on academic achievement among Qatar University students.

Testing Second Hypothesiss

In this research, one-way ANOVA was used to test the second hypothesis (H2). The Table 5 shows that there are statistically significant differences between the traditional and electronic tests in test anxiety among Qatar University students, as the value of t-statistic was (3.689) and the p-value was (0.000), as the differences came in favour of the electronic test.

Table 5. Results of One-Way ANOVA – The Difference between the Traditional and Electronic Tests in Test Anxiety among Qatar University Students.

Dependent Variable	Tests	Number	Mean	SD	t-statistic	DF	p-value
Test Anxiety	Electronic	5	3.895	1.029	3.689	53	0.000
	Traditional	5	2.749	0.845			

Testing Third Hypothesiss

In this research, one-way ANOVA was used in order to test the third hypothesis (H3). The Table 6 shows that there are statistically significant differences between the traditional and electronic tests in academic achievement among Qatar University students, as the value of t-statistic was (3.885) and the p-value was (0.000), as the differences came in favour of the traditional test.

Table 6. Results of One-Way ANOVA – The Difference between the Traditional and Electronic Tests in Academic Achievement among Qatar University Students.

Dependent Variable	Groups	Number	Mean	SD	T-statistic	DF	Sig.
Academic Achievement	Electronic	5	12.23	0.986	3.885	53	0.000
	Traditional	5	17.54	1.125			

The Results of Open Ended Questions

As mentioned previously, the questionnaire consisted of two open ended questions. The first question aimed to identify the problems facing the implementation of electronic exams at Qatar University. The results came as shown in the Table 7.

Table 7. The Most Important Problems Facing the Implementation of Electronic Exams from the Point of View of Students of the College of Education at Qatar University.

Problem	Frequency	Percent (%)	Order
The Technology Used	345	86.25	1
The Internet and Fiber Connections	284	71.00	2
The Examination Material	202	50.50	3
The Teaching Staff	175	43.75	4
The Student	114	28.50	5

The Table 7 showed the most important problems that faced the application of electronic tests at Qatar University. As the problems related to the technology used came in the first place with a percentage of 86.25%, where research sample answers showed that there are some defects in the tablet device in terms of the slowness and inaccuracy of the screen and the touch, as the pen of the tablet did not correspond to the screen, and therefore the students were unable to solve some mathematical problems that required the use of the pen. Some devices were unable to enter the exam, as some students were unable to perform the exam with their colleagues, and there was not enough space in the writing area for some questions. There is

no technology to prevent cheating or students entering the Google site during the exam performance, as a large number of students entered the Google translation site in the English language, as well as transferring some answers from websites. While the problems related to the Internet came second with a percentage of 71.00%, as the respondents' answers indicated that the Internet is slow, and the servers are in poor condition, as some servers did not work efficiently, as well as some exams were not sent through the server. A number of students were surprised by failing in some subjects because they did not take the exam, even though they went and took the exam, and it was not sent or uploaded to the server. In addition, the problems related to the examination material ranked third with a percentage of 50.50%, as the respondents' answers explained that they were not trained in this type of questions that measure the higher levels of thinking. As the lecturers did not use the tablet device in the explanation, as well as they used traditional teaching methods, and therefore many students were unable to answer some questions that require higher thinking skills. The problems related to the teaching staff were ranked fourth, with a percentage of 43.75%. Where the respondents' answers indicated that the reason for this is due to poor training, as they did not receive adequate training on the tablet system and the new teaching system. Moreover, the teaching staff did not have the ability to deal with advanced technology, and they had no desire to train, update and develop themselves, or change traditional methods. Finally, problems related to students ranked fifth with a percentage of 28.50%, as the respondents' answers indicated that they are were not adequately trained on the tablet device, as well as the students were not trained on this type of questions, and the courses were not explained to them in a way that would develop their higher thinking skills. Some students enter the exam through the email of one of their colleagues, and therefore no one can identify the owner of the original email. Accordingly, anyone can impersonate any student and enter through her account and take the exam without getting to know her.

Regarding the second question, which aimed to know the most important solutions that contribute to the success of applying electronic test and reduce anxiety among students at Qatar University. Where the study sample proposed a set of solutions, the most important of which was training the teaching staff on advanced technology and the smart board, as well as training them on modern teaching methods that help students develop their higher-order thinking skills. While some suggested the need to solve technical problems related to the tablet and obtaining reliable software that is able to prevent students from entering other sites during the exam and cheating through them, as well as creating software and techniques that prevent students from entering non-scientific sites, making techniques and software that help the technological development officer at the university to monitor all students during the exam, creating a more accurate technique that prevents the entry of any student with the email of any colleague or the theft of another colleague's code. The answers of some of the study sample also dealt with the need to reduce the percentage of marks allowed for the electronic test, as it does not exceed 35%, while there is 50% of the marks are allocated to scientific research and activities, 15% of the grades are attendance, behavior and activities. Finally, a small sample of respondents indicated the importance of spreading the culture of electronic evaluation and exams among students, faculty members, and all university employees by holding seminars and workshops.

Discussion

The results showed that there are negative attitudes among students towards electronic tests. This result is consistent with Curelaru, (Amzalag et al., 2022; Curelaru et al., 2022). This result may be attributed to the poor skills of some students in using computers in electronic

exams as a modern technology, the difficulty of providing and maintaining personal computers for every student at the university, the difficulty of measuring practical and applied capabilities and skills with this type of objective questions in electronic exams. This result may be due to some technical problems related to the exam platform itself, as well as the weakness of the Internet for some students. In order for electronic tests to bear fruit and perform their role optimally, the skills of faculty members should be developed for the possibility of planning, implementing and managing them, as well as training students on how to respond to them in a simple and easy way, and equipping the university with the infrastructure of e-learning management systems, and technological laboratories supported by international Internet networks. In addition to raising awareness through social media and television programs of the importance of using modern technology in facing contemporary challenges and improving the level of teaching and learning.

In addition, the results showed that electronic tests raise the level of test anxiety among Qatar University students. This result is consistent with (Ewell et al., 2022; Pelucio et al., 2022). Therefore, Fitriyah and Jannah (2021) pointed out that the academic staff in universities need a training period on electronic exam questions, which have become more dependent on understanding than memorization and indoctrination, because training the academic staff on methods of setting modern exams will achieve great successes and contribute to the success of the new system in a greater proportion than it is now. On the other hand, the results showed that traditional tests reduce the level of test anxiety among Qatar University students. This result may be due to the fact that the traditional tests allow students to skip some questions while writing answers and return to them at any time before submitting the answer paper, as this feature is not provided by electronic tests (Harley et al., 2021).

Also, this paper found that students had higher academic achievement in traditional tests as compared to electronic exams. This result is consistent with Le (2022), who emphasized that the traditional tests are the ideal way to produce a semi-real result for the level of the students in a fair way and to avoid the mistakes that occurred with the electronic tests. Traditional tests help in overcoming technical and mood errors and inconsistencies between them while developing evaluation mechanisms, which contributes to improving students' academic achievement. On the other hand, the results showed that there is a negative impact of the electronic tests on academic achievement among Qatar University students. This may be due to the poor preparation of the electronic test, in terms of design, selection of screens, colors, method of answering, undo options, progress in answers, and other specifications that hinder the academic achievement of students, and their desire to use electronic tests (Conijn et al., 2022). This result contradicts Yang et al. (2022), who explained that the electronic exams contributed to improving the academic achievement of students, as well as knowing the levels of students and their strengths and weaknesses in the courses, and classifying them accordingly through electronic statistical analyzes automatically, which achieves speed and accuracy in the results. This confirmed by Clark et al. (2021), who illustrated that electronic tests are an easy way to measure students' performance electronically, where the university professor was able to identify the level they reached after the end of the learning period in order to find out the strengths and weaknesses, by preparing exams in a way that is easy to apply to students, and is corrected electronically and immediately, which guarantees credibility and transparency in the correction.

This paper made it clear that there are many risks and challenges facing electronic tests in Qatar University, including credibility and reliability, infrastructure, grade distribution, students with special needs, and the online final exam using multiple-choice questions. This result is

consistent with Noorbehbahani et al. (2022), which explained that electronic tests require a higher level to ensure credibility and reliability, as it could be misused, as a result of non-compliance with the approved evaluation controls while undergoing unmonitored evaluations. In addition, Fitriyah and Jannah (2021) pointed out the lack of training in the skills of planning, implementing and managing electronic exams, and dealing with their programming languages among some faculty members. The challenges also lie in the poor skills of some students in using modern computer technologies, and the difficulty of measuring practical and applied capabilities and skills with this kind of objective questions in electronic tests (Pham et al., 2022). From the point of view of this research, these obstacles can be overcome in light of contemporary challenges by providing training courses for university faculty members at Qatar university on planning, implementing and managing electronic tests remotely. In the case of implementing simultaneous exams, it is important to assure faculty members not to be strict in exam controls, to consider flexibility in time, and to use flexible exam control options. Alternative exams may also be made available before the start of the first semester of the next academic year for students who were unable to attend for reasons beyond their control. This idea corresponds to Butler-Henderson and Crawford (2020), who clarified that electronic tests need an appropriate incubating environment that guarantees continuity and success and keeping pace with traditional methods or surpassing them with regard to efficiency, integrity and credibility. Additionally, the electronic tests require automatic equipment represented in a sufficient number of computers that must be characterized by high capabilities and needs high-speed Internet. Such a problem will imply that those who belong to environments where computers are not common will face problems in getting used to the way of dealing with the computer during the performance of the exam (Sabet et al., 2020).The current research had several limitations. Firstly, the quantitative approach may reduce the possibility of formulating scientific logical conclusions based on the limited study sample that is limited to female students at Qatar University, which affects the possibility of generalizing the results to other universities. Secondly, because of the quantitative character of the tasks presented to the students in this study, many respondents provided similar answers for the several tasks. Thus, future research should look into larger student samples that are evenly dispersed by gender from various universities across different areas.

CONCLUSIONS

Test anxiety is an academic problem that many students suffer from, which negatively affects their psychological, physical, and achievement status. So, this paper contributes to the literature by combining the quantitative approach and the quasi-experimental study to examine the impact of electronic tests on students' anxiety and their academic achievement at Qatar University. Overall, the results showed that there are negative attitudes among students towards electronic tests. The results also found that the electronic tests raise the level of test anxiety among Qatar University students, in contrast to the traditional tests. Moreover, the study found that students had higher academic achievement in traditional tests as compared to electronic exams. Based on these results, this paper recommended the necessity of holding training courses for students on the skills of dealing and responding to electronic exams on their own through digital platforms, including zoom, google meet, and others. Also, more attention must be directed towards addressing electronic test anxiety, which most female students suffer from at the university, as well as designing or building remedial counselling programs to reduce levels of electronic test anxiety among female students. Finally, this paper stresses the need to reconsider the readiness of the technological infrastructure, avoid mistakes

with old experiences, and provide all the elements of electronic exams without prejudice to any element in order to ensure the success of the exams electronically.

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