

Assessment of Electronic Exams, Academic Self-Efficacy and Test- Anxiety among Nursing Students

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Abstract

Background: Implementing electronic exams for nursing students increases the anxiety related to the exams so, these students need to increase their self-efficacy to overcome test anxiety: **This study aimed to:** Assess the effect of electronic exams on nursing students' test -anxiety and academic self-efficacy. **Design:** A descriptive design was used to conduct this study. **Setting:** This study was conducted by the faculty of nursing at Sohag University. **Subjects:** A stratified sample of 330 nursing students. **Tools of data collection:** The first tool is a demographic interviewing questionnaire. The second tool is the Westside Test Anxiety Scale. Third tool: Academic Self-Efficacy Scale. **Results:** More than half (55.2%) of the studied nursing students had high levels of test anxiety. In addition, less than half (49.7%) of them had moderate self-efficacy levels. **Conclusion:** Electronic exams are an effective factor that contributes to increased test anxiety and academic self-efficacy may help in decreased it among nursing students. **Recommendation:** Designing and implementing counselling interventions to reduce the levels of test anxiety among nursing students and improve their academic self-efficacy.

Keywords: Academic Self-efficacy, Electronic Exams, nursing students, Test- Anxiety.

Introduction

The electronic test is an innovative form of assessment that offers many benefits, including less time spent writing questions, checking papers, and printing results. It is regarded as an efficient evaluation style, with special emphasis on providing instant test responses (Elsalem, et al., 2020).

Test anxiety is characterised as a combination of tension, nervousness, and autonomic activity that happens when being tested (Martin and Naziruddin, 2020). It impairs students and prevents them from exhibiting previously acquired knowledge, hindering learners from focusing on the exam (Keller and Szakál, 2021). Around 20%–40% of students suffer from test anxiety (Maghaminejad, et al., 2020).

Exam anxiety was shown to be a serious issue that caused unfavourable symptoms and was harmful to academic performance in nursing students. Reduced academic performance, poor outcomes, low self-esteem,

failing the nursing test, not finishing the program and practising nursing (Khaira, et al., 2023).

Academic Self-efficacy is the degree to which learners believe in the ability they have to plan and carry out the activities necessary to achieve a specific outcome (Maier, et al., 2021). Students' academic self-efficacy might have been impacted differently by the abrupt switch to online learning and the use of online learning resources as a result of the COVID-19 pandemic (Aldhahi, et al., 2021).

Students with a high level of self-efficacy would set appropriate high goals for their learning, select effective strategies to learn, concentrate in the classroom, manage their time and utilize the resources effectively, value learning, hold an optimistic view on the outcomes of their actions and took pride of their effort. Thereupon, it is expected that boosting self-efficacy would reduce test anxiety (Wang and Rashid, 2021).

More academic accomplishment and less exam anxiety were linked to greater levels of

self-efficacy. Furthermore, self-efficacy was discovered as a mediator of test anxiety, and the study showed that there was a negative link between self-efficacy and test anxiety (**Tang, 2023**).

Significance of the study:

Numerous detrimental effects might result from test anxiety. It causes emotional working memory impairment, lowers academic performance and psychological well-being in students, and raises suicide, drug misuse, and dropout rates. Additionally, it has a detrimental impact on a variety of parts of students' lives, including learning, academic accomplishment, job progression, and test ability (**Maghaminejad, et al., 2020**).

25% to 65% of health profession students experience test anxiety, which negatively impacts their motivation, concentration, learning, and test performance, and even leads them to drop out of college. Approximately one in three undergraduate health students worldwide experience anxiety, a 33.8% incidence rate that is in excess of the general population (**Hussain, et al., 2023**).

When compared to learners in other fields, nursing students had greater degrees of exam anxiety. Furthermore found that 58.3% of 60 nursing learners at a nursing college had medium anxiety about exams, while 3.3% suffered high test anxiety (**Khaira, et al., 2024**).

Self-efficacy enhances learners' self-assurance in their skills and has a beneficial impact on their educational style, setting objectives, and drive for success (**Chen, et al., 2023**).

Thus, students who have elevated self-efficacy are able to develop strategies to deal with obstacles, become resilient, be driven to work towards a goal, manage stress, and direct their learning by planning study sessions outside of the regular classroom. On the other hand, students who have poor self-efficacy are more vulnerable to conflict and adverse feelings, have low confidence in their capability to finish an assignment, have a lack of resilience, and have a tendency to give up on a task when difficulties arise (**Anyango, et al., 2024**).

Previous research discovered a correlation between reduced exam anxiety prior to and following tests and elevated academic self-efficacy. Additionally, learners who had poor self-efficacy often expressed greater exam anxiety and did not think they could pass exams (**Lei, et al., 2021**).

According to **Maier et al. (2021)** results, test anxiety variability was explained by self-efficacy to the tune of 14%. It was also shown that a high level of test anxiety is linked to a low level of self-efficacy.

Many individuals, particularly those in academic contexts, may benefit from understanding test anxiety and self-efficacy in relation to how these characteristics interact and impact a student's performance in university. Knowing how test anxiety and self-efficacy relate to one another allowed the researcher to create an improvement program that identifies learners who may struggle academically and provides them with support to do well (**Chen, 2023**).

Therefore, the current study attempted to evaluate the impact of electronic exams on test anxiety and academic self-efficacy in nursing students to assist in lowering test anxiety and raising academic self-efficacy.

This study aimed to:

Assess electronic exams, academic self-efficacy and test- anxiety among nursing students.

This aim was achieved by assessing the following:

- 1- The levels of self-efficacy among nursing students.
- 2- The levels of electronic test- anxiety among nursing students.
- 3- The relation between self-efficacy and test- anxiety among nursing students.

This aim was achieved through answering the following questions:

- 1-What are the levels of academic self-efficacy among nursing students?
- 2-What are the levels of electronic test- anxiety among nursing students?

3-Is there a relationship between academic self-efficacy and test anxiety among nursing students?

Subjects and methods:

The subjects and methods of this study were portrayed under four main designs as follows:

- I. Technical design
- II. Operational design
- III. Administrative design
- IV. Statistical design

I. Technical Design

The technical design for this study includes the Study design, Setting of study, subjects of the study, and tools of data collection:

1. **Study design:** A descriptive research design was used to assess electronic exams, academic self-efficacy and test- anxiety among nursing students.
2. **Setting of study:** The study was conducted at the Faculty of Nursing affiliated with Sohag University.
3. **Subjects of the study:** The sample was equal to 330 nursing students. The total number of nursing students in the first, second, third, and fourth at the faculty of nursing, at Sohag University was 2368 nursing students of the academic year (2023/2024).

Academic Year	Number	Percentage
First	74	22.4 %
Second	94	28.5 %
Third	78	23.6 %
Fourth	84	25.5 %
Total	330	100 %

Sample type

A stratified sample was used in this study. Every academic year categorized as a group (state).

Sample size:

The sample size was taken from each academic year's stratum (according to the following sample size equation (Krejcie and Morgan, 1970).

$$n = \frac{\chi^2 (NN)(PP)(1-PP)}{(\chi^2 (PP)(1-PP))} \div [(d^2) (NN-1) + (\chi^2) (PP)(1-PP)]$$

where, n = the required sample size

χ^2 = table value of chi-square for 1 df at desired confidence (generally 95%) level, N = the population size

P = the population proportion (generally assumed to be .50 to maximize sample size)

d = the level of accuracy of the estimate expressed as a proportion

$$n = \frac{3.841 \times 2368 \times 0.5 \times 0.5}{((0.05)^2 \times (2368 - 1) + (3.841) \times 0.5 \times 0.5)} = 330$$

4. Tools of data collection

Data were collected through the use of the following tools:

Tool I: Demographic questionnaire: It was developed by the researcher and aimed to assess the student's age, sex, place of residence, and academic grade/year.

Tool II: A Westside Test Anxiety Scale: It was developed by Driscoll (2007) to assess anxiety levels and cognitions which can impair performance. It consists of 10 statements. It includes two sub-items Impairment items (1, 4, 5, 6, 8, and 10) and Worry items (2, 3, 7, and 9).

Scoring systems

The responses followed five points Likert scale ranging from extremely or always true (5 degrees), highly or usually true (4 degrees), moderately or sometimes true (3 degrees), slightly or seldom true (2 degrees), not at all or never true (1 degree).

The total score of the Westside test anxiety scale for Facilitating statistical analysis ranges from 10-50 classified as:

- 10-22 low levels of anxiety
- 23-37 Average levels of anxiety
- 38-50 high levels of anxiety

Tool III: Academic Self-Efficacy Scale: It was developed by Greco, et al., (2022) to assess students' self-efficacy beliefs in managing academic tasks. It consists of 30 statements divided into eight subscales "Planning Academic Activities, (6 items)" "Learning Strategies, (6 items), Information Retrieval, (6 items), "Working in Groups, (3 items)" "Management of Relationships with Teachers, (3 items) "Managing Lessons," (4 items) "Stress Management," (2 items).

Scoring systems

Each item was rated on five responses. 1= exactly false, 2= nearly false, 3= neutral, 4= nearly true, 5= exactly true.

The total score ranged from 30: to 150 divided as follows:

- 30-70 low level Academic Self-Efficacy.
- 71-110 moderate level Academic Self-Efficacy.
- 111-150 high level Academic Self-Efficacy

II. Operational Design:

The operational design for this study includes the preparatory phase, pilot study, fieldwork, and ethical considerations.

A. Preparatory phase

It included reviewing past, current, local

and international related literature and theoretical knowledge of various aspects of the study using books, articles, internet, periodicals and magazines regarding assessment of the effect of electronic exams on nursing students' test -anxiety and academic self-efficacy.

Tool Validity and Reliability:

The tools were tested and evaluated for face and content validity and reliability by three experts from the Faculty of Nursing Ain Shams and Sohag University. They were from different academic categories, i.e., professor and assistant professor. To ascertain the relevance, clarity, and completeness of the tool experts elicited responses that were either agreed or disagreed for the face validity and content reliability. All of the tool items had consensus from the group of experts.

Testing the reliability through Cronbach's Alpha reliability analysis.

To achieve the criteria of trustworthiness of the tool reliability a doctor in statistics checked the faces and content of all items. The reliability of the tools was assessed through 10 % of cases (pilot study) using the developed questionnaire. Measuring their internal consistency by determining Cronbach alpha coefficient, proved to be high as indicated in the following table:

Table (1): Cronbach's Alpha reliability analysis

Tool	Reliability		Validity		Internal consistency
	Reliability Coefficient	Cronbach's Alpha	Self validate	Content valiantly	
Demographic interview questionnaire	0.859	0.929	0.932	0.922	Good
A Westside Test Anxiety Scale	0.818	0.753	0.824	0.782	Good
Academic Self-Efficacy Scale	0.954	0.878	0.949	0.912	Good
Total	0.858	0.848	0.897	0.863	Good

This table shows Alpha Cronbach's test which is used to measure the internal consistency (Reliability of the used tool or instrument) the reliability scores of the tool as above is (0.929, 0.753, 0.878, and 0.848), for Assess demographic characteristics among nursing, Westside Test Anxiety Scale, academic self-efficacy and total questionnaire respectively, where the minimum reliability coefficient we need is 60%, so is the reliability

coefficient for all questions.

While the validity score of the tools is (0.922, 0.782, 0.912, and 0.863) for Assess demographic characteristics among nursing students, Westside Test Anxiety Scale, academic self-efficacy and total questionnaire respectively, this indicated high total internal consistency of the used tool.

Final reliability (Cronbach's alpha) = 0.848

Final validity (Content valiantly) = 0.863

B. Pilot study:

A pilot study was performed after the researcher was granted official permission from the Dean of the Faculty of Nursing of Sohag University. The pilot study was carried out in October 2023 before data collection on a group of 10% (33) students to test and evaluate the clarity, feasibility and applicability of the research tools, in order to estimate the time needed to collect data. No changes were made to the tools. So, the students from the pilot study were added to the overall sample.

C. Filed work

The actual fieldwork for the process of data collection consumed two months starting in November 2023 and was completed by December 2023. The researcher obtained approval from the dean of the Faculty of Nursing at Sohag University, heads of departments, and clinical coordinators responsible for students during the clinical period to collect data.

D. Ethical Consideration:

After securing official requirements for carrying out the study, approval of the Scientific Research Ethics Committee was obtained. The university nursing students were informed that they are allowed to participate or not in this study and that they have the right to withdraw from the study at any time. Informed consent was taken from each student to participate in the study. The researcher explained the objectives and nature of this study to the university nursing students included in the study. The researcher assured maintaining anonymity and confidentiality of the subject data with reassurance about the information given and that it will be used for scientific research only. **Ethical code 24.12.442**

III. Administrative design:

The researcher in order to obtain approval to conduct the research study, the researcher received official permissions from the following authorities:

- Official letters from the Dean and the Ethical Committee of the Faculty to responsible authorities in the faculty of nursing at Ain-shams University.
- The dean of the faculty of nursing at Sohag University, and the chairperson of each department of nursing in the faculty.

IV. Statistical design:

Recorded data were analyzed using the statistical package for social sciences, version 22.0 (SPSS Inc., Chicago, Illinois, USA). Quantitative data were expressed as mean \pm standard deviation (SD). Qualitative data were expressed as frequency and percentage.

The following tests were done:

A chi-square (χ^2) test of significance was used in order to compare proportions between qualitative parameters.

Pearson's correlation coefficient (r) test was used to assess the degree of association between two sets of variables

The confidence interval was set to 95% and the margin of error accepted was set to 5%. So, the p-value was considered significant as the following:

Probability (P-value)

- P-value <0.05 was considered significant.
- P-value <0.001 was considered as highly significant.
- P-value >0.05 was considered insignificant.

Results

Table (1): shows that the mean age of the studied nursing students was 20.20 ± 1.47 and less than two-thirds of them (60.9%) were female. Concerning residence, more than two-thirds (67.3%) of the studied nursing students reside in rural areas. As regards academic year more than one quarter (28.5%) of them were in their second academic year.

Table (2): represents that more than half (55.2%) of the studied nursing students had high levels of test anxiety.

Table (3): demonstrates that less than half (49.7%) of the studied nursing students had moderate self-efficacy levels.

Table (4): illustrated that there was a significant relation between self-efficacy and levels of test anxiety among the studied nursing

students.

Table (5): shows that there was a highly significant negative correlation between total Westside test anxiety and total academic self-efficacy among the studied nursing students at P-value =<0.001**.

Table (1): Number and percentage distribution of the studied nursing students according to their demographic characteristics (N=330).

Demographic data	No.	%
Age (years)		
18-19 years	115	34.8
20-21 years	144	43.6
>21 years	71	21.5
$\bar{x} \pm SD$	20.20±1.47	
Sex		
Male	129	39.1
Female	201	60.9
Residence		
Urban	108	32.7
Rural	222	67.3
Academic Year		
First	74	22.4
Second	94	28.5
Third	78	23.6
Fourth	84	25.5

Table (2): Number and percentage distribution of the studied nursing students according to their levels of test anxiety = (330).

Westside test anxiety scale	No.	%
Low anxiety (Score 10-22)	69	20.9
Average anxiety (Score 23-37)	79	23.9
High anxiety (Score 38-50)	182	55.2
Total	330	100.0

Table (3): Number and percentage distribution of the studied nursing students according to their total levels of academic self-efficacy scale (N=330).

Academic self-efficacy scale	No.	%
Low Self-Efficacy (Score 30-70)	70	21.2
Moderate Self-Efficacy (Score 71-110)	164	49.7
High Self-Efficacy (111-150)	96	29.1
Total	330	100.0

Table (4): Relation between the levels of test anxiety and levels of self-efficacy among the studied nursing students (N=330).

Self-Efficacy	Level of anxiety						Total		Chi-square test	
	Low anxiety		Average anxiety		High Anxiety					
	No.	%	No.	%	No.	%	No.	%	x2	p-value
Low Self-Efficacy	6	8.7%	4	5.1%	60	33.0%	70	21.2%	39.552	<0.001**
Moderate Self-Efficacy	49	71.0%	41	51.9%	74	40.7%	164	49.7%		
High Self-Efficacy	14	20.3%	34	43.0%	48	26.4%	96	29.1%		
Total	69	100.0%	79	100.0%	182	100.0%	330	100.0%		

Using: Chi-square test

p-value >0.05 NS; *p-value <0.05 S; **p-value <0.001 HS

Table (5): Correlation between total score of Westside test anxiety scale and total score of academic self-efficacy scale.

		Total score of Westside test anxiety scale	Total score of academic self-efficacy scale
Total score of Westside test anxiety scale	r		-0.409
	p-value		<0.001**
	N		330
Total score of academic self-efficacy scale	r	-0.409	
	p-value	<0.001**	
	N	330	

r-Pearson Correlation Coefficient;

*p-value <0.05 significant correlation; **p-value <0.001 highly significant

Discussion

Nursing students are exposed to many practice-related stressors causing anxiety (Berdida and Grande, 2023). COVID-19 was the outbreak of a digital revolution in the higher education system through online lectures, teleconferencing, and online exams to maintain high-quality nursing education (Kim, et al., 2021). Electronic exams represent one of the electronic assessment tools that can be used to overcome the difficulties that hinder the implementation of traditional paper-based tests (Al-Shehri and Al Harthi, 2021).

Part I: Demographic characteristics of the studied nursing students:

The present study showed that the mean age of the studied nursing students was 20.20±1.47. These findings are in line with Ferguson and Perry (2022) entitled: " Evaluation of meditation and reported test anxiety in bachelor of science nursing student ", which reported that the mean age of the participants was 20.73.

Concerning the gender of the study sample, the results revealed that less than two-thirds of them were female. This finding was congruent

with the result of **Almory et al. (2023)** study titled: "The Mediation Role of Peer Effects, Test Anxiety and Academic Motivation in Relationship between Intelligence and Self-Efficacy among University Students " reported that more than two-thirds of the participants were female.

Also, this finding was accepted by the result of **Elshazly et al. (2023)**, who carried out a study about: " Relationship between exam anxiety, computer experience, and obstacles for nursing students who had undertaken electronic exams " reported that less than two-thirds of the participants were female.

However, this finding was inconsistent with the result of **Orhan et al. (2022)**, who performed a study about: " Examination of Test Anxiety and Self-confidence Levels for Individuals Who Take Talent Based University Entrance Exams " reported that more than two-thirds of the participants were Male.

Regarding the place of residence, the results revealed that more than two-thirds of them were living in rural areas, this can be explained from the researcher's point of view on the basis that, the nature of Sohag governorate where most people live in rural areas. This finding was in the same line with the result of **Salem et al. (2023)** who carried out a study about: " Nursing Students' Anxiety, Self -Satisfaction and Attitudes toward Electronic Online Exams ", and found that less than three-quarters of the study participants were living in rural areas.

This finding was contrary to the result of **Ugwuanyi et al. (2020)**, who performed a study about: " Effect of cognitive-behavioral therapy with music therapy in reducing physics test anxiety among students as measured by generalized test anxiety scale", who found that more than half of study participants were living in an urban area.

Regarding academic year, the current study showed that more than one-quarter of the study sample were in the second year in nursing college; this may be due to that the sample size of second-year nursing students was larger than the rest of the study groups.

The current result was supported by **Hidayati et al. (2022)** who carried out a study about: "The Correlation of Self-Efficacy with

Anxiety Level among Nursing Students during Online Learning " they revealed that more than one-quarter of the nursing students were in the second academic year level.

The current result was incongruent with the **Salem et al. (2023)** study titled: " Nursing Students' Anxiety, Self -Self-Satisfaction and Attitudes toward Electronic Online Exams " which revealed that more than one-third of the nursing students were in the third academic year.

Part II: The levels of test -anxiety among the studied nursing students:

Regarding levels of test anxiety for nursing students, the result of this current study revealed that more than half of the studied nursing students had high levels of test anxiety. This may be related to various considerations, such as lack of experience in using computers and the technique of electronic exams. Students spend more time in clinical placements and are required to perform multiple roles. Poor study skills, a focus on getting good grades, a lack of problem-solving skills, and ineffective communication skills.

This result was congruent with **Sohail et al. (2020)** who carried out a study about: "Impact of Pre-exam Anxiety on the Academic Performance of Final Year. Medical Students " and revealed that less than half of the nursing students had high levels of test anxiety.

While, the current study was incongruent with **Hanfesa et al. (2020)** study titled: " Test Anxiety and Associated Factors among First-Year Health Science Students of University of Gondar, Northwest Ethiopia: A Cross-Sectional Study " which revealed that the minority of the nursing students had a high level of test anxiety.

Part III: The levels of academic self-efficacy among the studied nursing students:

The result of this study demonstrates that about half of the studied nursing students had moderate levels of self-efficacy. This could be explained by the university students are exposed to more stressors generated by the academic context as the overload of tasks and frequent evaluations could lower expectations of self-efficacy. Also, negative emotions such

as tension and a high level of concern could decrease the levels of achievement and academic self-efficacy. On the other hand, low academic achievements may lead to further anxiety that affects their level of academic self-efficacy.

The current result was congruent with **El-Sayed et al. (2021)** entitled: " Academic Motivation, Academic Self-Efficacy and Perceived Social Support among Undergraduate Nursing Students, Alexandria University, Egypt. " who revealed that about half of the nursing students had Moderate levels of self-efficacy.

While this result was incongruent with **Bhati et al. (2022)** who carried out a study about: " Academic Self-Efficacy and Academic Performance among Undergraduate Students in Relation to Gender and Streams of Education " which revealed that about half of the nursing students had high levels of self-efficacy.

Part IV: Relation between the studied variables:

There was a significant relation between levels of academic self-efficacy among the studied nursing students and their levels of test anxiety. This may be related to students' high level of anxiety, which hinders their ability to carry out various tasks and disrupts their influence in completing items. While students with high perceptions of academic self-efficacy believe that they have sufficient cognitive resources needed to learn their skills subjects and success in exams.

This result was congruent with **Hidayati et al. (2022)** entitled: " The Correlation of Self-Efficacy with Anxiety Level among Nursing Students During Online Learning" revealed that significant relationship between levels of self-efficacy among the studied nursing students and their levels of test anxiety.

Part VI: Correlation between the studied variables:

There was a significant negative correlation between total Westside test anxiety and total academic self-efficacy among the studied nursing students at $P\text{-value} = <0.001^{**}$. This may be due to that, the increased level of test anxiety leads to a reduction in academic self-

efficacy. Test anxiety makes an individual obsessively think about the test and its consequences, such that they cannot retrieve information in their memory, are deprived of peace of mind, and fail to use proper strategies to fight educational challenges and problems. As a result, academic self-efficacy decreases in these students.

This result was congruent with **Jasani (2022)** who carried out a study: " Assessing High School Students' Anxiety Levels, Self-Efficacy Beliefs, Attitudes, and Performance Towards Arithmetic and Algebra" revealed that a significant correlation between total Arithmetic self-efficacy among students and their total Arithmetic of test anxiety.

This result was incongruent with **Lei et al. (2021)** which entitled: "Academic self-efficacy and test anxiety in high school students: A conditional process model of academic buoyancy and peer support" revealed that no significant correlation between total self-efficacy among students and their total of test anxiety.

Conclusion

Electronic exams are an effective factor that contributes to increased test anxiety and academic self-efficacy may help in decreased it among nursing students.

Recommendations

The current study recommended that:

- There is a need for future studies to evaluate the electronic and compare it with the traditional evaluation.
- Designing and implementing a counselling intervention to reduce the level of test anxiety among students and improve academic self-efficacy.
- Further studies are essential to examine variables that could contribute to academic self-efficacy.
- Further study is needed to assess the relationship between academic self-efficacy, academic achievement, and anxious symptoms in first-year students.

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