

Nursing Teaching Staff and Students' Perception about Quality of Electronic Exams and it's Relation to Students' Satisfaction

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Abstract

Background: Quality of electronic exams become a necessity in nursing education as it make nursing students assessment easier and positively affect nursing student satisfaction. **Aim:** The study was aimed to assess nursing teaching staff and students' perception about quality of electronic exams and its relation to nursing students' satisfaction. **Study design:** A descriptive correlational design was used. **Setting:** The current study was conducted at all academic departments of the Faculty of Nursing Benha University. **Subjects:** All available of nursing teaching staff (112) and stratified random sample consist of (1084) nursing students out of (3543) students from the four academic levels at academic year (2022/2023). **Tools of data collections:** Two tools were used; I) Electronic Exams' Quality Questionnaire II) Nursing Students Satisfaction Questionnaire. **Results:** Shows that the most (94.6%) of the nursing teaching staff had high perception levels toward quality of electronic exams and more than two third (71.8%) of the nursing students had high perception levels toward quality of electronic exam. Also, the majority (85.1%) of the nursing students had high satisfaction levels about quality of electronic exams. **Conclusion:** The study concluded that, there was a highly statistical significant positive correlation between total quality of electronic exams as perceived by nursing teaching staff and students and total nursing students' satisfaction. **Recommendations:** Designing training programs for nursing teaching staff and students about quality of electronic exams to increase effectiveness in using and dealing with electronic exams, design electronic exams in terms of choice of appropriate colors, questions fonts, answer method, using underlines under important instructions to enhance students' desire to use electronic exams.

Keywords: Nursing students, Quality of electronic exams, Satisfaction, Teaching staff.

Introduction:

Higher education institutions faced many challenges during the spread of COVID-19, Information and communication technology has been widely used in educational assessment. As the number of students enrolled in universities increased, paper-based exams have become insufficient in terms of time and effort therefore, electronic exams have become an attractive option for educational institutions looking to solve the problems that exist in the traditional way in the assessment (Zhan, 2023).

Quality of electronic exams become a necessity in nursing education as turns out quality dimensions that must be commitment during electronic exam preparation and implementation in an organized and effective manner that reflects the true image of the quality of the entire educational process (Singh et al., 2023). Quality of electronic exams provides a double service for both the student and teaching staff. Higher-quality electronic exams make it easier for nursing students to be evaluated and boost exam efficiency. Exam marking is done automatically, saving

teachers' time and effort. Additionally, provides teaching staff with access to a range of alternate question types, including matching, multiple-choice, and true-false questions **(Lin et al., 2023)**.

Quality of electronic exams having many dimensions including; flexibility and the ease of use, clarity, fairness, feasibility, challenges of electronic exams **(Badawi & Elhussien, 2022)**. The ease of use and flexibility describe to what degree nursing students believe using electronic exams free of any effort as exam system are flexible in use, easy to use in registration from the first login, flexibility in student's exam schedules **(Hartnett et al., 2023)**.

The clarity of electronic exams refers to what extent electronic exams are clear to help nursing students to understand every aspect of exam in natural and understandable way including clear and specific written instructions, how to answer its various questions, clear and direct exam questions that are free from any logistic errors, written in a distinct and prominent font, provided with fairly simple language **(Elshazly et al., 2023)**.

The fairness of electronic exams means absence of bias in the electronic exams process, equitable treatment of nursing students as the same rule is applied to all nursing students, provide nursing students comparable opportunities **(Nguyen et al., 2023)**. The feasibility of electronic exams refer to using electronic exams is more effective and efficient compared to the paper based exams, reduces financial costs, saves the effort and time of the nursing teaching staff and student **(Baume, 2023)**.

Finally, challenges of electronic exams describe the issues that need to be effectively addressed in order to prevent difficulties with the electronic

exams process including; network issues, computer malfunctions, and the need to train nursing students on how to use the program for electronic exams. The reachability of quality of electronic exams depends mainly on the degree to which the nursing teaching staff applying all quality dimensions in preparing of exams that will enhancing evaluation process, increase nursing students' satisfaction about electronic exams **(Mustehsan et al., 2023)**.

Quality of electronic exams is the key to achieve nursing students' satisfaction as improving quality of electronic exams system increases the student interaction and satisfaction in examination process, facilitate the simplification of the conventional exams, make students evaluation is more easier and increases the efficiency and speed of exam, improving the assessment validity and comprises the nursing students' performance **(Omran et al., 2022)**. Nursing students' satisfaction is the accumulation of student's perceptions and behaviors derived from the total benefits obtained, evaluates quality of electronic exams, which evaluates the level of quality of the faculty and the level of services provided **(Wong & Chapman, 2023)**.

Nursing students' satisfaction includes various dimensions; electronic exam environment, electronic exam login, electronic exam characteristics, Feedback. Use of electronic exams that describe usability, flexibility of electronic exams system. Otherwise electronic exam environment dimension describe that creating an appropriate exam environment on term of the capacity of the laboratories is suitable for the number of students, the efficiency of the connection and the speed of the WI-FI network in the e-exam laboratories is fast **(Kacapor et al., 2022)**.

Electronic exam login dimension refers to nursing students' ease of entering exam system using username and password, and navigating between the exams questions. Electronic exam characteristics dimension refers to creating an appropriate exam characteristic that has a significant impact on the effective assessment process and is frequently seen as a key antecedent of students' satisfaction with the system (Madugula et al., 2023). Finally, feedback dimension refers to nursing students experiences regarding using of electronic exams. Effective and relevant feedback allows students to reflect on using of electronic exams and outcomes can be used by the Faculty of Nursing to implement future improvements over electronic exams (Abd Elgalil et al., 2023).

Significance of the study

The education system is witnessing great and successive developments to keep pace with the changes resulting from the advancement of science and technology and the implications of the spread of the COVID-19 pandemic, the need for the development of learning methods and the use of technology has emerged as a necessity due to the rapid developments occurring in the different fields in nursing education, so E-exams are new concept in student evaluation process. (Al-Dmour, 2020). Better understanding of nursing teaching staff and students' perception of quality of E-exams will assist in identifying the major challenges in achieving undergraduate students' acceptance of their application of E-exams, enhancing and developing quality of E-exams in higher educational institutions which may affect educational output and learning outcomes. (Gorgani & Shabani, 2021).

From the real contact with the students of the Faculty of Nursing during final exams in electronic exams center, I noticed that students faced some problems as the system may log off before finishing the exam, network problems during conducting the E-exam, some questions not suitable for the exam time, weren't understandable for nursing students and require more than one answer. To overcome these problems the nursing teaching staff must apply the E-exams quality dimensions. So that this study was conducted to assess nursing teaching staff and students' perception about quality of electronic exams and it's relation to student's satisfaction.

2. Aim of the study:

The study was aimed to assess nursing teaching staff and students' perception about quality of electronic exams and it's relation to nursing students' satisfaction.

Research questions

1. What are nursing teaching staff and students' perception levels about quality of electronic exams?
2. What are nursing students' satisfaction levels about quality of electronic exams?
3. What is the relation between quality of electronic exams and nursing students' satisfaction?

3. Subjects and method:

I. Technical design:

The technical design included study design, study setting, subjects, tools and methods that used in data collection.

Study Design:

Descriptive correlational design was utilized to achieve the aim of the present study.

Setting:

The current study was conducted in all academic departments at Faculty of Nursing, Benha University

Study Subjects:

Two groups were included in the present study:

1. Nursing teaching staff group:

All the available nursing teaching staff 112 (Professors, Assistant professors and Lecturers).

2. Nursing students' group:

Stratified random sample consisted of 1084 nursing students out of 3543 students from the four academic levels during the academic year (2022/2023).

Tools of data collection:

The data for this study was collected by using two tools namely:

Tool (1): Electronic Exams' Quality Questionnaire:

A structured questionnaire were developed by the investigator after reviewing of the related literature (Abu Qurs, et al., 2019; Dalaa & Dalaa, 2019; Elharby, 2021; Badawi & Elhussien, 2022 & Awadallah, 2022) to assess quality of electronic exams as perceived by nursing teaching staff and nursing students.

It consists of three parts:

Part I: Personal characteristics of nursing teaching staff including: (Academic department, age, marital status, academic degree, years of experience in applying electronic exams, have you attended training courses on preparing electronic exams, if the answer is (yes) mention the name of the courses, have you taken training courses on Word and Excel programs).

Part II: Personal characteristics of nursing students includes: (Age, gender, marital status, academic level, have a computer or laptop, have you taken computer courses, if yes, indicate the number of computer courses, did you attend an introductory seminar on how to deal with electronic exams, what was your academic grade last year).

Part III-(A): Nursing teaching staff' Electronic Exams' Quality

Questionnaire: To assess nursing teaching staff' perception levels about quality of electronic exams. It consisted of 52 items divided into 5 main dimensions distributed as follows; the ease of use & flexibility (13 items), the clarity (13 items), the fairness (9 items), the feasibility (9 items) and challenges (8 items).

Scoring system:

Nursing teaching staff responses were scored based on a three-point Likert Scale ranged from (3) Agree, (2) agree to somewhat, (1) Disagree.

The total quality of electronic exams level score was ranged from (52-156) and it was considered high perception level if the percent score was $\geq 75\%$ that equals (117-156 scores), while considered moderate perception level if the percent score was ranged from 60 to $< 75\%$ that equals (94-116 scores), and considered low perception level if it is $< 60\%$ that equals (52-93 scores). (Badawi & Elhussien, 2022).

Part III-(B): Nursing students' Electronic Exams' Quality

Questionnaire: To assess nursing students' perception levels about quality of electronic exams. It consisted of 49 items divided into 5 main dimensions distributed as follows; the ease of use & flexibility (10 items), the clarity (10 items), the fairness (11items), the feasibility (7 items) and challenges (11 items).

Scoring system:

Nursing students' responses were scored based on a three-point Likert Scale ranged from (3) Agree, (2) agree to somewhat, (1) Disagree. The total quality of electronic exams level score was ranged from (49-147) and it was considered high perception level if the percent score was $\geq 75\%$ that equals (111-147 scores), while considered moderate perception level if the percent score was ranged from 60 to $< 75\%$ that equals (89-110 scores), and

considered low perception level if it is < 60 % that equals (49-88 scores). (Badawi & Elhussien, 2022).

Tool (2): Nursing Students' Satisfaction Questionnaire: A structure questionnaire was developed by investigator after reviewing of the related literature (Binsaif et al., 2021; Qalawa et al., 2021; Asad et al., 2021; Jalandaniah, et al., 2022; Zahedi et al., 2022), to assess nursing students' satisfaction levels about quality of electronic exams.

It was consisted of 42 items divided into 5 main dimensions distributed as follows; Use of electronic exams (7 items), Electronic exams' environment (7 items), Electronic exams' login (5 items), Electronic exams' characteristics (10 items), and finally Feedback(13items)

Scoring system:

Nursing students' responses were scored based on a three-point Likert Scale ranged from (3) satisfied, (2) satisfied to somewhat, (1) dissatisfied. The total nursing student's satisfaction level score was ranged from (42-126) and it was considered high if the percent score was $\geq 75\%$ that equals (95-126 scores) while considered moderate if the percent score was ranged from 60 to < 75 % that equals (76-94 scores), and considered low if it is < 60 % that equals (42-75 scores). (Qalawa, et al., 2021).

II. Administrative Design:

An official permission was issued from the vice dean for learning and students affairs to heads of academic departments at the Faculty of Nursing to conduct the study, and seek their support for completing the data collection.

III- Operational design:

It included preparatory phase, pilot study and field work.

Preparatory phase: This phase take three months started from January 2023 to March 2023. It included the

following: Reviewing the national and international related literature using journals, periodicals, textbooks, internet and theoretical knowledge of the various aspects concerning the topic of the study for developing the tools and translating the tools into Arabic language and back translation to check its accuracy.

Validity of the tools:

Face and content validity of study tools were done by group of Juries consisted of 11 experts, eight of them from different Faculty of Nursing (two professors from Tanta University, two professors from Menofia University, and two assistant professors from Benha University in nursing administration. In addition to the director Benha University Electronic Exams' Center, one professor of general internal medicine and previous Dean of faculty of veterinary medicine Benha University, one assistant professor of educational technology and expert of electronic exams at Benha University Measurement and Evaluation Unit, one assistant professor of community health nursing and the manager of information technology unit at Faculty of Nursing Benha University, one lecture of community health nursing and the coordinator of electronic exams at Faculty of Nursing Benha University.

Some modifications in Arabic statements were done in tools based on comments of jury experts such as modifying some words in some statements to give the right meaning for the phrase which did not understand clearly to arrive at the final format of the tools.

Pilot study:

A pilot study was carried out in May 2023 to ascertain the clarity and applicability of the study tools representing 10 % of total study subjects. 108 nursing students from

four academic levels and 11 nursing teaching staff were included in the pilot study. It has also served in estimating the time needed for filling the questionnaires. It ranged between 15-20 minutes for quality of electronic exams questionnaire by nursing teaching staff and nursing students and between 10-15 minutes for nursing students' satisfaction questionnaire. No modification was needed. The pilot study included in the study main subjects.

Reliability of tools

Reliability of tools was conducted to determine the internal consistency and homogeneity of used tools by using Cronbach's Alpha Coefficient test as the following:

Table (c): Reliability of the study tools:

Tools	Nursing teaching staff	Nursing students
Quality of electronic exams questionnaire	0.930	0.956
Students' satisfaction questionnaire	-----	0.980.

Field work:

- Data collection took about 2 months from the beginning of June to the end of July 2023.
- The investigator prepared the questionnaire electronically via Google form design and took the permission from heads of academic departments who explained the aim and the nature of the study and the method of filling the electronic questionnaires to the nursing teaching staff and students in their departments and then the links were sent to nursing teaching staff and students through the WhatsApp groups via heads of different academic departments.

Teaching staff questionnaire link:

(<https://forms.gle/o7sxq2VftYZQFMH8>).

Students' questionnaire link:

(<https://forms.gle/cw7VdpHorDp6G53k8>) that include: Electronic Exams' Quality as perceived by nursing students and nursing students' satisfaction

- questionnaires. Nursing teaching staff and students started to open the links and fill the questionnaires.
- Data was collected daily and the average number of responses per day was ranged between 10-18 response from nursing students and 1-2 responses from nursing teaching staff.

Ethical Considerations

Prior to the conduction of the study, ethical approval was obtained from the scientific research ethics committee at Faculty of Nursing Benha University. All subjects were informed that participation in the study was voluntary and informal consent was obtained from the participants in the study through their acceptance for filling questionnaires. Confidentiality of data obtained was protected by the allocation of a code number to the questionnaire sheets. Subjects were informed that the content of the study tools will be used for the research purpose only. Participants' right to withdraw from the study at any time was ascertained.

IV- Statistical Design:

- Data were collected, tabulated, statistically analyzed by using an IBM personal computer with statistical package of social science (SPSS) version 22 where the following statistics were applied.
- Descriptive statistics: In which quantitative data were presented in the form of Mean, standard deviation

(SD), frequency, and percentages distribution.

- Correlation (r): Was used to study association between two qualitative variables.

- Chi-square test (χ^2): was used to study.

- Fisher Exact Test (FET) cell 2×2 : The used tests of significance included p-value test: A significance level value was considered when P-value ≤ 0.001 , non-significance when p-value > 0.05 .

4. Result:

Table (1): Shows the personal characteristics of studied nursing teaching staff, indicated that less than one quarter (22.3%) of them were worked in medical surgical nursing department. Regarding to age, more than one third (37.5%) of them aged ranged between 30-<35 years old, with mean \pm S.D (38.40 \pm 5.12). As related to their marital status, the majority (89.3%) of them were married. Regarding to their academic degree, approximately two fifth (43.7%) of them were assistant professor. Regarding to their years of experience in applying electronic exams, more than three quarters (78.5%) of them had 3 years of experience with mean \pm S.D (2.72 \pm .057). As related to attending training courses on preparation of electronic exams, the most (94.6%) of them had attended. Regarding to name of courses, approximately two fifth (41.5%) had attended all courses including (how to prepare electronic exams, preparing electronic questions and electronic correction). Regarding taking training courses on Word or Excel programs, the most (90.2%) of them had taken training courses.

Figure (1): Clarifies that the most (94.6%) of the nursing teaching staff had high perception levels toward quality of electronic exams.

Table (2): Represents that the highest mean score (24.99 \pm 3.15) with

the mean percent (92.5%) of nursing teaching staff was related to the feasibility. While, the lowest mean score (20.17 \pm 2.92) with the mean percent (84.0%) of them was related to challenges.

Table (3): Shows the personal characteristics of studied nursing students, indicated that more than three fifth (63.3%) of nursing students aged equal and more than 20 years old with Mean \pm SD (20.02 \pm 1.23) years old. As far as their gender, more than two thirds (74.0%) of them were females. In relation to their marital status, the most (97.6%) of them were unmarried. Regarding to their academic level, more than one quarter (27.8%) of them were in the third academic year. Regarding to having a computer or laptop, more than half (52.2%) of them have a computer or laptop. Regarding to taken computer courses, the most (93.3%) of them hadn't taken computer courses and minority (6.7%) of them had taken computer courses and less than half (49.3%) had taken one course. Regarding to attend an introductory seminar on how to deal with electronic exams, more than half (57.3%) of them had not attend. Regarding to their academic grade at the last year, half (50.1%) of them had excellent grade.

Figure (2): Clarifies that more than two thirds (71.8%) of the nursing students had high perception levels toward quality of electronic exam. While, less than one quarter (23.7%) of them had moderate perception levels.

Table (4): Represents that the highest mean score (26.40 \pm 4.49) with the mean percent (88.0%) of nursing students was related to the ease of use & flexibility. While, the lowest mean score (21.03 \pm 7.20) with the mean percent (63.7%) of nursing students was related to challenges.

Figure (3): Clarifies that the majority (85.1%) of the nursing

students had high satisfaction levels about quality of electronic exams. While, more than one tenth (11.6%) of them had moderate satisfaction levels.

Table (5): Represents that the highest mean score (18.76 ± 3.29) with the mean percent (89.3%) of nursing students was related to electronic exams' environment. While, the lowest mean score (33.68 ± 5.99) with the

mean percent (86.4%) of nursing students was related to feedback.

Table (6): Indicates that there was a highly statistical significant positive correlation between total quality of electronic exams as perceived by teaching staff and nursing students and total nursing students' satisfaction.

Table (1): Frequency distribution of nursing teaching staff regarding their personal characteristics (n=112)

Personal characteristics	No	%
Academic departments		
Nursing administration	16	14.3
Medical surgical nursing	25	22.3
Pediatric nursing	18	16.1
Community health nursing	18	16.1
Obstetrics and gynecology nursing	21	18.8
Psychiatric nursing and mental health	14	12.5
Age (years)		
<30	26	23.2
30-<35	42	37.5
35-<40	25	22.3
40+	19	17.0
Range	31-62	
Mean \pm SD	38.40\pm5.12	
Marital status		
Married	100	89.3
Unmarried	12	10.7
Academic degree		
Lecturer	47	42.0
Assistant professor	49	43.7
Professor	16	14.3
Years of experience in applying electronic exams		
1	7	6.3
2	17	15.2
3	88	78.5
Mean \pmSD	2.72\pm.57	
Have you attended training courses on preparing electronic exams?		
Yes	106	94.6
No	6	5.4
If the answer is (yes), mention the name of the courses (n=106)		
How to prepare electronic exams.	30	28.3
Preparing electronic questions.	19	17.9
Electronic correction.	13	12.3
All of the above	44	41.5
Have you taken training courses on Word and Excel programs?		
Yes	101	90.2
No	11	9.8

Table (2): Frequency distribution of nursing students regarding their personal characteristics (n=1084).

Personal characteristics	No	%
Age		
≤ 20 years	686	63.3
20+ years	398	36.7
Range	18-25	
Gender		
Male	282	26.0
Female	802	74.0
Marital status		
Married	26	2.4
Unmarried	1058	97.6
Academic level		
First level	245	22.5
Second level	287	26.5
Third level	301	27.8
Fourth level	251	23.2
Do you have a computer or laptop?		
Yes	566	52.2
No	518	47.8
Have you taken computer courses?		
Yes	75	6.7
No	1009	93.3
If yes, indicate the number of courses (n=75)		
1	37	49.3
2	23	30.7
3	15	20.0
Did you attend an introductory seminar on how to deal with electronic exams?		
Yes	463	42.7
No	621	57.3
What was your academic grade last year? (n=839)		
Acceptable	24	2.9
Good	98	11.7
Very good	296	35.3
Excellent	421	50.1

Figure (1): Nursing teaching staff' perception about quality of electronic exams.

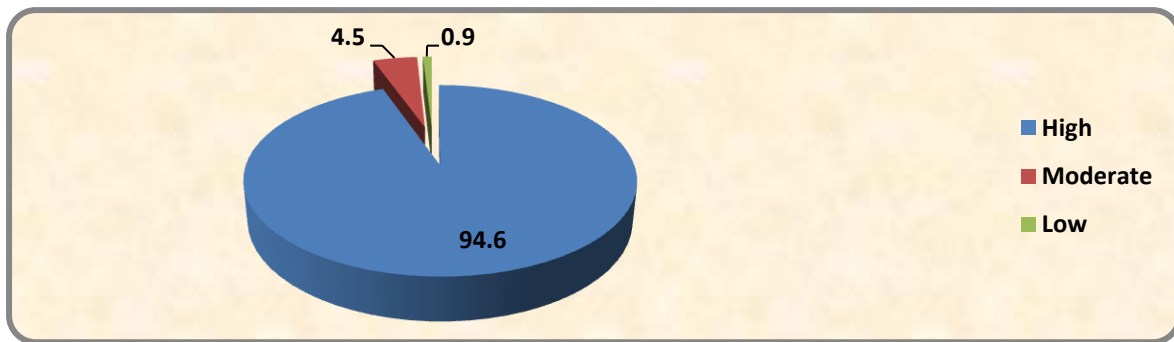


Table (3): Mean scores & mean percent of total quality of electronic exams dimensions as perceived by nursing teaching staff (n=112)

Dimensions	Maximum score	$\bar{X} \pm SD$	$\bar{X} \%$	Ranking
The ease of use & flexibility	39	34.78±4.10	89.1	4
The clarity	39	35.61±4.23	91.3	2
The fairness	27	24.08±2.92	89.2	3
The feasibility challenges	24	20.17±2.92	84.0	5
Total	156	139.65±13.57		89.5

Figure (2): Nursing students' perception about quality of electronic exams.

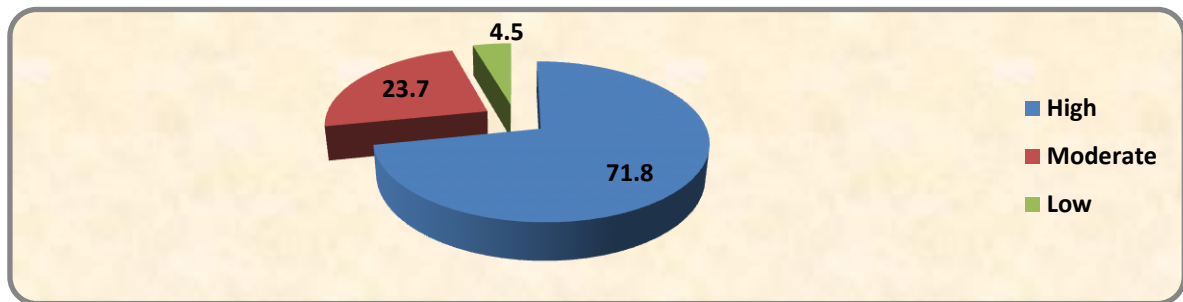


Table (4): Mean scores & standard deviation of total quality of electronic exams dimensions as perceived by nursing students. (n=1084)

Dimensions	Maximum score	$\bar{X} \pm SD$	$\bar{X} \%$	Ranking
The ease of use & flexibility	30	26.40±4.49	88.0	1
The clarity	30	26.01±4.44	86.7	2
The fairness	33	27.92±5.39	84.6	4
The feasibility challenges	21	17.93±3.56	85.4	3
Total	147	119.31±19.08		81.2

Figure (3): Nursing students' satisfaction about quality of electronic exams

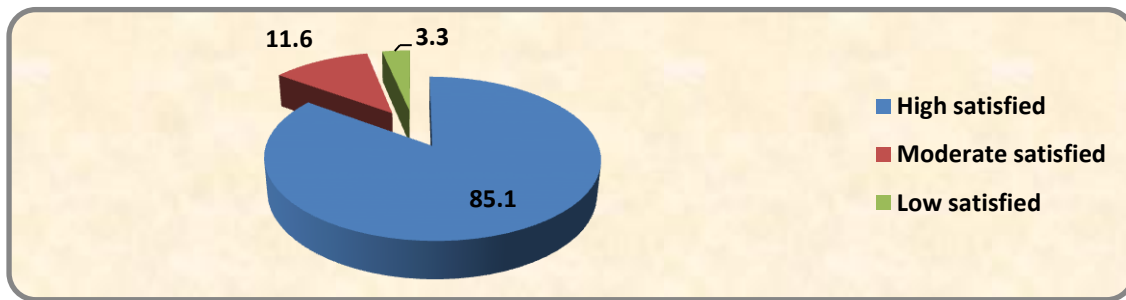


Table (5): Mean scores & standard deviation of total nursing students' satisfaction dimensions regarding quality of electronic exams (n=1084)

Dimensions	Maximum	$\bar{X} \pm SD$	$\bar{X} \%$	Ranking
Use of electronic exams	21	18.16±3.51	86.5	4
Electronic exams' environment	21	18.76±3.29	89.3	1
Electronic exams' login	15	13.31±2.49	88.7	2
Electronic exams' characteristics	30	26.54±4.64	88.5	3
feedback	39	33.68±5.99	86.4	5
Total	126	110.43±14.99		87.6

Table (6): Correlation between study variables quality of electronic exams as perceived by nursing teaching staff and students & nursing students' satisfaction.

Variables	Total nursing students' satisfaction	
	<i>r</i>	P value
Total quality of electronic exams as perceived by teaching staff	0.606	0.000**
Total quality of electronic exams as perceived by nursing students	0.731	0.000**

5. Discussion:

In nursing education quality of electronic exam has become necessary as helps improving the assessment validity, the efficacy of examination process and make students evaluation is easier. For achieving quality of electronic exams there are five main dimensions include ease of use and flexibility, the clarity, the fairness, the feasibility and challenges (Badawi & Elhussien, 2022). The students' satisfaction is a prerequisite for the effective application of electronic

exams. As it's important to view student satisfaction dimensions about quality of electronic exams as a valuable asset which can assist policymakers at learning institutions to make decisions regarding continuous improvement (Tria, 2023).

Regarding to personal characteristics of the nursing teaching staff, the findings of the present study clearly showed that less than one quarter of nursing teaching staff were worked in medical surgical nursing department. Regarding to age more than one third

of them had age ranged between 30- <35 years old, with mean \pm S.D (38.40 \pm 5.12). As related to their marital status the majority of them were married. Regarding to their academic degree approximately two fifth were assistant professor. Regarding to their years of experience in applying e-exams more than three quarter of them had 3 years of experience with mean \pm S.D (2.72 \pm .057). As related to attending training courses on preparation of electronic exams most of them had attended. Regarding to name of courses approximately two fifth had attended all above of courses (how to prepare electronic exams, preparing electronic questions and electronic correction). Regarding taking training courses on Word or Excel program the most of them had taken training courses.

Regarding to personal characteristics of the nursing students the results of this study revealed that more than three fifth of nursing students were aged equal and more than 20 years old with Mean \pm SD (20.02 \pm 1.23) years old. As far as their gender more than two third of them were females. In relation to their marital status, the most of them were unmarried. Regarding to their academic level, more than quarter of them were in the third academic year. Regarding to having a computer or laptop, more than half of them have a computer or laptop.

Regarding to taken computer courses, the most of them hadn't taken computer courses and minority of them had taken computer courses and less than half had taken one course. Regarding to attend an introductory seminar on how to deal with electronic exams, more than half of them not attend. Regarding to their academic grade last year half of them have excellent grade.

As regard nursing teaching staff' total perception levels regarding quality of

electronic exams. The findings of the present study revealed that the most of the nursing teaching staff had high perception levels toward quality of electronic exams. This might be due to most of nursing teaching staff attended training courses about how to prepare electronic exams, as Faculty of Nursing Benha University conducting electronic exams since corona virus pandemic from 3 years, and the faculty Measurement and Evaluation Unit provide continuous training courses for teaching staff. This result was consistent with **(Elharby, 2021)**, who conducted a study about " Quality standards in preparing remote electronic exams for science from point of view in Jordanian Universities" and indicated that application of quality standards for electronic exams from the point of view of faculty members was high. In addition, **(abo Qurs, 2019)**, who conducted a study about " The degree of availability of quality standards in the design of electronic tests for level exams from the point of view of faculty members in Jordanian Universities" and showed that the availability of quality standards in electronic exams as perceived by teaching staff was high.

Also, the result was in the same line with **(Almelwth& Elshrbeni, 2015)**. Who conducted a study about "Quality standards of electronic exams as perceived by faculty members and students in the faculties of girls at King Khalid University" and reported that availability of electronic exams quality standards at King Khalid University from as perceived by teaching staff was high. Conversely, this result was contraindicated with **(Bakhit et al., 2021)**, who conducted a study about " The Quality Standards in the design of Electronic exams from the point of view of Faculty members and Students at Jinan University" and stated that the

degree of availability of quality standards for electronic exams of from the perspectives of the teaching staff in Faculty of Education, University of Jinan was more than moderate. Also, **(Dalaa& Dalaa, 2019)**, who conducted a study about " Quality standards of electronic exams design as envisioned and the degree of availability in the level tests in Jordanian Universities" and stated that availability of quality standards of electronic exams in Jordanian universities as perceived by teaching staff was moderate. Regarding to mean scores of quality of electronic exams dimensions as perceived by nursing teaching staff. The finding of the present study represents that the highest mean percent of nursing teaching staff was related the feasibility dimension. From the investigator point of view, this might be electronic exams reducing financial costs such as (printing materials, papers, and office supplies), saves the time and effort exerted by the teaching staff as electronic exams corrected automatically, electronic marking achieves the characteristics of stability and impartiality, encourage teaching staff and students to employ technology in educational process.

This result was supported by **(Elbadwi& Elhussien, 2022)**, who conducted a study about " Investigating the electronic examinations' quality from faculty members' and students' experiences and perspective" and indicated that the most significant dimension of the quality of electronic exams was the feasibility as economical in saving time, and money unlike the in-class exam, it does not require much effort to prepare or administrate it as stated by teaching staff. Also, the result supported by **(Saad, 2021)**, who conducted a study about " Attitudes of secondary school teachers towards the use of electronic exams" and reported that feasibility of

electronic exams from teaching staff point of view was most significant as it helps reduce the economic cost and saves time and effort because the exam is corrected automatically.

Also, the result of this study showed that the lowest mean score of nursing teaching staff was regarding challenges dimension. This could due to electronic exams require the development of a large number of questions and more than one sample of the exam questions in the case of evaluating more than one group of students. Conversely, this result was contraindicated with **(Bashitialshaaer et al., 2021)**, who conducted a study about "Obstacles to applying electronic exams amidst the COVID-19 pandemic: An exploratory study in the Palestinian universities in Gaza" and reported that challenges have the most important effect in applying quality of electronic exams remotely under the COVID-19.

As regard nursing students' total perception levels regarding quality of electronic exams. The findings of the present study revealed that more than two third of the nursing students had high perception levels toward quality of electronic exam. While, less than quarter of them had moderate perception levels. This could be due to the Faculty of Nursing Benha University start to conducting electronic exams since corona virus pandemic since 2020. This result was contraindicated with **(Badawi& Elhussien, 2022)**, who reported that the most of students have high perception level toward quality of e-exams. This result was contraindicated with **(Fluck et al., 2017)** analysis who conducted a study about " Secure e-examination systems compared: studies from two countries. Journal of Information Technology Education" and reported that most of the Nigerian students expressed their negative perceptions about quality of electronic

examinations. Also, the result of present study revealed that less than quarter of them had moderate perception levels. This could be due to more than half of students not attend an introductory seminar on how to deal with electronic exams. The result was supported with **(Bakhit et al., 2021)**, who conducted a study about "The Quality standards in the design of electronic exams from the point of view of faculty members and students at Jinan University" and stated that the degree of availability of quality standards for electronic exams as perceived by students in Faculty of Education, University of Jinan was moderate. Also, the result was harmony with **(Almelwth& Elshrbeni, 2015)**. Who reported that degree of application of quality standards of e-exams as perceived by King Fahd University students was moderate.

Regarding to mean scores of quality of electronic exams dimensions as perceived by nursing students. The finding of the present study represents that the highest mean percent of nursing students was related to the ease of use & flexibility. From the investigator point of view, this might be due to electronic exams schedules early posted on faculty website; exam system is easy to use, easy to login with username and password, ability to reviewing the answers before end of exams, easy to exit after completing exam. This result was supported by **(Elbadwi & Elhussien, 2022)**, who stated that the ease of use & flexibility is the first dimension as perceived by students.

Also, this result was parallel with **(Semlambo et al., 2022)**, who conducted a study about "Perceived usefulness and ease of use of online examination system: A case of institute of Accountancy Arusha" and stated that ease of use and flexibility of electronic exams system are the most

significant dimension for majority of students.

Conversely, this result was contraindicated with **(Fluck et al., 2017)** who reported that the Nigerian students expressed negative opinions about electronic exams due to some students' scarceness and unfamiliarity with the technology and a lack of knowledge about the methods of e-exams. While, the result of this study showed that the lowest mean percent of nursing students was related to challenges. This could be due to students can look at another computer or use the internet during the electronic exam and some messages can appear and distract students during the electronic exam. Conversely, this result was contraindicated with **(Bashitialshaaer et al., 2021)**, who conducted a study about "Obstacles to applying electronic exams amidst the COVID-19 pandemic: An exploratory study in the Palestinian universities in Gaza" and reported that challenges have the most important effect in applying quality of electronic exams remotely under the COVID-19.

Regarding nursing students' satisfaction toward quality of electronic exams, the finding of current study revealed that the majority of the nursing students had high satisfaction levels about quality of electronic exams. While, more than tenth of them had moderate satisfaction levels. From the investigator point of view this result related to the electronic exams center' environment is appropriate for conducting exams, system is easy to use, easy to login to exam, electronic exams reduce effort and time for nursing students, exams characteristics is appropriate. This result supported by **(Qalawa, 2021)** who conducted a study about "An investigation of satisfaction regarding electronic exams among KSA nursing students: A Multi-University Study" and stated that the

majority of the students had high satisfaction levels toward electronic exams. Also, **(Zahedi, 2022)**, who conducted a study about "Attitudes and Satisfaction of Medical Sciences Students with Electronic Exams at Birjand University of Medical Sciences" and stated that student's satisfaction was excellent and above average about electronic exams.

Conversely, this result contraindicated with **(Jaldaniyah, 2022)**, who conducted a study about "The level of satisfaction of faculty members and students of the University of technology and applied Sciences in Rustaq about electronic achievement exams" and stated that the majority of students had moderate satisfaction level. Also, **(Abdel Rahman, 2020)**, who conducted a study about "Attitudes and satisfaction of students and faculty members towards automatic grading and electronic exams at the Faculty of Education, Damanhur University" and stated that the majority of students had moderate satisfaction level.

In relation to mean and standard deviation of students' satisfaction toward quality of electronic exams, the results of present study revealed the highest mean and standard deviation was related to electronic exams' environment. This could be due to Benha University electronic exams' center had appropriate environment for examination in mean of availability of good ventilation and lightening, capacity of laboratories was suitable, computers are modern, WIFI connection and internet speed was fast. This result was supported with **(Omran et al., 2022)**, who conducted a study about "Facilitators and barriers of employing electronic exams as perceived by nursing students and the relation to their satisfaction" and found that electronic exams environmental factors strongly affected students'

satisfaction. Conversely, these results contraindicated with **(Mohamed& Saleh, 2017)**, who conducted a study about "Opinion of teaching staff and students' toward implementation of e-exam" and stated that the lowest mean score was related to exam environment preparation dimension. While the lowest mean and standard deviation was related to feedback dimension. This could be due to Electronic exams not allowing students to know the results immediately after taking the exam. Conversely, these results contraindicated with **(Rajala et al., 2015)**, who conducted a study about "Automatically assessed electronic exams in programming courses" and stated that student feedback seem to be most significant dimension in determining students satisfaction about electronic exams. Regarding relation between quality of electronic exams as perceived by teaching staff and students and nursing students' satisfaction, the results of present study explored that there was a positive highly statistical significant correlation between total quality of electronic exams as perceived by teaching staff and nursing students and total nursing students' satisfaction. This is due to high perception levels toward quality of electronic exam as perceived by nursing teaching staff and students and this lead to high students' satisfaction levels, as quality of electronic exams increase flexibility and ease of use of electronic exams, facilitate assessment process for nursing students. Also, provide financial costs such as (printing materials, papers, and office supplies), save the effort exerted by the nursing teaching staff in correcting the exam. This result supported by **(Arjenaki, 2017)**, who conducted a study about "Surveying The Quality of Electronic Tests in The Student Satisfaction" and stated that there was highly statistical significant correlation

between the quality of e-exam and student satisfaction. Also, (Bello& Abdullah, 2021), who conducted a study about "Investigating the Influence of Quality Factors on User Satisfaction with Summative Computer-based Assessment" and stated that all quality dimensions of the electronic exams significantly influence the student's satisfaction.

6. Conclusion

In the light of the present study findings, the study concluded that most of the nursing teaching staff had high perception level toward quality of electronic exams. Also, two third of the nursing students had high perception level toward quality of electronic exam. In addition to, the majority of the nursing students had high satisfaction levels about quality of electronic exams.

Moreover, there was a highly statistical significant positive correlation between total quality of electronic exams as perceived by nursing teaching staff and students and total nursing students' satisfaction.

7. Recommendations:

Based on the findings of the present study, the following recommendations are proposed.

1- For Faculty Administration:

- Designing training programs for nursing teaching staff and students about quality of electronic exams to increase effectiveness in using and dealing with electronic exams.
- Conducting training programs for nursing students to acquire basic skills in computer that will help them during the conduct of electronic exams.
- Activating questions banks system in all faculty academic departments to facilitate process of preparing of electronic exams.

- Activating questions banks system in all faculty academic departments to facilitate process of preparing of electronic exams.

2- For nursing teaching staff:

- Design electronic exams in terms of choice of appropriate colors, questions fonts, answer method, using underlines under important instructions to enhance students' desire to use electronic exams.
- Develop questions types that help students think critically as (problem- based questions).
- Prepare a variety of questions formats in electronic exams as subjective questions (Short Essay- List questions) and use clear, simple language questions and revise to prevent ambiguity and students distraction during electronic exams.

3-For nursing students:

- Attending training programs to increase awareness, computer skills and deal with electronic exams

3- For Further research:

- Replication of the study on larger probability sample is highly recommended to achieve generalizable result.
- Assess the relation between quality of electronic exams and students' motivations Conducting studies about the obstacles hindering effective using of electronic exams in Benha University and measures must be taken to overcome such obstacles

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