



Effectiveness of Using Electronic Exams in Assessment in Saudi Universities: Empirical Study

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Abstract

The present study aimed to explore the effectiveness of electronic exams in assessing students at Saudi universities from the perspective of the students. A five point Likert questionnaire was used and a descriptive analytical approach was adopted. Through the purposive sampling method, the researcher selected a sample consisting from 370 male and female students. Those students were selected from various faculties at Prince Sattam bin Abed Al-Aziz University in Al-Salil, Saudi Arabia. The questionnaire forms were distributed by hand to all of the selected students. All of the form were filled and retrieved. However, 357 form are considered valid for analysis. SPSS program was used. The researcher found that electronic exams play an effective role in assessing students in Saudi universities from the students' perspective. It was found that e-exam is capable of assessing students' amount of knowledge effectively. It was found that e-exam enables instructors to save their effort. It was found that e-exam hinders students from committing acts of cheating.

Keywords:

*Assessment, effectiveness
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1. Introduction

Technology has changed various things in human life. In addition, it has been widely spreading and utilized in various areas, and institutions. For instance, it is used today in many academic institutions. That's because technology increases human accuracy and efficiency. It's because technology enables people to obtain results that are free from any error. Therefore, technology is utilized much for learning, teaching and assessment. To be specific, it has been utilized much in developing and developed countries for assessment (Ajinaja, 2017)

Today, there are two types of exams for assessing students; paper-based and electronic exams. The term (paper-based exam) refers to the conventional exam through which students are provided with a paper-based question sheet and the answers must be provided in writing in the answer sheet. As for the electronic exam (e-exam), it was introduced in the late 1990s. (Ajinaja, 2017). It refers to a computer-based exam that students take through using a computer and a special examination software. It usually takes the form of a multiple choice exam (Da'asin, 2016). It may be also defined as the use of information technology (IT) for evaluating students' performance (Singh & De Villiers, 2017).

The e-exam questions may be represented in true/false, matching, drop-down list, fill in the blank, drag and drop, re-ordering, categorizing, or multiple choice questions (Singh & De Villiers, 2017). In order for students to take an e-exam, there are two elements that must be present. The first element is represented in

the software. The software is represented in an electronic examination system and a computer system. As for the hardware, it's represented in the devices (i.e. the physical elements of the computer). In fact, e-exam can be utilized for meeting various goals. For instance, it can be used by educators and academics in academic institutions to identify the amount of knowledge that students have about a certain topic. It can be used by trainers to assess the trainees' knowledge and performance. It can be used by the researchers working at research institutions to collect data from the members of sample. In fact, it can be also used for assessing students' skills, such as: the problem solving skills (Daramola, 2017).

E-exam provides students and instructors with immediate feedback about the students' performance (Alsadoon, 2017). It enables students and instructors to avoid the commitment of language mistakes (Al-Khayat, 2017). E-exam enables instructors to use multimedia. That makes this type of exam suitable for assessing various skills and capabilities. That makes this type of exam suitable for assessing students in many courses. For instance, through the e-exam, medicine students can listen to heart murmurs or see a radiograph in order to ask them to give a diagnosis. Therefore, e-exam enables instructors to simulate real life situations when assessing students. In addition, the use of e-exam shall ensure that no exam paper will be lost. It shall ensure that no instructor shall commit a mistake in correcting the papers. It facilitates the process of archiving and auditing marks. It reduces the time dedicated for correcting the exam papers and processing the marks. (Burr, Chatterjee, Gibson, Coombes, & S., 2016). The time saved through using e-exam shall provide instructors with more time to hold discussions in classroom (Anakwe, 2008).

The use of e-exam has several advantages. For instance, it participates in improving the cognitive capabilities and academic performance of students. It enables students to identify the things they need to learn about. It enables students to identify their academic weaknesses and the amount of knowledge they have about a subject. In fact, it serves as an enjoyable method for assessment. Earphones can be used in e-exam to make the assessment more enjoyable for students (Yurdabakan & Uzunkavak, 2012). It's considered more cost effective than paper-based exam. It participates in raising students' academic performance and intrinsic motivation level. It increases students' self-efficacy levels (Burr et al., 2016).

The e-exam serves as a useful and credible assessment method. It doesn't allow students to commit acts of plagiarism. It doesn't allow students to cheat. It provides student with feedback during, or after the exam (Oladimeji, Oyebola, Christopher, & Annene, 2017). Although there are many benefits for e-exam, there are many challenges associated with its use. For instance, a security breach, and power failure may be experienced. Due to a software bugs, the e-exam or some of its questions may not be appear to students. The instructors using the e-exam may not be provided with technical support and maintenance services. A defect in the computer software, or hardware or network failure may be experienced. There may be problems experienced when upgrading the system. The server performance may be poor which may hinder the e-examination process (Burr et al., 2016). In the light of the aforementioned merits of e-exam and the challenges associated with it, the researcher believes that it's necessary to conduct more studies about the effectiveness of this type of exam. That's needed to improve the quality of the assessment process, especially in developing countries.

2. Statement of the Problem

Assessment is an essential part of the learning process. Through this process, the learning outcomes can be measured and assessed. Carrying out the assessment process enables instructors to identify whether students have met the sought academic goals or not. Therefore, much attention must be provided to the assessment process (Alsadoon, 2017). However, the use of paper-based exam is time consuming and tiring. Therefore, educators started to integrate technology in the assessment process. That can be manifested through the use of electronic exam (e-exam). The e-exam enables instructors to assess a great number of students within a short period of time (Jamiludin, Darnawati, & Uke, 2017). It enables instructors and their students to keep up with the latest ICT developments (Ridgway, McCusker, & Pead, 2004).

E-exam is used at schools (Jamiludin et al., 2017) kindergartens (Khairil & Mokshein, 2018) and universities (Al-Momani, 2019). It has been increasingly used worldwide. That's because it enables instructors to save their efforts when assessing students. It's because it can provide instructors with accurate results about the students' academic performance. Through the e-exam, instructors can use a stimuli to asset students which can take an audio, graphic, visual, or kinaesthetic form (Daramola, 2017).

The e-exam employs an auto-marking technique. This technique enables instructors to get the marks rights away after the exam without having any human error in correction process. It enables academic institutions to save costs. That's because e-exam enables institutions to save the time and the materials (e.g. question and answer sheets) that are dedicated for paper-based exams. That shall be reflected positively on the environment and reduce the environmental pollution. In addition, E-exam serves as a flexible and convenient assessment method. For instance, students may take the e-exam at any place they want and at any time they desire. Thus, e-exam enables students to overcome the spatial and temporal constraints hindering them from attending the assessment session (Khairil & Mokshein, 2018). In the light of the aforementioned argument, the researcher aimed to explore the effectiveness of using e-exam in assessing students at Saudi universities.

3. Objective

This study aimed to explore the effectiveness of electronic exams in assessing students at Saudi universities from the perspective of the students.

4. Question

This study aimed to answer this question:

How effective are electronic exams in assessing students at Saudi universities from the perspective of the students?

5. The Study's Significance

This study participates in filling a gap in the literature that sheds a light on the use of e-exam in Saudi universities. That's needed, because such literature is considered scarce. This study shall participate in expanding the knowledge of faculty members and students about the merits gained from the use of e-exams for assessment. The present study is significant because it shall expand the knowledge of decision makers and officials at the Saudi Ministry of Higher Education about the advantages of using electronic assessment methods. That shall encourage those decision makers and officials to improve the IT infrastructure of Saudi universities. The present study shall expand the knowledge of Saudi universities' management about the advantages of integrating technology in the assessment process.

6. Limits

- The temporal limits: The researcher conducted this study during the first semester of the academic year of 2020/2019.
- The spatial limits: This study was conducted at Prince Sattam Bin Abdulaziz University. This university is located in Al-Salil, Saudi Arabia.
- The human limits: This study targets the students enrolled at Saudi universities.
- The thematic limits: The present study aimed to explore the effectiveness of the effectiveness of electronic exams in assessing students at Saudi universities from the perspective of the students.

7. Definitions

7.1. Theoretical Definitions

- E-exam: It refers to a computer-based exam that students take through using a computer and a special examination software. It usually takes the form of a multiple choice exam (Dammas, 2016).
- Effectiveness: It refers to the degree to which a thing does good more than doing harm (Kim, 2013)

7.2. Operational Definitions

- E-exam: In this study, this term refers to the exam taken by students at the computer labs in Saudi universities. The operational definition of this term is illustrated through the questionnaire.
- Effectiveness: It refers to the effectiveness of using electronic exams in computer labs in assessing students at Saudi universities.

8. Theoretical Framework

E-exam enables instructors to assess students' life skills. That's because e-exam may include simulation models that simulate real life situations. E-exam participates in motivating students and encouraging them to show the best performance. It makes students control their own learning process (Ridgway et al., 2004). It enables instructors to identify the weaknesses and problems that students have. It provides students with instant feedback. Having an e-examination system enables academic institutions to store and organize numerous exams for different courses (Nikolova, 2012).

E-exam participates in improving the quality of the assessment process. It participate in raising students' motivation and reducing their anxiety (Ghaderi, Mogholi, & Soori, 2014). The use of e-exam facilitates the processes of marking. It facilitates the processes of archiving and auditing the changes made to the items of the e-exam (Burr et al., 2016). There are two types of e-exam; linear e-exam and adaptive e-exam. Through the linear e-exam, the computer presents questions without taking into consideration the performance of the one taking the exam. However, through the adaptive exam, the computer presents questions with taking into consideration the performance level of the one taking the exam. In the latter type of exam, questions shall be ordered based on the latter performance (Ajinaja, 2017).

Using e-exam participates in improving the students' capability to manage time while taking the exam (Ajinaja, 2017). It participates in raising students' productivity level while taking the exam. In other words, it enables students to answer a greater number of questions. It offers students immediate feedback of different types and enables instructors to use various format. Despite the merits of e-exam, there are challenges

associated with it. Such challenges may include: the high cost of maintenance and the need to dedicate much time to develop the elements of the examination software (Ajinaja, 2017).

E-exam enables instructors and institutions to assess a great number of students within a short period of time. It enables instructors to track the progress achieved by students. It enables the students living in remote areas to take exams without travelling, because the e-exam may be taken at home. It reduces the extent of committing cheating. That's because there may be various models of the same exam in the examination room. It also serves as a secure method for conducting assessment. That's because each student must enter his ID number and password before taking the exam (Alruwais, Wills, & Wald, 2018).

E-exam can be effectively utilized in higher education institutions. For instance, it can be used for assessing students' higher order thinking. It's less costly for such institutions to use e-exam instead of paper-based exam. It is a very effective assessment method for assessing disabled students. For instance, the students with visual impairment can adjust the font size to see the questions by themselves. Students with auditory impairment can be provided with auditory assistive tools. E-exam offers students immediate feedback. It can be taken at any time and place. It is free from any bias in correction, because the answers are automatically corrected. It can be used for assessing students' performance in tasks. Through using e-exam for assessment, students shall become responsible for their own learning process. It shall provide students with positive experiences (Appiah & van Tonder, 2018).

9. Empirical Studies

Nikou and Economides (2016) aimed to explore the impact of paper-based, computer-based and mobile-based assessment on the achievement and motivations of students in physics in a secondary school. An experimental approach was adopted. Pre-test and post-test were used. It was found that computer-based and mobile-based assessment can effectively increase the academic achievement of the students who usually show poor achievement. It was found that computer-based and mobile-based assessment can increase students' motivation to learn.

Da'asin (2016) aimed to identify the students' attitudes at Ash-Shobak University College in Jordan towards e-exams. Questionnaire forms were distributed to 112 students. 108 forms were retrieved and considered valid for analysis. The latter researcher found that students have positive attitudes. He found that e-exam serves as a reliable assessment method and provides accurate results. He found that the regulations and system of the e-exam are perceived as clear. However, he found that e-exam increases the levels of stress and anxiety among students. He found that this exam makes the cheating process easier, but doesn't participate in improving students' performance.

Dammas (2016) aimed to explore the attitudes of students at a chemistry course in King Abdul-Aziz University in Saudi Arabia towards computer-based exams. Through the convenience sampling method, the latter researcher selected a sample consisting of 60 female and male students. She developed a questionnaire. Then, she distributed questionnaire forms to the selected sample. However, 54 forms were retrieved. 49 forms are valid for analysis. It was found that most of the students show positive attitudes towards this kind of exams. It was found that the time dedicated for this exam is inadequate. It was found that there are some errors in the e-exam related to formulas, chemical equations and structure. It was found that using e-exam shall ensure that students are assessed in a fair and just manner. It was found that students have positive experiences in taking the e-exam.

Jamiludin et al. (2017) aimed to explore the high school students' attitudes towards making the national exams computerized in Indonesia. Interviews were conducted. The latter researchers used a questionnaire. The sample consists from 34 high school students in Kendari, Indonesia. Through using the questionnaire, it was found that it's easier to read computer based exam than paper-based exam. For instance, in some paper-based exams, the question paper may not be easy to read due to using bad printers. In addition, it was found that students prefer the computer-based exam over the paper-based one. Through conducting interviews, it was found that computer-based exam provide the respondents with valuable and positive experiences in using technology. It was found that the computer-based exam requires less amount of time to be taken than paper-based exam. It was found that using the computer-based exam shall make cheating harder. It was found that computer-based exam has a negative impact on the eye health of students. That's because students may spend much time in front of the examination screen. Interviewees suggested that their connection level may be negatively affected in case the examination system slows down.

Al- Khayat (2017) aimed to explore the attitudes of university students and instructors at the faculty of business at Al-Blaqa Applied University towards the use of computerized exams. The stratified random sampling method was used. The sample consists from 338 students. It also consists from 5 instructors. Data was collected from the instructors through conducting interviews, and data was collected from students through using a questionnaire. It was found that instructors and students have positive attitudes towards this kind of exams. Through the survey, it was found that this exam is an objective assessment method, because the exam is corrected by the machine and thus, no form of bias shall be practiced by instructors. It was found that this exam enables students to answer questions faster. It was found that preparing for computerized exam requires less effort and time than preparing for paper-based ones. However, the use of computerized exam

hinders students from concentrating. However, in the courses that requires solving equations, the score in the computerized exam shall not reflect students' actual capabilities to solve equations. Thus, it was found that computerized exam isn't a suitable assessment method for assessing students in all courses.

Alsadoon (2017) aimed to explore the attitudes of students at the Saudi Electronic University towards electronic assessment. He developed a questionnaire. He sent the questionnaire forms to 80 students. All of those students have experiences in taking the e-exam. The latter forms were sent to the students through e-mail. Forty four (44) students only returned the forms filled. It was found that e-exam doesn't facilitate cheating. It was found that e-exam doesn't require having students whose advanced technical skills are advanced. It was found that e-exam is suitable for all the categories of students, but not for all the subjects. It was found that e-exam participates in improving students' technical skills and reducing the stress associated with taking exams. It was found that e-exam promotes a self-learning approach and raises the quality of the assessment process in higher education institutions. It was found that e-exams use a grading system that is characterized with being unbiased. Thus, e-exam is an objective assessment method (Alsadoon, 2017).

IsauAdewole, Olugbenga, Olusegun, and Susan (2018) aimed to explore the university students' attitudes in Nigeria towards computer-based exams. Five hundred questionnaire forms were distributed to students. 400 forms were retrieved and analysed. It was found that students have positive attitudes. It was found that this exam enables students to edit answers and serves as a secure method for assessing students. It was found that there isn't any problem faced by students when opening the examination system or logging in this system to take this exam.

Garas and Hassan (2018) aimed to conduct a comparison between computer-based exams and paper-based ones in terms of improving students' academic performance. They adopted an experimental approach. The sample consists from 78 students. Those students were selected from four sections of a financial accounting course in Zayed University in UAE. It was found that there isn't any significant difference between the scores of the students taking the paper-based exam and the scores of the students taking the computer-based one. It was found that the males show a better performance than females in the computer-based exam. It was found that females show a better performance than males in the paper-based exam.

Al-Momani (2019) aimed to explore the undergraduate students' attitudes towards the use of e-exam for assessment in Jordan. She developed and used a questionnaire. She distributed the questionnaire forms to 93 undergraduate students enrolled at the University of Jordan. All these forms were retrieved. However, the latter researcher considered 87 forms as valid for analysis. It was found that those students have positive attitudes towards e-exams. It was found that e-exams can effectively assess students' amount of knowledge and reduce students' anxiety level while taking the exam. It was found that e-exam hinders students from cheating. It was found that e-exam increases students' concentration level. It was found that e-exam enables instructors to save their efforts and time and track the progress of their students. However, e-exam doesn't assess students' skills effectively nor enable them to show a higher achievement (Al-Momani, 2019).

10. Methodology

10.1. Approach

To provide answers to the question of this study, the researcher adopted a descriptive-analytical approach.

10.2. Methods for Classifying Means

For classifying means, specific criteria were adopted by the researcher. These criteria are displayed through the table presented below.

Table-1. The criteria used for classifying means.

Range	Level	Attitude
2.33 or less	Low	Negative attitude
2.34-3.66	Moderate	Neutral attitude
3.67 or more	High	Positive attitude

Through the criteria in Table 1, the means are classified into high, moderate and low means. Through such criteria, attitudes are classified into positive, moderate, and neutral attitudes.

10.3. Methods for Data Analysis and Collection

The researcher developed a questionnaire to collect the sought data. He also reviewed the books, and studies that are relevant to the topic of the present study. To analyse the data that was collected through collecting the questionnaire forms, the researcher used the SPSS program. He calculated standard deviations and means. To measure reliability, Cronbach alpha was calculated too. Through the cover page of the questionnaire, the researcher confirmed that the collected data shall remain confidential.

10.4. Instrument

To collect the needed data, the researcher developed and used a questionnaire. This questionnaire consists from fifteen (15) statements. It was developed after reviewing the relevant references, such as: the studies conducted by: Alruwais et al. (2018); Al- Khayat (2017); Ajinaja (2017); Da'asin (2016); Nikolova (2012); Appiah and van Tonder (2018); Alsadoon (2017); Al- Khayat (2017); Al-Momani (2019); Daramola (2017) and Oladimeji et al. (2017). The questionnaire forms were distributed to the sample in Arabic language. Then, the questionnaire was translated into English language to be presented in this study. The researcher collected demographic data through using the questionnaire. He adopted the five point Likert scale. This scale consists from 5 categories. These categories are listed below. Each category of those ones represent a specific score.

Table-2. The categories and scores of the five point Likert scale.

Category	Score
Strongly agree	5
Agree	4
Neutral	3
Disagree	2
Strongly disagree	1

Source: Al-Amery (2020).

Based on **Table 2**, each category represents a specific score. Through processing these scores, the researcher is able to calculate the means in order to identify the respondents' attitudes.

10.5. Sample and Population

The population of this study is represented in all the students who are enrolled at Saudi universities. Through employing the purposive sampling method, the researcher selected a sample consisting from 370 male and female students. Those students were selected from various faculties at Prince Sattam bin Abed Al-Aziz University in Al-Salil, Saudi Arabia. The questionnaire forms were distributed by hand to all of the selected students. All of the form were filled and retrieved. However, 357 form are considered valid for analysis. Thus, thirteen (13) forms are excluded due to missing data. The response rate is 100%. The respondents' characteristics are displayed through the third table.

Table-3. Distribution of the respondents' in accordance with gender and faculty

Variable	Category	Frequency	Percentage
Gender	Male	134	37.53
	Female	223	62.464
Faculty	Scientific faculty	241	67.50
	Human science faulty	116	32.49

Note: N=357

Based on **Table 3**, it was found that 37.53% of the respondents are males and 62.46% of the respondents are females. It was found that 67.50% of the respondents are enrolled in a scientific faculty and 32.49% of the respondents are enrolled in a human science faulty

10.6. Validity

The initial version of the questionnaire was passed to two faculty members specialized in educational sciences. This version is drafted in Arabic language. Those faculty members were asked to provide an assessment for the questionnaire in terms of language, clarity and relevancy. Both faculty members suggested that the items of the questionnaire are clear and relevant to the goals of the study. However, they corrected some language mistakes. After making these correction, the final version of the questionnaire was drafted.

10.7. Reliability

Cronbach alpha coefficient value was calculated. It is 0.821 which is high. That indicates that the questionnaire can provide results that are very reliable.

11. Results and Discussion Related to the Study's Question

The Study's Question: How effective are electronic exams in assessing students at Saudi universities from the perspective of the students?

To get an answer for the study's question, the researcher calculated means. He also calculated standard deviation and presented levels and attitudes. Such data is presented in the fourth table below

Table-4. The effectiveness of electronic exams in assessing students at Saudi universities from the perspective of the students.

No.	Statement	Mean	Std.	Attitude	Level
1.	Electronic exam serves as a secure method for conducting assessment	2.31	0.42	Negative	Low
2.	Electronic exam enables instructors to track the progress achieved by students	4.48	0.64	Positive	High
3.	Electronic exam enables students to answer questions faster	4.34	0.57	Positive	High
4.	Electronic exam improves the students' capability to manage time while taking the exam	4.21	0.93	Positive	High
5.	Electronic exam reduces the anxiety associated with the assessment process	2.20	0.30	Negative	Low
6.	Electronic exam motivates students to show the best performance	4.67	0.12	Positive	High
7.	Electronic exam is suitable for assessing disabled students	4.53	0.28	Positive	High
8.	Electronic exam increases students' concentration level	4.61	0.76	Positive	High
9.	Electronic exam is an objective assessment method	4.75	0.68	Positive	High
10.	Electronic exam improves students' technical skills	2.14	0.51	Negative	Low
11.	Electronic exam is suitable for all courses	2.20	0.77	Negative	Low
12.	Electronic exam can effectively assess one's amount of knowledge	4.74	0.42	Positive	High
13.	The preparation for an electronic exam requires less effort than the preparation for a paper-based exam	2.21	0.91	Negative	Low
14.	Electronic exam enables instructors to save their effort	4.87	0.04	Positive	High
15.	Electronic exam hinders students from cheating	4.91	0.77	Positive	High
	Total	3.81	0.54	Positive	High

Source: The instrument was developed by the researcher based on the following references: Alruwais et al. (2018); Al- Khayat (2017); Ajinaja (2017); Da'asin (2016); Nikolova (2012); Appiah and van Tonder (2018); Alsadoon (2017); Al- Khayat (2017); Al-Momani (2019); Daramola (2017) and Oladimeji et al. (2017).

Based on Table 4, it was found that electronic exams play an effective role in assessing students at Saudi universities from the perspective of the students. That's because the total mean is 3.81 which is high. It was found that electronic exam isn't considered as a secure method for assessing students, because the relevant mean is 2.31. The latter result is inconsistent with what's suggested by Alruwais et al. (2018). It may be attributed to the fact that electronic examination system may be breached or get affected by a virus. It was found that e-exam enables instructors to track the progress achieved by students, because the relevant mean is 4.48. The latter result is consistent with what's suggested by Alruwais et al. (2018). That's because e-exam enables instructors to assess students several times during the semester due to the auto-correction feature.

Based on Table 4, it was found that e-exam enables students to answer questions faster, because the relevant mean is 4.34. The latter result is consistent with the result concluded by Al- Khayat (2017). That's because e-exam usually comes in the form of multiple choice questions which doesn't require typing nor writing. It was found that e-exam improves the students' capability to manage time while taking the exam, because the relevant mean is 4.21. The latter result is consistent with what's suggested by Ajinaja (2017). That's because seeing the remaining time on the e-exam page enables students to manage their time effectively.

Based on Table 4, it was found that e-exam doesn't reduce the anxiety associated with the assessment process, because the relevant mean is 2.20. The latter result is consistent with the result concluded by Da'asin (2016). It was found that e-exam motivates students to show the best performance, because the relevant mean is 4.67. The latter result is consistent with what's suggested by Nikolova (2012). It was found that e-exam is suitable for assessing disabled students, because the relevant mean is 4.53. The latter result is consistent with what's suggested by Appiah and van Tonder (2018). That's because the font of the e-exam page can be adjusted to suit the ones suffering from visual impairment. It was found that e-exam increases students' concentration, because the relevant mean is 4.61. The latter result is consistent with the result concluded by Al- Khayat (2017). It may be attributed to the use of text effects, colours, sounds, and multimedia in e-exam.

Based on Table 4, it was found that e-exam is an objective assessment, because the relevant mean is 4.75. The latter result is consistent with the result concluded by Alsadoon (2017). It was found that e-exam doesn't participate in improving students' technical skills, because the relevant mean is 2.14. The latter result is inconsistent with the result concluded by Alsadoon (2017). It was found that e-exam is not suitable for all courses, because the relevant mean is 2.20. The latter result is consistent with the result concluded by Al- Khayat (2017). That's because some courses require conducting a practical assessment, such as: music and acting courses.

Based on Table 4, it was found that e-exam can effectively assess one's amount of knowledge, because the relevant mean is 4.74. The latter result is consistent with the result concluded by Al-Momani (2019). It was

found that the preparation for an electronic exam doesn't require less effort than the preparation for a paper-based exam, because the relevant mean is 2.21. The latter result is inconsistent with the result concluded by Al- Khayat (2017). It was found that e-exam enables instructors to save effort, because the relevant mean is 4.87. The latter result is consistent with what's suggested by Daramola (2017). It may be attributed to the auto-correction feature. It was found that e-exam hinders students from cheating, because the relevant mean is 4.91. The latter result is consistent with the result concluded by Oladimeji et al. (2017).

12. Conclusion

The researcher found that electronic exams play an effective role in assessing students at Saudi universities from the perspective of the students.. It was found that e-exam enables instructors to track the progress achieved by students and enables students to answer questions faster. It was found that e-exam improves the students' capability to manage time while taking the exam. It was found that e-exam increases students' concentration, and serves as a suitable method for assessing disabled students. It was found that e-exam is an objective assessment method and capable of assessing students' amount of knowledge effectively. It was found that e-exam enables instructors to save their effort, and hinders students from committing acts of cheating. However, it was found that e-exam doesn't reduce the anxiety associated with the assessment process.

13. Recommendations

The researcher recommends:

1. Conducting more studies about the effectiveness of using e-exam in Saudi schools, training centres and vocational colleges.
2. Conducting studies about the obstacles hindering Saudi universities from using electronic exams to assess students. After that, several measures must be taken by Saudi officials to address such obstacles.
3. Encouraging faculty members in Saudi universities to use electronic exam for assessing graduate students.
4. Dedicating more funds to Saudi public schools and taking measures to start assessing students in such schools through using e-exam.
5. Providing faculty members in Saudi universities with more training courses to improve their computer skills.

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Appendix 1 Image for a log in page of students in an e-examination system.

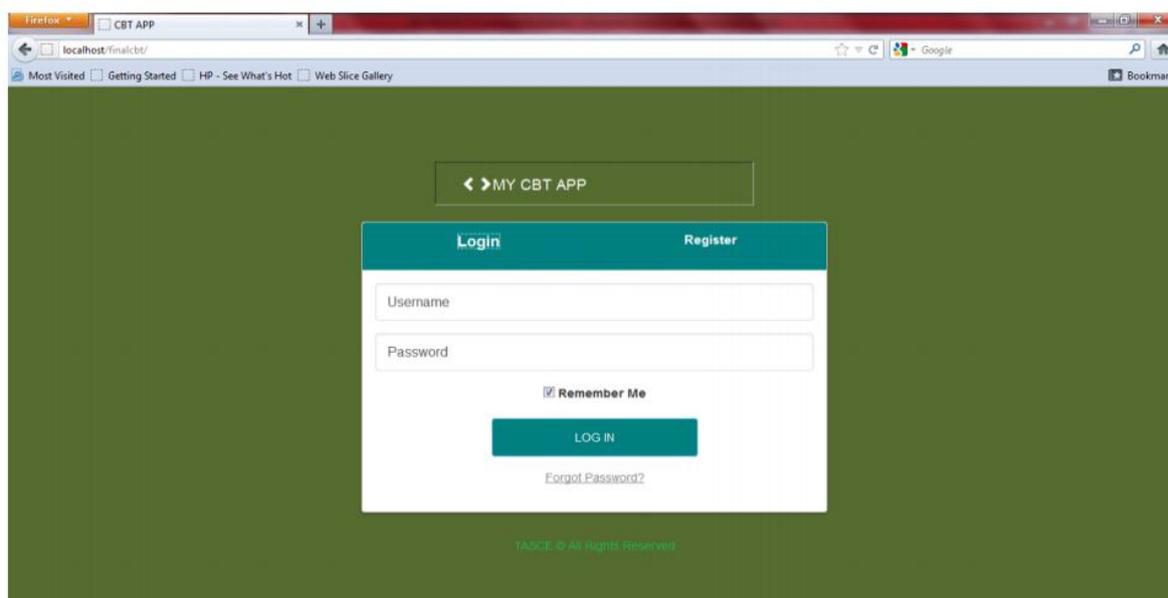


Figure-1. A log in page of students in an e-examination system.

Source: Abass, Olajide, and Samuel (2017).