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Students' Perspective on Online Assessment during the COVID-19 Pandemic in Higher Education Institutions

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Abstract: The main purpose of this analysis was to explore the acceptance of online assessment on the part of students of Princess Sumaya University for Technology (PSUT) in Jordan during the spread of the COVID-19 pandemic. The researchers used a descriptive approach. A questionnaire with 22 items was distributed to a sample of 862 students from a total population of 3446 students of PSUT. SPSS was used to analyze the data. The findings revealed that undergraduate students demonstrated a high degree of acceptance of the implementation of online assessment during the spread of the COVID-19 pandemic. Moreover, the findings also revealed that the degree of acceptance of online assessment varied according to the college variable (in favor of the School of Computing Sciences), and according to computer skills (in favor of students with Moderate computer skills). Finally, there was no statistical significance according to gender variable. The study recommends further studies into the implementation of an online assessments system in higher education institutions.

Keywords: COVID-19 pandemic, Higher education institutions, Online assessment, perspective, Princess Sumaya University for Technology (PSUT).

1 Introduction

Pandemics have been known to have a wide range of effects on human life throughout history [1]. Daniel argues that the COVID-19 pandemic, the effects of which we are still feeling in our lives in several respects, has also wrought huge changes in educational systems all over the globe [2]. One area that has been impacted in this way is education, which has witnessed great challenges and successive developments and improvements due to this pandemic in order to maintain the continuity and quality of education. Moreover, during this pandemic, many governments have completely or partially suspended face-to-face learning systems in their educational institutions in order to slow the growth of COVID-19 [3]. As a result, educational institutions and systems in all nations of the world have attempted to adapt to these changes and challenges by applying appropriate teaching and assessment strategies to the new situations created by the COVID-19 pandemic. The assessment system is considered one of the most essential components of any educational system, since it makes it possible to categorize and sort learners based on their skills, knowledge, abilities, and academic progress. According to Tyler [4] and Castillo Arredondo and Cabrerizo Diago [5], assessment as a process involving the mere verification of the achievement of learning objectives or knowledge should have evolved towards a conception that encompasses regulation, reorientation, and ordering of learning, to improve both the teaching and learning system. Moreover, García-Peñalvoa, Corell, Abella-García and Granded [6] argued that in the learning-oriented assessment approach, the assessment design takes the learning outcomes as its starting point, followed by the assessment process, which, in this case, will be the level of learning acquired and, more specifically, the assessment of the students. According to Spain's National Agency for Quality Assessment and Accreditation (Agencia Nacional de Evaluación de la Calidad y Acreditación), the learning outcomes determine

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assessment activities and methods, as illustrated in Figure 1 [7].

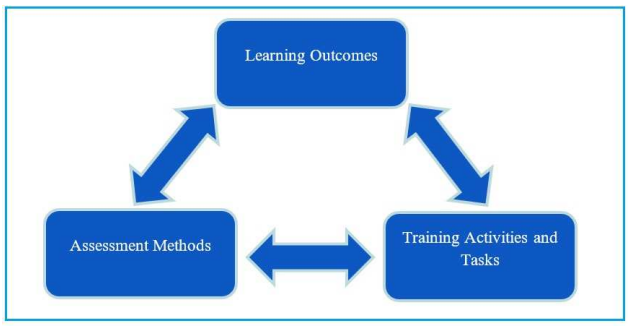

Fig. 1: Triangulation between learning outcomes, training activities, and assessment methods.

Sutton argued that the improvement and development of assessment strategies is a significant prerequisite for academic accreditation for educational institutions [8]. The North Central Association of Colleges and Schools (NCA) and the National Council for Accreditation of Teacher Education (NCATE) consider the assessment system one of the basic and necessary criteria for accreditation. Hence, online assessment came to provide a vital function to the education system during the spread of the COVID-19 pandemic.

The idea of online assessment emerged with the advent of the first computers in the 1970s, whenever the ability of this new technology to create entirely new environments for the design and management of the exams was acknowledged [9]. Online assessments progressed significantly in the 1990s with the widespread diffusion of the internet, which facilitated communication processes and helped to establish online exams as a way of assessing and evaluating students electronically. Furthermore, Russell et al. mentioned that the online assessment system was not used in the educational field before the 1980s, but since this time, studies comparing online tests with paper tests began to appear, identifying factors that affect users' performance on online tests [10]. According to Akdemir and Oguz, the use of computers and the internet for evaluation purposes in higher education institutions around the world increased widely and rapidly from the beginning of the twenty-first century [11]. Nugent pointed out that some nations' governments have shown a trend of adopting online assessment in various stages of public education and higher education [12]. For example, the UK government began to adopt online assessments in public education in 2008 [12]. Online assessment can be defined as all forms of assessment and evaluation that are carried out using digital technologies [13, 14]. There are many studies that highlight a number of advantages of online assessments, in addition to some disadvantages, when compared to conventional printed paper assessments [15–20]. These advantages and disadvantages are illustrated in Figures 2 and 3 below.

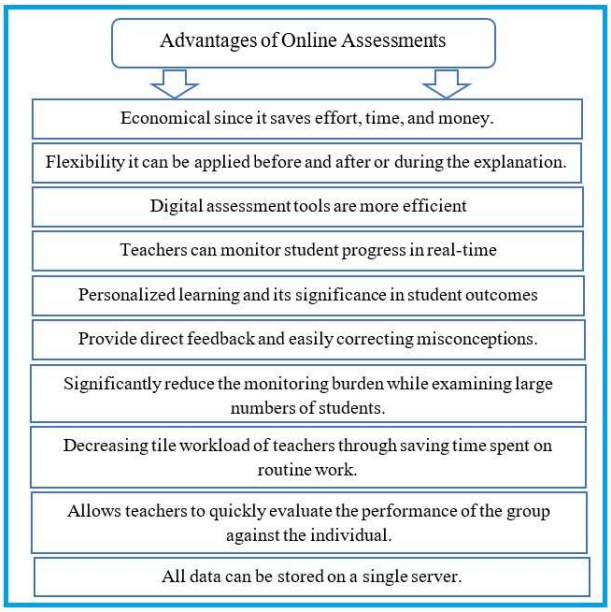

Fig. 2: Advantages of online assessments.

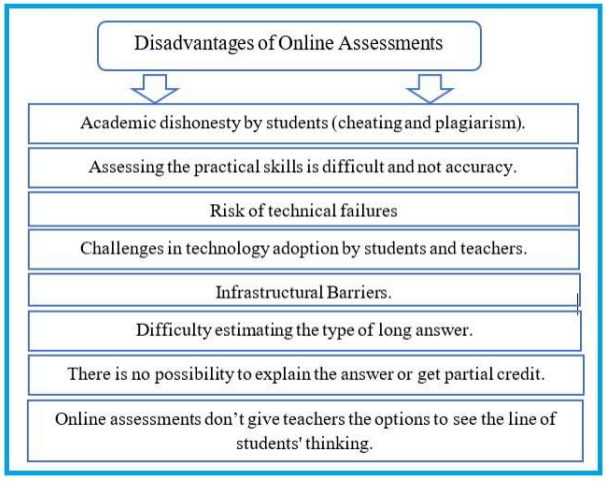

Fig. 3: Disadvantages of Online Assessments.

New technologies, situations, and conditions during the spread of the COVID-19 pandemic have made it possible to apply modern and non-traditional assessment methods, such as computerized assessment, online assessment, remote assessment, and question banks. Due to its

precision and reliability, the online assessment system is now regarded as a rapidly developing assessment instrument during the COVID-19 pandemic in most educational institutions.

Several studies have aimed to explore the application of online assessment in universities and schools, but until now these studies have remained insufficient to establish the success and effectiveness of online assessment in education and learning as a replacement for conventional printed exams [9, 19–26]. Results from these studies focused on the perceptions of students and faculty members concerning the relative benefits, features, and challenges of online assessment and their efficiency compared to conventional paper exams. The results showed that students demonstrated openness and acceptance of online assessment. They also confirmed that they prefer online assessment tests of the type of multiple-choice questions; in addition to a preference for the feature in the online assessment that enables them to re-sit the exam several times in order to improve their scores. Furthermore, the study conducted by Spivey and McMillan indicated that the application of online assessment does not have a negative effect on learners' achievement, and the benefits of online assessment were appropriate and accepted by learners' [26]. Moreover, Wang claimed that the system of online assessments could reduce the burden on teachers and enhance instructional quality [27]. Also, some studies have confirmed that online assessment exams offer direct feedback to students and help improve learning in comparison with conventional paper exams [28–31].

On the other hand, the study conducted by Betlej showed that students were dissatisfied with the inability to explain their responses and answers because of strict computer technology settings, which raised their stress and confusion during the exam [32]. Also, in Gewertz's study, the results showed that students' readiness for the type of online assessment they need to complete, together with the consistency of the exam, ultimately affects their academic results [33]. Moreover, Kim [34] identified reasons for removing the time-limits imposed on electronic exams during the COVID-19 pandemic: it causes unnecessary pressure on students; problems with bandwidth and network connectivity can cause delays; timed exams measure speed, which is only weakly connected with comprehension; electronic exams are not secure from fraud; and time-limits might put an extra burden on learners who need learning accommodations. Furthermore, the study conducted by Da'asin showed that while online assessment might be a reliable tool to measure the focal factors, it may also raise students' anxiety and tension levels and might make it easier to cheat [35]. Also, Eshet-Alkalai and Geri pointed out that learners preferred print to digital displays during their studying and exams, as reading electronic online exams may lead to more cognitive stress load on the reader compared to reading from print exams [36].

Most educational institutions started using the online assessment system during the COVID-19 pandemic due to its positive features, such as reductions in the time required for students' exams, and ease of monitoring learners during their examinations [37]. Moreover, The authors in [38] concluded that there is a positive relationship between the service quality dimensions and students' satisfaction. However, students' perspectives on online assessment during the COVID-19 pandemic in higher education institutions in Middle East countries. A thorough review of the literature identified no studies that have been conducted in these countries aimed at exploring students' views about online assessment. Thus, the study sought to investigate the students' perspectives about the implementation of online assessments during the COVID-19 pandemic in higher education institutions at Princess Sumaya University for Technology (PSUT) in Jordan. Online assessments were carried out at PSUT in Jordan, in the fall of 2020 during the spread of COVID-19. The current study is therefore aimed at investigating students' acceptance of the implementation of online assessment in their university. Moreover, this study may provide educational experts and managers of higher education institutions such as universities with valuable information about students' acceptance of the online assessment implemented during the spread of the COVID-19 pandemic. In turn, this will assist in the adoption of online assessment as a reliable assessment instrument, and a valid alternative to traditional printed examinations in higher education institutions in the future. In order to explore the degree of acceptance of online assessment during the spread of the COVID-19 pandemic of students of PSUT in Jordan, the following research questions are formulated:

RQ1: To what extent did PSUT students accept online assessment during the spread of the COVID-19 pandemic?

RQ2: Does PSUT students' degree of acceptance of online assessment during the spread of COVID-19 vary according to gender, college, and computer skills?

2 Method

2.1 Approach of the Study

The current analysis was carried using a descriptive method approach, which is a type of research that describes an under-examined population, condition, or phenomenon by gathering quantifiable data that can be used for statistical analysis [39]. Thus, a questionnaire tool was used to gather data from a sample of the population.

2.2 Population of Study

The study population consisted from all male and female students of all PSUT colleges registered in the first

semester in the academic year 2020/2021. The total number was 3446 undergraduate students, as shown in Table 1 and Figure 4.

Table 1: Study Population

	College	# of students	(%)
1	School of Computing Sciences	1005	29.2%
5	School of Engineering	851	24.7%
3	School of Business Technology	1590	46.1%
	Total	**3446**	**100.0%**

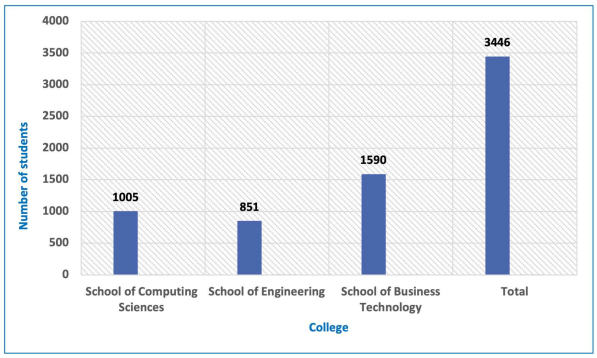

Fig. 4: Research population.

2.3 Sample

A sample of 25% of the population of each college was taken by the investigators. A random sampling method, implemented through a stratified sample technique, was used to obtain the sample for this study, which totaled 862 (3446 * 25/100 = 861.5 nearly 862) students. For example, for the students of the School of Computing Sciences, 1005 * 25/100 = 251.25 = 251, which indicated that a sample of 251 students was required from this college. As a percentage of the total sample, School of Computing Sciences students were 251/862 * 100 = 29.12%. The same process was followed for the other colleges (see Table 2 and Figure 5).

Table 2: Research Sample

	College	# of students	Percentage (%)
1	School of Computing Sciences	251	29.1%
2	School of Engineering	213	24.7%
3	School of Business Technology	398	46.2%
	Total	**862**	**100.0%**

A total of 862 questionnaires were distributed to students in order to collect the data needed to achieve the study

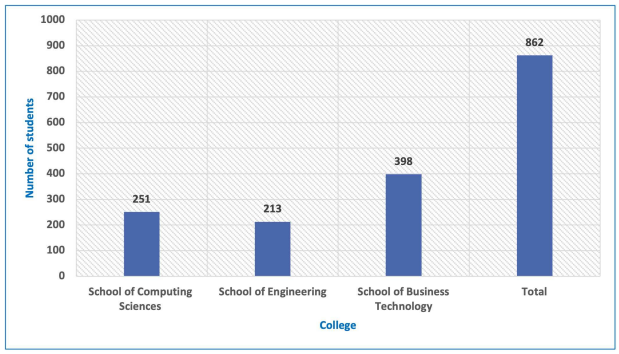

Fig. 5: Research sample.

Table 3: Demographic Information of Students

Study variables	Variables levels	Frequency (f)	Percentage (%)
Gender	Female	389	47.3%
	Male	434	52.7%
	Total	**823**	**100.0%**
College	School of Computing Sciences	237	28.8%
	School of Engineering	201	24.4%
	School of Business Technology	385	46.8%
	Total	**823**	**100.0%**
Computer skills	Poor	98	11.9%
	Moderate	200	24.3%
	Good	301	36.6%
	Excellent	224	27.2%
	Total	**823**	**100.0%**

objectives. Of these, 823 were returned completed correctly and in full. A number of learners (n=39) across all selected colleges did not responding correctly to the questionnaire. Consequently, the sample became 823 students. Table 3 shows the demographic data for the selected sample of students who answered the questionnaire correctly.

2.4 Study Instrument

The questionnaire was used to gather data from the sample students. It was sent to them during the first semester of the academic year 2020/2021, during the occurrence of the COVID-19 pandemic. During the design of the questionnaire, similar research in this area was reviewed, such as studies conducted by Hassan and Al Mari [40] and Shraim [41]. The questionnaire comprised two sections. The first section concerned students' basic information, and the second part consisted of the questionnaire items (n=22) based on the study's objectives.

- **The validity of the instrument**

A group of arbitrators (9 faculty members of UAE universities) with extensive experience in the field of education were asked to express their views on the items of the questionnaire, in terms of the relevance of items for achieving the research aims and the number and comprehensiveness of the questionnaire items. The

educational specialists' comments and suggested modifications were taken into account, and relevant deletions, amendments, and additions were made. As a result, the questionnaire after modification consisted of 22 items, to achieve the objective of the research.

- **Reliability of the instrument**

To verify the internal consistency of the study tool, Cronbach's alpha was used. It was applied to a pilot study involving 40 students from outside the study sample, for which the calculated Cronbach alpha coefficient was 0.852.

2.5 Data Analysis Measures

In this analysis, a five-dimensional Likert scale is implemented, as shown in Figure 6 below.

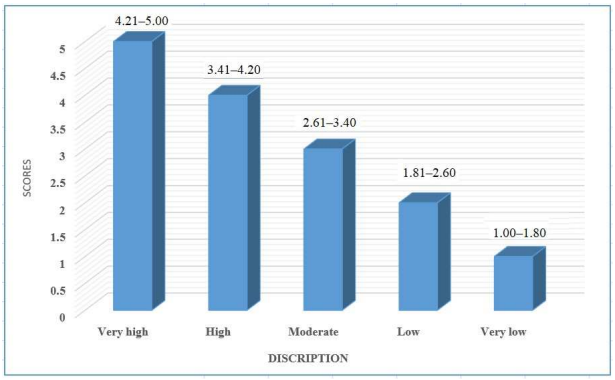

Fig. 6: Evaluation of scale data based on the options of scale and score intervals.

2.6 Statistical Analysis of the Data

For data analysis, the researchers utilized the Statistical Package for the Social Sciences (SPSS) to compute the percentage, mean, standard deviation (SD), independent t-test tests, one-way ANOVA, and the Scheffe test.

3 Results

3.1 ***Findings of the study attributed to Question 1:*** *To what extent did PSUT students accept online assessment during the spread of the COVID-19 pandemic?*

To address the first research question, we computed average scores and standard deviations of students' responses to every one of the questions 122, which were relevant to the students' acceptance of online assessment during the spread COVID-19 pandemic, as seen in Table 4.

Table 4: Descriptive Statistics for the Students' Responses to the Items About the Degree of Acceptance of Online Assessment During The Spread COVID-19 Pandemic.

No.	Paragraphs	Mean	SD	Description
Q1	Online assessment limits cheating attempts.	2.62	1.12	Moderate
Q2	Online assessment serves as an accurate and reliable assessment method.	3.23	1.38	Moderate
Q3	Online assessment is more environmentally friendly than paper exam.	3.02	1.15	Moderate
Q4	The design of the online assessment test interface is appropriate.	3.99	0.95	High
Q5	Online assessment provides the ability to easily identify and access unanswered questions.	2.84	1.15	Moderate
Q6	Online assessment measures what it is intended to measure.	2.85	1.25	Moderate
Q7	The number of online assessment questions is sufficient.	3.44	1.08	High
Q8	Online assessment times are appropriate for students.	3.39	1.17	Moderate
Q9	Online assessment is suitable for assessing students on any course.	2.68	1.21	Moderate
Q10	Students do not need external help when using the computer.	2.70	1.14	Moderate
Q11	The online assessment system is clear and specific.	3.61	1.08	High
Q12	I prefer taking a paper-based exam to assess my knowledge more than online assessment.	3.54	1.30	High
Q13	Taking the online assessment requires less time than taking the paper-based exam.	3.57	1.22	High
Q14	Online assessment makes me feel less stressed than paper-based exam.	3.61	1.23	High
Q15	Online assessment helps raise the efficiency of student achievement.	3.56	1.27	High
Q16	Online assessment regulations are clear and easy to understand.	3.67	1.32	High
Q17	Online assessment serves as a flexible assessment method.	4.27	0.91	Very High
Q18	Online assessment enables me to show a better academic achievement.	3.73	1.25	High
Q19	In general, I prefer taking online assessment more than taking paper-based exam.	3.82	1.04	High
Q20	The online assessment log-in interface is clear and easy to operate.	3.81	1.24	High
Q21	Online assessment provides a more engaging experience than using paper.	3.88	2.20	High
Q22	The online assessment facilitates the extraction of results in a fast and effective manner.	4.11	0.99	High
Total		**3.45**	**1.21**	**High**

The findings shown in Table 4 show that the mean for responses for all items (1–22) was 3.45 (SD 1.21), indicating that the students showed a High acceptance of online assessment during the COVID-19 pandemic. This finding might indicate that most students of PSUT preferred online assessment to traditional paper exams during the COVID-19 pandemic. It is also evident from the results in Table 4 that the students' answers to Q-17 ('Online assessment serves as a flexible assessment method') was given the highest mean value (4.27) at a very high degree, and Q-22 ('Online assessment facilitates the extraction of results in a fast and effective manner') came in second, also at a high level with a mean value of 4.11. Also, Q-4 ('The design of the online assessment test interface is appropriate') came in third, at a high level with a mean value of 3.99. Furthermore, Q-21 ('Online assessment provides a more engaging experience than using paper') came in fourth, at a high level also with a mean value of 3.88. Moreover, it is also evident from the students' responses to Q-19 ('In general, I prefer taking online assessment more than taking paper-based exam') that this question was rated as having the fifth highest degree of acceptance of using the online assessment, with a mean of 3.82, and came at a high degree. Similarly, a high degree was also found for Qs 20, 18, 16, 11, 14, 13, 15, 12, and 7, with the respective mean values of 3.81, 3.73, 3.67, 3.61, 3.61, 3.57, 3.56, 3.54, and 3.44. The lowest mean (2.62) was acquired for Q-1 ('Online assessment limits cheating attempts'), suggesting a Moderate degree. In the same way, a Moderate degree was also obtained for Qs 9, 5, 6, 10, 3, 2, and 8, with the respective mean values of 2.68, 2.84, 2.85, 2.70, 3.02, 3.23, and 2.56.

*3.2 **Findings of the study attributed to Question 2:** Does PSUT students' degree of acceptance of online assessment during the spread of COVID-19 vary according to gender, college, and computer skills?*

Mean scores and SD were calculated for questions, and t-test, one-way ANOVA test, and Scheffe's post-hoc comparison test were also conducted to determine the significance of the variations between averages. The findings of the answers to the study subjects are listed below according to the study variables.

3.2.1 **First: Gender variations among students**

A t-test was utilized to assess the significance of the differences between the averages of the acceptance of online assessment by undergraduate students at PSUT during the spread COVID-19 according to gender, as shown in Table 5.

Table 5: Means and SD of the Students' Answers Based on Gender

Gender	N	Mean	SD	Mean Difference	T. Value	df	Sig.
Female	390	3.42	0.548	0.064	1.704	821	0.089
Male	433	3.48	0.534				

* Statistically significant at ($p<0.05$)

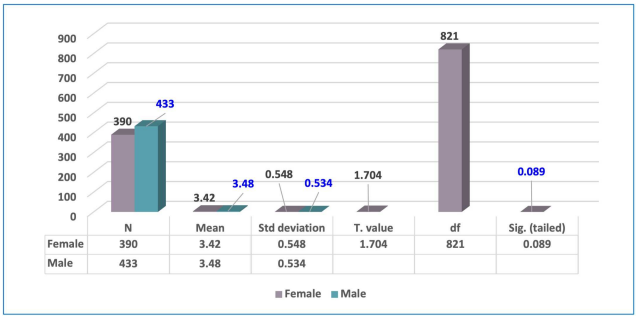

Fig. 7: Means and standard deviations of the students' answers based on gender.

As presented in Table 5 and Figure 7, the findings clearly illustrated that the computed t value was 1.704, which is smaller than the (t) table, indicating that there is no significant difference between the mean values for males and females, at the significance level of 0.089, which is greater than the required statistical significance level (0.05). The result means that male and female students at PSUT accepted the online assessment system at approximately the same level during the spread of COVID-19.

3.2.2 **Second: College variable among students**

A one-way ANOVA test was utilized to assess the significance of the differences between averages of PSUT undergraduate students' acceptance of online assessment during the spread COVID-19, according to the college variable. The findings of the one-way ANOVA test of this variable are shown in Table 6, Figure 8 and Figure 9.

Table 6: One-way ANOVA test for College Variable Among Students

		Sum of squares	df	Mean square	F	Sig. (tailed)	Sig. level
College variable	**Between Groups**	4.693	2	2.346	8.138	0.001	Significant
	Within Groups	236.435	820	0.288			
	Total	241.127	822				

* Statistically significant at ($p<0.05$)

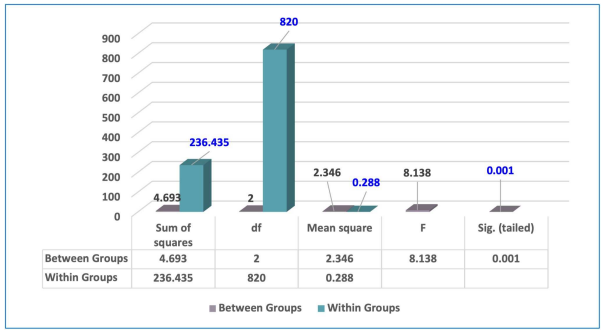

Fig. 8: One-way ANOVA test for college variable among students

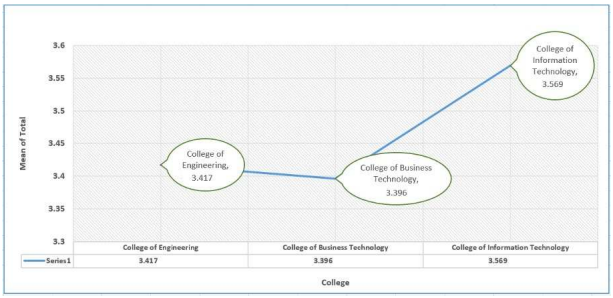

Fig. 9: Means plots.

As displayed in Table 6, Figure 8 and Figure 9, the results clearly illustrated that there are statistically significant differences in students' perspectives according to the variable of college, as the p-value is 0.001, which is less than the required statistical significance level (0.05). Therefore, in order to identify the source of the differences, the Scheffe test was used for the following

comparisons, and the findings are shown in Table 7 below. The results shown in Table 7 emphasize that the source of the differences in the students' acceptance of online assessment according to the variable of college was in favor of students of the School of Computing Sciences.

Table 7: The Scheffe Test Results According to the College Variable

(I) College	(J) College	Mean Difference (I-J)	Sig.
School of Engineering	School of Business Technology	0.021	0.905
	School of Computing Sciences	-0.152*	0.013
School of Business Technology	School of Engineering	-0.021	0.905
	School of Computing Sciences	-0.173*	0.001
School of Computing Sciences	School of Engineering	0.152*	0.013
	School of Business Technology	0.173*	0.001

* Statistically significant at ($p<0.05$)

Third: Computer Skills Variable Among Students

A one-way ANOVA test was utilized to assess the significance of the differences between averages of the acceptance of online assessment by undergraduate students at PSUT during the spread COVID-19, according to the computer skills variable. The findings of the one-way ANOVA test of this variable are shown in Table 8, Figure 10 and Figure 11. As displayed in Table 8, Figure 10 and Figure 11, the results clearly illustrate that there are statistically significant differences in students' perspectives according to the variable of computer skills, as the p-value is 0.003, which is less than the required statistical significance level (0.05).

Table 8: One-way ANOVA Test for Computer Skills Variable Among Students

		Sum of squares	df	Mean square	F	Sig. (tailed)	Sig. level
Computer Skills	Between Groups	5.536	4	1.384	3.966	0.003*	Significant
	Within Groups	606.179	1737	0.349			
	Total	611.715	1741				

* Statistically significant at ($p<0.05$)

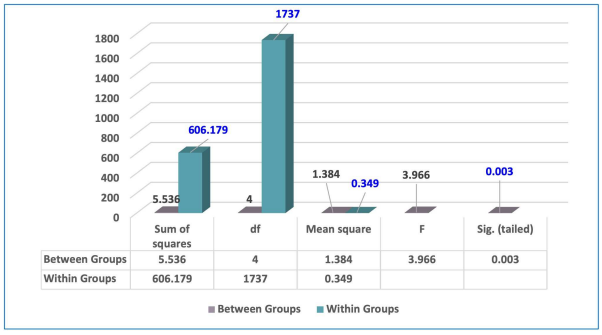

Fig. 10: One-way ANOVA test for computer skills variable among students.

Therefore, in order to identify the source of the differences, the Scheffe test was used for the following comparisons, and the findings are shown in Table 9 below. The results shown in Table 9 indicate that the source of the differences in the students' acceptance of online assessment according to the variable of computer skills was in favor of students with Moderate computer skills.

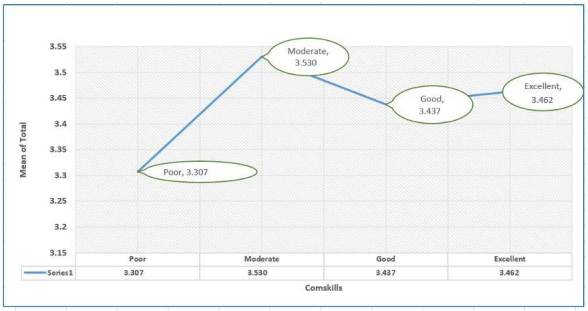

Fig. 11: Means plots.

Table 9: The Results of the Scheffe Test According to the Computer Skills Variable

(I) computer skills	(J) computer skills	Mean difference (I-J)	Sig.
Poor	Moderate	-0.223*	.011
	Good	-0.130	.229
	Excellent	-0.155	.130
Moderate	Poor	0.223*	.011
	Good	0.093	.314
	Excellent	0.068	.641
Good	Poor	0.130	.229
	Moderate	-0.093	.314
	Excellent	-0.025	.965
Excellent	Poor	0.155	.130
	Moderate	-0.068	.641
	Good	0.025	.965

* Statistically significant at ($p<0.05$)

4 Discussion

To what extent did PSUT students accept online assessment during the spread of the COVID-19 pandemic?

Results for the first research question on PSUT students' degree of acceptance of online assessment during the spread of the COVID-19 pandemic indicate that, from the students' own perspective, the degree of acceptance of online assessment was at a High level, with general arithmetic mean of 3.45 and standard deviation of 1.21. The High acceptance level found in this study might mean that most of the undergraduate students at PSUT prefer to accept the implementation of online assessment during the COVID-19 pandemic, compared to traditional paper-based exams. Based on the results in Table 4, related to the students' responses to the questionnaire items, it was noted that most of their responses (14 from 22 questions) indicated positive attitudes towards the

implementation of online assessment at PSUT. Items Q-4, Q-7, Q-11, Q-12, Q-13, Q-14, Q-15, Q-16, Q-17, Q-18, Q-19, Q-20, Q-21, and Q-22 all indicated high degrees of acceptance. This implies that undergraduate students of PSUT may be satisfied to accept the application of online assessment in their university throughout the Covid-19 pandemic's spread. Findings indicated that this high level of acceptance could be attributable to features of online examinations such as quicker feedback and marks, saving time, flexibility, environmentally friendly, easy to identify and access unanswered questions, the system of electronic exams being clear and easy, and the ability to take the exam anywhere and at any time. These findings are consistent with previous research [6, 19–26, 42, 43]. According to the findings of these studies, students of PSUT are open to and accepting of online assessment, and they also confirmed that they prefer online assessment. Furthermore, the findings support previous research [28–31] that found that students prefer online assessment because it provides faster feedback and helps them improve their learning and understanding of curriculum content when compared to conventional paper exams.

In contrast, however, some of the students' responses in some studies [32–34, 44] showed negative attitudes towards the implementation of an online assessment, because students believed that online assessments were lowering their academic results and making them dependent on multiple-choice questions. Moreover, the results of these studies also showed that the students' fear of internet interruption during their completion of online assessment tests would cause them great anxiety. Furthermore, we can see that PSUT undergraduate students' responses to Q-1 ('Online assessment limits cheating attempts') showed a Moderate level, with a mean value of 2.62. This may mean that students at PSUT feel that there are multiple opportunities for them to cheat during their online assessment process. This finding is consistent with other studies, such as the one conducted by King et al. [45] and another by Da'asin [35], which found that students believe it is easier to cheat when they are assessed online. Furthermore, the findings of these studies indicated that while online assessments may be a reliable tool for measuring what they aim to measure, they may also increase students' anxiety and tension levels, making cheating easier.

The second research question focused on determining whether the degree of acceptance of online assessment by undergraduate students at PSUT students' during the spread COVID-19 varied, from the students' perspectives, according to gender, college, and academic year. Our findings (as shown in Tables 5, 6, 7, 8, and 9, as well as Figures 7, 8, 9, 10, and 11) revealed that the degree of acceptance of online assessment by undergraduate students at PSUT did not differ by gender, implying that male and female students at PSUT accepted the online assessment system at roughly the same level during the spread of COVID-19. Also, the results indicate that acceptance also varies according to college type (in favor of the School of Computing Sciences.), and according to computer skills (in favor of students with Moderate computer skills). Like any other analysis, this study has some limitations that should be acknowledged. First, this study was limited to the responses of Princess Sumaya University of Technology (PSUT) students, and faculty responses were not taken. Second: The study was limited to a sample size of 823 students representing 25% of the study population.

5 Conclusion

As we know, due to the spread of the COVID-19 pandemic, most educational institutions, such as universities and schools, have moved toward utilizing technology in the process of assessing students through the implementation of online assessment during the educational process. The current study sought to investigate PSUT undergraduate students' acceptance of online assessment during the spread of the COVID-19 pandemic. The results showed that PSUT students showed high acceptance of online assessment during the spread of the COVID-19 pandemic, with an overall mean and standard deviation of 3.45 and 1.21, respectively, which means that PSUT students gave a positive impression of it in their responses to the items of the questionnaire. This impression might be due to the advantages associated with online assessment, such as quicker feedback and marks, time savings, environmental friendliness, ease of identifying and accessing unanswered questions, the system of electronic exams being clear and easy, and the ability of learners to take the exam anywhere and at any time. Moreover, the findings indicated that there are no differences according to students' gender in their acceptance of the online assessment system, with both genders demonstrating roughly the same level of acceptance. Also, the findings indicate that acceptance of online assessment varies according to college type (in favor of the School of Computing Sciences), and according to computer skills (in favor of students with Moderate computer skills).

6 Implications and Recommendations

Despite the above limitations, the following educational implications and recommendations are outlined for future implementation of online assessment systems, and for studies of it:

- During the COVID-19 pandemic, most universities and schools made the decision to avoid all in-person contact and close their campuses completely, which led to the use of online assessments rather than traditional paper exams. As a result, it is critical to provide students with accurate and fair grades. This

necessitates universities providing ongoing protection systems for these online assessments.
– Suitable solutions must be found for technical issues and internet disruptions encountered during the implementation of the online assessment.
– Processes must be created to ensure that there are no instances of cheating during online assessment.
– Similar studies should be conducted on the implementation of online assessment in educational institutions.

7 Delimitations of the Study

– *Location Limit:* Princess Sumaya University for Technology (PSUT), Main campus, Amman, Jordan.
– *Time Limit:* First semester of the academic year 2020/2021.
– *Human Limit:* The students of Princess Sumaya University for Technology (PSUT), in all colleges.

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Availability of data and materials
While we would have liked to share the data, it is primary, and sharing it would therefore pose a risk of breaches of participant confidentiality.

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Competing interests
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