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Medical Students' Evaluation of Online Assessment: A Mixed-Method Account of Attitudes and Obstacles

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Abstract. This mixed-method account explores the medical students' perceptions and attitudes regarding online assessment in two Palestinian universities. The researchers aimed at identifying the way medical students look at online assessment, as well as the pitfalls and the drawbacks of such an atypical evaluation method at the university level. Of the large number of medical students enrolled in the two universities, 302 completed and returned the survey, and 61 students were selected to interpret their open responses qualitatively. The study findings suggest that the evaluation of Al-Quds University in Jerusalem was better and higher than that of the An-Najah National University in Nablus. Statistically significant differences were found, when some demographic variables, i.e., gender and year of study interaction were selected. Finally, the study respondents highlighted a number of drawbacks for online assessment, which the researchers sorted into eight main categories that varied in percentages. The medical students showed their dissatisfaction with this type of assessment, for many considerations, including, but not limited to, technical and administrative matters in nature.

Keywords: evaluation; medical students; online assessment; perceptions; technical problems

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1. Introduction

A lot of factors have recently emphasised the necessity to opt for the adoption of online teaching and learning. The tremendous technological advances, educators' and students' high expectations, and the rise of unexpectedly urgent conditions and demands, all dictate that the majority of educational institutions should seriously consider the use of modern technology in learning/teaching situations. Consequently, a large number of higher educational institutions worldwide have currently been incorporating computer technology for a considerable time.

Pedagogically, education is not merely communicating information to learners in a passive way. Rather, students acquire information, or knowledge, by being actively engaged socially, psychologically and cognitively, as they construct meanings. This is deeply rooted in the constructivist model, in which such factors as socio-cultural and emotional beliefs, values and attitudes significantly impact students' learning outcomes and their interaction in schools (Ambrose et al., 2010). As such, the main premise of the constructivist approach revolves around bringing the learner to the forefront of the teaching/learning situation, while adopting relevant pedagogical strategies that build on students' diverse needs, interests, strengths, and expectations, and that are conducive to their academic success and social development (Richardson & Fleer, 2003).

Students are very likely to develop meaningful knowledge, based on their experiences away from stringent, firm classroom regulations; and they might then well suggest their own relevant assessment techniques that are very necessary in the teaching/learning process (Kottail, 2009); they also learn better when they are provided with opportunities to be part of the assessment approach that is used in the classroom. It has been argued that the application of various evaluation and assessment techniques, within the boundaries of the constructivist model, promotes students' critical thinking skills and increases their academic achievement.

Additionally, involving students in educational assessment may have future positive outcomes in their lives. It should also reduce instructors' anxieties or concerns. In fact, relevant and meaningful forms of assessment tend effectively to measure and "evaluate judgment, attitude and behaviour, in addition to knowledge, and skills" (Harris et al., 2017, p. 605).

The quality of educational assessment processes should be based on universal standards, as well as on students' unique and preferred learning styles and intelligence levels (Harris et al., 2017). While this can be a challenging process, it might be facilitated by integrating alternative assessment strategies, including the online assessment technique (Bennett, 2011). This new type of assessment could well result in improving students' performance outcomes. In fact, this approach can help in overcoming the gaps in traditional assessment that might not be suitable for assessing higher-level cognitive and affective skills (Kuh et al. 2014).

Using technology in the process of assessment has become a reality that ranges from developing examinations to storing results for future use. It is intended for assessing learners' prior knowledge, skills, and abilities; it also aims to create and manage materials and resources, in addition to providing feedback (Cakiroglu et

al., 2017). E-assessment provides new methods and opportunities for various types of assessment related to various types of knowledge (Alruwais, Wills & Wald, 2018; Chang et al., 2013; Crews & Curtis, 2010; Kuriakose & Luwes, 2016).

Furthermore, electronic assessment helps to reduce the work load of instructors and students; since it is likely to be accessed at anytime and anywhere (Cukusic et al., 2014). Accordingly, it is easy for educators and school administrators to gather data, to conduct statistical analyses and to test the results (Broughton, 2013; Douglas, 2012); and consequently, to make good decisions (Duran et al., 2013). Furthermore, e-assessment can be easily reproduced and utilized; since it needs no more than a simple computer, or a smart phone with an internet connection. This would make it possible to measure students' outcomes, and to instantaneously, help them to get direct and immediate feedback on their performance (Alruwais, Wills & Wald, 2018; Betlej, 2013).

It is intended to promote authentic assessment, as well as to facilitate testing and collaboration (Guo et al., 2014; Johnson & Davies, 2012). Electronic testing is more cost-effective, and easier to handle, to administer and to score, more reliable and easier to replicate; and sometimes, it is more authentic, objective, and bias-free, when marking students' responses (Jordan & Mitchell, 2009; Khare & Lam, 2008). It also allows instructors to use questions that promote interactivity and the use of multimedia (Lahad et al., 2004), which would undoubtedly benefit students who are subjected to this form of evaluation (Ali et al., 2021).

Online assessment may face some challenges and obstacles. For instance, some students may be inexperienced in handling computer programs and online assessment techniques (Alruwais, Wills & Wald, 2018). Another challenge may relate to computer availability and internet connection (Ridgway et al., 2004), as well as to the lack of sufficient and good infrastructure (Ridgway et al., 2004), especially in poor countries like Palestine.

It is also possible for some teachers to face problems, when they are forced to use e-assessment techniques, especially for the first time; some instructors may lack the necessary experience, or they may not be familiar with the technology; and consequently, this may pose problems for students, such as delaying the loading of exams (Ogletree et al., 2014; Russell & Shepherd, 2010).

Furthermore, there is the open-question issue; marking open questions, such as explaining, and listing items would then be difficult to handle (Stodberg, 2012). Student identification is another major challenge that exacerbates the reluctance to adopt online assessment; needless to say, learners cannot be verified easily, although being remote. Cheating is another pitfall of online assessment; when students take an exam that is not invigilated. Cheating more than doubles in such situations (Osuji, 2012; Stodberg, 2012; Yates & Beaudrie, 2009).

Students have different attitudes and perspectives towards their instructors, the teaching/learning methodologies, as well as the assessment techniques used to evaluate their performance. They also have their own reservations about the effectiveness in certain circumstances. The current study aimed to identify medical students' evaluation of online assessment, which had been used for a

whole year in two Palestinian universities. The researchers attempted to answer the following two questions: 1) Do medical students' evaluation of the electronic assessment differ, according to students' gender, level (academic year), and total average?: and 2) What are the major obstacles that face educators, when using online/electronic assessment?

2. Methods

To carry out the current quantitative/qualitative study, institutional consent and approval had to be obtained from the two university vice-presidents of academic affairs, the directors of the Electronic-Learning Centre, the deans of Scientific Research Departments, as well as the research Ethics Committees. Quantitatively, a descriptive online questionnaire was compiled to explore the way medical students evaluate and perceive online assessment during the COVID-19 pandemic, in the academic year of 2019/2020. As the researchers were interested in examining the relevant information efficiently, e-assessment as an evaluation tool, which was conceived comprehensively, in order to include any possible advantage, or to exclude any disadvantage that might be relevant to instruction and/or education at the university level.

The survey included 100 constructed declarative statements, which were sent to 40 arbitrators, whose scores were collected; and the correlation between each paragraph and the total was calculated; and then the paragraphs, the correlation of which was found to be less than 0.6, were deleted. Then, the mean scores for the first and last quarters were calculated by the arbitrators, for rating the paragraphs. A t-test of two independent samples between the means of the two quarters for each paragraph was calculated, and the paragraphs for which the differences were not statistically significant, were deleted – simply because the researchers were merely interested in the paragraphs that are distinguished by high discrimination. Finally, 35 high discrimination items that were of significant relevance and correlation to the concept of e-assessment were retained.

To ensure the questionnaire's validity, factorial validity was calculated by using the Kaiser-Mayer-Olkin test; this was found to be 0.0955 which ensured that the items were suitable for exploratory-factor analysis. To exclude orthogonal items, the principal-component method and the Oblimin rotation method were used; consequently, items (9, 10, 11, 24, 29, 34) the communality degree, or factor loading of which was less than 0.3, were excluded. In total, 29 items were retained, as shown in the scree plot below.

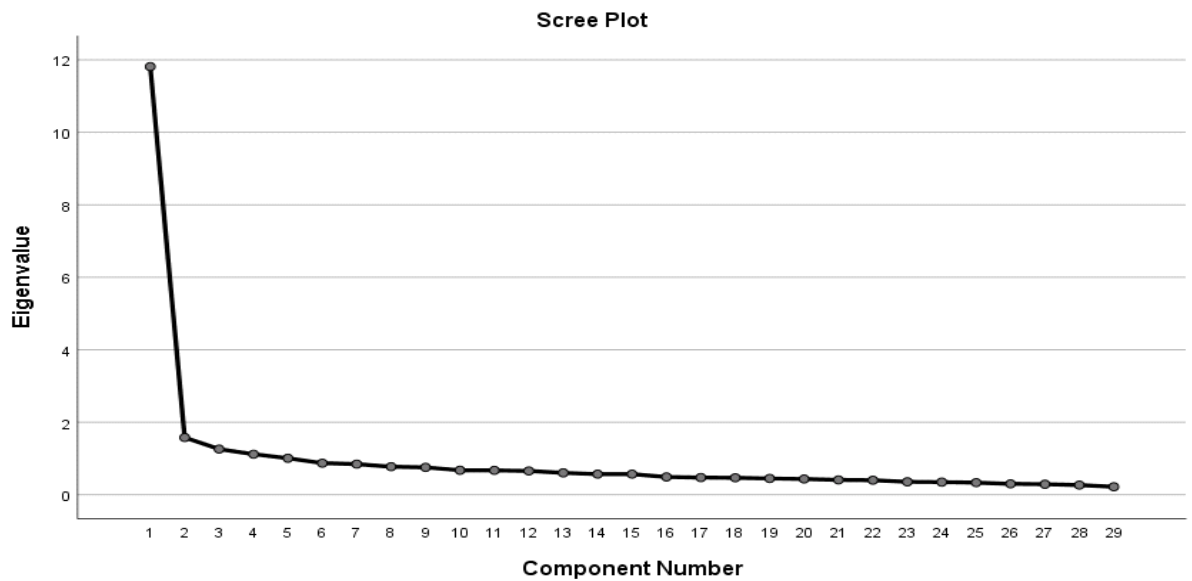


Figure 1: Scree plot for the number of dimensions in the questionnaire

Clearly here, there was a dominant dimension; since there was one inflection point, which represented 41% of the explained variance, as shown in Table 1 below. Consequently, the questionnaire was considered suitable, according to the factorial-validity analysis.

Table: Total Variance explained for the dominant dimension of the questionnaire

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% Variance	Cumulative %	Total	% Variance	Cumulative %
1	11.812	40.733	40.733	11.812	40.733	40.733

To ensure the reliability of the questionnaire, Cronbach's Alpha was calculated. Cronbach's Alpha coefficient was 0.946 for the total of 29 items. The alpha value was higher than 0.7; this shows that the questionnaire is reliable. Eventually, the questionnaire was posted for medical students to complete online. 302 survey instruments were completed and returned for analysis.

Qualitatively, the principal study tool also required students to provide information about their attitude towards online assessment, the various obstacles they faced and the ways to overcome them, in order to complement and inform the quantitative findings by providing valuable data that would help to understand online assessment and the students' attitudes towards it. Sixty-one students from each university were randomly selected; and their responses were analyzed by using MAXQDA. The researchers sorted through the obstacles and classified them into eight different codes, as follows: ethical, administrative, training, time, technical, negative attitudes, substantive issues, and psychological problems.

2.1. Sample

The population of this study included those students who study medicine at An-Najah National University in Nablus and those at the Al-Quds University in Jerusalem. However, few students answered the survey ($n = 302$), with 151 from each university. A total of 61 students' responses were randomly selected, in order to account for the qualitative analysis of the data.

2.2. Procedures

Eventually, the questionnaire was posted to the university students online; it was written in the students' native language (Arabic), to ensure that all the students fully understood the survey items. A total of 302 survey instruments were completed and returned for analysis. Data collection was carried out during the first semester of the academic year of 2019/2020.

Quantitatively, the data were normally distributed and analyzed by using descriptive statistics; factorial ANOVA was used to calculate the mean differences between the demographic elemental scores, by using the SPSS version 26. The principal study tools also required students to provide information about their attitudes, opinions and perspectives on e-assessment, in order to complement and inform the quantitative findings by providing valuable data that examined students' attitudes towards these matters.

Qualitatively, MAXQDA was used by the researchers themselves, in order to calculate the frequencies, percentages and students' responses, and their opinions, as well as the information provided on the open-ended questions. MAXQDA is a software program designed for computer-assisted qualitative methods, data and text analysis; it offers tools for the organization and analysis of qualitative data, especially those obtained as texts, in order to attain a valuable explanation and a comprehensive understanding or interpretation of a phenomenon, or a tendency [MAXQDA: The Art of Data Analysis, n.d.].

2.3. Analysis

Quantitatively, the data were normally distributed and analyzed by using descriptive statistics; and factorial ANOVA was used to calculate the mean differences between the demographic elemental scores by using the SPSS version 26. Qualitatively, MAXQDA was used to calculate the frequencies, percentages, and students' responses to the open questions.

3. The Results

3.1. Demographic characteristics and the evaluation of the online assessment

To answer the first question, (302) students studying medicine and health sciences at An-Najah National University ($n = 151$) and Al-Quds University ($n = 151$) responded to the questionnaire. The descriptive statistics of the students' responses were calculated, based on the demographic variables; the results are shown in Table 2.

Table 2: Demographic features of respondents and the results

		An Najah University			Al Quds University		
		N	M	S.D.	N	M	S.D.
Gender	Male	51	3.10	0.85	46	3.45	0.55
	Female	100	3.07	0.63	105	3.21	0.50
Average	Excellent	23	2.79	0.81	20	3.33	0.75
	Very good	57	3.25	0.60	60	3.30	0.56
	Good	57	3.03	0.77	61	3.25	0.42
	Fair	14	3.08	0.53	10	3.28	0.38
Year	Freshman	17	2.78	1.12	18	3.25	0.57
	Sophomore	35	3.11	0.52	35	3.34	0.50
	Junior	56	3.14	0.70	39	3.30	0.64
	Senior	34	3.13	0.65	32	3.17	0.53
	Super senior	9	3.01	0.62	27	3.33	0.33
Total		151	3.08	0.73	151	3.28	0.53

The results in Table 2 show that medical students' evaluation of the online assessment was medium; as the mean squares ranged between 2.6 - 3.4, based on a Likert Scale. However, the evaluation of the students at the Al-Quds University was higher than those of the An-Najah University (0.2). Furthermore, there were differences among the students' demographic variables. To ensure whether these differences were statistically significant, the researchers used Factorial ANOVA, as shown in Table 3 below.

Table 3: Tests of Between-Subjects Effects (Factorial ANOVA) for demographic variables

Source	SS	Df	Mean Square	F	P	η^2
University	1.35	1	1.35	3.78	0.04	0.02
Gender	1.09	1	1.09	3.07	0.08	0.01
Average	0.04	3	0.01	0.04	0.99	0.00
Year	0.58	4	0.14	0.41	0.80	0.01
university * gender	0.15	1	0.15	0.43	0.51	0.00
university * average	0.63	3	0.21	0.59	0.62	0.01
university * year	0.89	4	0.22	0.63	0.64	0.01
gender * average	1.61	3	0.54	1.51	0.21	0.02
gender * year	3.73	4	0.93	2.62	0.04	0.04
average * year	5.41	12	0.45	1.27	0.24	0.06
university * gender * average	0.06	3	0.02	0.06	0.98	0.00
university * gender * year	0.72	4	0.18	0.51	0.73	0.01
university * average * year	5.33	10	1.03	1.48	0.20	0.02
gender * average * year	4.65	9	0.52	1.45	0.17	0.05
university * gender * average * year	0.54	2	0.27	0.76	0.47	0.01
Error	84.42	237	0.36			
Corrected Total	119.59	301				

The results showed that there was a statistically significant main effect in the evaluation of online assessment attributed to university, $F(1, 237) = 3.87, p = 0.04, \eta^2 = 0.02$; looking back at Table 1, one sees that the evaluation of Al-Quds University was better than that of An-Najah University. However, no statistically significant differences were found, based on the other variables. With respect to interactions among the demographic variables, the study results showed that there were no statistically significant differences for most of them, except the interaction between gender and the year of study, $F(4, 237) = 2.62, p = 0.04, \eta^2 = 0.04$. Figure 2 below illustrates the trends of these differences.

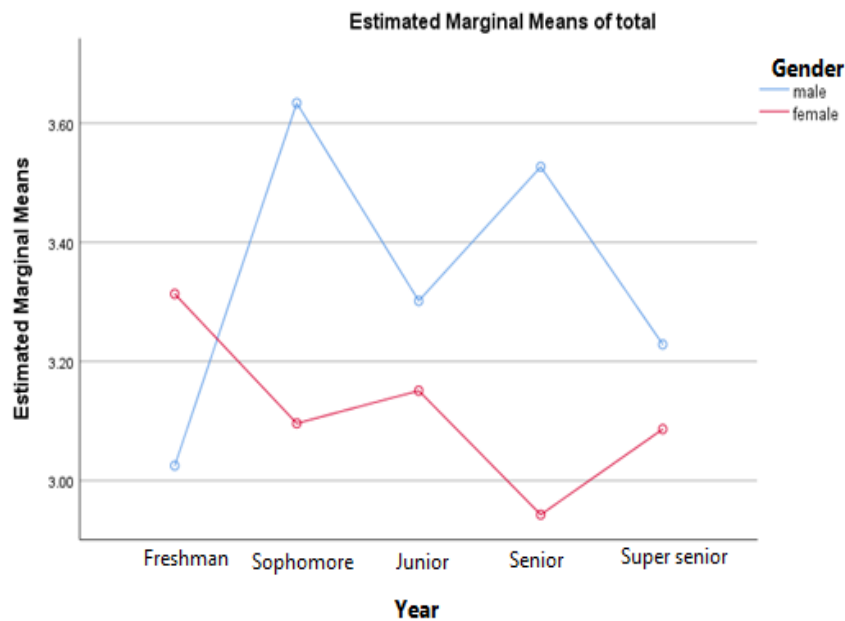


Figure 2: Trend of interaction between student’s gender and year of study

Figure 2 above shows that the evaluation of male students is better than that of the female students in all the years of study, except for the freshmen, whose evaluation was higher. However, the higher the level of the student, the lower their evaluation. This is inconsistent with the findings of a study conducted in Romania, which showed acceptance of online assessment increases, as the students move to higher levels (Marius et al., 2016).

To answer the second question, which required students to provide information about their attitudes towards online assessment, the various obstacles faced, and the ways to overcome them, sixty-one students from each university were randomly selected; and their responses were analyzed by using MAXQDA. The researchers sorted the obstacles and classified them into eight different codes, as follows: ethical, administrative, training, time, technical, attitudinal, substantive, and psychological problems, as outlined in Figure 3. It can be noticed that the students in both universities believe that most of the obstacles were administrative in nature; the way the two universities manage online assessment has many pitfalls, such as question types, mark distribution, marking, and the lack

of any feedback. Technical problems (e.g., poor internet connection, lack of infrastructure, etc.) were also detected in both universities.

Attitudinal and psychological problems were more at An-Najah University than at Al-Quds University; and this explains why the evaluation of Al-Quds University was better than that of An-Najah University.

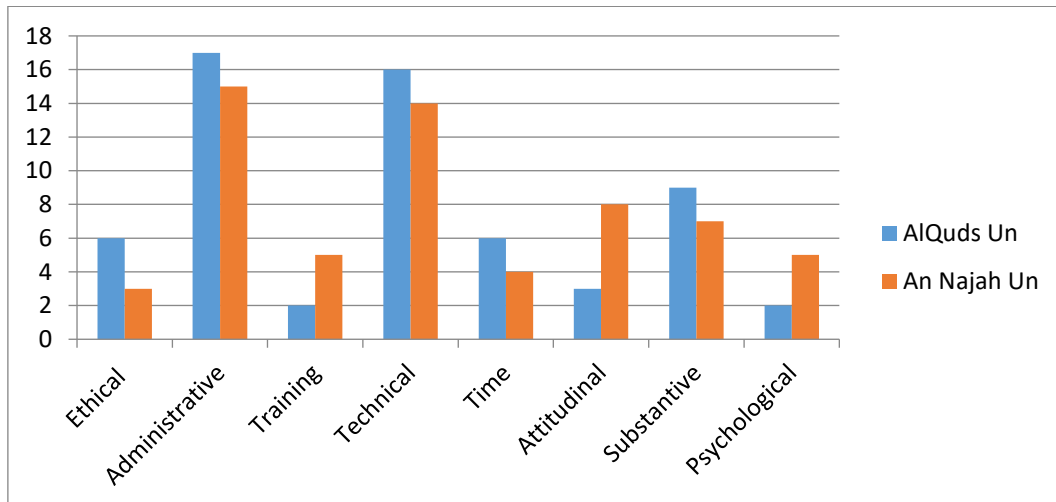


Figure 3: Codes of students' attitudes to online assessment

4. Discussion

The main study findings showed that the evaluation of Al-Quds University (Mean is 3.28) was better and higher than those of the other university (Mean is 3.08), as shown in Table 2 above. This could be explained by various reasons. Firstly, the marking system used in the two universities varies. An-Najah University administers at least three exams per semester, in addition to a set of assignments, research papers, projects, discussions, or presentations; while Al-Quds University administers very few exams. This means that it is very likely for students to lose marks in each exam, or in any other evaluation activity. In addition, the high percentage of the participation mark is offered to Al-Quds students; it is 20% of the total mark of each course at this university; while it is 5%-10% in very few courses at An-Najah University. Secondly, An-Najah University adopts the National Board of Medical Exams (NBME), which forces students to sit for these exams at different levels; and it contributes 40% of its weight to the final mark of many courses. Some of these exams are very demanding (Internal Medicine and Advanced Surgery); and many students do not do well in them; since they were originally prepared for students whose native language is English, but not for students that use English as a foreign language.

Furthermore, An-Najah students study a course called Medical Ethics in the first year; and they are tested in this course in the fourth year, as part of the NBME; added to this, is the fact that these exams are paid for by the students themselves. On the other hand, most of these exams are held locally at Al-Quds University; and they are free of charge.

The study findings also showed that both gender and year interacted; and consequently, this resulted in statistically significant differences. Responses to the questionnaire items showed that the evaluation of fresh male students was lower than that of their female counterparts; female students in the first year of study were mostly more apprehensive and more anxious, due to being in a different environment, and this, together with their inability to find the necessary textbooks, resources and materials, increased their concerns. However, the evaluation of females improved considerably in the second year; but it was still lower than that of their male counterparts.

This could be attributed to the fact that these females started to become familiar with the university and its system; they made considerably more effort; and they also showed more satisfaction with the exam marking and teaching methodologies. Furthermore, the study findings showed that in the third year, female students showed more dissatisfaction with online assessment; since they started to lose marks, due to adopting the online assessment approach, which lacks precision, fairness, and an explicit grading system. Similar results were reached by Wiggins (1990). Third year students began to lose marks, due to examiners' high level of subjectivity, as stated by (Moni et al., 2002).

With respect to the main obstacles that face online assessment, the researchers sorted them into eight main categories, which varied in abundance. A lot of students in the two universities stated that the time allocated to online exams was barely sufficient; consequently, these students were forced to exert more effort to study and gain higher marks. This finding is inconsistent with the findings of previous research done by Cukusic et al. (2014). Added to this is the timer on the exam; it creates more stress (Khan and Khan, 2019). This is also contrary to Betlej's (2013) findings that online assessment is easy to handle and enables students to get feedback very speedily.

The current study showed that e-assessment was not that easy, due to the lack of adequate infrastructure for online assessment and poor internet connection (Ridgway et al., 2004). Students at both universities also stated that in most online exams, students could not go back to questions that they had already answered, due to examiners' intervention; and this relates indirectly to the marking of these exams. While these results are consistent with those of Stodberg's (2012) research findings, they contradict those of other researchers, such as Jordan & Mitchell (2009), Khare & Lam (2008), who undermined the role of examiners.

Furthermore, students argued that sitting for many exams, doing many assignments, and being tested on topics they had never studied, was very difficult and challenging – so much so, that exams become irrelevant, and arbitrary; and they are done just to acquire marks (Hawe, 2002); while most of the question items required deeper understanding; and this further reduced their motivation.

Another major technical obstacle, according to students, is related to poor internet connection, which results in slow logging into the exams, and sometimes delayed loading of these exams by instructors (Russell & Shepherd, 2010). Finally, some students believed that online assessment was not fair; since it possibly allows

some students to cheat, due to insufficient invigilation and examinee-identity verification; such a result is consistent with other studies, including those of Osuji (2012); Russell & Shepherd, (2010); Yates & Beaudrie (2009). Consequently, online assessment reduces motivation among smart, hard-working students, who would eventually disapprove of this type of assessment.

5. Conclusion

The researchers found that applying new types of assessment without careful, prior strategic planning, is very likely to create different attitudes among students, irrespective of their gender, year of study or average marks. Students' evaluations differ, based on where they study. Medical students showed dissatisfaction with this type of assessment, for many reasons, including, but not limited to, various technical and administrative aspects. Consequently, students' perceptions and attitudes, regarding online assessment, should be considered, in order to ascertain a smooth educational process that effectively incorporates technology.

University administrations are supposed to prepare well for such a transition to online assessment, in order to persuade students of the usefulness thereof. This study showed that to convince students to accept online assessment, universities should plan well, provide adequate infrastructure, and consider students' circumstances. Finally, the highlighted pitfalls of online assessment should be addressed seriously and carefully, in order to integrate this type of assessment – not only at universities – but also in all the other educational institutions.

This study was carried out in two Palestinian universities; it could be improved if other universities or university staff members, as well as decision-makers, were involved. Added to this limitation, of course, was the limited access to students in the other university, which is located in a place that was not easy for the researchers to access, without having a permit from the Israeli occupation. The small number of participants involved in the qualitative survey was attributed to this fact. The time allocated to respond to the online questionnaire played a negative role; and it resulted in having a small, unrepresentative sample of participants, who completed the survey. Consequently, a future longitudinal study could shed more light on the benefits, challenges, and shortcomings of online assessments, as well as their impact on students' attitudes and their academic achievements.

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