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**The relationship between the academic achievement of
computerized tests and traditional tests of Business
College students. An empirical study**

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Abstract:

The study aims to investigate the relationship between the academic achievement of computerized tests and traditional pen and paper exams of Business College students at the University of Jordan- Aqaba branch as well as relate differences results to students` gender.

The study sample comprised 136 students of a compulsory course at the Business Faculty. A computerized mid-term test was held while the final one was traditional. The results of the two tests were compared where the other general factors affecting students` academic achievement, namely (the same students, course subject, course subject lecturer) were set. The tests marks were sampled as percentage to the test mark so as to delete the denominator difference of marks where the mid-term mark is out of 30 while the final test is out of 50.

The SPSS was used to compare the results of the two tests. Results were related to students` gender, whether gender-related differences are found. The study concluded that there is no statistical significant relationship between the academic achievement of computerized tests and traditional ones (paper and pen) held at the Business College in The University of Jordan- Aqaba branch.

The results also indicated that the academic achievement differences resulting from computerized tests have to do with the student gender variable in favor of male students.

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Keywords:

student, computerized test, traditional pen and paper test, academic achievement of computerized test, academic achievement of traditional pen and paper test, the University of Jordan

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Introduction

The University of Jordan, established in 1962, is one of the main public government universities located in Amman. In 2009, a royal decree was issued to establish a branch of the University of Jordan in Aqaba. During the same year, the Faculty of Business was established to contribute to providing services that help improve the financial and business sector through qualified students. The Faculty of Business awards the BA. and MA. degrees; BA. degree in the following fields: Business Administration, Accounting, Insurance and Risks, while the MA degree covers Accounting and Business Administration. The sample of the study comprised a course in Business Administration, being that a compulsory requirement of the Faculty given to all the Faculty freshers in the first semester of the first academic year, along with a set of courses. A computerized mid-term test was set, while the final test was a traditional pen and paper one.

Rehmani (2003) stressed that exams have a significant role in assessing the educational process and measuring students` learning process, where the information revolution has transferred exams to a higher level; traditional pen and paper exams to computerized ones that are held in computer labs instead of classrooms. These exams are designed by the course lecturer or computer labs supervisors. Students are identified by their university card or by their own lecturer. In computerized exams, a bank of questions is inserted in the computers` servers, and each student is provided with a number of randomly-ordered questions.

Literature Review

In Jordan, Al-Qdah (2017) investigated the impact of internet-based exams on students` achievements through comparing Internet-based exams with paper exams. Results showed that students prefer paper exams to computerized ones, nonetheless they showed preference in the immediate results obtained through computerized exams.

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Al-Khayyat also concluded the existence of a positive proportional relationship between students and computerized exams, and that the gender variable has an impact on the relationship between computerized exams and academic achievement, where it was found stronger in male students.

Bodmann, Robinson (2017) investigates the impact of the various methods of exams management on grades and finishing time. In Experiment 1, the paper assessment was compared with the computer-based assessment. University students completed a computer-based assessment faster than a paper-based assessment, with no difference in grades. Experiment 2 assessed three different computer interfaces which provided students with different levels of flexibility to change and revise responses. No differences in grades were noticed between the three patterns, but students were able to complete the less flexible faster than the other two. It seems that the less flexible exam pattern is faster and does not result in low performance compared with more flexible ones.

In Australia, James (2016) aims at identifying students' attitudes towards the use of computerized exams in New England University. The study concluded that there are challenges facing students regarding computerized exams, namely: technology use, techniques and exams systems. The study concluded that computerized exams lessens students' anxiety and is lower in cost.

In Turkey, Aybek; etal (2016), a simulation experiment of an exam conducted by the teacher was carried out, an assessment of the academic achievement was developed by using simulCAT, and students were trained to the simulation model. Students' grades were similar to those of the paper exam model. Karman (2011) showed that assessing computerized internet-based workshops is achieved through computerized exams. Uysal and A. Kuzu (2009) concluded that developing an infrastructure to integrated education is a must, as well as boosting this with courses in computer ethics. This infrastructure shall adopt quality criteria to computer-based learning. In China, Chien (2008) also addressed the impact of computer anxiety on e-learning effectiveness. The study showed that anxiety in relation to computers has an impact on e-learning.

In Taiwan, Win & Tasi (2006) concluded that male students' inclination to computerized exams was higher than that of female students in the Faculty of Business. In Germany, Brosnan (1998) showed anxiety of using computers is gender-specific; it is higher among female students than their counterparts.

Research problem: The study problem lies in determining the relationship between the academic achievement resulting from computerized exams and the academic achievement resulting from the traditional pen and paper one held at

the Faculty of Business in the University of Jordan – Aqaba branch, where there is a tendency from faculty members to evaluate students through computerized exams and find a connection between academic achievement results and gender.

Research Questions

Is there a correlation between academic achievement resulting from computerized exams and academic achievement resulting from traditional pen and paper exams held at the Faculty of Business in the University of Jordan-Aqaba branch.

Are there differences between academic achievement resulting from computerized exams and academic achievement resulting from traditional pen and paper exams held at the Faculty of Business in the University of Jordan-Aqaba branch attributed to gender.

Hypotheses

HO1: There is no statistically significant relationship between academic achievement resulting from computerized exams and academic achievement resulting from traditional pen and paper exams held at the Faculty of Business in the University of Jordan- Aqaba branch.

HO2: There is no statistically significant correlation of the difference between academic achievement resulting from computerized exams and academic achievement resulting from traditional pen and paper exams held at the Faculty of Business in the University of Jordan- Aqaba branch attributed to gender.

Research Methodology

Mid-term exams real grades of students taking the Business Administration course during the first semester of 2019-2020 were obtained, where a computerized exam was conducted as well as a final traditional pen and paper exam regarding the same course.

Research population: Students of the Faculty of Business/ University of Jordan-Aqaba branch.

Research sample: Students of both Business Administration course classes at the Faculty of Business/ University of Jordan- Aqaba branch.

Research Variables

- The academic achievement resulting from computerized exams is represented in this study by the mid-term exam grades out of 30%. The student`s grade was calculated divided by 30.

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- The academic achievement resulting from traditional pen and paper exams is represented in this study by the final exam grades at the end of the semester out of 50%. The student's grade was calculated divided by 50.

- Gender

Description of the study sample

Table (1)

Classifying students per university admission year

2012	2013	2014	2015	2016	2017	2018	2019	Admission year
1	0	1	1	0	0	6	127	Number of students
007.	0	007.	007.	0	0	04.	93.	Ratio

127 fresh students holding university ID card numbers of 2019, 6 students accepted in 2018, 8 students accepted in 2017, 1 student accepted in 2015, 1 student accepted in 2014, and 1 accepted in 2012.

The table above indicates that 93% of the students are freshers and the rest are students who have been accepted in previous years.

Table (2) Classifying students per gender

Female	Male	Number
63	73	136
46%	54%	100%

It is noted from the table above that male students outnumber female students, with a percentage of 54% for males and 46% for females.

Table 3: Classification of students who passed and those who failed in the computerized and traditional pen and paper exam

Academic achievement in the traditional pen and paper exam	Academic achievement in the computerized exam	Student status
76	31	passed
56%	23%	percentage of students who passed
60	105	failed

44%	77%	Total
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It is noted from the table above that 77% of the students failed in the computerized exam while 44% students failed in the traditional pen and paper exam, with a difference of 33% in favor of the traditional pen and paper exam.

Hypotheses Testing

HO1: There is no statistically significant relationship between academic achievement resulting from computerized exams and academic achievement resulting from traditional pen and paper exams held at the Faculty of Business in the University of Jordan- Aqaba branch.

Table 4 shows the correlation between academic achievement in the computerized exam and academic achievement in the traditional pen and paper exam.

	Academic achievement in the computerized exam	Academic achievement in traditional pen and paper exam
Academic achievement in the computerized exam	1	119. Pearson Correlation
Sig. (tailed-2)		172.
Academic achievement in traditional pen and paper exam	119. Pearson Correlation	1
Sig. (tailed-2)	172.	
**. Correlation is significant at the 0.01 level (tailed-2). *. Correlation is significant at the 0.05 level (tailed-2).		

The Table above shows that the P. value (172.) is less than 5%, thus the null hypothesis HO1 stating that " there are is no statistically significant relationship between the academic achievement resulting from computerized exams and academic achievement resulting from traditional pen and paper exams held at the Faculty of Business in the University of Jordan – Aqaba branch.

Testing the second hypothesis HO2 shows that there are no statistically significant differences in the academic achievement resulting from computerized exams and academic achievement resulting from traditional pen and paper exams held at the Faculty of Business in the University of Jordan – Aqaba branch.

Table 5 shows the differences in central tendency and dispersal measurements of academic achievement resulting from the computerized exam.

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Measurements	Male	Female	Difference
Number	73	63	Male students outnumber with a difference of 10
Ratio	54%	46%	Difference 8%
Mean	41.	40.	Difference 01.
Median	43.	40.	Difference 03.
Variance	015.	019.	Difference 004.
Std Deviation	122.	136.	Difference 014.
Minimum	000	000	000
Maximum	73.	90.	17.

The table above indicates that the number of male students reached 73 while female students reached 62. When observing the central tendency measurements, it is noticed that the arithmetic mean for male students is higher than that for female students with a difference of 01, so is for the moderator with a difference of 03 in favor of male students. This is attributed to the fact that there are differences in the academic achievement in the computerized exam due to gender, where male students get higher grades than female students, while the higher grade was that of a female student, and the difference and standard deviation of male students achievement average was lower than that of females.

Table 6 shows the differences in central tendency and dispersal measurements of academic achievement resulting from the traditional pen and paper exam.

Measurements	Male	Female	Difference
Number	73	63	Male students outnumber with a difference of 10
Ratio	54%	46%	Difference 8%
Mean	47.577.	2.0808	Difference 1.60504
Median	53.	49.	Difference 04.
Variance	064.	159.78	Difference 158.936
Std Deviation	253.	12.64	Difference 12.387
Minimum	000	000	000
Maximum	88.	100	12.

The table above indicates that the number of male students reached 73 while female students reached 62. When observing the central tendency measurements, it is noticed that the arithmetic mean for male students is higher

than that for female students with a difference of 01, so is for the moderator with a difference of 03 in favor of male students. This is attributed to the fact that there are differences in the academic achievement in the traditional pen and paper exam due to gender, where male students get lower grades than female students, while the higher grade was that of a female student, and the difference and standard deviation of male students' achievement average was lower than that of females.

Table 7 shows the correlation in the academic achievement differences resulting from computerized exams and academic achievement resulting from traditional pen and paper exams held at the Faculty of Business in the University of Jordan-Aqaba branch attributed to gender.

Correlations

Control Variables		comexm	papexam
comex m	Correlation	1.000	1.000
	Significance (tailed-2)	.	000.
	Df	0	130
papexa m	Correlation	1.000	1.000
	Significance (tailed-2)	000.	.
	Df	130	0

The Table above shows that the P. value (000.) is less than 5%, thus the null hypothesis stating that " there are no statistically significant differences for the academic achievement resulting from computerized exams and academic achievement resulting from traditional pen and paper exams held at the Faculty of Business in the University of Jordan – Aqaba branch due to gender" is rejected, whereas the alternative hypothesis which states that " there are statistically significant differences for the academic achievement resulting from computerized exams and the academic achievement resulting from traditional pen and paper exams held at the Faculty of Business in the University of Jordan-Aqaba branch due to gender" is accepted, where results are in favor of male students.

Results and Recommendations

The study concludes that there is no statistically significant relationship between academic achievement resulting from computerized exams and academic achievement resulting from traditional pen and paper exams held at the Faculty of Business in the University of Jordan-Aqaba branch. Results also indicate a difference in academic achievement due to gender, being that in favor of male students. Accordingly, this study accords with most literature which showed results in favor of male students. On the other hand, this study disagrees with

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Aybek, et al which concluded that results are even between computerized and traditional pen and paper exam. This is attributed to the fact that there is an appropriate infrastructure, students are trained to attend computerized exams and there is no room for anxiety regarding using computers during the learning experience.

The researcher has recommended the following:

1. Conducting similar studies at the other university faculties to improve the provision quality of computerized exams which serve the interest of students and faculty members.
2. Conducting similar studies regarding other faculty courses to improve the provision quality of computerized exams which serve the interest of students in relevant specializations as well as faculty members.
3. Training students regarding computer-based exams since this is related to the competence test by which the university is evaluated.
4. Training students regarding computer-based exams since most recruitment exams are computer-based.

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