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Impact of COVID-19 Pandemic on Academic Performance: A Comparison between the E-Learning and Classical Classroom Learning for Arabic Language Department

تأثير جائحة كوفيد-19 على الأداء الأكاديمي: مقارنة بين التعلم الإلكتروني والتعلم الصفي التقليدي لقسم اللغة العربية

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ABSTRACT

Background : the learning system in Iraq has been switched to an e-learning system as a taken action to decrease the infections of COVID-19 in Iraq. The question of "to what extent does this system affect the performance of students" has been raised and needed investigation.

Aim: This study aimed to compare students' performance between e-learning and traditional classroom learning.

Method: Data were collected from 183 students at Anbar University in Iraq from the College of Education for Human Sciences. The collected data for students' achievement was scaled to five levels from 1 to 5. The paired t-test and independent t-test were used to determine if there are any significant differences between students' performances according to the learning approaches and to determine if there are any significant differences between students' performances depending on the student's gender.

Results: A statistical analysis of the exam results was conducted using paired and independent t-tests. The results show that the performance was higher when using e-learning while gender is not a significant factor in performance change.

Conclusion: The outcome of this study demonstrated the existence of the differences between the performances of students in the two semesters; their performance was higher when using the e-learning system. This indicates the significant effect of the use of e-learning on the performance of students.

الخلاصة

الخلفية العلمية: تم تحويل نظام التعلم في العراق إلى نظام التعلم الإلكتروني كإجراء متخذ لتقليل الإصابات بفيروس كورونا (COVID-19) في العراق. وقد أثير سؤال "إلى أي مدى يؤثر هذا النظام على أداء الطلاب" ويحتاج إلى بحث .

الهدف: هدفت هذه الدراسة إلى مقارنة أداء الطلاب بين التعلم الإلكتروني والتعلم التقليدي في الفصول الدراسية .

الطريقة: تم جمع البيانات من 183 طالبا في جامعة الأنبار في العراق من كلية التربية للعلوم الإنسانية. تم قياس البيانات المجمعة لتحصيل الطلاب إلى خمسة مستويات من 1 إلى 5. وتم استخدام اختبار t المقترن واختبار t المستقل لتحديد ما إذا كان هناك أي فروق ذات دلالة إحصائية بين أداء الطلاب وفقا لمناهج التعلم وتحديد ما إذا كان توجد فروق ذات دلالة إحصائية بين أداء الطلاب باختلاف جنس الطالب.

النتائج: تم إجراء تحليل إحصائي لنتائج الامتحان باستخدام اختبارات t المقترنة والمستقلة. وأظهرت النتائج أن الأداء كان أعلى عند استخدام التعلم الإلكتروني في حين أن الجنس ليس عاملا معنويا في تغيير الأداء .

الاستنتاج: أظهرت نتائج هذه الدراسة وجود فروق بين أداء الطلاب في الفصلين الدراسيين؛ وكان أداؤهم أعلى عند استخدام نظام التعلم الإلكتروني. وهذا يدل على التأثير الكبير لاستخدام التعلم الإلكتروني على أداء الطلاب.

Keywords

E-learning, traditional classroom Learning, Pair t-test, Independent t-test, Student performance, COVID_19 pandemic.

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1. INTRODUCTION

In the last two years, since the World Health Organization (WHO) has declared that the COVID-19 is a pandemic, the Iraqi government has taken actions to prevent the risk of the disease by limiting social contact. These actions have affected the daily activities of people in many ways. Replacing the traditional ways with electronic ways is the most common change in many sectors, such as using e-learning in the education sector. Various online virtual platforms, such as Google Classroom and Edmodo, and various electronic meeting applications have been used to replace face-to-face meetings between teachers and students.

Iraqi students, especially undergraduate students and lower education levels, do have not enough experience in this kind of learning. Therefore, it was challenging to get used to e-learning systems and tools. In addition, many students could not afford digital instruments. Furthermore, the e-learning system was not the correct alternative to practical and laboratory classes. Moreover, the virtual classrooms do have not the requirements of an exam room. From these, a question has been generated, to what extent the performance and satisfaction of students have been affected by using an e-learning system? To answer this question, this paper aimed to measure the change in the students' performance during the COVID-19 pandemic.

2. LITERATURE REVIEW

Academic learning and teaching style in terms of its environment and conditions have a strong impact on the student's satisfaction and performance. Studies reported that the learning style has a significant correlation with the learning outcomes and students' perceptions which can be measured by students' grades [1-5]. Laguador et al. [6] demonstrated that the physical characteristics of universities and classrooms are associated with the ability of students to learn. The studies also considered the e-learning style in their studies as it has different environments and conditions.

Summers et al. [7] examined the impact of using an online distanced education system on the students' satisfaction and performance in terms of final scores. Their results showed that there is no significant effect on the final grades but there is a negative effect on the students' satisfaction in terms of teachers' explanations, enthusiasm, and openness to students.

Bruestle [8] studied the choice of using e-learning based on gender. It was found that gender had not been a significant factor in using e-learning as using electronic facilities has become an essential part of the daily lives of both genders. The same conclusion has been obtained by Paul and Jefferson [9] when they examined the variance in the scores of students in the environmental science used e-learning systems and traditional classes according to gender. While González-Gómez et al. [10] demonstrated in their study at the Universidad de Granada in Spain that female students were more satisfied, gave more attention, and were more interactive with teachers than males with the e-learning subjects.

Sokolová [11] compared the performance of two groups of students, the first group used traditional learning while the second group used e-learning in the course Principles of Management I. the performance of students was measured through a post-test for both groups. It is concluded in this study that there are no significant differences between the results of the two groups.

Dondorf et al [12] found that the performance of a group of students using the online Mathematics course of RWTH Aachen University in Germany in the field of engineering was lower than those used traditionally in classroom learning. The author showed that the motivation of students may be affected negatively by using the e-learning system. The students claimed that the freely selecting time and space of study was a negative factor of motivation, not a positive factor as expected.

Dang et al. [13] investigated systematically and empirically the influence of students' computer self-efficacy, teacher characteristics, and facilitating conditions factors on the students' perceived accomplishment, perceived enjoyment, and satisfaction. They found that computer self-efficacy has a significant influence on the three dependent variables for males and females. However, females were more likely to be affected by teacher characteristics and facilitation conditions than males.

Ciuclea et al. [14] evaluated the project of integrating the Virtual Campus using a Moodle-based platform in the teaching system of the Politehnica University of Timisoara. The correlation between the grades of the students and their activity in the virtual classrooms was conducted. It is concluded that there is a significant positive correlation between the online access levels of students and their grades because using e-learning as a supportive means of education has led to more efficient interactions between students and their teachers and administrative staff.

Hammouri and Abu-Shanab [15] explored the factors influencing students' satisfaction with e-learning at Yarmouk University in Jordan. Their results demonstrated the strong correlation between perceived ease of use, perceived usefulness, system quality, information quality, and computer self-efficacy and students' satisfaction.

Hurlbut [16] compared the performance of students in traditional classrooms and virtual classrooms in terms of grades and responses, perceived instructional strategies, and participation in online interactive content. It was found that the grade of students in the online classes is lower than their grade in the traditional class with the same teacher and material.

Radha et al. [17] identified the interest and attitude of students toward using E-learning resources across the world. It has been shown that E-learning has become quite popular among students all over the world due to its availability and students' comfort to access learning materials at a convenient time.

Despite that, challenges have been faced by students and teachers when using e-learning systems and these issues have been the subject of much research. Almaiah et al. [18] employed the interview method using thematic analysis through NVivo software to explore the most critical challenges at six universities in Jordan and Saudi Arabia. The main factors that affected the use of e-learning that had been identified in this study were using technologies, cultural aspects, self-efficacy factors, and trust factors. While the main identified challenges were technical issues, financial issues, and management system issues.

Mseleku [19] identified other challenges by reviewing related works of literature. These challenges include the inability to access the online resources in some rural and low-income areas and mental health-related issues such as associated stress, depression, and anxiety were identified as challenges as well.

Alqahtani and Rajkhan [20] investigated the factors that most likely affected the use of e-learning. They found that technology management, providing training sessions, and increased student awareness of to use of E-learning systems were the most influential factors.

Mahdy [21] analyzed collected data from an online distributed questionnaire form to the veterinary medical students asking about the impact of COVID-19 lockdown on their academic performance. About 47.5%, of the participants, believed that their academic performance has been greatly affected by the COVID-19 pandemic lockdown whereas 23.3% were moderately affected and 20% were considerably affected. The results showed also that the smartphone and laptop are the most electronic device used by students. Participants showed that they used online materials such as pdf lectures, e-books, YouTube videos, university platforms, educational websites, and educational applications. The most used meeting tools were Zoom, WhatsApp, Google classroom, and social networks. Taking the practical courses was the most challenging issue.

Gonzalez et al. [22] conducted a study to analyze the differences in assessments graded by students at Universidad Auto´noma de Madrid (Spain) during the pandemic (2019/2020) from the grades corresponding to students from 2017/2018 and 2018/2019. Significant differences were shown as the grades of assessment were higher due to the changes in the learning system during the COVID-19 confinement. The results showed also that that student changed their learning strategies to a more continuous habit.

Aini et al. [23] conducted a literature review from the Scopus database between January to August 2020 concerning the challenges faced by universities as academic institutions, lecturers, and students in e-learning in the context of a pandemic. Their results showed that using an e-learning system, lack of electronic knowledge, and low motivation were the main challenges faced by students whereas e-skills, lack of training, maintaining student engagement, and higher teaching workload issues were the main challenges faced by teachers.

Prigoff et al [24] compared Students whose course of the practice of medicine was interrupted by the COVID-19 pandemic to the students who did the same course before the pandemic from a similarly timed surgery between 2017 and 2019 according to the exam scores, clinical evaluations and the percentage of students who received grades of Honors. The COVID-interrupted clerkship group attended the course using e-learning. They got higher exam and performance evaluations and had a higher percentage of students with honors. Using an open book exam is the most likely reason for these significant differences.

Maatuk et al. [25] used two types of self-designed questionnaires, one was distributed to the Information Technology (IT) faculty at the University of Benghazi and the other was distributed to the teachers in the same facility. The descriptive analysis of the results highlighted the positive effect of using e-learning in the era of the pandemic as it was a successful alternative for higher education. Despite that, many challenges were highlighted such as weakness in the technical and financial support, lack of training sessions and e-skills, and lack of copyright protection, the low quality of Internet services in Libya during the pandemic period.

Moustakas and Robrade [26] investigated the challenges of using electronic facilities in sports and physical education using online surveys. The low students' motivation due to lack of visual connection is the main challenge reported by teachers in addition to the lack of e-skill and resources.

Osei et al [27] tested a model to predict and examined the qualifications of the acceptance of students in Sub-Saharan Africa to use e-learning during the COVID-19 period using Self Determination Theory and Core Self-Evaluation Theory. They concluded that the intention and acceptance of students to use e-learning have been positively influenced by their personality and motivation.

3. METHODOLOGY

In this study, a comparison between the traditional classroom learning (TCL) approach with the e-learning approach was performed. In the Anbar University, the case study of this research, the traditional classroom learning approach was applied thoroughly as the main approach in the first semester without adopting the e-learning approach whereas the learning approach has changed to e-learning after spreading the COVID-19 pandemic at the beginning of the second semester.

To measure the change in the students' performance, the final results of students in the first and second semesters were used in the study. It is worth noting that these results for the student's achievement for the two semesters have been scaled on five levels before applying the statistical analysis. The five processing scale includes poor, accepted, good, very good, and excellent as the highest level of evaluation.

This study involved the four years students in the computer science department in the college of computer science and information technology at the University of Anbar. In total, 183 students were involved in this research. The number of males was 64 students constituting 34.9% of the total percentage while the number of females was 117 students and their percentage was 64.9%. The age ranges from 19 to 26 years for participating students.

IBM SPSS Statistics software (version 26) was employed in the study for examining the student's results. Two statistical tests, Paired t-test and the Independent t-test, in addition to introducing a descriptive analysis, were adopted to obtain the final results.

4. RESULTS

The first statistical test used in this study was the dependent or paired t-test, this test was used because the observations of the traditional classroom learning and the e-learning were not independent. The paired t-test is a statistical procedure used to determine whether the mean difference between two sets of observations is zero or not. Table 1 shows the two mean values for student's achievement in the e-learning and the TCL and which are statistically significantly different from each other. The mean for the TCL in the first semester (Mean=3.11) was lower than the mean for e-learning in the 2nd semester (Mean=4.15). While the standard deviations show reasonable values for the deviation in the final achievements for students. The standard deviation for the TCL (SD=1.010) was higher than the e-learning (SD=0.818). Fig 1 depicts these differences in mean and standard deviation values.

TABLE I. PAIRED SAMPLES STATISTICS OF THE STUDENTS' PERFORMANCE

	Mean	N	Std. Deviation
Traditional Classroom Learning	3.11	183	1.010
E-Learning	4.15	183	.818

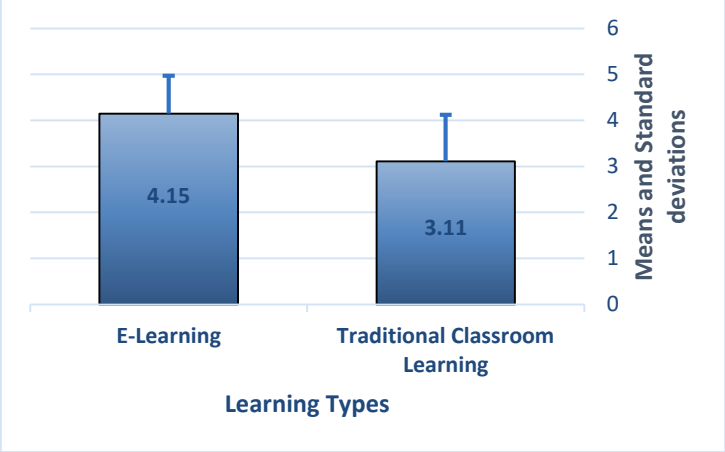

Fig .1. The differences in means and standard deviations

Table 2 shows the measure of the strength and direction of the linear relationship between e-learning and the TCL. The value for the correlation coefficient is 0.571; this correlation is positive and shows a moderate level for the correlation between the two types of learning.

TABLE II. PAIRED SAMPLES CORRELATIONS

	N	Correlation	Sig.
Traditional Classroom Learning & E-Learning	183	.571	.000

For the ratio of the mean of the difference to the standard error of the difference, the **t** value shown in Table 3 is negative indicating that the student's performance in e-learning is better than in traditional classroom learning. In addition, the value for the degree of freedom df is 182 which refers to the total number of participants in the two semesters minus one.

TABLE III. PAIRED SAMPLES TEST

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Traditional Classroom Learning-E-Learning	-1.044	.863	.064	-1.170	-.918	-16.354	182	.000

In the second phase, an independent t-test was conducted to determine the different test scores of males and females who were involved in this study. The test was used to compare the student's achievements in each type of learning approach based on the student's gender. The obtained results for the independent samples are shown in Table 4. It can be seen that there were 64 male and 117 female participants tested in each type of learning approach. The mean for males and females in e-learning was higher than in the traditional approach; similarly, the mean for female participants was higher than for males in both learning approaches, whilst the lowest deviation was for the female participants in the e-learning approach.

TABLE IV. THE INDEPENDENT SAMPLES STATISICS OF THE STUDENTS' GRNDER

	Gender	N	Mean	Std. Deviation
Traditional Classroom Learning	male	64	2.98	.951
	female	117	3.23	.959
E_Learning	male	64	4.06	.732
	female	117	4.27	.665

In the Independent sample test, shown in Table 5, the method for computing the standard error of the means difference is based on the assumption regarding the variances of the male and female groups. The first test was Levene's test, which was used to test the assumptions of equal variance between the two groups in the independent sample t-test. The significance value of F is used to make the statistical decision about the assumptions of equal variance. The results of Levene's test are, $F(179) = 0.896$, $p = 0.345$ for the traditional classroom learning and $F(179) = 0.000$, $p = 0.989$ for the e-learning. This significant value is used to make the statistical decision about the mean of the two groups. If the predetermined significance level is greater than the calculated value, then we can say that the means are significantly different. But the p-value, shown in Table 5, for both the learning approaches was much higher than 0.05 ($p > 0.05$). Therefore there is evidence that the variances for the male and female students were approximately equal.

TABLE V. THE INDEPENDWNT SAMPLES TEST

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Traditional Classroom Learning	Equal variances assumed	.896	.345	-1.657	179	.099	-.246	.149	-.540	.047
	Equal variances not assumed			-1.661	130.667	.099	-.246	.148	-.540	.047
E-Learning	Equal variances assumed	.000	.989	-1.970	179	.050	-.211	.107	-.422	.000
	Equal variances not assumed			-1.915	119.457	.058	-.211	.110	-.429	.007

5. DISCUSSION

The results of the paired t-test show that the performance of students during the COVID-19 pandemic when they started to use the e-learning system is higher than their performance when using the TCL. This result is interesting, as the students in the second semester were not satisfied with the new learning system for many reasons. Firstly, the motivation of the students has fluctuated in the second semester because of using the new system. In addition, the online materials were not ready to be presented to the students, teachers spent time preparing them. Furthermore, the virtual interaction between students and teachers was not effective as the face-to-face interaction. Moreover, students were not used to freely selecting time and space for study which made them could not manage their time the study.

On the other hand, as the students are studying computer science and information technology, their computer self-efficacy and skills in information technologies were higher than other students. This may help them to perform higher in e-learning. In addition, e-learning exams are based on open book and open–group exams in which students can refer to all the main and supportive materials of the exam with the assistance of their colleagues. This helps students to get higher scores on the exam.

Regarding the results of the Independents t-test, it is shown that gender is not a significant factor in using an e-learning system. The performance of both males and females has the same variance when switching from traditional to e-learning. This empowered gender equality in gaining equal access to e-education facilities.

6. CONCLUSION

The main purpose of this study was to find out the changes in the performance of the computer science and information technology students at the University of Anbar after using the e-learning system as an alternative to the traditional learning system due to the COVID-19 pandemic. The final grades of the students in the first semester of 2019-2020 were used to measure the performance of students when using the traditional style while their grades in the second semester were used to measure their performance when using e-learning. Paired and independent t-tests were used to analyze the results.

The outcome of this study demonstrated the existence of the differences between the performances of students in the two semesters; their performance was higher when using the e-learning system. This indicates the significant effect of the use of e-learning on the performance of students. This may be due to the higher

computer self-efficacy skills as the students specialized in computer science. Using an open book exam is an important reason as well.

It is recommended for future work to investigate the performance of students when using different styles of open-book exams and various e-education platforms to select the best strategy and tool that help students to perform better in emergent conditions.

Conflicts Of Interest

The paper explicitly states that there are no conflicts of interest to disclose.

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