

Using Non-Parametric Test for the Impact of On-Campus, Online and Blending Studies Respectively on Students Grades. Case Study in Sulaymaniyah City-Iraq

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**”استخدام اختبار اللامعلمي لتأثير الدراسات داخل الحرم
الجامعي وعبر الإنترنت والمزج على التوالي على درجات
الطلاب. دراسة حالة في مدينة السليمانية – العراق”**

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ABSTRACT

Many public and private institutions and universities all over the world went on complete closure' for an unknown end. Among the most important sectors, which faced trouble was education. This study includes a comparison of students' scores in the final test at the time of the Corona pandemic before the Corona pandemic and after the Corona pandemic, by taking the students' scores in the final exams in the mentioned years, By using three different study systems such as on-campus study, online study and blending study, which consist of four different topics such as (Time Management, Management Information Systems, Staff Performance Management, Marketing, and Customer Service), taken from 116 students at the Kurdistan Technical Institute in Sulaymaniyah Governorate, to find out the extent of the impact of abnormal and natural conditions in the field of study and its impact on students grades in the presence of the Corona pandemic. After analyzing and studying the grades obtained by students under the study systems used that we mentioned previously, it was found that the grades obtained by students in the electronic system were higher than the two systems on campus and blended.

Key Words: Non-Parametric tests, Online Studies, Blending Studies, and Students' Grades.

1. Introduction:

The Corona pandemic developed new pressures on various fields of life, most notably the area of education. Therefore, resorting to distance education was the quickest emergency solution to maintain education, and Searching for the available means according to the available possibilities for the students to carry on receiving education. The educational Sector has been negatively affected by the Coronavirus outbreak. Educational institutions, including universities and institutes, prompted the closure of their doors to reduce the chances of its spread. This aroused great concern among the affiliates of this section. Iraqi universities and institutes and the Kurdistan region are among the most important educational institutions by their scientific and knowledge nature, and among the largest leading institutions in the field of modernization and development. Iraqi universities and institutes, including the Kurdistan Technical Institute, were keen to confront the pandemic that hindered the continuation of the learning process at the institute. Through the interest in the rapid development of distance education technologies and the necessity of using them in the educational process considering the actual need for it. [1]

learning from a distance is not new, it has been known for tens of years in some developed countries, and it has become an urgent need, especially in times of crisis and the prevalence of epidemics that require social distancing; In 1892 the University of Chicago established the first independent Department of Correspondence Education. In 1956, Chicago Community The first open American university was founded in response to the demand of students for higher education to be accessible to them through non-traditional methods. Colleges introduced television services in teaching through educational channels. The trend toward "digital education" was therefore not unexpected; it was anticipated; yet, the "Covid 19" pandemic sped its rise and brought it to the forefront. [2]

2. Literature Review

Blended learning is one of the most effective ways now today from the process of learning because of a global pandemic. There were many studies concerned with this aspect and used different ways to analyze, among them using non-parametric and parametric aspects. [3] provide a cross-sectional study that was assessed by using Mann-Whitney U-test and Kruskal-Wallis test to detect a significant difference observed in the course enrollment. [4], did an experiment to compare the effectiveness of a hybrid versus a traditional lecture format, and the analysis of final grades revealed that the students in the traditional section did significantly better than those in the hybrid section. [5] reported that the students in the online-only and blended conditions demonstrated significantly higher levels of objective political knowledge relative to students taking the course in a more traditional format. [6], explained that the students who obtained better academic performance were those students who used the online resources more frequently and more significantly and depending on the degree of the student's interaction with the system. [9], wanted to explain the previous experience affected outcomes in a blended learning environment, so they got that there were no effects on outcomes from having previous experience versus having none, also they found that online and blended experience provided an appositive effect on outcomes.

From the mentioned study we get that the online and blended study has affected outcomes for some subjects spatially for the theoretical aspect if the processes do perfectly and obtain all necessary

equipment. On the other hand, students indicated that the traditional way is better than the online study for those subjects that have an application aspect.

3. The difference between electronic study and studying on-campus or Blending Studies:

Many students at different levels want to complete their studies without having to go to the university campus, but they do not know what this is called. Many students do not know the difference between online study and normal study. Through this study, we will explain the most important difference between the three types of study. We will also explain what distinguishes each of them from the other, and what are the Advantage and Disadvantages of each type.[7]

When deciding what is preferable, the electronic study, the normal study, or the mixed study? There is no correct answer, as this matter depends entirely on the capabilities of the student, as there are those who prefer electronic study over regular study, and there is also the opposite, as well as those who wish to study mixed, so the decision is entirely up to the student. [8]

3.1 Electronic study, E-learning, or Online studies

It is known as learning from a distance, online learning, e-learning, open learning, or home learning. You can pay in advance for the academic year or course and get all the materials in one shipment, or you can pay monthly with some service providers. [9]

3.2 Advantages and Disadvantages of e-learning:

Through this study, we will explain the Advantage and Disadvantages of the electronic study to study the situation correctly and try to compare the Advantage and Disadvantages of the electronic study with the normal and mixed studies and decide what is appropriate for the study. [10]

3.3 Advantages of e-learning:

- 1- One of the most adaptable options available to students is e-learning.
- 2- You can study from wherever you feel comfortable.
- 3- It can suit you and suit your professional, family, and social obligations.
- 4- You can also fully control the number of daily study hours.
- 5- Online education is easier with interactive platforms. [11]

3.4 Disadvantages of electronic study:

- 1- A very high sense of commitment and discipline is required of the learner.
- 2- It should be known that there are always deadlines for handing in the assignments required. of you.
- 3- You must know that the compatibility of studying with life is important, so before applying and taking a step toward electronic studies, you must make sure that you will be able to adapt well.
- 4- You must ask yourself are you organized? Can you go ahead and stay motivated to complete a distance learning course to the end? [12]

3.5 study on campus:

It is the study that Everyone is aware of, this study is also referred to as a face-to-face study. It is a situation where a student attends a school or university and learns in a very natural way while on the campus of the university. [13]

3.6 Advantages of studying on campus:

- 1- One of the most important advantages of studying on campus is the direct interaction between students and the teacher in the classroom.
- 2- Additionally, face-to-face instruction encourages students to communicate with one another and share ideas, personal experiences, and challenges related to the lecture material. Due to the complexity of the teacher's position, this may be a tremendous learning resource that e-learning students are almost unaware of. Another important feature of the regular study is student assessment. Where the teacher can evaluate the student face to face, interact with him, know his capabilities, and develop them continuously.
- 3- You may find that you remain motivated to complete the course or academic year. You must attend a certain number of lectures, etc. For many students, this mandatory attendance is what propels them forward to complete the course or academic year.
- 4- You can get instant answers to questions by interacting with the teacher who explains to you in the lecture or educational class. [14]

3.7 Disadvantages of Studying on Campus

Unlike online learning, the majority of the time, Education in the classroom is organized, but it does not provide the learner with the flexibility that e-learning provides because if a student has a full-time job or other commitments, it will take more time. Instead, e-learning can produce You are free at the time of education. [15]

3.8 Blended Studies:

The combination of traditional schooling and online learning in a learning environment is known as blended learning. E-learning, conventional classroom instruction, and individual study are all successfully combined in blended learning. It has been more well-known in recent years as a result of the startling growth of online education on the one hand and the persistently staunch positions of traditional schools on the other. It goes by several names, including Dual Learning, Integrated Learning, Hybrid Learning, Blended Learning, and Mixed Learning. [16]

3.9 Advantages of Blended Studies:

- 1- Blended learning provides the learner with reasonable comfort and flexibility, as students can control the pace of learning and how they learn.
- 2- According to academic research, blended learning helps students grasp the course material more thoroughly.
- 3- Social skills also advance in the environment since blended learning enables interaction between students and instructors. [17]

3.10 Disadvantages of Blended Studies:

There are a wide variety of negatives that blended learning is exposed to, which made many educators abandon its use, and these negatives are represented by the following

- 1- Blended learning depends on a set of methods that he is still not interested in, as the Internet is still ineffective in many places, especially in remote places and others.
- 2- To use blended learning effectively, the student needs to be well-versed and appropriately acquainted with the use of technology.
- 3- Blended learning is computer-based, which incurs many physical, installation, and maintenance costs.
- 4- Low level of evaluation process efficacy, monitoring system, and student attendance or non-attendance. [18]

4. Objectives of the Study:

This study aims to compare the performance of students in studying and their results in exams from the on-campus study, electronic study, or Blended study. This comparison is done through their results in the final exams and finding out whether the on-campus study, the electronic study, or the Blended study have the same effect in providing information to the student on the one hand, and in the final exams, the student grades differ and what is the reason for this difference on the other hand.

5. Research Hypotheses

We want to evaluate if is there any difference between the three types of study such as on-campus, online study, and blending study during the pandemic, before and after the pandemic.

6. METHODOLOGY

6.1 Research design

The study is created utilizing real recorded data to address the study's questions.

6.2 Location

The main setting for this study is Kurdistan Technical Institute -Business Administration department.

6.3 The Population of the Study

The study's primary participants are 4th-semester students for the business administration department in the academic years (2018-2019, 2019-2020, and 2020-2021).

6.4 Method of Analysis

SPSS software was used for the sampling since the data does not follow the normal distribution, hence the non-parametric test is been used, for this reason, the methods that were used are as follows:

1. Descriptive statistic
2. Correlations coefficient
3. Mann-Whitney U test
4. Kruskal-Wallis test

6.5 Research Methodology and Data Collection

This study was conducted in accordance with the impact of On-campus, online learning, and blended learning on studying methods during the COVID-19 pandemic. Since the studying system in the Kurdistan region of Iraq does not follow the online systems and is fully on-campus, therefor the pandemic has made sufficient changes in the studying and examination methods. For this reason, this research was considered important to be done to understand the differences in the students' performances and final results between the different academic years before the pandemic, during, and after the pandemic including (2018-2019 full on-campus study, 2019-2020 online learning and e-learning, and 2020-2021 blended learning).

The study thus adapts the real recorded data for Nevertheless, the study strategy that is most suited to examine the hypothesis. Recorded data for this research uses the grades for all the courses in the 4th semester for 116 students which are five courses.

The quantity of students varies between the years, hence the minimum number to complete the analysis was 116 students using random sampling to choose the students for the testing and analyzing purposes, final grades for each student for all the courses in the 4th semester were confidentially used to complete the research tests. The courses are (Staff Performance Management, Marketing and Customer Service, Management Information System, Time Management, and Entrepreneurship Management)

7. Survey Instrument and Sampling

Three different academic years in a row for this research were used (2018-2019, 2019-2020, and 2020-2021) including only the 4th-semester final grades of the courses which are only five courses, taking 116 students as the sample of the study by using random sampling.

All the data will be kept confidential and are not for the publishing purpose, statistical package for social sciences (SPSS) software was used to take into account every possibility in the population of the study by using several tests such as Descriptive statistics, Correlations coefficient, Mann Whitney U, and Kruskal Wallis. Finally, the result of the research is discussed following the research objectives and hypothesis of the study.

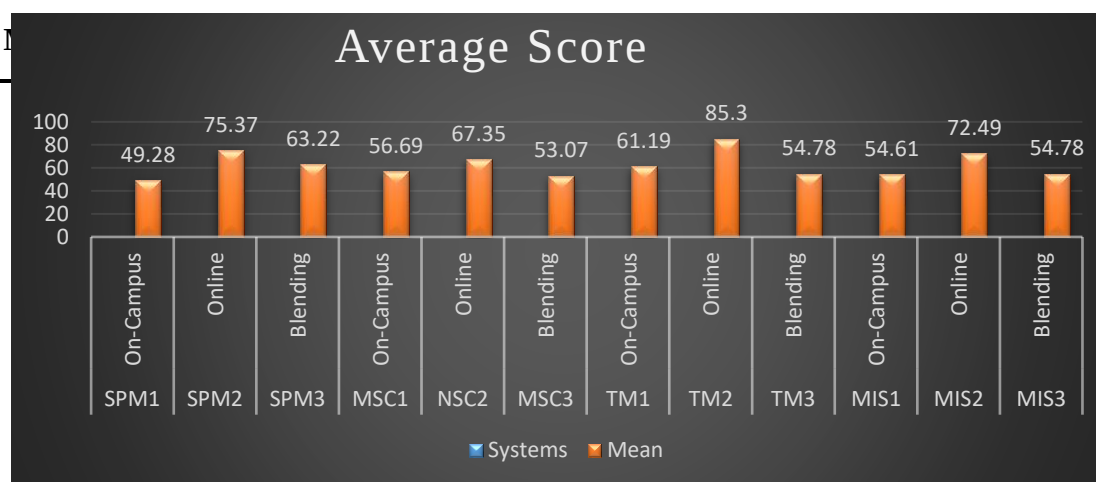
8. Description of Data

Through the descriptive statistical analysis, we explain some important points from the table below. Table 1. displays descriptive statistics like Minimum, Maximum, Mean, and Standard Deviation of the lessons under study such as (Staff Performance Management, Marketing, Customer Service, Time Management, and Management Information Systems).

Table 1.- Descriptive Statistics for each variable

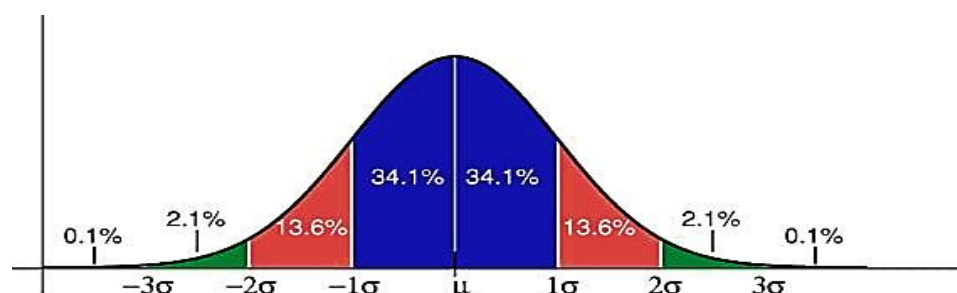
Subject	Systems	N	Minimum	Maximum	Mean	Std. Deviation
SPM1	On-Campus	116	13	95	49.28	15.28
SPM2	Online	116	30	91	75.37	11.97
SPM3	Blending	116	5	97	63.22	17.40
MCS1	On-Campus	116	20	90	56.69	15.25
NSC2	Online	116	30	98	67.35	9.56
MCS3	Blending	116	18	100	53.07	18.57

TM1	On-Campus	116	22	95	61.19	16.20
TM2	Online	116	34	98	85.30	13.54
TM3	Blending	116	25	97	54.78	17.63
MIS1	On-Campus	116	10	100	54.61	20.03
MIS2	Online	116	50	100	72.49	11.26



From Table 1, we will display the average grades for the lessons under study, so that through the results of the descriptive analysis, all the average values for lessons in the online system are greater than in the Blending system and the on-campus system

FIGURE 1- Average Score for each variable



Normality:

8.1

Test of

Normal distribution, also known as the Gaussian distribution, is a symmetric probability distribution about the average that demonstrates that data close to the average occur more frequently than data distant from the mean. The bell curve represents the normal distribution on a graph. We employed non-parametric tests to examine the data because the data does not follow a normal distribution, allowing us to obtain accurate and reliable results. [17]

Table 2- Tests of Normality

Tests of Normality						
	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
SPM	.083	348	0.00	.972	348	0.00
MCS	.090	348	0.00	.986	348	0.002
TM	.095	348	0.00	.949	348	0.00
MIS	.080	348	0.00	.987	348	0.004

8.2 non-parametric tests:

Non-parametric tests are statistical analysis techniques used in statistics that don't require a specific distribution to meet the assumptions required for their analysis (especially if the data is not distributed normally). For this reason, all times are referred to as distribution-free tests. Non-parametric tests serve as an alternative to parametric tests such as The ANOVA or T-test can only be used if the underlying data meets certain criteria and assumptions. [18]

8.3 Kruskal-Wallis Test:

The Kruskal-Wallis test is used to test the significance of differences in independent sample averages (from 3 samples or more), which corresponds to the ANOVA test in parametric tests. Therefore, researchers resort to using the Kruskal-Wallis test when the conditions of the parametric tests are not met, as well as when the data are classified Rank, and is symbolized by the symbol H. [19]

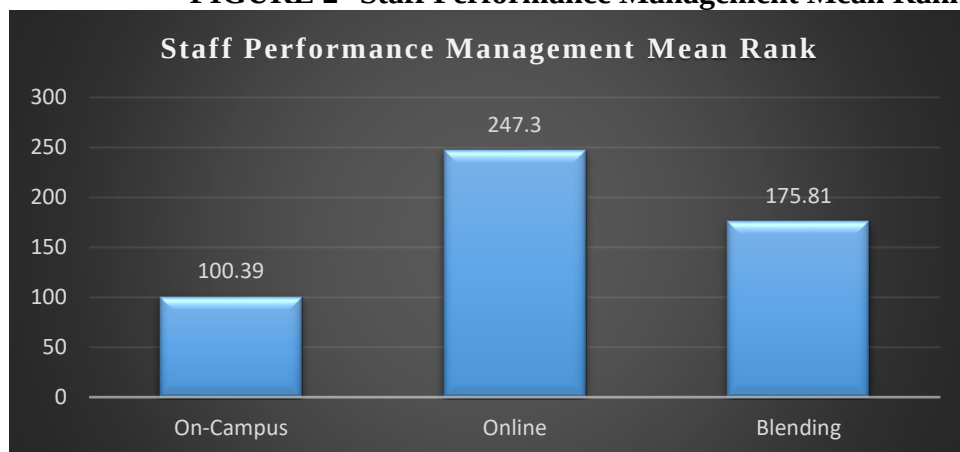
$$H_0: \mu_1 = \mu_2 = \mu_3$$

$$H_1: \mu_1 \neq \mu_2 \neq \mu_3$$

Table 3- Kruskal-Wallis Test for Staff Performance Management lesson

Ranks				Test Statistics	
Type1	Studies	N	Mean Rank	Staff Performance Management	
SPM1	On-Campus	116	100.39	Kruskal-Wallis H	123.769
SPM2	Online	116	247.30	df	2
SPM3	Blending	116	175.81	Asymp. Sig.	0.00

FIGURE 2- Staff Performance Management Mean Rank



the results of Table 3, and through the Kruskal Wallis test, show that there is a significant difference in the arithmetic mean in the lesson (**Staff Performance Management**) between the on-campus study, the Online study, and the Blending study so that it is the highest Mean rank for the year of Online study under the Corona pandemic and its value was (247.30), and the second-largest value was the Blending study and its value was (175.81), and the lowest value of the study is inside the university campus and its value was (100.39), and with a level of statistical significance less than (0.05) and the value is equal (0.00) As explained in the table NO (3), hence we reject the null hypothesis and accept the alternative hypothesis. This indicates that there are significant differences between averages in a lesson (**Staff Performance Management**).

To find statistically significant differences between average variables with each other, we use the Mann-Whitney U test.

8.4 Mann-Whitney U test:

When comparing differences between two independent groups and the dependent variable is either ordinal or continuous, the Mann-Whitney U test is utilized., but not follow normally distributed, the modules on hypothesis testing presented techniques for testing the equality of means in two independent samples. [20]

Table 4- Whitney U test for Staff Performance Management

Ranks					Test Statistics			
Staff Performance Management	Type1	N	Mean Rank	Sum of Ranks		SPM (1,2)	SPM (1,3)	SPM (2,3)
	SPM1	116	69.35	8045.00	Mann-Whitney U	1259.0	3600.0	3752.0
	SPM2	116	163.65	18983.00	Wilcoxon W	8045.0	10386.0	10538.0
	SPM1	116	89.53	10386.00	Z	-10.702	-6.121	-5.825
	SPM3	116	143.47	16642.00	Sig. (2-tailed)	0.00	0.00	0.00
	SPM2	116	142.16	16490.00	SPM = Staff Performance Management			
	SPM3	116	90.84	10538.00				

The results of the analysis are in Table 4. showed that there were differences that were statistically significant at a level less than (0.05) between the lesson averages of (**Staff Performance Management**) for the three Studies systems.

Table 5- Kruskal-Wallis Test for Marketing and Customer Service

Ranks				Test Statistics	
Type1	Studies			N	Mean Rank
MCS1	On-Campus	116	157.63	Kruskal-Wallis H	57.788
MCS2	Online	116	230.92		2
MCS3	Blending	116	134.95	Asymp. Sig.	0.00

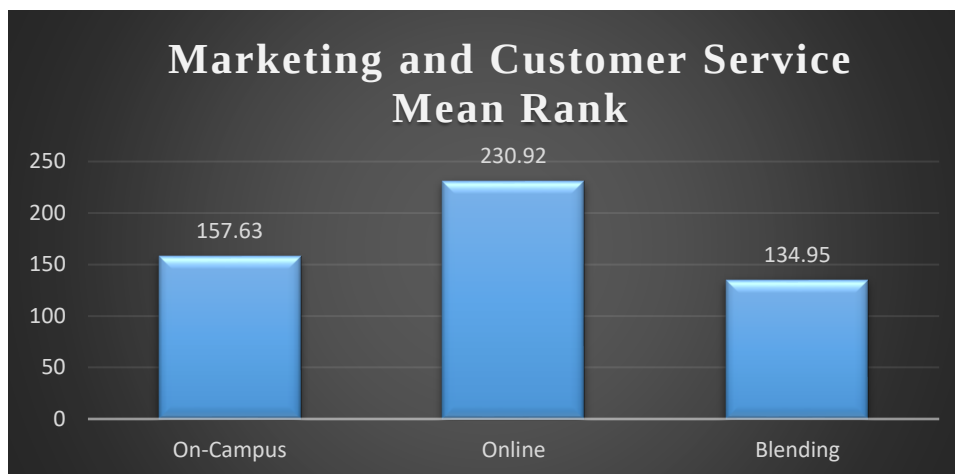


FIGURE 3- Marketing and Customer Service Mean Rank

the results of Table 5, and through the Kruskal Wallis test, show that there is a significant difference in the arithmetic mean in the lesson (**Marketing and Customer Service**) between the on-campus study, the Online study, and the Blending study so that it is the highest Mean rank for the year of Online study under the Corona pandemic and its value was (230.92), and the second-largest value was the on-campus study and its value was (157.63), and the lowest value of the Blending study and its value was (134.95), and with a level of statistical significance less than (0.05) and the value is equal (0.00) As explained in table 5, hence We accept the alternative hypothesis while rejecting the null hypothesis. This indicates that there are significant differences between averages in a lesson (**Marketing and Customer Service**).

Table 6- Whitney U test for Marketing and Customer Service

Ranks					Test Statistics			
Marketing and Customer Service	Type 1	N	Mean Rank	Sum of Ranks		MCS (1,2)	MCS (1,3)	MCS (2,3)
	MCS 1	116	90.44	10491.00	Mann-Whitney U	3705.000	5661.500	3206.500
	MCS 2	116	142.56	16537.00	Wilcoxon W	10491.000	12447.50	9992.500
	MCS 1	116	125.69	14580.50	Z	-5.930	-2.087	-6.903
	MCS 3	116	107.31	12447.50	Sig. (2-tailed)	0.00	0.037	.000

MCS 2	116	146.86	17035.50	MCS = Marketing and Customer Service
MCS 3	116	86.14	9992.50	

According to the analysis's findings in Table 6. there were statistically significant differences between the (Marketing and Customer) Service lesson averages for the three Studies systems at a level less than (0.05).

Table 7- Kruskal-Wallis Test for Time Management

Ranks				Test Statistics	
Type1	Studies	N	Mean Rank	Time Management	
TM1	On-Campus	116	143.88	Kruskal-Wallis H	145.348
TM2	Online	116	264.85	df	2
TM3	Blending	116	114.77	Asymp. Sig.	0.00

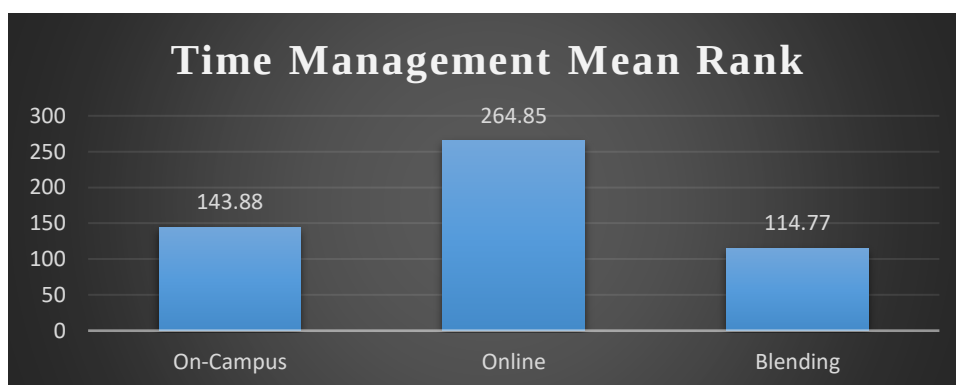


FIGURE 4- Time management Mean Rank

the results of Table 7, and through the Kruskal Wallis test, show that there is a significant difference in the arithmetic mean in the lesson (Time Management) between the on-campus study, the Online study, and the Blending study so that it is the highest Mean rank for the year of Online study under the Corona pandemic and its value was (264.85), and the second-largest value was the on-campus study and its value was (143.88), and the lowest value of the Blending study and its value was (114.77), and with a level of statistical significance less than (0.05) and the value is equal (0.00) As explained in table 7. hence, we reject the null hypothesis and accept the alternative hypothesis. This indicates that there are significant differences between averages in a lesson (Time Management).

Table 8- Whitney U test for Time Management

Ranks					Test Statistics			
Type 1	N	Mean Rank	Sum of Ranks			MCS (1,2)	MCS (1,3)	MCS (2,3)
Time Management	TM1	116	72.79	8444.00	Mann-Whitney U	1658.00	5210.00	1317.00
	TM2	116	160.21	18584.00	Wilcoxon W	8444.00	11996.00	8103.00
	TM1	116	129.59	15032.00	Z	-9.924	-2.973	-10.595
	TM3	116	103.41	11996.00	Sig. (2-tailed)	0.00	0.003	0.00
	TM2	116	163.15	18925.00	TM = Time Management			
	TM3	116	69.85	8103.00				

Table 8. contains the analysis findings. demonstrated that the lesson averages of (**Time Management**) for the three Studies systems had statistically significant variations at a level less than (0.05).

Table 7- Kruskal-Wallis Test for Management Information Systems

Ranks				Test Statistics	
Type1				Studies	Management Information Systems
MIS1	On-Campus	116	143.40	Kruskal-Wallis H	74.641
MIS2	Online	116	240.28	df	2
MIS3	Blending	116	139.82	Asymp. Sig.	0.00

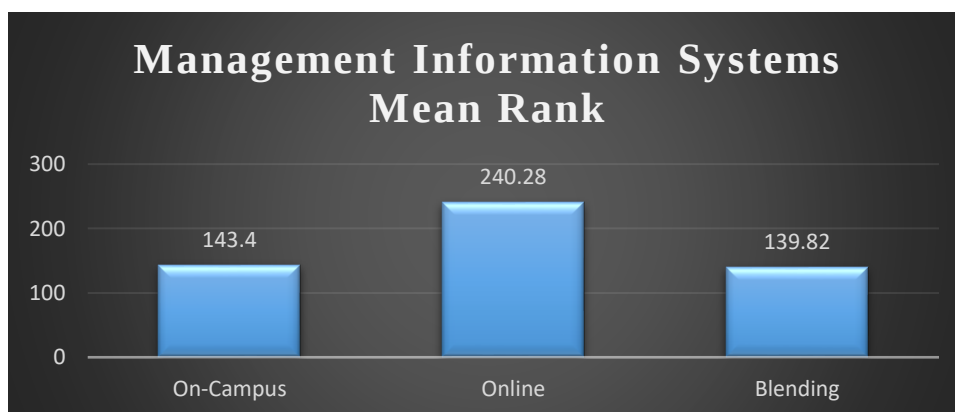


FIGURE 5- Management Information Systems Mean Rank

The results of Table 9, and through the Kruskal Wallis test, show that there is a significant difference in the arithmetic mean in the lesson (**Management Information Systems**) between the on-campus study, the Online study, and the Blending study so that it is the highest Mean rank for the year of Online study under the Corona pandemic and its value was (240.28), and the second-largest value was the on-campus study and its value was (143.40), and the lowest value of the Blending study and its value was (139.82), and with a level of statistical significance less than (0.05) and the value is equal (0.00) As explained in table 9, hence we reject the null hypothesis and accept the alternative hypothesis. This indicates that there are significant differences between averages in a lesson (**Management Information Systems**).

Table 10- Whitney U test for Management Information Systems

Ranks					Test Statistics			
Management Information Systems	Type 1	N	Mean Rank	Sum of Ranks		MCS (1,2)	MCS (1,3)	MCS (2,3)
	MIS 1	116	85.00	9859.50	Mann-Whitney U	3073.50	6681.50	2751.50
	MIS 2	116	148.00	17168.50	Wilcoxon W	9859.50	13467.50	9537.50
	MIS 1	116	116.90	13560.50	Z	-7.158	-.091	-7.803
	MIS 3	116	116.10	13467.50	Sig. (2-tailed)	0.00	0.927	0.00
	MIS 2	116	150.78	17490	MIS = Management Information Systems			
	MIS 3	116	82.22	9537.50				

The analysis's findings, which are presented in Table 10, revealed that there were statistically significant variations between the lesson's average score, and as long as the level of statistical significance is larger than (0.05), there are no variations between the average lessons, with the exception of the year of campus study and the year of blended study. The result was (0.927) of (Management Information Systems) for the three Studies systems.

9. Conclusion:

Based on the findings of this comprehensive study, which included a rigorous statistical analysis, significant differences were identified in the performance of students across three distinct educational systems: on-campus study, online study, and Blending study. Specifically, it was evident that the grades attained in the online study system surpassed those obtained in the other two systems. This notable contrast can be attributed to several factors, including the inherent advantages of the online exam format. In the online study system, students enjoy the freedom to access various educational resources, providing them with additional support and information to enhance their performance. Moreover, the generous time allocation for answering questions in this system allows students to carefully reflect and respond, potentially leading to more accurate and thorough answers. However, it is crucial to acknowledge that in this particular system, there may not be a clear distinction between students who excel solely through their

individual efforts and those who benefit from external assistance or resources. This aspect raises questions regarding fairness and the evaluation of true academic achievements in the online study system.

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