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The impact of Facebook usage in education on students' academic performance at the University of Jordan

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Abstract

Facebook, as a social networking site, is one of the most important means of communication technologies that have been widely adopted by college students and their professors worldwide. The purpose of this study is to shed light on the impact of Facebook on higher education generally and specifically on the academic performance of the students of the University of Jordan. For the completion of this study, the researchers selected a random sample of students from the University of Jordan and gave them a questionnaire on how Facebook affected their academic performance. The collected data was analyzed and tested by using correlation tests through SPSS, a data analysis program. The independent variable measured: 1- communication among students and communication between them and the faculty members; 2- sharing of resources and materials; 3- and collaboration among students. The academic achievement of students was measured by examinations and/or by continuous assessment such as (their GPAs, overuse or multitasking, and the time they spend on studying). Three pre-determined hypotheses tested are: (H1) Communication through Facebook has no significant impact on students' academic performance. (H2) The sharing of educational resources and materials through Facebook does not significantly influence students' academic performance. (H3) Collaboration among students through Facebook has no significant influence on their academic performance.

KEYWORDS: Facebook, Education, Students' Academic Performance.

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1. Introduction

Hundreds of thousands or even millions of people are heavily immersed in Web 2.0 technologies (i.e. blogs, twitter, podcasts, wikis, social network sites (SNSs), virtual worlds, video sharing and photo sharing). Social network sites are quickly becoming ubiquitous online and the social media has become one of the most important communication means in recent times.

Currently, social networks exist as a means to provide communication among people regardless of location, enabling them to easily share information, have access to files, pictures and videos, send messages, and conduct real-time conversations. Simply, they allow easy and effective communication with colleagues and coworkers. Studies showed that social network tools support educational activities by facilitating interaction, collaboration, active participation, resource sharing, and critical thinking (Ajjan & Hartshorne, 2008; Selwyn, 2009).

Using social networks in educational and instructional contexts can be considered as a potentially powerful idea, simply because students spend a lot of time on these online networking activities. Although university professors have started to address this phenomenon, there have been only a limited number of studies on social networks in education.

As a new means of communication, Facebook caters for a specific population whose members share a common interest in communicating, exchanging ideas, and sharing information. This specific population can be represented by any group of people in any society.

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Limited in scope, this study focuses on the effect of the usage of Facebook on the academic performance of a specific group of people, represented by university students within their educational environment. The population of this study is a sample of students from the Faculty of Business Administration and the Faculty of Information Technology at the University of Jordan (UJ). Modern, yet the oldest higher educational institution in Jordan, the UJ has dedicated itself to the advancement of knowledge, research and community service, offering more than 3500 different courses in 18 faculties (the website of the University of Jordan UJ).

2. Literature review

One study finds out that students spend approximately 30 minutes on Facebook as part of their daily routine (Pempek et al., 2009). Another study points out a significant negative relationship between Facebook use and academic performance (Kirschner & Karpinski, 2010). A third study shows that the majority of students claimed to use Facebook log into their accounts at least once daily. Similar results are also reported in (Boogart, 2006; Rouis et al., 2011; Junco, 2011; Junco & Cotten, 2012). According to a Nielsen Media Research study, conducted in June 2010, almost 25 percent of students' time on the Internet is now spent on social networking. As for the relationship between social media and grades, a study released by Ohio State University reveals that college students who utilize Facebook spend less time on studying and have lower grades than students who do not use the popular social networking sites (Kalpidou et al., 2011). It is reported that, on average, Facebook users score lower GPAs than their peer Facebook nonusers.

Another study points out that Facebook is currently used by people of different ages, education levels, gender, social status, and cultural backgrounds, but the same study stresses the fact that the vast majority of Facebook users are university students, aged between 18 and 25 (Mazman & Usluel, 2010). Another study, conducted by (Boyd & Ellison, 2008), shows that Facebook could be used as a supplemental tool in education. According to (Cavus et al., 2021), e-Learning and social networking sites contribute to solving education problems, especially in times of crises, such as during the COVID-19 pandemic. The study of (Mukhtar et al., 2020) shows many positive advantages of e-Learning in terms of ease of access and convenience of use in many scientific fields. During the COVID-19 pandemic, e-Learning offered an opportunity for sustainable development. The educational institutions that used it gained a competitive advantage, through the redefinition of teaching methods and channels of interaction (Sá & Serpa, 2020). The pandemic has contributed to activating the supporting capabilities, increasing the speed of response levels, managing resources and multimedia elements, and learning and practicing knowledge and skills (Chen et al. 2020; Chapman, & Marich, 2020; Liu, & Hung, 2020). The study of Greenhow and Chapman, published in 2020, indicates that social media has a role in promoting education and building societies whose citizens are aware of the importance of the use of both social media and traditional education systems, especially in times of crises, such as the COVID-19 crisis.

3. Background

3.1 Importance of Facebook

An online social networking service, Facebook was founded in February 2004 by Mark Zuckerberg and his roommate and fellow at Harvard University. As a social utility, it helps people communicate more efficiently with their friends, family and coworkers.

Many organizations work to develop technologies that facilitate the sharing of information through the social graph, the digital mapping of people's real-world social connections. Anyone can sign up for Facebook and interact, in a kind of trusted environment, with people they know. Facebook was reported to have more than 21 million registered members generating 1.6 billion page views each day (Ellison et al., 2007).

Facebook members can join networks based on school affiliation, universities, employers, and geographic regions. Facebook can be used for keeping track of old and new friends. It is free to join Facebook, and this requires only that you be over 13 years of age and have a valid email address. In 2006, Facebook was used at over 2,000 United States colleges and was the seventh most popular site on the World Wide Web with respect to total page views (Ellison et al., 2007). Undoubtedly, Facebook helps you connect and share with others.

3.2 The Benefits of Facebook in Education

When involved in classroom networks, students use Facebook as an academic tool. They also use it as a social network. Students and lecturers can be more closely connected, which in return can strengthen the lecturer-student relationship.

A unique social networking site, Facebook helps create connections between students and faculty members within an online academic community (Peruta & Shields, 2017; Liu, & Hung, 2020). It eases communication within such a community, through facilitating uploading photos and videos, with a wide variety of courseware options. According to the chart below, 52% of the users of Facebook are people aged between 18 and 34. Thus, most of the Facebook users are university students, who can access Facebook from their PC's, laptops, tablets, or smart phones (Burbary, 2011).

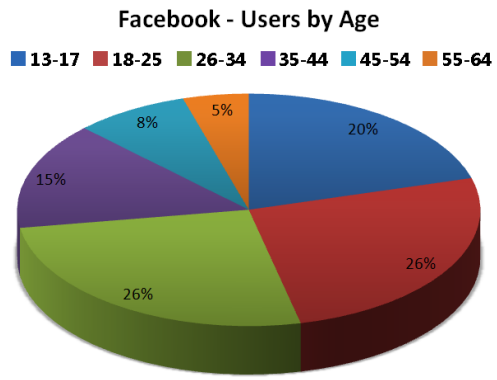

Figure 1 - Facebook Users by Age.

In higher educational institutions, Facebook is used to provide virtual training. Virtual learning environments offer an opportunity for flexible and active learning under a constructivist approach. They also cater for innovation in teaching and learning processes (Luo et al., 2017; & Almenara et al., 2019; Liu & Hung, 2020). Recently, Facebook has developed its downloadable applications, which can supplement its educational functions. Social influence is the most important factor in adopting the use of Facebook. Offering an opportunity for peers to interact and share ideas, Facebook is an educational tool for communicating. In addition to helping peers share ideas about various projects, Facebook enables both learners and teachers to choose the topics to be discussed. On Facebook, they can ask and answer questions and share information (Arteaga et al., 2014; & Hew, 2011).

4. Research goals

The objectives of the study are:

1. to show how college students use Facebook, i.e., to determine the purposes of their use of Facebook.
2. to assess, in students' opinion, whether the use of Facebook has affected their academic performance or not.

5. The Proposed Model and Hypotheses

The research model in (Figure 2) proposes a direct impact of the usage of Facebook on education, including communication, sharing of materials and resources, and collaboration. It also indicates that there is a direct correlation between Facebook and the ease to access knowledge, therefore affecting academic performance. Thus, this model posits that there is a direct impact of Facebook on the academic performance of the students of the University of Jordan, reflected by their GPAs, overuse or multitasking, and the time they spend on studying.

Beneath the graph, each dimension of Facebook usage at the University of Jordan is discussed in more detail, followed by related hypotheses.

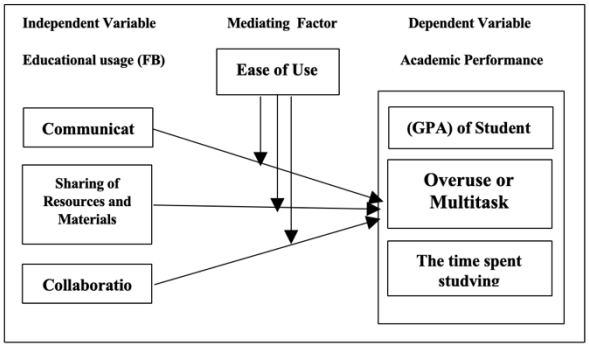

Figure 2 - The Research Model: The Impact of Facebook Usage in Education on the Academic Performance of Students at the University of Jordan.

5.1 Educational usage

As mentioned earlier, a study conducted by Boyd shows that due to students' digital proceeding and participation, Facebook could be used as a supplemental tool in education (Boyd & Ellison, 2008). According to that research, the possible factors that may affect Facebook usage are communication, sharing of resources and materials, collaboration, and ease to use. These factors are suggested to play an influential role in Facebook usage, mainly in education. Like other social networks, Facebook facilitates informal learning because of its active role in members' daily lives. Like other social networking sites too, Facebook supports collaborative learning, helps engage individuals in critical thinking, and enhances communication and writing skills through activating collective work in personalized environments (Ajjan & Hartshorne, 2008; Lockyer & Patterson, 2008). Below, some explanation is provided.

5.1.1 Communication

Communication refers to the active interactions between educators and students and among students themselves on the one hand, and on the other between students and personnel at university, which helps students access information on classes, courses, resources, announcements, departments, delivery of homework assignments, and other related links (Ekahitanond, 2018).

Communication through social networking also occurs between administrators, parents, and other community members (Butler, 2010). Not only do college students spend the greatest amount of their personal time communicating face-to-face or on the phone, but it also seems that social networking sites, mainly Facebook, might have the lion's share of these interactions among themselves (Hanson et al. 2012; Ekahitanond 2018). According to (Meyers, 2004; Paolini, 2015),

communication increases effectiveness and student motivation. It also builds rapport and allows instructors to grow professionally.

HO1: Communication has no statistically significant impact on the use of Facebook in education and eventually on students' academic performance.

5.1.2 Sharing of Resources and Materials

People exchange ideas and information through Facebook. They can also share their resources, materials, projects and documents with their staff members to build collaborative communities in higher educational institutions (Peruta & Shields, 2017). Facebook provides students with plenty of resources and materials, as well as with activities based on exchanging multimedia resources, videos, animated videos, and audio materials. Thus, through Facebook, students can easily access some links to external resources or pages, with audio and visual materials and resources.

HO2: Sharing of instructional resources and materials on Facebook has no statistically significant influence on the academic performance of students at the University of Jordan.

5.1.3 Collaboration

As Facebook contains different categorical groups and communities, it provides opportunities for members to join new networks in a way to open up spaces for collaborative learning (Selwyn, 2009; Al-Rahmi & Othman, (2012). On Facebook, people can exchange information and share knowledge within groups. In education in particular, the usage of Facebook for collaboration among members of academic groups on issues related to their universities, departments, and classes, help them carry out their common responsibilities and homework assignments. Such activities surely influence the academic performance of students, besides helping teachers both formally and informally. Simply, Facebook can be used by both as a sounding board to give informal academic advice, to receive suggestions, and to share thoughts (Amador & Amador, 2017).

HO3: On Facebook, collaboration in education has no statistically significant influence on the academic performance of students at the University of Jordan.

5.2 Usability

Ease of use is defined as "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989). Rogers (2003) and Thompson, Higgins, & Howell, (1991) consider ease of use as complexity and, to them, it is defined as "the degree to which a system is perceived as relatively difficult to understand and use".

Ease of use can be achieved through the use of certain software applications, websites, tools, machines, processes, or anything a human being can interact with. In human-computer interaction and computer science, usability studies the interaction with a computer program or a web site (web usability). Usability differs from user satisfaction and user experience because usability also considers usefulness. So the social networking sites, as important applications, are utilized in education to achieve many values and benefits. Thanks to the unique features of Facebook and its usability, students can perform better.

HO4a: Usability or (ease of use) of Facebook in education has no statistically significant influence on the GPAs of students.

HO4b: Usability or (ease of use) of Facebook in education has no statistically significant influence on the time students spend studying.

HO4c: Usability or (ease of use) of Facebook in education has no statistically significant influence on students' overuse or multitasking.

5.3 Academic Performance

Academic performance or achievement can be defined as the outcome of education, the extent to which a student, teacher or institution has achieved their educational goals. Aiming at measuring academic performance through dimensions such as the GPAs of students, the time spent on studying, and multitasking, this study will focus on how the use of new technologies, primarily Facebook, in education influences the academic achievement of the students at the University of Jordan.

The study will address that issue, taking into account the results of the most recent exploratory survey study that has reported a negative relationship between Facebook use and academic achievement, as measured by self-reported GPA and hours spent for studying per week (Karpinski & Duberstein, 2009). The study will also consider the results of a study conducted by Al-Rahmi & Othman, (2012), which states that when the quality of technology use is not closely monitored or ensured, computer use may do more harm than good to students' achievement. However, the study will consider the exploratory findings of another group of researchers, which show no relationship between Facebook use and the GPAs of students (Pasek, More & Hargittai, 2009). Given the overall consensus that the questioned relationship between social networking sites and academic performance remains largely unanswered, the study might help unravel such a relationship.

5.3.1 Student's Grade Point Average (GPA)

Grading in education is the process of applying standardized measurements of varying levels of achievement in a course. Grades can be assigned in

letters (for example A, B, C, D, E or F), as a range (for example 1 to 6), as a percentage of a total number, as a number out of a possible total (for example out of 20 or 100), or as descriptors (excellent, great, satisfactory, needs improvement). GPA is calculated by taking the number of grade points a student earns in a given period of time divided by the total number of credits taken by the same student.

Based on that grading system, it has been reported that college students' use of social networks has been linked to a decrease in academic success, with 8.9% of students in 2000 reporting this occurrence (Junco & Cotten, 2012). As the trend to use social media networks becomes more prominent among college students, academic failure is likely to occur. A recent study of college undergraduate students revealed that 76% of them felt that Facebook™ had a negative effect on their ability to study effectively (Pempek et al., 2009). The same study also showed that 82% of the same students felt that Facebook™ had a positive influence on their social, not educational, lives (Pempek et al., 2009).

5.3.2 Multitasking

Defined as the synchronous execution of two or more processing activities at the same time without loss of efficiency or effectiveness, multitasking is a phenomenon, explained by some by the fact that that there has been a specific evolution of our brains. Yet, to others, that is fallacious reasoning, for to them human beings are not really capable of multitasking, but can, at best, switch quickly from one activity to another (Kirschner, Sweller & Clark, 2006; Sweller, Kirschner & Clark, 2007). Therefore, multitasking on Facebook and study time split the students' attention, causing a decrease in knowledge retention (Junco & Cotten, 2012). This is because during multitasking, students engage in an unrelated activity that reduces their ability to fully comprehend knowledge being taught. It also distracts their attention from their schoolwork and adds excess loads on the brain (Wood et al., 2012). When working memory is overloaded, the brain is unable to effectively understand the information being learned (Sweller, 1994).

This is consistent with the CLT, which states that the combination of typical learning processes and external distractions can result in a reduction of the brain's ability to effectively process knowledge (Sweller,1994) and to build an effective schema (Burak, 2012). Some have even theorized that when two tasks are switched back and forth, the brain may remove one task from working memory, so that the brain does not have excess load amounts (Kieras, Meyer, Ballas & Lauber, 2000).

As technology improvements have occurred (Burak, 2012), multitasking within the classroom, represented by students' easy access to social networking sites through cell phones and laptops, has increased, leaving detrimental impact on their ability to learn and store knowledge (Ellis et al., 2011).

5.3.3 Time Spent Studying

According to Boogart (2006), heavy Facebook use is observed among students with lower GPAs. No control variables were implemented in the analyses, though. Conversely, Kolek & Saunders (2008) found that there was no correlation between Facebook use and GPA in a sample of students from a public Northeast research university. Kirschner & Karpinski, (2010) suggest that Facebook™ users spend fewer hours studying, when compared to non-users, which may lead to their poor academic performance. The theories of Astin (1984) and Chickering & Gamson, (1987) suggest that the amount of time allocated for academic work is predictive of academic success. The more the hour's students spend studying, the better the grades they score.

6. Research Methodology

6.1 Instrument Development

This study follows a quantitative methodology. Data was collected by means of an online survey and a paper format was distributed manually. A random sample of students from the University of Jordan was selected.

The survey consists of three sections. The first section includes five questions about demographic characteristics, including gender, age, social status, educational level, and the type of college. The second section focuses on specific information on whether or not the student has an account on Facebook, whether he/she uses Facebook for educational purposes, how often he/she checks his/her account on Facebook, the length of time spent on Facebook for educational purposes, and information about his/her GPA. The third section includes questions on certain specific information. All questions use a five point Likert-scale, consisting of these levels: strongly agree =5, agree =4, neutral=3, disagree=2, and strongly disagree =1.

6.2 Sampling and Questionnaire Distribution

For the purposes of the current study, a random sample of students, representing the business and IT faculties at the University of Jordan, was taken. Equal proportions of the different departments were examined. The study includes postgraduate students only.

6.3 Reliability

The Statistical Package for the Social Sciences (SPSS) has been used to get the overall stability coefficient of the study variables.

The fact that this coefficient is rated at 88.8% in this study indicates that the instrument items have reached a value higher than that of the required minimum reliability limit, usually rated at 65% (Sekaran & Bougie, 2013). The Table 1 indicates an acceptable degree of reliability required for scientific research purposes.

6.4 Data Analysis and Results

The gathered data was analyzed by the version 18.0 of the Statistical Package for the Social Sciences (SPSS), utilized for the purposes of descriptive statistics. Analytical statistics were used to test the study hypotheses. Hypotheses were analyzed by using regression analysis and variance analysis to calculate the F-value.

6.4.1 Descriptive Analysis

Descriptive statistics, which describe a set of data quantitatively, are used to find out how similar or scattered data are about a particular mean. Central tendency measures include the arithmetic mean, median, and mode. The dispersion measures include standard deviation, minimum value, maximum value, variance and others. By using normal distribution tests, descriptive statistics can indicate whether data is normal or not, as shown in Tables 2 and 3 below. As Table 2 shows, the mean of the Gender variable is equal to 1.39, and the standard deviation of the Gender variable is equal to 0.488. The mean of the Age variable, as Table 2 shows, is equal to 2.51, and the standard deviation is equal to 0.624. The maximum value of the Age variable is 4, and the minimum value of the Age variable is 2. The mean of the Social Status variable is equal to 1.29, and the standard deviation is equal 0.454. The mean of the Highest Degree Earned variable is equal to 1.97, and the standard deviation is equal to 0.157. The mean of the Type of College variable is equal to 1.58, and the standard deviation is equal to 0.494. The minimum value is equal to 1, and the maximum value is equal to 2.

6.4.1.1 The Demographic Data of the Study

1. *Gender*: In the light of the study results, Table 4 shows that the percentage of the male participants was greater than that of the female ones. Of the 318 participants, 195 were males, representing 61.3% of the total sample, and 123 were females, representing 38.7% of the total sample. See Figure: 3.

2. *Age*: Table 4, which classifies the study sample based on age, shows that the highest age category included the age range 20-29 years old. The frequency of that category was 179 of the total sample comprising 56.3%. The second category included the age range 30-39 years old. The frequency was 117 of the total sample comprising 36.8%. The lowest age category included the age range 40 years old and above. The frequency of that category was 22 of the total sample comprising 6.9%. See Figure 3.

3. *Social Status*: The sample included single and married individuals. Table 4 shows that 226 single individuals constituting the largest portion of the sample, comprising 71.1% of the total sample, participated in the study. The other 92 students who also took part in the study, comprising 28.9% of the total sample, were married. See Figure:3.

4. *Highest Degree Earned*: This study included students at the master's and PhD levels, as shown in Table 4. 310 students at the master's level constituted the largest portion of the sample comprising 97.5% of the total sample, followed by 8 students at the doctoral level, comprising only 2.5% of the total sample. See Figure: 3.

Variables		Cronbach's Alpha Value
Independent Variables	Communication	81.3 %
	Sharing of Resources and Materials	70.3 %
	Collaboration	68.2 %
Mediating Factor	Usability	62.0 %
Dependent Variable	Academic Performance	71.7 %

Table 1 - The Reliability Statistical Analysis of the Study.

	N	Minimum	Maximum	Mean	Std. Deviation
Gender	318	1	2	1.39	.488
Age	318	2	4	2.51	.624
Social Status	318	1	2	1.29	.454
Highest Degree Earned	318	1	2	1.97	.157
Type of College	318	1	2	1.58	.494
N	318				

Table 2 - The Descriptive Statistics of the Study.

			Statistic	Std. Error
Gender	Mean		1.39	.027
	95% Confidence Interval for Mean	Lower Bound	1.33	
		Upper Bound	1.44	
	5% Trimmed Mean		1.37	
	Median		1.00	
	Variance		.238	
	Std. Deviation		.488	
	Minimum		1	
	Maximum		2	
	Range		1	
	Interquartile Range		1	
	Skewness		.467	.137
	Kurtosis		-1.793	.273
Age	Mean		2.51	.035
	95% Confidence Interval for Mean	Lower Bound	2.44	
		Upper Bound	2.58	
	5% Trimmed Mean		2.45	
	Median		2.00	
	Variance		.390	
	Std. Deviation		.624	
	Minimum		2	
	Maximum		4	
	Range		2	
	Interquartile Range		1	
	Skewness		.838	.137
	Kurtosis		-.312	.273
Social Status	Mean		1.29	.025
	95% Confidence Interval for Mean	Lower Bound	1.24	
		Upper Bound	1.34	
	5% Trimmed Mean		1.27	
	Median		1.00	
	Variance		.206	
	Std. Deviation		.454	
	Minimum		1	
	Maximum		2	
	Range		1	
	Interquartile Range		1	
	Skewness		.934	.137
	Kurtosis		-1.135	.273
Highest Degree Earned	Mean		1.97	.009
	95% Confidence Interval for Mean	Lower Bound	1.96	
		Upper Bound	1.99	
	5% Trimmed Mean		2.00	
	Median		2.00	
	Variance		.025	
	Std. Deviation		.157	
	Minimum		1	
	Maximum		2	
	Range		1	
	Interquartile Range		0	
	Skewness		-6.093	.137
	Kurtosis		35.348	.273
Type of College	Mean		1.58	.028
	95% Confidence Interval for Mean	Lower Bound	1.53	
		Upper Bound	1.64	
	5% Trimmed Mean		1.59	
	Median		2.00	
	Variance		.244	
	Std. Deviation		.494	
	Minimum		1	
	Maximum		2	
	Range		1	
	Interquartile Range		1	
	Skewness		-.346	.137
	Kurtosis		-1.892	.273

Table 3 - Descriptive Statistics: Test of Normality.

The Variables		Frequency	Percent	Cumulative Percent
Gender	Male	195	61.3	61.3
	Female	123	38.7	100.0
	Total	318	100.0	
Age	Less than 20 years	0	0	0
	Between 20 - 29 years	179	56.3	56.3
	Between 30 - 39 years	117	36.8	93.1
	Between 40 - 49 years	22	6.9	100.0
	50 years or older	0	0	0
	Total	318	100.0	
Social Status	Single	226	71.1	71.1
	Married	92	28.9	100.0
	Total	318	100.0	
Highest Degree Earned	Master	310	97.5	97.5
	PHD	8	2.5	100.0
	Total	318	100.0	
Type of College	Humanity Colleges - (IT College)	186	58.5	58.5
	Scientific Colleges -(Business College)	132	41.5	100.0
	Total	318	100.0	

Table 4 - The Demographic Data of the Study.

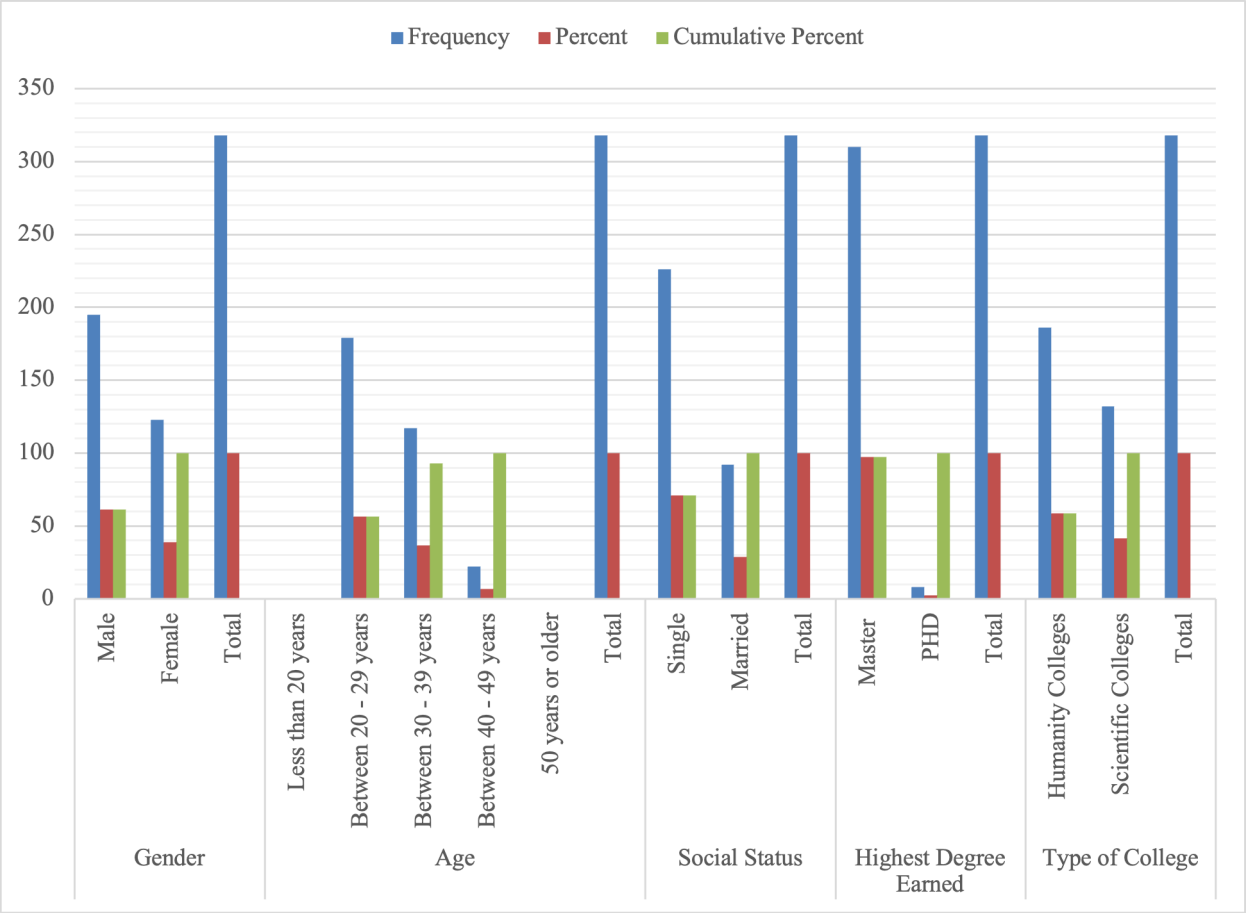

Figure 3 - The Demographic Data of the Study.

5. *Type of College*: Both colleges or faculties of the humanities and science were included in the study. Table 4 shows that faculties of the humanities represented the highest frequency. 186 individuals comprising 58.5% of the total sample, were from the humanities, while 132 individuals, comprising 41.5% of the sample, were from the faculties of science. See Figure 3.

6.4.1.2 Facebook Usage

In the paragraph on Facebook usage as a tool in education, there are 4 questions. Below are the answers to them, as shown in Table 5.

Question 1. Do you use a Facebook account for educational purposes? Table 5 shows that the number of students that use Facebook for educational purposes is greater than the number of students who do not. 309 students comprising 97.2% of the total sample use a Facebook account for that, while only 9 students comprising 2.8% of the total sample do not.

Question 2 On average, how often (many time per day) do you check your account on Facebook? As shown in Table 5, the frequency of students who check their Facebook accounts 5 times a day is the greatest. 138 students comprising 43.4% of the total sample check their accounts 5 times daily. 99 students comprising 31.1% of the total sample check their accounts once daily. 66 students comprising 20.8% of the total sample check their accounts 6-10 times daily. 15 students comprising 4.7% check their accounts more than 10 times daily.

Question 3. How much time do you spend daily on Facebook for educational purposes? As shown in Table 5, 162 students comprising 50.9% of the total sample spend less than 30 minutes a day on Facebook for educational purposes. 122 students comprising 38.4% spend approximately one hour daily for the same purpose. 34 students comprising 10.7% spend one to two hours daily for that too. No students spend more than three hours daily on Facebook for educational purposes.

Question 4. What is your GPA? Based on the results shown in Table 5, 263 students comprising 82.7%, the highest percentage, have very good GPAs. 34 students comprising 10.7% have excellent GPAs. 21 students comprising 6.6% have good GPAs. No students have acceptable GPAs.

6.4.2 Hypotheses Testing

In this section, the study hypotheses will be discussed, analyzed and measured based on the three independent variables and the mediating one used in the study. The extent of their influence on the academic performance of the postgraduate students of the Faculties of Business and Information Technology (IT) at the University of Jordan was measured.

1. *Measuring the direct impact of the Independent Variables on the Dependent Variable (in the absence of the Mediating Factor)*.

In the light of the results of the linear regression analysis, as described in Table 6, there is a statistically significant positive relationship among all independent variables and the dependent variable. This relationship is represented by collaboration, sharing of materials and resources, communication, and dependent variable academic performance. The value of (R) was as follows: R= 0.49, R= 0.77, R= 0.92, and the value of the coefficient of determination (R2) was as follows: R2= 0.24, R2= 0.60, R2=O.86. These ratios indicate what can be explained by the academic performance

Question			**Frequency**	**Percent**	**Cumulative Percent**
1.	**Do you use Facebook account for education purpose?**	Yes	309	97.2	97.2
		No	9	2.8	100.0
		Total	**318**	**100.0**	
2.	**On average, how many times in a day can check your account on Facebook?**	Once a day	99	31.1	31.1
		5 times a day	138	43.4	74.5
		6-10 times a day	66	20.8	95.3
		More than 10 in a day	15	4.7	100.0
		Total	**318**	**100.0**	
3.	**What is the length stay in Facebook for education?**	Less than 30 minutes	162	50.9	50.9
		Approximately an hour	122	38.4	89.3
		Between 1 - 2 hours	34	10.7	100.0
		More than 3 hours	-	-	
		Total	**318**	**100.0**	
4.	**What is your GPA?**	Excellent	34	10.7	10.7
		Very Good	263	82.7	93.4
		Good	21	6.6	100.0
		Acceptable	-	-	
		Total	**318**	**100.0**	

Table 5 - Facebook Usage Data of the Study.

through the three independent variables in this model, and the remaining ratios are caused by other factors that cannot be explained or measured in the model of this study.

In addition, when explaining this case, the null hypothesis shall be rejected, which states that there is not any statistically significant impact of the use of Facebook in education on the academic performance of the postgraduate students at the University of Jordan, through the independent variables as follows:

- Communication on Facebook has no statistically significant impact on education and eventually on students' academic performance. According to the statistical rule and because the value of the (sig. F) is less than $\alpha = 0.05$, then the null hypothesis is rejected and the alternative hypothesis is accepted, which means that communication on Facebook has a statistically significant effect on education and eventually on students' academic performance.
- Sharing of resources and materials: the null hypothesis is rejected and the alternative hypothesis is accepted because the value of (sig. F) is less than $\alpha = 0.05$. This means that sharing of resources and materials through Facebook has a statistically significant effect on education and eventually on students' academic performance.
- Collaboration: the null hypothesis is rejected and the alternative hypothesis is accepted because the value of (sig. F) is less than $\alpha = 0.05$. This means that there is a statistically significant effect of collaboration on students' academic performance.

As a result, the highest contribution into the variance occurred in the dependent variable is represented by collaboration with (β) coefficient of 1.074, then the sharing of resources and materials with (β) coefficient of 1.062, while the lowest contribution represented by communication with (β) coefficient equal 0.702.

2. *Measuring the direct impact of the Mediating Factor (Usability or Ease of use) on the Dependent Variable (Academic Performance)*.

In the light of the results of the linear regression analysis, as described in Table 7 below, there is a statistically significant positive relationship between the mediating variable, usability, and the dependent variable, academic performance. This relationship is represented by the value of (R) which was R= 0.808 and the value of the coefficient of determination (R2) which was R^2= 0.653.

In addition, when explaining this case, the null hypothesis shall be rejected, which states that there is not any statistically significant impact of usability; i.e. the ease of use of Facebook, on education and on the academic performance of the postgraduate students at the University of Jordan. The value of (sig. F) was less than $\alpha = 0.05$, as shown in Table 7 below.

As a result, and as shown in Table 7, the contribution degree into the variance occurred in the dependent variable is represented by usability with (β) coefficient of 1.091. This is a confirmation that there is a direct relationship between the mediating variable (usability or ease of use) and the dependent variable (academic performance), in the absence of the independent variables in this study.

3. *Measuring the direct impact of the Independent Variables on the Mediating Factor (Usability or Ease of use)*.

In the light of the results of the linear regression analysis, as described in Table 8 below, there is a statistically significant positive relationship among all independent variables and the mediating variable (usability or ease of use). This relationship is represented by collaboration, sharing of resources and materials, communication, and the mediating variable (usability or ease of use). The values of (R) were R= 0.337, R= 0.581, R= 0.791, and the values of the coefficient of determination (R2) were as follows: R^2= 0.114, R^2= 0.338, R^2= 0.625. These ratios indicate what can be explained by the usability of the Facebook through the three independent variables in the study model, and the remaining ratios are caused by other factors that cannot be explained or measured in the model of this study.

In addition, when explaining this case, the null hypothesis shall be rejected, which states that there is not any statistically significant impact of the independent variables and the mediating variable (usability or ease of use of Facebook) on the education of the postgraduate students at the University of Jordan. The value of (sig. F) is less than $\alpha = 0.05$, as shown in Table 8 below.

As a result, and as shown in Table 8, the highest contribution into the variance occurred in the mediating variable is represented by collaboration with (β) coefficient of 0.678, then the sharing of materials and resources with (β) coefficient of 0.590, while the lowest contribution represented by communication with (β) coefficient of 0.356.

4. *Measuring the effect of both the Independent and Mediating Variables on the Dependent Variable.*

As shown in Table 9, it was found that there is a strong positive relationship between all independent variables and the dependent variable in the presence of the mediating variable. This relationship is referred to by the values of (R): R= 0.841, R= 0.891, R= 0.936, and the values of the coefficient of determination (R2): R2= 0.708, R2= 0.794, R2= 0.876. Note that, compared to the first case, the values of (R) and (R2) have increased with the presence of the mediating variable with all independent variables. This is evidence of the amount of contribution to influence and the strength of the

1.Measuring the direct impact of the Independent Variables on the Dependent Variable (in the absence of the Mediating Factor):						
H_{O1}: Communication has no statistically significant impact on the use of Facebook in education and eventually on students' academic performance.		R	R Square	Adjusted R Square	Std. Error of the Estimate	
		.492[a]	.242	.240	.34995	
Model		Sum of Squares	df	Mean Square	F	Sig.
Regression		12.366	1	12.366	100.979	.000[a]
Residual		38.699	316	.122		
Total		51.065	317			
	Unstandardized Coefficients		Standardized Coefficients			
	B	Std. Error	Beta	t	Sig.	
(Constant)	1.357	.298		4.548	.000	
Communication	.702	.070	.492	10.049	.000	
H_{O2}: Sharing of instructional resources and materials on Facebook has no statistically significant influence on the academic performance of students at the University of Jordan.		R	R Square	Adjusted R Square	Std. Error of the Estimate	
		.775[a]	.601	.600	.25394	
Model		Sum of Squares	df	Mean Square	F	Sig.
Regression		30.688	1	30.688	475.879	.000[a]
Residual		20.378	316	.064		
Total		51.065	317			
	Unstandardized Coefficients		Standardized Coefficients			
	B	Std. Error	Beta	t	Sig.	
(Constant)	-.207	.209		-.991	.322	
Material and Resources Sharing	1.062	.049	.775	21.815	.000	
H_{O3}: On Facebook, collaboration in education has no statistically significant influence on the academic performance of students at the University of Jordan.		R	R Square	Adjusted R Square	Std. Error of the Estimate	
		.928[a]	.861	.861	.14966	
Model		Sum of Squares	df	Mean Square	F	Sig.
Regression		43.987	1	43.987	1963.775	.000[a]
Residual		7.078	316	.022		
Total		51.065	317			
	Unstandardized Coefficients		Standardized Coefficients			
	B	Std. Error	Beta	t	Sig.	
(Constant)	-.312	.106		-2.961	.003	
Collaboration	1.074	.024	.928	44.314	.000	

Table 6 - The hypotheses testing results to the independent variables (Communication, Material and Resources Sharing, and Collaboration) on the dependent variable (Academic Performance).

2.Measuring the direct impact of the Mediating Factor (UsabilityEase of use) on the Dependent Variable (Academic Performance):						
Testing hypotheses: H_{O4a}, H_{O4b}, and H_{O4c}		R	R Square	Adjusted R Square	Std. Error of the Estimate	
		.808[a]	.653	.652	.23675	
Model		Sum of Squares	df	Mean Square	F	Sig.
Regression		33.353	1	33.353	595.051	.000[a]
Residual		17.712	316	.056		
Total		51.065	317			
	Unstandardized Coefficients		Standardized Coefficients			
	B	Std. Error	Beta	t	Sig.	
(Constant)	-.400	.195		-2.048	.041	
Usability or Ease of use	1.091	.045	.808	24.394	.000	

Table 7 - The hypotheses testing results to the mediating variable (Usability or Ease of use) and the dependent variable (Academic Performance).

relationship between these variables and the dependent variable.

Also, based on the results in Table 9, we shall reject the null hypothesis and accept the alternative hypothesis that there is a statistically significant effect of the independent variables in the presence of the mediating variable on the dependent variable because the value of (sig. F) is less than $\alpha = 0.05$.

As a result, the highest contribution into the variance occurred in the mediating variable is represented by collaboration with (β) coefficient of 0.678, then the sharing of materials and resources with (β) coefficient of 0.590, while the lowest contribution represented by communication with (β) coefficient of 0.356.

In addition, the contribution of the independent and mediating variables in the proposed study model to the dependent variable through the value of (β) coefficient is in the descending order shown in Table 10 below. From these values, we notice that the mediating variable mediates the relationship between the independent variables and the dependent variable where the value of (sig. F) was closer to zero. Hence, after completing all the previous steps, it can be shown that the mediation is complete between the mediating variable (usability) and the dependent variable (academic performance) in this study.

7. Discussion and Conclusion

The technological development that the world is witnessing nowadays is an incubator for the massive emergence of applications and electronic means of communication, and Facebook is one of the electronic means that can play an effective role in the process of

3.Measuring the direct impact of the Independent Variables on the Mediating Factor (Usability or Ease of use):						
Communication on Usability or Ease of use		R	R Square	Adjusted R Square	Std. Error of the Estimate	
		.337[a]	.114	.111	.28034	
Model		Sum of Squares	df	Mean Square	F	Sig.
Regression		3.180	1	3.180	40.464	.000[a]
Residual		24.834	316	.079		
Total		28.014	317			
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
(Constant)	2.835	.239		11.860	.000	
Communication	.356	.056	.337	6.361	.000	
Material and Resources Sharing on Usability or Ease of use		R	R Square	Adjusted R Square	Std. Error of the Estimate	
		.581[a]	.338	.336	.24230	
Model		Sum of Squares	df	Mean Square	F	Sig.
Regression		9.462	1	9.462	161.176	.000[a]
Residual		18.552	316	.059		
Total		28.014	317			
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
(Constant)	1.822	.200		9.121	.000	
Material and Resources Sharing	.590	.046	.581	12.696	.000	
Collaboration on Usability or Ease of use		R	R Square	Adjusted R Square	Std. Error of the Estimate	
		.791[a]	.625	.624	.18231	
Model		Sum of Squares	df	Mean Square	F	Sig.
Regression		17.511	1	17.511	526.828	.000[a]
Residual		10.503	316	.033		
Total		28.014	317			
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
(Constant)	1.411	.129		10.976	.000	
Collaboration	.678	.030	.791	22.953	.000	

Table 8 - The hypotheses testing results to the independent variables (Communication, Material and Resources Sharing, and Collaboration) and the mediating variable (Usability or Ease of use).

4.Measuring the effect of both the Independent and Mediating Variables on the Dependent Variable:						
Communication and usability or Ease of use on Academic Performance.		R	R Square	Adjusted R Square	Std. Error of the Estimate	
		.841[a]	.708	.706	.21770	
Model		Sum of Squares	df	Mean Square	F	Sig.
Regression		36.137	2	18.068	381.245	.000[a]
Residual		14.929	315	.047		
Total		51.065	317			
	Unstandardized Coefficients		Standardized Coefficients			
	B	Std. Error	Beta	t	Sig.	
(Constant)	-1.416	.223		-6.347	.000	
Usability or Ease of use	.978	.044	.725	22.395	.000	
Communication	.354	.046	.248	7.664	.000	
Material and Resources Sharing and usability or Ease of use on Academic Performance.		R	R Square	Adjusted R Square	Std. Error of the Estimate	
		.891[a]	.794	.793	.18270	
Model		Sum of Squares	df	Mean Square	F	Sig.
Regression		40.551	2	20.275	607.411	.000[a]
Residual		10.515	315	.033		
Total		51.065	317			
	Unstandardized Coefficients		Standardized Coefficients			
	B	Std. Error	Beta	t	Sig.	
(Constant)	-1.536	.169		-9.072	.000	
Usability or Ease of use	.729	.042	.540	17.189	.000	
Material and Resources Sharing	.632	.043	.461	14.684	.000	
Collaboration and usability or Ease of use on Academic Performance.		R	R Square	Adjusted R Square	Std. Error of the Estimate	
		.936[a]	.876	.875	.14169	
Model		Sum of Squares	df	Mean Square	F	Sig.
Regression		44.741	2	22.371	1114.226	.000[a]
Residual		6.324	315	.020		
Total		51.065	317			
	Unstandardized Coefficients		Standardized Coefficients			
	B	Std. Error	Beta	t	Sig.	
(Constant)	-.690	.117		-5.880	.000	
Usability or Ease of use	.268	.044	.198	6.128	.000	
Collaboration	.892	.037	.771	23.816	.000	

Table 9 - The hypotheses testing results to the independent variables (Communication, Material and Resources Sharing, and Collaboration) and the mediating variable (Usability or Ease of use) on the dependent variable (Academic Performance).

Highest contribution	***Medium contribution***	***Lowest contribution***
Collaboration = 0.892	Material and Resources Sharing = 0.632	Communication= 0.356
Usability = 0.268	Usability = 0.729	Usability = 0.978

Table 10 - The contribution of the independent and mediating variables on the dependent variable in the proposed model in the study.

electronic communication in many fields, especially in higher education. Looking at the results shown previously in Tables 6 - 10, it is found that each of the three independent variables, whether alone or together, (collaboration, the sharing of resources and materials, and communication), in addition to the presence of the mediating factor (usability or ease of use) have a positive impact, statistically significant, on the dependent variable represented by the academic performance of the students in the study. This leads to the following conclusions:

1. Universities should be encouraged to invest in using these tools and applications in all their academic departments, the humanities and science.

2. Facebook applications should be used because of their positive impact on the learning process and teaching methods, and because of the diverse environment they can offer to both teachers and students, which will greatly boost the academic performance of students and upgrade the skills of both teachers and learners.

3. Facebook applications should be used since they have certain features and characteristics that make Facebook function as an educational platform and as an electronic source available at any time to all. Information and educational resources needed by students can be shared easily and quickly on Facebook, and they can be kept for a longer period of time.

4. Information sharing and easy access to data or other information can be achieved through Facebook.

5. Facebook usage can help educational institutions achieve their strategic goals, improve their competitiveness, and add new work values to the services they offer.

6. All educational institutions, public and private universities in particular, should cooperate, collaborate and work hard to provide electronic educational platforms available to everyone at all times, and to use various means and applications in education and for society development.

7. All other educational institutions that do not use such electronic means should have deep insight in this field and should move forward towards starting using such applications, due to the progress they can achieve in science. Such adoption will create new opportunities for innovation and diversity in technology as well, which will eventually impact positively all development sectors in the country.

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