Measurement of Benefits, Reasons, and Barriers to Students' Adoption of Electronic Applications .

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Abstract

Over the past decade, electronic applications, particularly social networking applications (SNAs), have been gaining considerable popularity, including among educated young people. The advantages of SNAs are apparent in many sectors, with education being no exception. SNAs are also playing the main role in enhancing the quality of education. The aim of this paper is to explore SNAs use (e.g., Twitter, Facebook, and YouTube) in higher education students enrolled at Albaha University, Saudi Arabia, focusing on their associated advantages, barriers, and reasons for adoption, as well as differences between the participants with respect to the study variables. The research methodology was a survey approach and the sample size reached 243 students, including 123 males and 120 females. The survey was distributed to students electronically. The results indicate that most students benefit from SNAs, and these resources motivate them to engage with SNAs to enhance their education. Barriers were also identified that must be addressed for effective education. No difference was found between male and female students in terms of benefiting from SNAs, as well as the reasons and barriers, thereby indicating the availability of SNAs for both genders and the flexibility of their use at any time and place, as well as awareness in both genders about their use. A noticeable difference was identified in the extent of the benefits derived from SNAs between participants older and younger than 20 years, and differences were also found in the reasons underpinning these benefits. This reflects a disparity in the use and mastery of SNAs between the two age groups. Students aged 20-25 years also encountered greater barriers to SNAs use compared to students aged younger than 20 years, which may be attributed to the lower familiarity of older students with SNAs.

Keywords: Web 2.0 applications, electronic applications, technology-enhanced learning, e-learning, computer-based education.

Introduction

In the current era, every person who wants to connect with others can do so due to the availability of social networking applications (SNAs). As such, individuals can connect and interact worldwide, breaking the barriers imposed by borders. Over the past decade, SNAs use has dramatically increased, because of which it has gained more momentum [1]. Smartphones are a great source of connection as almost every person owns one and connecting with others using this device is the easiest way to connect to SNAs. Almost every individual has an account with an SNAs, and these online applications play a major role for every individual. SNAs have a significant influence on many fields, including education, and in the case of the education sector, benefits have been identified in the form of increased collaboration between students and higher student participation[2]. Also, when students use SNAs, it is easier for them to review and track team project progress, e-learning resources are abundantly available, and video conferencing is frictionless. In addition, SNAs provide connectivity, and in the context of education, it is the students who lead student collaboration [3]. This connectivity of students allows them to create new friends and classmates for possible collaboration to develop projects and work collectively on specific tasks. SNAs are playing a key role in enhancing the quality of education, and the benefits of SNAs are not limited to students as even faculty members benefit from these platforms [4]. Faculty members can encourage students to participate in educational tasks with the help of SNAs. With the significant increase in SNAs usage by lectures and students in higher education institutions worldwide because of the COVID-19 pandemic, this research is critical to see how SNAs can be integrated and implemented in sharing educational materials, interacting between lecturers and their students, and determining the usefulness of SNAs for students. The contribution of this research study is to examine the use of SNAs (such as Twitter, Facebook, and YouTube) by higher education students enrolled at Albaha University in Saudi Arabia. It does this by concentrating on the benefits, challenges, and reasons for adoption of these SNAs as well as any differences in participant characteristics regarding the study variables. We develop the following research questions:

- Question 1: How do the participants benefit from SNAs?
- Question 2: What are the participants' reasons for using SNAs?
- Question 3: What barriers do the participants face in using SNAs?
- Question 4: What is the relationship between the participants' reasons for using SNAs and the extent of their associated benefits?
- Question 5: What is the relationship between the participants' barriers to the use of SNAs and the extent of their associated benefits?

The research study also seeks to test the following hypotheses:

- Significant statistical differences exist

between the mean scores of the sample in terms of benefits, reasons, and barriers with respect to the variable of gender.

- Significant statistical differences exist between the mean scores of the sample in terms of benefits, reasons, and barriers with respect to variable of age.

To achieve the research aims, we prepared a survey to get information from students at Albaha University. The questionnaire contains two demographic variables: gender and age; also, it has 20 items distributed on three main dimensions: benefits, reasons for using SNAs, and barriers.

As shown in Figure 1, the research revolves around the three components of benefits, barriers, and motivation.

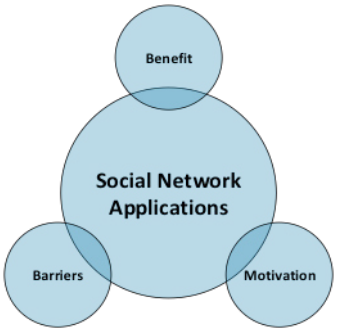

Fig. 1. Major Study Details with Social Networking Applications.

Literature Review

An author with more than 5 years of teaching experience at public universities has concluded that the traditional medium of teaching – that is, the face-to-face medium – is more beneficial. However, the major issue with this medium is that it is dependent on time, space, and the place of teaching, which needs to be taken care of by everybody, including teachers, students, and educational institutions.

Based on the above issue, a literature review on SNAs shows that the use of SNAs in education sectors have grown exponentially [5]; also, SNAs offer a more interactive and collaborative method of communication between learners and help them to obtain knowledge [1,5]. SNAs can supplement the traditional teaching and learning methodologies that are currently used by institutions of higher education. In a similar work, Erhel et al. [6], conducted a long-term study to evaluate the impact of using twitter on students' outcomes; the study concluded that twitter is a more interactive and engaging platform for learning compared to the traditional mode of teaching (e.g., lectures). Of the many SNAs that have been deployed online, Al-Qaysi et al. [7], suggested that some are more efficient than others for higher education, including Facebook, Twitter, and LinkedIn. Along with SNAs, media-sharing platforms such as YouTube, Flickr, Tumblr, wikis, and blogs can also play a major role in higher education.

Further to the above discussion, Jones [8], suggested that recent SNA technologies are no longer intended solely for entertainment and leisure; these technologies are becoming a major asset for interactions and learning. Another recent study focused on undergraduate students' tweeting activities in several universities of Singapore [9]. It was found that among many other benefits, the students were able to converse with their peers and interact with the instructor more freely and share knowledge efficiently. In

addition to the abovementioned benefits of SNAs in education, Menkhoff et al. [9] and Wheeler [10], stated other benefits. Even if the application is on computer or mobile, they identified three major benefits for the universities. The first benefit is that SNAs allow students to engage in blended learning, which promotes better learning; for example, Twitter helps students in learning face-to-face and sometimes in communicating with faculty members when they are at home. The second benefit of SNAs is that they allow students to be involved in collaborative studies and learning. Finally, the use of SNAs helps students by giving them a platform to post their questions, problems, and issues on blogs and Twitter to address difficulties in their subjects.

Concerning the daily usage of SNAs such as Facebook, Twitter, and LinkedIn, it is estimated that millions of people, mostly young people, are engaging with them worldwide. According to one study [11], involving a sample of approximately 3,000 students in the USA, 90% used Facebook and 37% used Twitter. A similar study was conducted by Smith and Anderson [12], which found that approximately 71% of university students were Facebook users. Further research on Facebook [12,13,14], revealed that it is the most frequently used SNA for both personal and educational purposes.

The ways in which people acquire knowledge has changed dramatically over the past decade, especially with the emergence of SNAs. The influence of SNAs has been felt both in the formal and informal education system. Formal education refers to the educational structure from nursery to the university level, which also includes specialized training and vocational learning for all age groups, and informal learning means acquiring knowledge by interacting and sharing information in a social environment [15]. Numerous studies have been conducted to estimate the use of SNAs. In this context, a study was conducted by the Islamic University of Bahawalpur in Pakistan where approximately 600 students were involved, nearly 90% of whom stated they used SNAs for educational purposes; noteworthily, most of the students were Facebook users [16]. In another study conducted at the University of Science, Malaysia, approximately 300 students showed great interest in Facebook and considered it an important tool for them to learn English language skills [17].

All the above-mentioned studies were concerned with the students' perspective, but teachers also show substantial interest in SNAs as a tool for facilitating teaching and learning. In this context, Waycott et al. [18], conducted a research study in Australia with 20 lecturers from various departments, including management, humanities, information technology, and health sciences. The students were asked to create and share their content on SNAs. The findings showed that using these platforms for their work and allowing the students to have transparency created new perspectives in learning.

Based on the above discussion and literature, it is becoming evident that there

are many positive aspects associated with the application of SNAs in education. Thus, upgrading the current paradigm of traditional learning to include social network-based learning to promote better educational outcomes is proposed. The areas that may have a greater influence on SNAs are social learning, communication, academic culture, and many others in the future. SNAs can support and create a more efficient educational environment and further enhance performance in the field of education for both the student seeking knowledge and the teacher delivering information [19].

Comparatively few studies [20,21], have analyzed the positive influence on student performance through the use of SNAs. According to Troussas et al. [22], SNAs influence the educational process in general and enhance student performance and collaboration between students and teachers. Additionally, Yusof et al. [23], highlights the benefits of SNAs, the e-learning environment, and the reasons for implementing SNAs. Educational processes based on group study are also influenced by SNAs. Similar results were reported in an Australian study of SNA use in education, wherein the students appeared to be excited and adequately inspired by the social learning settings they encountered [24].

Research Methodology

The research team prepared a questionnaire that included 2 demographic variables: gender and age. It also included 20 items distributed on 3 main dimensions: benefits (9 items), reasons for using SNAs (6 items), and barriers (5 items). The tool's apparent validity was also verified by presenting it to a group of professors who specialize in the fields of education technology, e-learning, and computing. Based on their opinions, some paragraphs were amended. The internal consistency and reliability of the questionnaire were also verified by administering it to a sample of male and female students (n = 43). Internal consistency was determined by calculating the Pearson correlation coefficient between the total score of each dimension and the total score of the scale, as well as the degree of each statement and the degree of the college for the dimension to which the statement belonged. This ranged between 0.793 and 0.886, and all of them were large, acceptable coefficients. Statistically significant results were established using the significance level of 0.01. The reliability coefficient was determined by calculating the coefficient of stability, Cronbach's alpha, for the paragraphs of each aspect of the survey, and for the paragraphs of the questionnaire. The results indicated that the values for all stability coefficients were high, ranging from 0.849 to 0.916. This shows that the previous results regarding the validity of the scale can be applied reassuringly in this study, as well as the reliability of its results. The target population comprised of all students at the Faculties of Sciences and Arts of Baljurashi, Computer Science, and Information Technology, amounting to 650 students, and the appropriate sample size was calculated according to Robert Mason's equa-

tion. The sample size reached 243 students, including 123 males and 120 females, as shown in Table 1. The survey was distributed to students electronically via emails and WhatsApp groups. The recruitment strategies used did not contribute to any bias in the obtained data. Given that it was important to protect the students' identities and encourage honest, non-attributional answers, the survey was anonymous, and students were not asked to provide any personal details about themselves.

Table 1. Frequency and Percentage of the Sample Distributed According to the Study Variables.

Variable	Category	Frequency	Percentage
Gender	Male	123	50.6
	Female	120	49.4
Age	Less than 20 years	212	87.2
	20-25 years	31	12.8

Before taking part in the research study, students were required to sign a consent form. Before beginning the research procedures, the Scientific Research Deanship at Albaha University granted ethical permission for the study. The aim of the research was to measure students' advantages, reasons, and barriers to using SNAs at the university. The research methodology was a survey approach that investigated students' reasons for using SNAs at Albaha University. The research instrument was an online multiple-choice questionnaire consisting of several themes. One of the themes focused on the benefits students derived from the use of SNAs (Theme questions are included in Table 3). Another theme focused on the reasons why students to use SNAs (Theme questions are included in Table 4). The final theme focused on the barriers students face regarding the use of SNAs (Theme questions are included in Table 5).

After creating the questionnaire with Google Forms, it was distributed electronically via emails and WhatsApp groups to the participants. Regarding the analysis of the students' responses, questionnaire data were analyzed using multiple statistical tests in SPSS. Further details about how the results were analyzed and presented is presented in the next section.

Data Analysis and Research Results

Determine the Degree of Response and Relative Weights

The degree of response was determined based on the weighted average value and considering the cut-off scores of the study tool scale. This was achieved by adopting the following criterion to estimate the degree of response, as the length of the 5-point Likert scale used in this tool was determined (from 1 to 5) and the range was calculated (5-1 = 4), which was divided by the number of the 5 periods of the scale to obtain the length of the period (i.e., 4/5 = 0.8).

Table 2. To Determine the Degree of Response, Relative Weights, and Arithmetic Means.

M	Relative Response	Period	Arithmetic Average	Degree of Response
1	20-35.9 %	(1) to less than (1.8)	1-1.79	Strongly disagree
2	36-51.9%	(1.8) to less than (2.6)	1.8- 2.59	Disagree

M	Relative Response	Period	Arithmetic Average	Degree of Response
3	52-67.9%	(2.6) to less than (3.4)	2.6-3.39	Neutral
4	68-83.9%	(3.4) to less than (4.2)	3.4– 4.19	Agree
5	84-100%	(4.2) to (5)	4.2-5	Strongly agree

This was then added to the lowest value in the scale (namely, 1) to determine the upper limit for the first period. The same process was applied for the remaining periods, as calculated repetitions of the members of the study population on the questionnaire for each statement under each of the alternatives to the answer by giving a ranking scale for each of the response alternatives as follows: strongly agree (5), agree (4), neutral (3), disagree (2), strongly disagree (1) (see Table 2).

Results for the First Question: How Do the Participants Benefit from SNAs?

The frequencies, percentages, arithmetic means, and standard deviation were calculated for each of the statements associated with the first dimension (i.e., benefit). The arithmetic averages were arranged in descending order to determine the higher expressions. The results are shown in Table 3. Table 3 shows that the total expressions for this dimension had a score of "strongly agree", with an arithmetic mean of 4.25 and a small standard deviation of 0.61. This indicates that there was agreement among the sample members about the total of this dimension. Most of the expressions for this dimension were rated "strongly agree", with 5 statements, and 4 expressions for this dimension were rated "agree".

Statement 2, which reads “I think the traditional learning style should be improved by using SNAs in the educational process”, ranked first with a score of “strongly agree”. It had the largest arithmetic mean (4.59) and a small standard deviation (0.60). Statement 5 had the lowest score, the text for which was, “I get more help from my SNAs members in my studies than in my lecture hall”. This statement had the degree of “I agree” and was associated with the lowest arithmetic mean (3.82) and a standard deviation of 1.10.

Table 3. Mean and Standard Deviations for the Expressions of the First Dimension: Benefits of SNAs Arranged in Descending Order According to the Mean

M	Phrases of the first dimension: benefits		Practice degree					The Mean	Standard division	Degree
			strongly disagree	disagree	Neutrals	agree	strongly agree			
1	I think the traditional learning style should be improved by using SNAs in the educational process.	F	0	0	14	71	158	4.59	0.60	strongly agree
		%	0	0	5.8	29.2	65			
2	I use SNAs to communicate with professors to inquire about assignments and other educational aspects.	F	14	0	14	43	172	4.48	1.03	strongly agree
		%	5.8	0	5.8	17.7	70.8			
3	When I started using and learning from SNAs, my performance and level of study improved.	F	0	14	15	86	128	4.35	0.84	strongly agree
		%	0	5.8	6.2	35.4	52.7			
4	I use SNAs to search and learn from the lessons available, such as using YouTube or Telegram.	F	0	14	15	114	100	4.23	0.81	strongly agree
		%	0	5.8	6.2	46.9	41.2			
5	I think social networking apps have a positive impact on self-development.	F	0	0	14	115	114	4.41	0.60	strongly agree
		%	0	0	5.8	47.3	46.9			
6	Using SNAs, I am developing more technology and communication skills than the traditional method.	F	0	0	29	86	128	4.41	0.69	agree
		%	0	0	11.9	35.4	52.7			
7	The use of social network applications allows me to participate more in scientific discussions with online groups.	F	0	29	29	85	100	4.05	1.01	agree
		%	0	11.9	11.9	35	41.2			
8	I see that learning from SNAs is more attractive to me than traditional learning.	F	14	28	15	86	100	3.95	1.21	agree
		%	5.8	11.5	6.2	35.4	41.2			
9	I get more help from my SNAs members in my studies than in my lecture hall.	F	0	43	43	72	85	3.82	1.10	agree
		%	0	17.7	17.7	29.6	35			
The total of first dimension: benefits								4.25	0.61	strongly agree

Results for the Second Question: What are the Participants' Reasons for Using SNAs?

The frequencies, percentages, arithmetic means, and standard deviation were calculated for each of the statements associated with the second dimension (i.e., reasons for using SNAs). The arithmetic averages were arranged in descending order to determine the higher expressions, and the results are shown in Table 4.

Table 4 shows that the total expressions for this dimension had a score of "strongly agree", with an arithmetic mean of 4.38 and a small standard deviation of 0.50. This indicates that there was agreement in the sample group regarding the total of this dimension. Most of the expressions for this dimension were rated "strongly agree" (with 5 statements), and only one statement was rated "agree". Statement 6, which reads "I use SNAs to learn about news and events", ranked first with a score of "strongly agree", the largest arithmetic mean (4.58), and an average standard deviation (0.79). In last place was Statement 3, the text for which was, "I use SNAs because they are free".

This statement had a degree of "agree" and was associated with the lowest arithmetic mean (4.16) and a standard deviation of 1.00. The researchers attributed this to the fact that one of the main reasons for using SNAs is that students liked to learn about events, news, and information to know what was going on around them, and they were also attracted by the ease of information sharing.

Table 4. Means and Standard Deviations for the Expressions of the Second Dimension: Reasons for Using SNAs are Arranged in Descending Order According to the Mean.

M	Phrases of the second dimension: Reasons Use		Practice degree					The Mean	Standard division	Degree
			strongly disagree	disagree	Neutrals	agree	strongly agree			
1	I use SNAs to know news and events.	F	0	0	15	56	172	4.58	0.79	strongly agree
		%	0	0	6.2	23	70.8			
2	I use SNAs because sharing information is so easy.	F	0	14	0	86	143	4.47	0.77	strongly agree
		%	0	5.8	0	35.4	58.8			
3	I use SNAs because they contain lots of entertainment, fun, and games.	F	0	0	14	116	113	4.41	0.6	strongly agree
		%	0	0	5.8	47.7	46.5			
4	I use SNAs because of their flexibility as they enable me to learn anytime and anywhere.	F	0	0	15	128	100	4.35	0.59	strongly agree
		%	0	0	6.2	52.7	41.2			
5	I use SNAs to stay in touch with my friends.	F	0	14	29	71	129	4.30	0.89	strongly agree
		%	0	5.8	11.9	29.2	53.1			
6	I use SNAs because they are free.	F	15	0	15	113	100	4.16	1.0	agree
		%	6.2	0	6.2	46.5	41.2			
The Total of the second dimension: Reasons Use								4.38	0.5	strongly agree

Results for the Third Question: What Barriers Do the Participants Face in Using SNAs?

The frequencies, percentages, arithmetic averages, and standard deviation were calculated for each of the statements associated with the third dimension (i.e., barriers to use). The arithmetic averages were arranged in descending order to determine the higher expressions, and the results are shown in Table 5.

Table 5 shows that the total expressions of this dimension had a score of "agree", with an arithmetic mean of 3.44 and a large standard deviation of 1.07. This reflects the fact that there was a difference between the sample group members with respect to the total of this dimension. Most of the expressions for this dimension were rated "agree" (4 statements) and only a single statement was rated "neutral". Statement 4, which reads "There are many SNAs, but I find it difficult to know which one is most appropriate for education", ranked first with a score of "I agree".

Table 5. Means and Standard Deviations of the Third Dimension Expressions: Barriers to Use are Arranged in Descending Order According to the Mean.

M	Phrases of the third dimension: Barriers to use		Practice degree					The Mean	Standard division	Degree
			strongly disagree	disagree	Neutrals	agree	strongly agree			
1	There are many SNAs, but I find it difficult to know which one is most appropriate for education.	F	0	0	86	84	73	3.59	1.25	agree
		%	0	0	35.4	34.6	30			
2	The search process in SNAs takes a lot of effort.	F	0	58	57	70	58	3.53	1.10	agree
		%	0	23.9	23.5	28.8	23.9			
3	Using SNAs wastes a lot of time.	F	14	43	58	56	72	3.53	1.24	agree
		%	5.8	17.7	23.9	23	29.6			
4	I think SNAs cause me to get distracted from studying.	F	14	58	28	85	58	3.47	1.25	agree
		%	5.8	23.9	11.5	35	23.9			
5	Frequent use of SNAs negatively affects the student's level.	F	57	43	14	86	43	3.06	1.48	Neutral
		%	23.5	17.7	5.8	35.4	17.7			
The Total of the third dimension: Barriers to use								3.44	1.07	agree

It had the largest arithmetic mean 3.59 and a large standard deviation 1.25. In last place was Statement 5, which reads "Frequent use of SNAs negatively affects a student's level". This had a degree of "neutral" and corresponded to the lowest arithmetic mean (3.06) and the largest standard deviation (1.48) among all expressions of a capacity. It is worth noting that the standard deviations were high for all paragraphs of this dimension, thereby reflecting existence of disparities in the participants' opinion relating to barriers to the use of SNAs.

Results for the Fourth Question: What is the Relationship Between the Participants' Reasons for Using SNAs and the Extent of their Associated Benefits?

To answer this question, the Pearson correlation coefficient was calculated between the total dimension of the usage reason and the total dimension of the benefit of SNAs. The value of the correlation coefficient was 0.765 ** with a significance level of 0.000. This means that there was a positive correlation between the reasons for using SNAs and the benefit of the SNAs to the participants. This can be attributed to all the students' reasons for using social networking applications, which led to an increase in the usefulness of applying them in the educational process (e.g., in this scientific research). We found that one of the reasons among students for using SNAs was to search for information and facts and, furthermore, to share them easily and conveniently. Thus, the benefits become very high.

Results for the Fifth Question: What is the Relationship Between the Participants' Barriers to the Use of SNAs and the Extent of their Associated Benefits?

The Pearson correlation coefficient was calculated between the total dimension of the barriers to SNA use and the total dimension of benefiting from SNAs. The value of the correlation coefficient was -0.654 - ** with a significance level of 0.000, meaning that a negative correlation existed between the two variables. This can be attributed to the fact that when students encounter fewer barriers toward the use of SNAs, their level of interest in the educational process increases (and vice versa). In this research study, we found that the extent to which students benefit from SNAs in the educational process is high compared to the barriers to their use.

Verification of Hypothesis

In the research undertaken by Azizi et al.[25], the researchers examined the connection between SNA addiction and academic attainment in a sample group of students from Iran. The results demonstrated a negative and statistically significant relationship between these two variables. To verify the validity of the research hypotheses linked to calculating the differences between the responses of the sample group according to the demographic factors of the study, it was necessary to test the moderation of the normal distribution among the participants to ensure the equilibrium distribution between the study sample categories. The Kolmogorov-Smirnov test was used to determine whether the data obtained from the sample followed the normal distribution, in order to determine the appropriate tests for each case, as parameter tests are used when the distribution is normal, and the significance level of the test is greater than 0.05, while non-parametric tests are used when the distribution is abnormal and the significance level of the test is less than 0.05. Table 6 shows the results. The importance of 0 for sig value of this Table is to measure the level of significance of the normal distribution of the sample, according to its variables, and through the 0-value shown in this table for sig value, it indicated that there was no normal distribution for the sample.

Table 6. Results of One-Sample Kolmogorov-Smirnov Test to Examine Normality of Study Sample.

Variable	Statistics value	Sig. value
Gender	5.363	0.000
Age	3.531	0.000

Based on the results shown in Table 6, two independent samples were used: namely, the Mann-Whitney U test with two variables (in this case, gender and age).

Verification of the First Hypothesis

The first hypothesis for this research was the following: statistically significant variations exist between the mean scores of the sample in terms of benefits, reasons, and barriers with respect to the variable of gender.

Table 7 shows the importance for sig(2-tailed) value with the level of significance for all the tool's dimensions was greater than 0.05. Hence, for the variable of gender, no differences that are statistically significant were identified at the level of

Table 7. Results of the Mann-Whitney U Test for Independent Two Samples to Reveal the Differences Between the Sample Mean Responses that are Attributed to the Gender Variable.

Dimensions	Gender	N	Mean Rank	Sum of Ranks	Mann-Whitney U	Sig. (2-tailed)
Benefits	Male	123	121.26	14914.5	7288.5	.866
	Female	120	122.76	14731.5		
Reasons	Male	123	122.59	15078.0	7308.0	.893
	Female	120	121.40	14568.0		
Barriers	Male	123	123.73	15218.5	7167.5	.693
	Female	120	120.23	14427.5		

significance (*oc*= 0.05) between the average responses of the sample members in all dimensions of the study tool.

Verification of the Second Hypothesis

The second hypothesis for this research was the following: statistically significant variations exist between the mean scores of the sample in terms of benefits, reasons, and barriers with respect to variable of age. Table 8 demonstrates that the degree of

Table 8. Results of the Mann-Whitney U Test for Independent Two Samples to Reveal the Differences Between the Sample Mean Responses that are Attributed to the Age Variable.

Dimensions	Age	N	Mean Rank	Sum of Ranks	Mann-Whitney U	Sig. (2-tailed)
Benefits	<20	212	130.40	27645	1505.0	.000
	20-25	31	64.55	2001		
Reasons	<20	212	137.14	29073	77.0	.000
	20-25	31	18.48	573		
Barriers	<20	212	109.77	23271	693.0	.000
	20-25	31	205.65	6375		

significance for all the tool's dimensions was less than 0.05. This demonstrates the existence of statistically significant variations between the sample members' average responses in the dimensions of benefits and reasons according to age at the level of significance (*OC*= 0.05).

In particular, the differences are in favor of the age group aged less than 20 years. The findings also demonstrate the existence of statistically significant variations in the sample members' average responses in the barriers dimension according to the age variable, favoring the 20–25 age group.

Discussion of Results

The research findings confirm that SNAs have utility for students at Albaha University in terms of advancing learning in the context of higher education. These results are in line with other findings that have been published in the literature that indicate the value of SNAs for students in various educational processes. For example, a research project undertaken with a sample group of 160 students enrolled in social studies and philosophy courses at the Uni-

versity of Delhi found, through interviews, that 71.25% of the participants used Facebook to facilitate discussion and research collaboration [26]. A comparable study was conducted at Boston University's pharmacology department, which found that 60 % of the students used Twitter to promote their professional knowledge and improve their educational outline [27].

It is reasonable to account for these results by referencing the fact that students who took part in this study viewed SNAs as having valuable educational applications and, accordingly, were motivated to use them to achieve educational goals (e.g., communicating with faculty members). SNAs serve as a valuable complement to traditional pedagogical tools and approaches. The findings of this study agree with those of numerous other studies, including [4, 28, 29], which have emphasized the educational value of SNAs in terms of facilitating teacher-student communication and improving academic attainment.

This study's results also indicate that the motivation of students at Albaha University to use SNAs stems in part from their value in enabling geographically and temporally unrestricted learning. As revealed in the literature review, information sharing is a crucial issue that drives many students to SNAs adoption, which stems from the fact that many online platforms, including Facebook and WhatsApp, offer features for file sharing and the dissemination of curricular materials.

This can be accounted for by referencing the fact that one of the fundamental reasons for students' use of SNAs relates to the ability they afford to keep updated about current events. This study's results are consistent with those reported elsewhere, including in Deng et al. [30], Valdez et al. [31], and Phua et al. [32], which found that the convenience of information sharing, the flexibility of SNAs, and the utility of SNAs in serving as an up-to-date source of news constituted the major reasons why students used SNAs for educational purposes.

This study's results highlight several barriers associated with the use of SNAs from the standpoint of students. For example, members of the sample group reported that the use of SNAs often resulted in wasted time. This is consistent with the results reported in [33], which suggested that a key barrier to students' adoption of SNAs is the negative impact that their overuse can have on focus, concentration, and academic attainment.

This result was accounted for by referencing the fact that the substantial number of SNAs, paired with the availability of diverse features on the existing and widely used SNAs, increased students' difficulties in identifying the optimal application for educational support. The responses given by the students also indicate that SNAs do not have a negative impact on their academic attainment, and that students have an adequate level of awareness about the use of SNAs and, in particular, how to exploit SNAs to achieve educational goals. As such, this study's results are consistent with those of several prior studies. For ex-

ample, Deng et al. [30] indicated that SNAs, when used in an effective way, positively influence students' academic attainment. It is important to recognize, however, that the improper use of SNAs may negatively influence students [33, 34].

This was attributed by the researchers to the students' reasons for using SNAs, which resulted in an increase in the utility of employing them in an educational context (e.g., to facilitate scientific research). We identified that one student's reason for using SNAs was to search for relevant data and share it with others conveniently. Hence, the benefits of SNAs are high for use cases such as these. In the previously referenced study of Hassan et al. [35], the researchers looked at how user advantages and continuing use of SNAs might be improved through motivating feedback. The findings showed that gamification has a positive relationship with the capacity for affective counsel, quantified self has a positive relationship with the usage of informational guidance and affective feedback, and social networking has a good relationship with social feedback.

The researchers accounted for this by referencing the fact that when there are limited barriers to students' use of SNAs, the degree to which they are interested in the educational process increases (and vice versa). In the present research, we found that the benefits associated with students' use of SNAs for educational purposes substantially outweigh the barriers to their use. In Azizi et al.'s research [25], the correlation between SNAs addiction and academic attainment was investigated in Iranian students. According to the results, SNAs addition and academic attainment were negatively correlated, and the relationship was statistically significant.

The researchers accounted for this by referencing the fact that the study revealed that no differences existed between male and female students regarding the benefits derived from SNAs, as well as the reasons and barriers. This reflects both the availability and accessibility of SNAs for members of both genders, and it also shows that both males and females have similar levels of awareness with respect to SNAs. Li et al.'s research [36], assessed whether an SNA-based game effectively improved problem-solving skills and mental health understanding in young people. The researchers also examined gender differences in learning outcomes and learning reason, and the results demonstrated that no differences were apparent.

The researchers accounted for this by referencing the fact that a noticeable difference existed in terms of the degree to which students benefitted from SNAs and the reasons underpinning the benefit in the age group consisting of students younger than 20 years. This reflects the greater usage rates and skill levels of younger SNA users compared to older SNA users. The study also found that students aged between 20 and 25 years encountered more substantial barriers in comparison to their younger counterparts, which could stem from their lower level of familiarity.

Pfeil et al. [37], investigated age differences

in MySpace usage to illuminate disparities in social capital between adolescents (individuals aged 13-19 years) and elderly people (individuals aged 60 years and above). It was found that the younger participants used varied forms of media available on MySpace, including music and video, with greater frequency compared to their older counterparts. The researchers also found that adolescents made more substantial use of self-references and negative emotions in their profile descriptions compared to the older participants.

Research Recommendations and Future Work

The research findings highlight several recommendations that can be given to students, faculty members, and universities. First, using SNAs, both students and faculty members can receive diverse benefits. For example, students can engage in e-learning in a more efficient way when they leverage SNAs, and they can also use these platforms to communicate with others, solve problems without needing to attend a physical location, and share information. In the case of faculty members, they can motivate students to engage in educational activities using SNAs. Teachers can benefit from frictionless communication with students, which also represents a benefit for students, and for students with limited interpersonal capabilities and social anxiety, SNA-mediated communication can ensure equal access to educational resources such as teacher time. An important recommendation is for higher education institutions to minimize the difficulties associated with accessing SNAs on campus by providing free Wi-Fi both for students and faculty members. At the same time, delivering training sessions to raise awareness about effective ways to exploit SNAs for educational purposes is something that higher education institutions should implement if resources are available. The findings of this study have substantial implications for educators. They will enable educators to understand how students at Albaha University are using SNAs for educational purposes, and they also highlight the optimal SNAs to use with students to improve their preferences and, in turn, enhance their academic attainment.

Regarding this study's limitations, the barriers that were identified as relevant for students offer opportunities for further research to address these barriers and minimize their impact on student performance. Undertaking one-on-one interviews with students would also be a worthwhile future research direction that could yield qualitative data to complement this study's quantitative data, potentially illuminating issues such as the difficulties faced by students. Additionally, the fact that this study's sample group was recruited from only two faculties at Albaha University highlights the importance of conducting comparable studies in other Saudi Arabian universities to enable the generalizability of these results. Focusing on other majors (e.g., medical students) may also represent a fruitful avenue for further research.

For future work, a machine learning tech-

nique will be applied to predict students' usage of SNAs for education, communication, or entertainment. Generally, machine learning consists of two types of paradigms: supervised and unsupervised. We will focus on a supervised technique wherein the students' data will be obtained after questionnaire responses have been used as an input for processing. Supervised learning takes these inputs as parameters and relates them to features, which lead to category classes. The goal of this learning will be to classify the responses received from the students into the following classes: SNA use for education, SNA use for communication purposes, or SNA use for entertainment. The classification will be facilitated based on the features, and these features will be taken as input parameters for analysis. To predict the students' interests, all the students' responses should be learned based on the areas of interest. Once the learning phase has been completed, weights will be assigned to these features based on the question of which category can be classified. The students' response data will be divided into a training set and test set at a proportion of 70% to 30%. After training the classifier, testing will be undertaken using tenfold cross-validation. Finally, a random student's record will used for prediction and performance evaluation. Based on the strength of the learning, it may be possible to make a correct and accurate prediction. The authors intend to perform these steps as we gather more data because, in this scenario, the data received will be abundant.

Conclusion

The phenomenal growth of digital technology, notably social networking applications (SNAs) applications, has had a tremendous impact on the field of education recently. Students may participate in discussions, interact with information, and access a variety of learning tools. This research recruited a sample of students from Albaha University to discern whether students benefitted from SNAs, to identify the reasons that motivated them to use SNAs, and to identify barriers associated with their use of SNAs for educational purposes. A noticeable difference was identified between the two age groups in the extent of benefits from SNAs and the reasons underpinning these benefits.

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