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## Using WhatsApp Messenger for improving learners' engagement in teaching and learning: a case of undergraduate students at the Sokoine University of Agriculture, Tanzania

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# **Using WhatsApp Messenger for improving learners' engagement in teaching and learning: a case of undergraduate students at the Sokoine University of Agriculture, Tanzania**

## **Abstract**

This study was set to investigate how WhatsApp Messenger supported learner-centred teaching and learning. Specifically, the study evaluated the level of exchange of scholarly information resources among students through WhatsApp Messenger, determined how WhatsApp supports learner-centred learning and assessed challenges influencing students when using WhatsApp Messenger in teaching and learning. The study involved undergraduate students and instructors at the Department of Records and Information Studies. It employed random sampling techniques in selecting students and purposive techniques in selecting instructors to be included in the study. Major results indicate that WhatsApp Messenger was highly adopted and used for supporting learning. All respondents were members of WhatsApp Messenger groups. Results indicate that the usage of WhatsApp Messenger has improved the accessibility of reading materials and reading culture among students. Usage of WhatsApp Messenger in learner-centred teaching and learning approaches is limited by the inadequate mobile phone storage space for downloaded scholarly contents and interruptions made by non-academic conversations made through the same application. It is concluded that if used effectively, the application may increase academic performance among students. It recommends developing WhatsApp Messenger functionalities that may facilitate the moderation of the teaching and learning process and make mobile internet services affordable.

## **Keywords**

WhatsApp Messenger; mobile learning; learner-centred approach; teaching and learning; Tanzania

## **1.0 Introduction**

Social media is a combination of web and mobile-based technologies that facilitate interactive communication and collaborations among individuals (Leftheriotis and Giannakos 2014). Some social media applications facilitate communication, collaboration, integration, participation, and engagement (Cesarano 2018). They are slowly replacing some of the non-interactive Information and Communication Technology applications in the communication process because they can easily facilitate feedback and engage more people at a time (Obermayer 2018).

Users of social media create accounts for their identification. A user account contains information of the user of social media; it helps to know who is using the application because user attributes are part of the account (Liu, Osvalder, and Karlsson 2010). A username and a password form an important part of the user account. The username and password are meant to secure the user account. User accounts help users to have control over their data and information (Cao, Ajjan, and Hong 2013).

Among the commonly used social media applications are WhatsApp Messenger which was introduced in 2009. Church and De Oliveira (2013) define WhatsApp Messenger is a cross-

platform instant messaging application for smart-phones, which enables users to send and receive location information, images, video, audio, and text messages in real-time to individuals and groups of friends. This application operates on most current devices and operating systems (Bouhnik and Deshen 2014). It enables communication with any person who possesses a smart-phone installed with this application. For it to work, a smart-phone must have a Subscriber Identity Module (SIM) card linked to mobile phone networks. It operates using mobile phone contact numbers and is an internet-based application. It has functionalities that allow users to attach images, video, and audio files, to create text messages, and link to web addresses (Dayani and Ariff, 2014; Church and De Oliveira, 2013).

Some institutions have adopted WhatsApp Messenger in teaching and learning (Ahad and Lim, 2014; Bouhnik and Deshen, 2014; Gachago *et al.*, 2015; Karapanos, Teixeira, and Gouveia, 2016; Gon and Rawekar, 2017; Abraham and Fanny, 2019). Adoption of this application in teaching and learning is most based only on its ability to exchange information using a variety of media including text, image, video, and audio messages (La Hanisi et al. 2018). Studies on the usage of WhatsApp Messenger in teaching and learning have centred on its effectiveness (Barhoumi, 2015; Yavuz, 2016; Gon and Rawekar, 2017; Ta'amneh, 2017; Oyewole, Animasahun and Chapman, 2020), acceptance, and perceived usefulness (So 2016), and its ability to enhance teacher-student interactions (Aburezeq and Ishtaiwa, 2013; Rosenberg and Asterhan, 2018).

Learning occurs when a learner interacts with sources of knowledge for gaining a new understanding or some new skills. It takes place in formal or informal settings. Learners who interact for learning purposes form a community of practice (Wenger 2010). The learning process takes place through interactions among parties on a similar topic (Taylor and Kapucu 2012). A community of practice is made up of people who discuss similar issues. In a learning process, a community of practice is made up of learners who to a large extent dominate the learning process by deciding on the contents of the learning activities, and effectively involving themselves, and actively participating in the learning process (Taylor and Kapucu 2012). The learner-centred approach is one of the learning approaches built on active interactions among learners and usually, it operates effectively through communities of practice. In learner-centred approaches, students learn and apply the skills of collaboration and teamwork by engaging in tasks defined and supervised by a teacher (McLoughlin and Luca 2002). WhatsApp Messenger facilitates interactions, collaborations, and teamwork (Aburezeq and Ishtaiwa 2013). This application can facilitate collaboration, participation, and teamwork among students in the teaching-learning process (Abraham and Fanny 2019). Thus, this study was set to investigate how WhatsApp Messenger supported learner-centred teaching and learning. Specifically, the study was set to:

- i. Evaluate the level of exchange of scholarly information resources among students through WhatsApp Messenger.
- ii. Determine how WhatsApp supports learner-centred learning.
- iii. Assess challenges influencing students when using WhatsApp Messenger in teaching and learning.

## **2.0 Literature review**

Social media includes the Internet and mobile technologies for interactive social networking (Lewis 2019). Unlike other Internet-based technologies, social media facilitates collaboration

and interactions and involvement, the use of mobile devices and computers. Social media facilitates social networking. It is for this reason; social media is also termed as a social network. It is a mass media platform that enables one person to communicate with hundreds or thousands of other people at a time (Mangold and Faulds 2009).

Among the social media applications widely adopted is WhatsApp Messenger. This mobile application was created by Brian Acton and Jan Koum in 2009 for easier and faster communication of multimedia contents (Endeley 2018). WhatsApp Messenger connects people; users of WhatsApp can make groups and share images, texts, videos, documents, and audios to individuals or groups. The application can work on both computers and smart-phones. The official website of WhatsApp indicates that by the year 2020 two billion people from 180 different countries use this application for communicating multimedia content (WhatsApp 2020).

WhatsApp Messenger and Short Message Service (SMS) are all based on text messaging. However, an SMS is limited to only 160 characters which makes it difficult and expensive to send big text messages (Church and De Oliveira 2013). An SMS may include images, videos, and sound contents and when shared with any of these contents the SMS is termed as Multimedia Messaging Service (MMS). When sending messages, a simple SMS is less expensive than the MMS. On the other hand, WhatsApp Messenger allows users to send and receive images, video, audio, and location-based messages to individuals or groups of friends (Church and De Oliveira 2013). WhatsApp Messenger operates through a mobile internet connection. For it to work the sender and receiver of messages must have installed the proprietary WhatsApp software in their smart-phones. Unlike SMS, users of WhatsApp may know who is online. Moreover, WhatsApp Messenger is characterized by simple operation, low cost, availability, and immediacy (Bouhnik and Deshen 2014).

To enhance privacy between the send and the receiver of the content, WhatsApp Messenger uses end-to-end encryption. This ensures that no one else may have access to contents being shared through WhatsApp Messenger other than the sender and receiver/s (WhatsApp 2020). It is, for this reason, the number of users of this application is increasing tremendously day after day. Moreover, it is for the same reason some organizations use WhatsApp Messenger as a parallel official communication channel.

The teaching and learning process may be conducted through two approaches namely learner-centred and instructor-centred. The former actively involves students in teaching and learning while the latter assumes a dominant role in teaching and learning and considers students as empty vessels to be filled with knowledge (Muganga and Ssenkusu 2019). Teaching and learning are communication processes (Muste 2016) that involve the transfer of knowledge from the knowledge source to the seeker. These processes can occur when two parties (instructor and students or students alone) are connected, engaged, and are communicating effectively for delivering and receiving knowledge (Taylor and Kapucu 2012). Effective teaching and learning can only take place when the interaction between learners and instructors and among learners is very high.

WhatsApp Messenger facilitates interactive communication among people. In teaching and learning, it links together students and teachers (Amry 2014). It increases the immediacy of delivery of contents and facilitates interactions and collaborations between learners and the

tutor and among learners (Bouhnik and Deshen 2014). In teaching and learning, WhatsApp Messenger allows learners to form groups, allows them to communicate among themselves, facilitates social interactions, creates dialogue, and encourages sharing of learning materials (Bouhnik and Deshen 2014). This study was set to investigate how WhatsApp Messenger supported learner-centred teaching and learning.

### 3.0 Conceptual framework

This study was set to investigate how WhatsApp Messenger supported learner-centred teaching and learning. The study was guided by the Task-Technology Fit (TTF) Model which helped in investigating issues of fit of technology to the task (D'Ambra, Wilson, and Akter 2013). This model explains the degree to which technology assists an individual in performing tasks (Goodhue and Thompson 1995). The Task-Technology Fit (TTF) determines the matching of the capabilities of the technology to the demands of the task, it tells about the ability of the technology to support a task (Goodhue and Thompson 1995). TTF model has four key constructs, the first two constructs (Task Characteristics, Technology Characteristics) together affect the third construct (Task-Technology Fit), which in turn affects the last construct the outcome variable, either performance or utilization (Goodhue and Thompson 1995). According to this model, technology will be used if, and only if, the functions available to the user fit the activities of the user (Dishan, Strong, and Bandy 2002).

### 4.0 Methodology of the study

The study focused on the usage of WhatsApp Messenger for supporting a learner-centred learning approach. The study was conducted at XXXXXXXX University in XXXXXXXX. The study used a survey research design. It involved students and instructors from the Department of Information and Records Studies at the University. This study used quantitative and qualitative research approaches to collecting and analyzing data.

The study employed purposive and simple random sampling techniques. A Bachelor's degree in Information and Records Studies was purposively selected for the study. The selection of this program was based on the fact that the program trains students on the usage of Information and Communication Technologies in managing information resources. It is expected that students from this program have a better understanding of how social media including WhatsApp Messenger. The study used random and non-random sampling techniques to select respondents among students and instructors involved in teaching this degree program in the academic year 2019/2020. In this academic year, there were 95, 83, and 102 first, second and third-year students respectively making a population of 280 students. There were also 17 instructors for this degree program.

The sample for this study was constructed using the formula developed by Krejcie and Morgan (1970).

$$s = \frac{X^2 NP(1-P)}{d^2 (N-1) + X^2 P(1-P)}$$

Where:

$s$  = required sample size.

$X^2$  = the table value of chi-square for 1 degree of freedom at the desired confidence level

(3.841).

$N$  = the population size.

$P$  = the population proportion (assumed to be .50 since this would provide the maximum sample size).

$d$  = the degree of accuracy expressed as a proportion (.05).

Basing on the calculations, a sample size of 162 students was drawn from the population of students. Stratified random sampling was used for selecting respondents among the 280 students where 54 respondents were selected from each year of study. Instructors were selected based on their academic rank, teaching experience, and involvement in the provision of library services. Basing on these criteria, seven instructors were selected and involved in the study.

A structured questionnaire was administered to 162 students. Among the 162 questionnaires distributed to students, 127 were returned making a 78.4% response rate. Moreover, a semi-structured questionnaire was administered to the seven instructors, all of the seven filled questionnaires were returned.

Data collected were cleaned, and coded accordingly before analysis. Quantitative data were analyzed using the Statistical Package for the Social Science SPSS while content analysis was used for analyzing qualitative data. Descriptive and inferential statistics were used for analyzing quantitative data; findings were presented in tabular and figural forms. Qualitative data were analyzed by analyzing the contents within the descriptions and presented in a form of explanations.

## 5.0 Presentation of results

The study involved students selected among those pursuing a Bachelor of Information and Records Studies from the Sokoine University of Agriculture. This academic program prepares students who will work as information scientists. Among those involved in the study, 40.2% were females and 59.8% were males.

**Table 1: Demographic characteristics of respondents n=127**

<b>Sex of the respondent</b>	
<b>Sex</b>	<b>Frequency</b>
Male	51 (40.2%)
Female	76 (59.8%)
<b>Total</b>	<b>127 (100%)</b>
<b>The age group of respondents</b>	
<b>Age group</b>	<b>Frequency</b>
15 – 20	36 (28.3%)
21 – 25	67 (52.8%)
26 – 30	24 (18.9%)
>30	00 (00%)
<b>Total</b>	<b>127 (100%)</b>

<b>Year of study</b>	
<b>Year</b>	<b>Frequency</b>
Year 1	36 (28.3%)
Year 2	44 (34.6%)
Year 3	47 (37.1%)
<b>Total</b>	<b>127 (100%)</b>

Results in Table 1 indicate that majority of the respondents (52.8%) were in the 21 to 25 age group while few were in the 26 to 30 age group. The results indicate further that slightly more year three students (37.1%) were involved in the study.

### **5.1 Usage of WhatsApp Messenger among students**

Results in Table 2 indicate that most respondents (89.8%) used WhatsApp Messenger daily. This implies that WhatsApp Messenger has been highly adopted as a communication tool among them.

**Table 2: Frequency of usage of WhatsApp Messenger among respondents n=127**

<b>Frequency of usage</b>	<b>Frequency</b>
Daily	114 (89.8%)
One to three times a week	6 (4.7%)
One to four three a month	7 (5.5%)
<b>Total</b>	<b>127 (100%)</b>

Only a few among the students, 4.7% and 5.5% used it a few times weekly and monthly respectively) used the application occasionally. This is an indication of the suitability of WhatsApp Messenger in enhancing interactive communication.

**Table 3: Time spent on WhatsApp Messenger in a day n=127**

<b>Time spent on WhatsApp Messenger</b>	<b>Frequency</b>
30 minutes	18 (14.2%)
30 minutes to one hour	19 (15%)
More than one hour	90 (70.8%)
<b>Total</b>	<b>127 (100%)</b>

Results in Table 2 indicate that majority of the students used WhatsApp Messenger on daily basis. In Table 3, results show that the majority (70.8%) of the students mentioned using WhatsApp Messenger for more than one hour a day. Others, 14.2% and 15% used WhatsApp Messenger for 30 minutes and from 30 minutes to an hour a day respectively. These results imply that the level of usage of WhatsApp Messenger among the students is very high.

Instructors mentioned using WhatsApp Messenger daily because the application was used instead of the traditional SMS. The interactive nature and ability to share a message to many recipients were the reasons for the adoption and high level of usage.

**Table 4: Interactions made through WhatsApp Messenger n=127**

Type of interaction	Frequency		Total
	Yes	No	
Exchange of files	125 (98.4%)	02 (1.6%)	127 (100%)
Chatting	127 (100%)	00 (00%)	127 (100%)

Results in Table 4 show the types of interactions made through WhatsApp Messenger. Results indicate that all of the students used WhatsApp Messenger for chatting with groups or individuals. Others, 98.4% used the application for exchanging files. Similar usages of WhatsApp Messenger were noted among instructors. They mentioned the application was useful for interactive communication. This was possible through SMS, voice and video calls, and through exchanging files.

Results in Table 5 indicate that all students were members of one or more WhatsApp Messenger groups. Results indicate that most of the students had membership in more than one WhatsApp Messenger group while few (3.9%) had membership in only one WhatsApp Messenger group. It was revealed that each group had its mission. So, students have joined WhatsApp Messenger groups basing on the group's mission.

**Table 5: Membership in WhatsApp Messenger groups n=127**

Number of WhatsApp Messenger groups	Frequency
One	5 (3.9%)
Two	15 (11.8%)
Three	26 (20.5%)
Four	11 (8.7%)
>four	70 (55.1%)
<b>Total</b>	<b>127 (100%)</b>

Like students, instructors were members of several WhatsApp groups each with a unique purpose. It was revealed that some of the groups closed when the mission was accomplished.

## 5.2 Academic usage of WhatsApp Messenger among students

Students involved in the study used WhatsApp Messenger for different purposes. Results in Table 6 indicate that all students involved in the study used WhatsApp Messenger for academic and socialization purposes while 82.7% and 52.8% used it for recreational and business purposes respectively.

**Table 6: Usage of WhatsApp Messenger**

Types of usage	Frequency
Academic purposes	127 (100%)
Socialization	127 (100%)
Recreational purposes	105 (82.7%)

Business	67 (52.8%)
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Among instructors, the usage of WhatsApp Messenger was more like that of students. They used the mobile application for sharing content, socialization, and recreation.

### 5.2.1 Academic contents exchanged through WhatsApp Messenger

Different types of academic contents were exchanged through WhatsApp Messenger. Results in Table 7 indicate that students used WhatsApp Messenger for exchanging different types of academic content. Results show that 95% and 93.7% of the students exchanged lecture notes and websites of educational contents respectively through WhatsApp Messenger.

**Table 7: Types of academic contents exchanged among students through WhatsApp Messenger**

Contents	Frequency		Total
	Yes	No	
Lecture notes	121 (95.3%)	06 (4.7%)	127 (100%)
Websites of educational contents	119 (93.7%)	08 (6.3%)	127 (100%)
E-books and journal articles	113 (89%)	14 (11%)	127 (100%)
Assignments	109 (85.8%)	18 (14.2%)	127 (100%)
Educational videos	87 (68.5%)	40 (31.5%)	127 (100%)
Educational audios	63 (49.6%)	64 (50.4%)	127 (100%)

Results indicate that 89% shared e-books and journal articles via WhatsApp Messenger. Others, 85.8%, 68.5% and 49.6% exchanged assignments, educational videos and audios respectively.

Instructors shared assignments, lecture notes, and some papers to students via WhatsApp Messenger. They shared journal articles, book chapters, and websites with calls for grants, conferences, and training.

### 5.2.2 WhatsApp functionalities used to support teaching and learning

The students used different WhatsApp Messenger functionalities to facilitate interactive teaching and learning. Results in Table 8 indicate that all of the students used the forward and sharing functionality, 98.4% used the group messaging functionality while 95.3% used the file attaching functionality. Moreover, results indicate 74% used the audio recording functionality.

**Table 8: WhatsApp Messenger functionalities used by students for interactive teaching and learning**

Functionality used	Frequency		Total
	Yes	No	
Forward/sharing	127 (100%)	00 (00%)	127 (100%)
Group messaging	125 (98.4%)	02 (1.6%)	127 (100%)
File attaching	121 (95.3%)	06 (4.7%)	127 (100%)

Audio recording	94 (74%)	33 (26%)	127 (100%)
Voice calls	75 (59.1%)	52 (40.9%)	127 (100%)
Picture recording	73 (57.5%)	54 (42,5%)	127 (100%)
Video call	71 (55.9%)	56 (44.1%)	127 (100%)
Video recording	69 (54.3%)	58 (45.7%)	127 (100%)
Broadcasting	50 (39.4%)	77 (60.6%)	127 (100%)

Results in Table 8 show that 59.1% of the students used the voice call functionality. Others, 57.5%, 55.9%, and 54.3% used the picture capturing, video call, and video recording functionalities. Few of the students used the broadcasting functionality for broadcasting academic content to selected recipients.

Instructors used the forward/sharing and group messaging functions for exchanging academic content. They also used the file attaching functions for exchanging files among themselves and students.

### 5.3 Usage of WhatsApp Messenger and students' learning habits

Results in Table 7 indicate that students used WhatsApp Messenger for exchanging academic reading materials. Reading materials exchanged among students was in the form of lecture notes, websites of educational contents, e-books and journal articles, assignments, educational videos, and educational audios. Results in Table 9 indicate that there is a strong correlation between using WhatsApp Messenger and students' reading culture (Cramer's  $V = .167$ ).

**Table 9: Association between usage of WhatsApp Messenger and students' reading culture**

		Value	Approx. Sig.
Nominal by Nominal	Phi	.167	.314
	Cramer's V	.167	.314
N of Valid Cases		127	

- a. Not assuming the null hypothesis.
- b. Using the asymptotic standard error assuming the null hypothesis.

Moreover, results in Table 10 indicate that there is also a strong correlation between using WhatsApp Messenger and the level of students' interactions with their instructors (Cramer's  $V = .237$ ). This is mostly attributed to the usage of different WhatsApp Messenger functionalities which promote interactions and the level of participation shown by students who under normal circumstances may feel shy.

**Table 10: Association between usage of WhatsApp Messenger and the level of students' interactions with instructors**

		Value	Approx. Sig.
Nominal by Nominal	Phi	.237	.128
	Cramer's V	.237	.128
N of Valid Cases		127	

- a Not assuming the null hypothesis.

b Using the asymptotic standard error assuming the null hypothesis.

Results in Table 11 show the correlation of usage of WhatsApp Messenger and the accessibility of teaching and learning materials among students. Results indicate that there is a very strong correlation between the usage of WhatsApp Messenger and the accessibility of reading materials among students (Cramer's  $V = .276$ ). This strong correlation between WhatsApp Messenger and accessibility of reading materials rests in the fact that WhatsApp Messenger was used by exchanging different types of reading materials among students (see Table 7).

**Table 11: Usage of WhatsApp Messenger and accessibility to reading materials among students**

		<b>Value</b>	<b>Approx. Sig.</b>
Nominal by Nominal	Phi	.276	.046
	Cramer's V	.276	.046
N of Valid Cases		127	

a Not assuming the null hypothesis.

b Using the asymptotic standard error assuming the null hypothesis.

Results in Table 12 indicate the correlation between the usage of WhatsApp Messenger among students and their participation in academic discussions. Results indicate that there is a very strong correlation (Cramer's  $V = .402$ ) between usage of WhatsApp Messenger among students and participation in academic discussions.

**Table 12: Usage of WhatsApp Messenger and participation in academic discussions**

		<b>Value</b>	<b>Approx. Sig.</b>
Nominal by Nominal	Phi	.402	.000
	Cramer's V	.402	.000
N of Valid Cases		127	

a Not assuming the null hypothesis.

b Using the asymptotic standard error assuming the null hypothesis.

According to Akoglu (2018), a value bigger than 0.25 is named as a very strong relationship for the Cramer's V. Therefore, the relationship between usage of WhatsApp Messenger and participation in academic discussions is stronger than that of usage of WhatsApp Messenger and accessibility of lecture notes.

Results in Table 13 indicate the correlation existing between the age of the students and the usage of WhatsApp Messenger as a platform for academic discussions. Results show that there is a weak positive relationship between student's age and usage of WhatsApp Messenger for academic discussions (Spearman's  $\rho = .316$ ).

**Table 13: Student's demographic characteristics and usage of WhatsApp Messenger for academic discussions**

			<b>Age group</b>	<b>Year of study</b>	<b>Sex</b>
Spearman's rho	Use WhatsApp Messenger for educational discussions	Correlation Coefficient	.316(**)	.072	-.125

		Sig. (2-tailed)	.000	.420	.163
		N	127	127	127

\*\* Correlation is significant at the 0.01 level (2-tailed).

These results tell that a student's age increase there is a slight increase in the level of usage of WhatsApp Messenger for educational discussions. Moreover, results indicate that there is no significant relationship between student's years of study and using WhatsApp Messenger for educational discussions (Spearman's rho = .072). Likewise, there is an insignificant relationship between the sex of the student and the usage of WhatsApp Messenger for educational discussions.

Results in Table 14 indicate that usage of WhatsApp groups in educational discussions has a significant positive correlation with improving students' communication skills (Pearson Correlation = .245(\*\*)). These results imply that students' participation in academic discussions facilitated by WhatsApp Messenger groups increases their ability to communicate better. This may be explained by the active participation shown by students when in WhatsApp Messenger groups.

**Table 14: Usage of WhatsApp and students' communication skills**

		Improved student's communication skills
WhatsApp Messenger groups in educational discussion	Pearson Correlation	.245(**)
	Sig. (2-tailed)	.005
	N	127

\*\* Correlation is significant at the 0.01 level (2-tailed).

Results from instructors revealed that the usage of WhatsApp Messenger in teaching and learning increases the accessibility of reading materials, improves the involvement of students, and creates a non-formal teaching and learning environment which encourages social interactions between instructors and students. WhatsApp Messenger groups were formed for different academic purposes, involvement, participation, and interactions with students in groups helped to know how to help students better. However, instructors opined that it is difficult to solely rely on WhatsApp Messenger in teaching and learning because it has so many social connections which may reduce concentrations during teaching and learning.

## 5.8 Challenges influencing usage of WhatsApp Messenger in learning

Results in Table 15 show that students faced several challenges while using WhatsApp Messenger in learning. Results indicate that 95.3% and 92.9% of the students thought that inadequate mobile phone storage space for downloaded scholarly contents and interruptions made by non-academic contents communicated through the same application respectively limited the usefulness of WhatsApp Messenger in learning.

**Table 15: Challenges limiting usage of WhatsApp Messenger in education**

Challenge	Frequency
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Inadequate mobile phone storage space for downloaded scholarly contents	121 (95.3%)	06 (4.7%)	127 (100%)
Interruptions made through non-academic conversations made through the same application	118 (92.9%)	09 (7.1%)	127 (100%)
Difficulties in moderation	111 (87.4%)	16 (12.6%)	127 (100%)
Not all students come online at the same time	105 (82.7%)	22 (17.3%)	127 (100%)
Unaffordable costs for mobile internet services	95 (74.8%)	32 (25.2%)	127 (100%)
Unreliable mobile internet services	91 (71.7%)	36 (28.3%)	127 (100%)
Some students remain inactive	69 (54.3%)	58 ((45.7%)	127 (100%)

Results in Table 14 also indicate that 87.4% of the students opined that there were some moderation difficulties while having academic discussions through WhatsApp Messenger. Others, 82.7% opined that not all students who formed a group were online at a similar time during discussions. This limited the inclusion capability of the application in teaching and learning. Moreover, 74.8% and 71.7% of the students mentioned the unaffordable costs for mobile internet services and the sometimes unreliable mobile internet services limited the usefulness of WhatsApp Messenger in facilitating teaching and learning. Finally, 54.3% of the students mentioned that some of their fellow students remained inactive despite being online on the WhatsApp Messenger platform.

## 6.0 Discussion

WhatsApp Messenger remains to be an interactive communication mobile application adopted by the majority of users worldwide. An Individual's level of usage of WhatsApp is measured by the time spent by an individual in using this mobile application. Results of this study indicate that most of the students spent more than an hour on WhatsApp Messenger on daily basis. This implies that WhatsApp Messenger is only adopted but also perceived to be fit for interactive communication. The time spent on WhatsApp Messenger has a direct and significant positive impact on social integration and kinship (Bano et al. 2019).

WhatsApp Messenger is used for chatting and exchanging files. Chats were made between two individuals or between an individual and a group. In WhatsApp Messenger, groups are created to form a virtue community of practice with a purpose in mind. A WhatsApp group may have up to 256 users (WhatsApp 2020). A traditional SMS can only be sent to 10 receivers at a time (Kabbiri et al. 2018). This limits the potential of traditional SMS in supporting teaching and learning because of large class sizes. It also makes WhatsApp Messenger a more cost-efficient communication application and more potential for teaching and learning as it may reach more in teaching and learning (Tawiah 2014).

WhatsApp Messenger is used for academic purposes, socialization, and recreation, and business purposes. Educational contents are exchanged among students and between an instructor and students via WhatsApp Messenger. Educational contents exchanged include lecture notes, websites of educational contents, e-books, and journal articles. Likewise, educational videos and audios can be shared via WhatsApp Messenger as attachments. This is supported by Bouhnik and Deshen (2014) who found that the usage of WhatsApp Messenger in education facilitates the accessibility of scholarly content among learners and instructors.

Academic chats in WhatsApp Messenger are like in traditional SMS, they can be sent to a group just like in traditional SMS. The only difference is that in WhatsApp Messenger such chats can be shared with more group members (256 members) than in traditional SMS which limits the number of recipients to 10. In WhatsApp Messenger, it is possible to reply to a unique message among the many messages received. It is also possible to copy and paste a much longer message and share it. Messages in traditional SMS have a limited number of characters. Moreover, when a chat is shared to 256 recipients from a group, it is being sent as a single message and charged based on the kilobytes it has and not as 256 different messages (Treré 2020). Therefore, WhatsApp Messenger has more potential of influencing more students to participate in the learning process because of its ability to enhance timely and cost-effective dissemination of information.

Other contents shared and exchanged among learners/instructors include websites, assignments, lecture notes, books, journal articles, video, and audio files. Websites with academic content may be copied and pasted on the Messenger platform before being shared. Assignments, lecture notes, e-books and journal articles, and video and audio files are shared as attachments. They may be shared with an individual or group of individuals. The capability of sharing content to many receivers at the same time makes WhatsApp more suitable for handling academic content meant to reach a wider audience like students in a class.

WhatsApp Messenger has several functionalities; however, not all of them are suitable for academic purposes. Usage of WhatsApp Messenger functionalities is manageable among most students. It is easy to learn how to use them. It is, for this reason, most of the students and all of the instructors involved in the study used most of the WhatsApp Messenger functionalities.

Results from this study indicate that file-sharing/forwarding, group messaging, file attachment, delete option and audio recording were the most used WhatsApp Messenger functionalities among students during learning. The forward/sharing functionality may facilitate discussions; group messaging is important for enhancing access to scholarly information to the entire group, it is also very useful for academic discussions and the involvement of students. In an academic setting, WhatsApp groups formed by students or students may cultivate the participation and involvement of most group members (Addi-Racciah and Yemini 2018).

The file attaching functionality is among the most used virtual systems involving the sharing of files. In WhatsApp Messenger, this functionality enables the accessibility of scholarly information in the form of e-books and journals, educational pictures, videos and audios, lecture notes, and assignments. A file can be attached and shared with an individual or group. It has more potential for normal chats because it can enhance the exchange of a bigger size of information resources.

Like other functionalities, voice and video calls may also be used for teaching and learning purposes. The two functionalities enable one to make a voice or video call to an individual or group. They may provide proof of someone's virtual presence because they involve synchronous real-time participation and involvement of learners in teaching and learning.

Moreover, video usage has a significant impact both on learning performance and on learning satisfaction (Nagy 2018).

Usage of WhatsApp Messenger had some relationship with students learning habits. It enables the exchange of lecture notes, e-books, e-journals, educational videos, audios, and assignments among and between learners and instructors. It increases the accessibility of scholarly content (Mulkalwar et al. 2020). Results from this study indicate that the accessibility of reading materials improves students' and instructors' reading culture. This is in-line with the results of the study conducted by Wema (2018) who found that students' reading culture increases with the availability and accessibility of reading materials.

Results from this study indicate that the usage of WhatsApp Messenger in teaching and learning is associated with an increased level of interactions among students/instructors and between students and instructors. Some WhatsApp Messenger functionalities including group messaging, chatting, voice and video calls, and file attaching are known to increase the level of interactions, involvement, and participation among learners and between learners and instructors. Learner's involvement, participation, and interactions are important features in learner-centred teaching and learning approaches (McLoughlin and Luca 2002). Therefore, the usage of WhatsApp Messenger in teaching and learning promotes learner-centred teaching and learning approaches.

Results from this study indicate that there is a very strong correlation between the usage of WhatsApp Messenger in teaching and learning and students' participation in academic discussions. WhatsApp Messenger groups facilitate academic discussions which may take place through chatting and video and voice calls. This functionality enhances students' participation and involvement in academic discussions. In turn, active participation in discussions increases students' ability to communicate effectively.

Several factors limit the usage of WhatsApp Messenger in teaching and learning. Reading materials shared through WhatsApp Messenger were saved in the mobile phone's storage space. Unfortunately not all mobile phones have adequate space for storing large sizes of data (Alsulami and Al-Aama 2019). This forced students to delete some of the contents they still needed for their future reference. Moreover, WhatsApp Messenger is primarily meant for interactive socialization and communication. It is not primarily meant for usage in education. This is proven by the lack of some important functionalities including the moderation function. It also has more functions that support social than educational interactions. Thus, the possibility of interrupting educational activities going on via WhatsApp Messenger by other social interactions is very high (Lai 2016). This adds some challenges in moderating the teaching and learning processes made through WhatsApp Messenger.

Sometimes it is difficult to have all students on the WhatsApp Messenger platform for synchronous discussion as some may have challenges associated with unreliable mobile internet services (Ishtaiwa, Khaled, and Dukmak 2015) while others may have challenges with the affordability of mobile internet services (Willemse 2015).

The level of activeness of students in WhatsApp Messenger is not the same. Some may be active while others may remain inactive. Inactive students may hardly participate in learning

activities taking place through WhatsApp. This may limit the usefulness of this application in teaching and learning.

## 7.0 Conclusion and recommendations

WhatsApp Messenger's functionalities are the potential for transforming teaching and learning and when used effectively academic performance may be improved. Results from this study have shown that WhatsApp Messenger is the potential for increasing the accessibility of reading materials and improving reading culture, enhancing interactive teaching and learning processes, and facilitating participatory educational discussions among students. It also helps to create a strong linkage between instructors and students and improves the involvement of both students and instructors in teaching and learning. However, interruptions with non-academic interactions taking at the same time via the same application may affect its potentials in teaching and learning. It is this important to develop functionalities that may facilitate the moderation of the teaching and learning process. It is also important to make mobile internet services affordable to the majority and improve mobile phone internet infrastructure.

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