Perceived Effects of Smartphone Usage on Students' Attitude Towards Learning in a Health Institution

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Abstract
Globally, the current advancement in technological gadgets has provided smartphones as a new tool for both teachers and students to support classroom and off classroom learning. This has led to the call for its integration into the educational system of health training schools in Ghana. The researchers studied health trainees' perception on the effects smartphone usage has on their attitudes towards learning. This study was grounded on the views of constructivist theory of learning. A descriptive cross sectional study design was adopted. Among 614 health trainees studying various medical and allied health courses at the College of Health-Yamfo of Ghana, 138 students were selected using both stratified and systematic sampling methods. Descriptive statistics was used to analyse the data. The outcome of the study indicated that health trainees who use smartphones in their learning activities develop positive attitude towards learning (76%). However, it was revealed that health trainees who do not use smartphones in their learning activities had negative attitude towards learning (57%). They were also not confident; did not complete assignments; depended on others during studies and did not have access to large volume of information via the internet. Finally, chatting through WhatsApp and other social media applications during lectures and small screen size were barriers to effective use of smartphone in learning activities. The study recommends development of policy that would encompass the integration of smartphone usage into teaching curriculum of health training schools in Ghana.
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1.   Introduction

Globally, the current advancement in technological gadgets has provided new tools for both teachers and students to support classroom and off classroom learning. Therefore, there has been support for the integration of these technological gadgets into the classrooms which now have become indispensable to students' life (Manochehri & Sharif, 2010). Prior to this invention, health trainees like medical students and other categories of students depended on their textbooks for learning (Koehler, Yao, Vujovic, & McMenamin, 2012). Currently, these technological gadgets include smartphones, computers, pagers, Personal Digital Assistants (PDA), projectors and many more. Among these devices is the astronomical rise in smartphones popularity and usage (Koehler et al., 2012). These smartphones are cell phones with highly sophisticated computing ability and connectivity that have other important functions such as portable media players, low-end compact digital cameras, pocket video cameras and Global Positioning System (GPS) navigation units (Suki, 2013). With the advances in smartphones, there has been a significant shift towards the use of electronic resources like electronic textbooks (Koehler et al., 2012). Smartphones have become popular and the functions offered on them have caused an increased demand; creating a state where they have become an inseparable part of everyday life and a majority of people carry them all the time (Suki, 2013) including health trainees.

Smartphones have become necessary electronic gadget found everywhere among the general public. They offer easy access to large volume of information on the internet than ever before (Payne, Wharrad, & Watts, 2012). Smartphone and computer usage offer students great opportunity to learn and discuss issues in situations where they are physically apart. It also encourages co-operative learning as an alternative to books, computers or attending physical classroom lectures on campus (Taleb & Sohrabi, 2012). Mobile technologies have permitted teachers to upload learning materials in a very easy way to their students and students can also communicate rapidly to their teachers through either text, voice or image (Kim, Rueckert, Kim, & Seo, 2013).

Several studies have been carried out in developed countries regarding attitude towards smartphone usage among students and its effect on learning. Most of these findings have shown how effective the usage of smartphones has been in students learning process. Wang and Smith (2013) noted that Japanese students perceived mobile phone-assisted learning positively as an effective means of enhancing reading and grammar proficiency. Kim et al. (2013) in their research argued that mobile technologies have the potential to offer new learning experiences. They went further to explain that within these experiences, students can participate more often in learning events outside their classrooms because of the numerous learning opportunities provided them in their community of practice.

Africa and other developing countries exceed developed countries in terms of mobile phone usage. This is

as a result of the rise in the number of mobile phones used by the younger generation (Ezemenaka, 2013), and this young generation is those in schools. Tutors at the various health training schools use Information and Communication Technology (including the use of smartphones) and acknowledged the benefit it has on the quality of teaching as well as on their students' education (Harris, Beyere, Danso, & Abel, 2015).

Anecdotal evidence suggests that health trainees in various levels of their training across health training institutions in Ghana rely heavily on their smartphones for both social and educational activities. Students use it to communicate with their friends and family members and for entertainment purposes. Others use it to get access to huge volume of academic information that might be relevant to their studies. Though there has been a call for the integration of smartphone learning in schools as result of popularity of smartphone usage among the younger generation, little information in developing countries is available on the effects and attitude of students towards its usage in learning. It is against this backdrop that this research sought to look into the perceived effects of smartphone usage on students' attitude towards learning.

2. Literature review

Alexander Graham Bell invented the first telephone in the 1870s which was a tremendous achievement in the history of communication. The kind of telephone developed by him had a problem of mobility. It could not be carried around. In 1973, the problem of mobility was solved by communications engineer, Martin Cooper, when he invented the first mobile phone. This first mobile phone weighed almost 1 kg whose electric charge could last just 20 minutes (Arslan, 2016). Comparatively, the subsequent generations of mobile phones were made smaller and lighter than their predecessor. They were used for calls and Short Message Service (SMS) and were called simple cell phones or classical cell phones (Arslan, 2016). Since the inception of mobile phones, a lot of modification and addition of features have been done. This has led to the evolution of intelligent cell phones called smartphones.

2.1 Types of mobile phones

Mobile phone comes in few different models. The first smartphones were made to combine the functions of PDAs with that of a mobile phone. Later models topped it up with other functionalities like portable media players, low-end compact digital cameras, pocket video cameras, and GPS navigation units to form a device with multi-functionalities. Contemporary smartphones comes with high-resolution touch screens and web browsers optimised to display standard web pages as well as mobile-optimised sites. Smartphones have the capability of multitasking between applications and operations. Another form of mobile phone is the fair phone. This model type of smartphones is made bearing in mind ecological and ethical issues. They are developed from "recycled, recyclable and responsibly-sourced materials." It is made in such a way that if any part becomes damaged or the user intends to upgrade it, he/she only needs to replace that part with another. Feature phones on the other hand, are low-end mobile devices that do not have the computing ability smartphones have. They have been designed to make calls, send text messages, browse the internet and with fundamental multimedia capabilities. These mobile devices run on a platform called Java Micro Edition platform which can only run basic applications. Comparatively, there is a functional gap between feature phones and smartphones. However, this gap is closing at a faster rate as feature phones are becoming advanced (Zakaria, Fordjour, & Afriyie, 2015).

The distinction between a cell phone and smartphone lies on the functionalities that can be found in these phones. Smartphones have various functional applications such as network connection, touchscreen, e-mail, game, fax, and pager. Furthermore, smartphones have special features that enable them to be used with computer, telephone and internet network system through one tool (Arslan, 2016). In the same paper, Ada and Tatli (2013) outlined nine clear ways smartphones are different from classical phones. These are: ability to record picture and sound; internet connectivity; capable of operating with one or more applications; availability of application markets where users can easily upload mobile applications; uses mobile operating system on which applications can be developed; screen touch interface is available; inbuilt memory which can be expanded; ability to make calls and send messages; and there are varied advanced connection options users could choose from such as GPS, Wireless Fidelity (Wi-Fi), third Generation (3G), Bluetooth, and Frequency Modulation (FM) (Arslan, 2016).

2.2 Functionality of smartphones

According to Dadas, Ashtewale, and Samudre (2012), there is no exact definition of smartphones. However, most scholars would agree to the fact that smartphones have been upgraded to do more than what Alexander Graham Bell initially intended for his originally invented telephone during the 1870s.

Contemporary smartphones have the capacity to support a range of applications. Many creative applications have been developed which facilitate the use of smartphones as sensors, recognise and monitor a lot of things. For instance, smartphones can be used to follow the traffic, sense the state of their user's health, detect urban space, monitor weather conditions, and help identify locations and a lot more. Nonetheless, these applications utilise substantial battery energy due to the requirement of constant internet connectivity. In attempt to solve

short battery life, the size of smartphones batteries were increased. However, this did not match with the increased consumption of energy. Currently, technology has increased the capacity of smartphone batteries but the pace at the development of battery technology is not commensurate with the high demand of energy. Therefore, power consumption is a recognised problem that needs attention. (Shah, Haq, Bashir, & Shah, 2016).

The popularity of smartphones has been based on the fact that they are portable and wireless in terms of connectivity. These two functionalities of smartphones make users able to effortlessly communicate with others on the go (Iqbal, Khan, & Malik, 2017).

Other researchers argued that smartphones are progressively moving from their "smart functions such as telephone calls, camera, calendar, address book (contacts), music/video player, text messaging, internet access and email, voice activated dialing, Bluetooth, Global Positioning System (GPS), office-type programs, and many more towards cognitive functions" (Campbell & Choudhury, 2012). Smartphones are developed with much super artificial intelligence in the form of classification models through which we could infer human behaviour and context. People carry their smartphones with them as they go through their normal day's activities. Smartphones could be well equipped to go beyond simple inferences of classes by putting together knowledge of the user's life pattern and choices. It was further predicted that the next generation of smartphones would not only build lifelogs of their users but also be able to foretell results and possibly help the user. This new generation of phone could be called the cognitive phone (Campbell & Choudhury, 2012).

Smartphones are extremely important electronic gadgets used by students at all levels of the educational ladder. Through smartphones, students are able to access e-learning materials. According to Uys (2003) as cited in Tarus, Gichoya, and Muumbo (2015), e-learning comes with benefits which include cost efficiency, accessibility and flexibility with regards to time and place. Both teachers and their students can use their smartphones to learn online because it can be done anywhere at any time.

2.3 Effects of smartphone usage on students' attitude

Bansal and Joshi (2014) conducted a research to find the perception and attitude of students' towards WhatsApp m-learning by creating WhatsApp learning atmosphere. Results revealed that students found WhatsApp m-learning ubiquitous aspect interesting and educationally useful. Aside that it was also determined that students found WhatsApp learning environment collaborative and aided them in social interactivity with their colleagues and teachers. Students had positive attitude towards WhatsApp m-learning and preferred it over traditional classroom learning. Students also showed their willingness to use it for their learning activities in the future.

Cross-sectional study was conducted to investigate the usage of smartphones for learning purposes among dental students. A convenient sampling method was used to select the participants in which questionnaires were used to collect data from 300 dental students. The data collected were analysed using descriptive statistics, Chi-square tests, and p-values were calculated. Findings revealed that 259 students out of the 300 study participants owned smartphones and 248 students had access to internet services. More than half of the study participants (86%) used their smartphones to take photos and record their work whilst 80% of them used smartphones to obtain study material. From the total participants surveyed, 53% had applications related to dental education. Majority of the students preferred using their smartphone to search for information and study materials than their school's library. The researchers also found out that the attitude of the students was positive toward mobile learning. And hence, expressed that smartphone usage for educational purposes should be reinvigorated by the college and staff (Bikumalla et al., 2017).

Taleb and Sohrabi (2012) conducted a study in Islamic Azad University of South Tehran University in which students' viewpoints about the educational use of mobile technology to support their learning process was documented. Out of 2140 students of Psychology and Educational Science, 289 students were selected by using cluster random sampling method. Results from the study suggested that students used their smartphones for calculating, text messaging and for finding the meaning of English words in English dictionary application on their smartphones. This outcome seems to provide support for the conception that students do not use smartphones for only social needs but educational needs as well. Taleb and Sohrabi further identified that being a male or a female has a great significant effect on educational usage of smartphones. However, they did not find significant effect on educational use of smartphones by academic major and course. In addition, the study showed that there were a number of factors that significantly influenced mobile phone use in students' academic affairs. The factors listed were: mobile phone with many capabilities, mobile phone with a long life battery charge, and mobile phone with internet access and capacity to pay for high technology mobile and different services.

In Japan, a research conducted on feasibility and the limitations of developing English reading and grammar skills through the interface of mobile phones has shown that mobile phone-assisted learning is perceived positively by students as an effective method for improving reading and grammar ability. However, for learning to be effective and productive, the material should be interactive without it being too arduous. Data also suggested that though phone assisted learning was perceived by students to be positive, it could only be

productive if certain criteria were established. These were: ensuring that the learning materials provided to students were not too difficult; efficient monitoring strategy must be used by teachers; making sure students were involved; provision of incentives; respect for privacy; ensuring that the mobile-platform environment was safe and secure (Wang & Smith, 2013).

Kim et al. (2013) in their research argued that mobile technologies have the potential to offer new learning experiences. They went further to explain that within these experiences students can participate more often in learning events outside their classrooms because of the numerous learning opportunities provided them in their community of practice.

In Monash University in 2011, a total of 594 medical students were invited to complete an anonymous online survey regarding mobile phones and medical applications. Results indicated that all students owned a mobile phone with 77 per cent of them having a smartphone. Those with smartphones who used medical applications represent 76 percent of the 594 medical students under study. On the whole, students had positive attitudes towards using medical applications on smartphones. Thus, the study suggests that these devices could play a more significant role within medical education (Koehler et al., 2012).

Karim (2012) as cited in Twum (2017) affirmed that smartphones are important technological devices that can enhance students' understanding of concepts that are nonconcrete in science. He also noted that smartphone usage positively affects the user by aiding suitable and relevant social relationships with learners through co-operation, exchange and sharing of information.

Smartphone usage has become ubiquitous and has spread to many settings including that of healthcare facilities with tremendous potential and benefits. An online survey conducted in one region of the United Kingdom on cohorts of medical and foundation level junior doctors with regards to whether they owned a smartphone and if they used applications on their smartphones to support their education and practice activities. The result pointed out that out of 1706 registered undergraduates, 257 medical students and 131 junior doctors responded. Those that owned a smartphone were 79.0% (n=203/257) of medical students and 74.8% (n=98/131) of junior doctors. It was further identified that both populations were alike in terms of application usage several times a day on their smartphones. Within 24 hours, it was noted that on the average applications were used for between 1–30 minutes for students and 1-20 minutes for doctors. The preferred applications for students were disease diagnosis/management and drug reference whilst with doctors it was clinical score/calculator applications (Payne et al., 2012).

To assess the awareness of medical applications and academic use of smartphones among medical students, questionnaire-based descriptive cross-sectional study was conducted among 569 medical students of the Rawal Institute of Health Sciences, Islamabad, Pakistan. Results showed that 545 (95.8%) had smartphones and 24(4.2%) were using simple cell phones. Generally, 226(41.46%) of the smart phone users were using some medical applications. Moreover, 137(24.08%) were cognisant of medical apps but were not utilising them. Similarly, 391(71.7%) students were not using any type of medical text eBooks through their phone and few 154(28.3%) had relevant text eBooks in their phones. It can be concluded that medical students had smartphones but were used mostly as a means of telecommunication rather than a device for enhancing their medical knowledge (Prasad, Patthi, Singla, Gupta, & Saha, 2017).

In Africa, smartphones have been found to aid learners develop positive attitude towards learning. A study carried out to examine the effects of two ICT tools on learners' attitude towards learning in adult literacy programmes by two researchers at the Department of Adult Education, University of Ibadan found significant difference in attitude between computer and smartphone usages. They based their study on the theory of constructivism which says learners create knowledge and meaning from an interaction between their experiences and their ideas. It was a descriptive survey design in which a population comprised of twenty (20) adult learners purposively selected in two adult literacy programmes (10 participants each for computer treatment and mobile phone treatment) were used. The findings from the study suggest that adult learners have a positive attitude towards learning after being exposed to ICT instructional tools (Weighted Average (WA) = 3.19). Furthermore, a significant difference in attitudes between the mean scores of learners exposed to mobile instruction and those exposed to laptop computer instruction towards learning ([18] = 2.75, p < 0.005) was established (Adelore & Itasanmi, 2016).

A descriptive survey conducted to examine the use of mobile phone and determined how this technology influences science students' teaching and learning, has shown the positive effect smartphones can have on students learning attitude. The study population comprised of science students and lecturers from three selected public universities in Ghana. The sample size of five hundred and thirty students (530) and seventy-one (71) lecturers were selected through purposive and convenience sampling techniques. Descriptive statistics was utilized in analyzing data collected from respondents. The researchers used open-ended questionnaire to solicit for the information from respondents from which qualitative analysis was employed. The outcome of the study affirmed that mobile phone had great potential as a learning tool and it could positively be used for teaching and learning purposes in science areas. Findings also indicated that most students used their smartphones to enhance

their learning experience. This suggests that smartphones offer easier way to have access to information that can be read every time of the day at anywhere at the user's choice. Hence, at the click of a button, students have voluminous information at the tip of their fingers. The ultimate effect is that the more students use mobile technology in their studies, the more they improve their learning experience. Lecturers were also indicated to be users of smartphone technology to support science teaching. This they do because they want to access current information and read materials online. Though they were aware of the use of their smartphones only few were aware of the instructional importance of these smartphones. Most of them are also not aware of the abundant opportunities that smartphones have on education (Twum, 2017).

2.4 Barriers to effective usage of smartphones

Though smartphones have been indicated to bring enormous benefit to its users especially students, a number of barriers have also been identified to be hindering its effective use. Hew and Brush in 2007 as cited in Farley et al. (2015) discovered that the use of smartphones for learning comes with about 123 barriers in which they were grouped into six categories:

1. Absence of resources like technology, time and technical support;
2. Inadequacy of knowledge and skills which includes technology-supported pedagogical knowledge and technology-supported classroom knowledge;
3. Problems at schools such as poor commitment by management, timetabling and planning problems;
4. The attitude and beliefs held by teachers;
5. Assessment difficulties including burdens of high-stakes testing and standardization;
6. Reluctance of educators to adopt technology due non-conductive subject culture (Farley et al., 2015).

Smartphones have been said to affect the health of its users due to prolong and continuous use for a long time. The common or general health effects caused by prolong use of smartphone include: headache accompanied by irritability from incessant use of mobile devices, lack of attentiveness when one is performing daily living activities. Anxiety is also seen with extreme users of smartphones because of the unrestricted information they receive; sooner or later eyestrain comes in; loss of appetite; make users to feel exhausted; loss of hearing seen with constant call making; and other issues like neck pain, limb pains, lack of sleep and addiction for smartphones (Subramanian & Rajesh, 2017).

Barriers to effective use of smartphones for educational activities are enormous. A study conducted among medical students and staff of Niger Delta University Bayelsa State - Nigeria in 2015 also identified some of these challenges. The study aimed to ascertain the impact of smartphones on the information seeking behaviour of medical students and staff. Descriptive survey design was adopted in which the researchers collected data through the use of questionnaires from 460 participants. Data were analysed using tables, frequencies, simple percentages and graphical illustration. Findings revealed that there was high awareness and use of smartphones/tablets by medical students and staff for their academic activities. Smartphones were identified to positively influence their medical education especially regarding to their ease and fast internet access, high speed browsing, saves time and money going to internet café or college library, easy access to available online medical e-learning materials. However, the study also revealed that certain factors also undermine the positive benefits of smartphone usage and cause frustration to student users. These factors include difficulties in operating smartphones, expensive data subscription from telecommunication network providers, fragile nature of smartphones and finally the lack of personnel with the requisite technical expertise to repair them when faulty within campus premises (Ebiye, 2015).

Research questions

The study sought to find answers to the following questions:

1.   What kind of attitude do health trainees with smartphones exhibit towards learning?
2.   What kind of attitude do health trainees without smartphones exhibit towards learning?
3.   What factors could hinder effective use of smartphone in learning process?

2.5 Conceptual framework

The conceptual model of this study illustrates the effects of smartphone usage on health trainees' attitude towards learning, whether those with or without smartphones have positive or negative attitude towards learning. Positive attitudinal factors include early completion and submission of assignments, independent studies, and easy access to large volume of information which inherently motivates the student to develop positive attitude towards learning. The researchers conceptualized that when students get information related to their course through their smartphones and create their own knowledge as well as interact with classmates via communication Apps, they gain a new form of experience that self-motivates them to become positive towards learning.

In contrast, those who do not use smartphone in their studies may develop negative attitude towards learning which could ultimately have consequences on their academic performance. This may be due to late

completion and submission of assignments, dependent on others for studies and less access to large volume of information. Such category of students mostly is not privy to information regarding their course given through communication Apps. They are also not able to timely seek for help regarding their course until they physically meet their colleagues. It is posited that late completion and submission of assignments, dependent on others for studies and less access to large volume of information serve to demotivate them and create negative attitude towards learning.
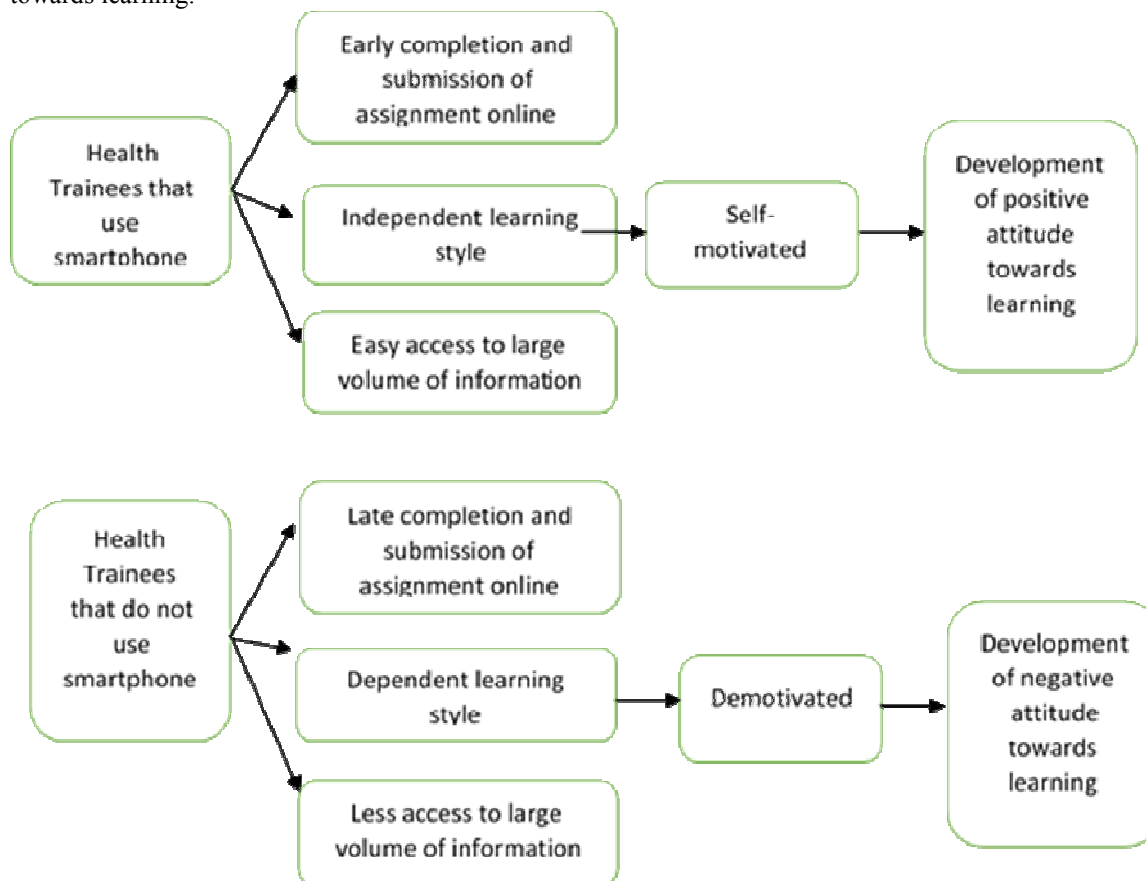

Figure 1: Interactions of variables leading to the development of positive and negative attitude towards learning.

3. Methodology

A descriptive cross sectional study design was adopted in this study. The study population comprised of 90 smartphone users and 48 non-smartphone users who were health trainees. Questionnaire was used to collect data from study participants. It was divided into three parts namely the demographic data, attitude towards learning and finally the third section was captioned barriers to smartphone usage. All the sections were developed on a four point Likert-type scale of "strongly disagree (1)", "disagree (2)", "agree (3)", and "strongly agree (4)". Non-probability convenience sampling method was used in selecting College of Health as the setting for the research. Due to varied groupings of students as a result of the academic level, the stratified sampling method was used to select these groupings. Afterwards, systematic sampling technique was adopted in selecting study participants from each group.

Five-member team, comprising of the principal researchers and one data collection assistant, was recruited for the study. The data collection assistant was given the required orientation to be able to play his part in the research. Afterwards, written and verbal consent was sought from the College of Health-Yamfo and individuals involved in the study. The five-member team then started with the data collection process. Both male and female respondents were requested to participate. Health trainees who met the inclusion criteria and volunteer to participate in the study were selected based on sampling technique employed in this research. They were then given the questionnaires to answer. The data collection assistant presented the questionnaires to the respondents. Each respondent was given a questionnaire and asked to freely express his or her views in writing without any interference from anyone. Seating arrangements were such that closeness between respondents was excluded. This was done to avoid one participant from being influenced by another. Subsequently, data collected were analysed using Statistical Package for Social Sciences (SPSS) version 20.0.

4. Results

4.1.1 Demographic data

Finding has revealed that 138 health trainees were involved in the study, out of which 67.4 % were males and 32.6% females. The ages of the participants ranged from 18 to 30 years, with 18 years being the least age and 30 years also being the maximum age recorded in this study. The difference between the maximum age and the least age was 12 years. The average participants' age was 22 years. Hence the research involved only young adults. Study participants at the time of this study were from three different academic levels: level 100(32.6%); level 200(35.5%) and level 300(31.9%) studying various professional programmes such as Community Mental Health, Health Information Management, Nutrition and Physician Assistantship. In terms of smartphone usage, smartphone users (65.2%) were almost twice the population of non-smartphone users (34.8%). Finally, it was identified that health trainees used variety of smartphones brands such as Techno, Infinix, Samsung, Apple and others. Infinix smartphone brand (22.2%) was the highest identified brand followed by Techno (n=19, 21.1%).

4.1.2 Research question 1

Table 1: Attitude of smartphone users towards learning

Items	1 n(%)	2 n(%)	3 n(%)	4 n(%)	Mean	Std. D
I feel confident and enjoy using smartphone to learn	1(1.1)	4(4.4)	17(18.9)	68(75.6)	3.69	0.61
It is interesting using smartphone for my personal studies	1(1.1)	4(4.4)	20(22.2)	65(72.2)	3.66	0.62
I increase my participation in class discussion because of the use of smartphone	7(7.8)	9(10)	24(26.7)	50(55.6)	3.30	0.94
I feel disadvantage having to use smartphone in my courses	57(63.3)	19(21.1)	8(8.9)	6(6.7)	1.59	0.91
Smartphones help me to complete my assignments and submit them early	4(4.4)	7(7.8)	33(36.7)	46(51.1)	3.34	0.81
Use of smartphones makes me independent in my studies	8(8.9)	12(13.3)	26(28.9)	44(48.9)	3.18	0.98
I think smartphone is not useful for learning	29(32.2)	47(52.2)	7(7.8)	7(7.8)	1.91	0.84
I feel supported in my use of smartphone for learning	11(12.2)	12(13.3)	25(27.8)	42(46.7)	3.09	1.05
The challenge of using smartphone for learning is exciting	1(1.1)	7(7.8)	55(61.1)	27(30)	3.20	0.62
Smartphone usage in class will cause social rupture between lecturers and learners	39(43.3)	34(37.8)	13(14.4)	4(4.4)	1.80	0.85
I am able to access large volume of information on my smartphone quickly via the internet than my school library	-	-	25(27.5)	65(72.2)	3.72	0.45
I am able to ask for help quickly from friends at a different location through social media application on my smartphone	-	5(5.6)	42(46.7)	43(47.8)	3.42	0.60
Learning through the use of smartphone is a more flexible method of learning as it can be done anywhere, anytime.	-	-	35(38.9)	55(61.1)	3.61	0.49
Weighted average =3.04 (76%)						

Key: 1=strongly disagree; 2=disagree; 3=agree; 4= strongly agree.

Results from Table 1 indicated that the weighted average attitude score was 3.04 (76%), which is an indication of positive attitude towards learning. Health trainees who used smartphone in their learning activities also agreed with the following statements: that they are confident and enjoy using smartphone (mean =3.69); it is interesting using smartphone for my personal studies (Mean = 3.66); I increase my participation in class discussion because of the use of smartphone (mean = 3.30); Smartphones help me to complete my assignments and submit them early (mean = 3.34); Use of smartphones makes me independent in my studies (mean = 3.18); I am able to access large volume of information on my smartphone quickly via the internet than my school library (mean = 3.72); learning through the use of smartphone is a more flexible method of learning as it can be done anywhere, anytime (mean = 4.64).

4.1.3 Research question 2

Table 2: Attitude of non-smartphone users towards learning

Items	1 n (%)	2 n(%)	3 n(%)	4 n(%)	Mean	Std. D
I feel confident and enjoy using smartphone to learn	11(22.9)	37(77.1)	-	-	1.77	0.06
It is interesting using smartphone for my personal studies	29(60.4)	19(39.6)	-	-	1.40	0.07
I increase my participation in class discussion because of the use of smartphone	13(27.1)	18(37.5)	14(29.2)	3(6.2)	2.15	0.13
I feel disadvantage having to use smartphone in my courses	2(4.2)	4(8.3)	22(45.8)	20(45.8)	3.25	0.11
Smartphones help me to complete my assignments and submit them early	21(43.8)	19(39.6)	4(8.3)	4(8.3)	1.81	0.13
Use of smartphones makes me independent in my studies	20(41.7)	21(43.8)	2(4.2)	5(10.4)	1.83	0.13
I think smartphone is not useful for learning	-	-	26(54.2)	22(45.8)	3.46	0.07
I feel supported in my use of smartphone for learning	23(47.9)	25(52.1)	-	-	1.52	0.07
The challenge of using smartphone for learning is exciting	8(16.7)	15(31.2)	14(29.2)	11(22.9)	2.58	0.15
Smartphone usage in class will cause social rupture between lecturers and learners	-	6(12.5)	21(43.8)	21(43.8)	3.31	0.10
I am able to access large volume of information on my smartphone quickly via the internet than my school library	15(31.2)	21(43.8)	6(12.5)	6(12.5)	2.06	0.14
I am able to ask for help quickly from friends at a different location through social media application on my smartphone	16(33.3)	16(33.3)	7(14.6)	9(18.8)	2.19	0.16
Learning through the use of smartphone is a more flexible method of learning as it can be done anywhere, anytime.	15(31.2)	15(31.2)	9(18.8)	9(18.8)	2.25	0.16
Weighted average = 2.28 (57%)						

Key: 1=strongly disagree; 2=disagree; 3=agree; 4= strongly agree.

Results from Table 2 indicated that the weighted average attitude score was 2.28 (57%). This an indication of a negative attitude towards learning. Health trainees who are non-smartphone users strongly disagreed with the following statements: I feel confident and enjoy using smartphone to learn (mean = 1.77); Smartphones help me to complete my assignments and submit them early (mean = 1.81); Use of smartphones makes me independent in my studies (mean = 1.83); I feel supported in my use of smartphone for learning (mean = 1.52). They also disagreed with the statement that 'I am able to access large volume of information on my smartphone quickly via the internet than my school library' (mean = 2.06).

4.1.4 Research question 3

The following factors were identified in the research to be barriers to effective use of smartphone among smartphones users. These include: reading news on their smartphones when the lecturer is teaching; chatting through WhatsApp and other social media applications during lectures; and small smartphone screen size.

4.2 Discussion

4.2.1 Research question 1

The outcome of the study showed that health trainees who use smartphones in their learning activities develop positive attitude towards learning [weighted average attitude score is 3.04 (76%)]. This suggests that students using any brand of smartphones become confident in their approach to learning, access large volume of information quickly via the internet than school library and participate in class discussion. The use of smartphones was found to help health trainees complete their assignments and submit them early and become independent in their studies. Finally, learning was more flexible as it can be done anywhere. The culminate effect is that health trainees using smartphones in their learning activities become self-motivated and this form of intrinsic force is the edge that leads to the development of positive attitude towards learning. Similar finding was indicated by Koehler et al. (2012). In their study, it was found out that students had positive attitudes towards using medical applications on smartphones. They further explained that smartphones could play a more significant role within medical education. Students could access more information on medical conditions,

interact with friends and share information through their smartphone. Furthermore, the results of this study is also consistent with the finding from a study conducted by Adelore and Itasanmi (2016) to examine the effects of two information communication technology tools on learners' attitude towards learning in adult literacy programmes. The findings from the study suggested that adult learners have a positive attitude towards learning after being exposed to smartphone and laptop instructional tools (Weighted Average (WA) = 3.19). In terms of learners becoming independent in their learning activities as found by this study, the findings of Barrs (2011) also support the current study by explaining that smartphones also helps encourage learner autonomy by moving them away from reliance on the teacher and towards independence on one's own learning due to great accessibility to materials and resources and mobility by students.

4.2.2 Research question 2

It was revealed that health trainees who did not use smartphones in their learning activities had negative attitude towards learning (weighted average attitude score is 2.28 (57%). Specifically: it was also identified they were not confident; did not complete assignments, submitted assignments late; dependent on others during studies and did not access large volume of information via the internet. Though they may rely on other sources for information, the rate at which the information may get to them in regards to their academic life may be limited. This, therefore, suggests that health trainees who do not use smartphones turn to be demotivated and show less commitment to their studies. The findings of this study were inconsistent with that of Koehler et al (2012), which specified that medical students had positive attitudes towards using medical applications on smartphones.

4.2.3 Research question 3

Findings indicated that chatting through WhatsApp and other social media applications during lectures (mean score = 3.04) and small screen size (mean score = 3.14) were barriers to effective use of smartphone in learning activities. This suggests that WhatsApp application used by students could disrupt their attention during lecture time. Students could be tempted to reply WhatsApp messages during lecture time and also during their personal learning time. This distract their attention to vital points raised by their teachers in class. The finding of this research therefore is inconsistent with that of Bansal and Joshi (2014), which found out that that trainees identified WhatsApp mobile learning universal and useful in their studies. Aside that they also find it a co-operative learning experience and as a platform that increased their interactivity with their fellow colleagues and teachers. The difference in this finding may probably be due to self-discipline and setting of priority. However, the findings in this research agreed with what Alson and Misagal (2016) stated in their research that texting in classrooms disrupts learning and prevents students from paying attention to classroom lectures.

5. Conclusion

Health trainees that used smartphones in their learning activities indicated positive attitude towards their learning activities. The study pointed out that these students took their learning activities serious and were more likely to have good grades in the various courses. By using smartphones, these health trainees were able to access large volume of information regarding their courses via the internet; able to learn anywhere because of the flexibility of carrying smartphones along with them; develop confidence; participate in class discussion because they have information and were also able to do their assignment and submit them quickly to their teachers. These factors serve to lay the foundation for independence in their studies and prevent over reliance on their teachers. Through the use of smartphones, they are able to explore knowledge outside the classroom and create their own experiences which become much relevant during classroom learning. The end effect is an internal edge that intrinsically motivate them to become positive in their attitude towards learning. However, health trainees that do not use smartphones displayed negative attitude towards learning by scoring weighted average attitude score of 2.28. Since this category of health trainees does not access large volume of information using their smartphones they do not also have much facts and outside classroom experiences regarding their courses and feel reluctant to participant in class discussion. A feeling that lower their self-esteem and confidence level. These therefore become factors that lead to their demotivation and development of negative attitude towards learning.

Though this study posited that smartphone usage by health trainees could assist in development of positive attitude towards learning, it also found out that certain factors could hinder their effective usage. These include the use of social media communication applications such as WhatsApp in class whilst lecture is ongoing and the small size of smartphone screen. Most students attempted to use one or more form of communication applications on their smartphones during class periods which took their attention from the lesson. Thereby missing very important points and facts. The small size of smartphone screens also hinder effective reading and adequate volume of information display at a time as compare to computers. This may cause frustration to smartphone users and unnecessary consumption of study time.

5.2 Recommendations

Before implementing smartphones usage in the main stream, both students and their tutors must be well trained and educated on the barriers to effective use of smartphones for learning purposes. This is to enable effective use

of smartphones for educative purposes. College of Health and other health training institutions can get into partners with smartphone manufacturing companies to produce smartphones with the basic functionalities and large screen size optimised for reading and learning at affordable price for students. Further research is needed to ascertain whether there is significant difference between smartphone users and non-smartphone users in terms of attitude towards learning.

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